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PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Description of the Work.
   2. Work not in contract.
   3. Contractor’s use of premises.

B. The Project consists of the modification of two rooms at the AC Transit Bus Maintenance Facility in Emeryville, California, to accommodate safe maintenance activities on hydrogen vehicles in compliance with the Contract Documents and Prevailing Code requirements. A summary of the project scope is includes:
   1. Alarm System Modifications
      i. Installation of four manual pull stations, two in each bay at both the east and west exits.
      ii. Installation of six hydrogen combustible gas detectors, two in Room 125 and four in Room 126 to detect a hydrogen leak.
      iii. Installation four emergency beacons, two located outside on both the east and west ends of the Maintenance building, one in the doorway between Room 125 and Room 126 and one in the adjacent Room 129.

   2. HVAC and Venting Modifications
      i. Installation of four circulation fans mounted on the ground to provide ventilation in case of an emergency. There will be two fans in each room and each fan will have a combination motor starter circuit breaker, 2-speed, non-reversing, lo-hi 900/1,800 rpm. Each circulation fan starters shall have a high/low speed control switch.
      ii. Twelve inch diameter ventilation ducting will be installed from each fan to the ceiling. A distribution manifold will automatically distribute increased ventilation in the event that a hydrogen gas leak is detected.
      iii. Four inch diameter vents will be installed along the length of each room along with a 24 inch vent extension and cap. The vents will be installed between each stem of the precast tees. A connection plate with anchors, insulation and sealant, flashing and rubber boots will provide the support and sealant of each vent.

   3. Electrical Modifications
      i. Replace the motors on the roll up doors to comply with Class 1, Div 2, Group B.
ii. Replace existing conduit with rigid galvanized steel (RGS) within the classified area. Seals shall be required within 18" of wall penetration.

iii. Existing lighting will be replaced with new Class 1, Div 2, Group B compliant lighting. Existing emergency lighting will be relocated to the non-classified area.

iv. Fire alarm horns/strobes, public address, cameras, time clock equipment, and electrical outlets will be relocated to the non-classified area.

4. Equipment Modifications

i. A one ton bridge crane will be installed in the East end of Room 126 to service the buses.

ii. Removal of the existing dynamometer and all its components from Room 126. Steel cover plates with grating will replace the dynamometer.

5. Provisioning of Portable Equipment (Non-Construction)

i. A portable mobile working platform will be provided as a stand-alone equipment (not part of the construction).

C. AC Transit shall apply and pay for any City Building Permits. Contractor is responsible for pulling the permit and providing the AHJ with all required insurance and license information. Contractor shall call for all required inspections and maintain the active permit on site throughout the duration of the work.

1.2 WORK NOT IN CONTRACT

A. The following will be provided by the Owner under separate contracts:

1. Tests and inspections specified to be provided by the Owner in the Contract Documents.

2. Items noted NIC (Not In Contract) on the Drawings or in the Specifications.

1.3 CONTRACTOR'S USE OF PREMISES

A. General:

1. During the construction period the Contractor shall have partial use of the premises for construction operations, including partial use of the site for staging, field offices and storage sheds.

2. The Owner's right to perform construction operations with its own forces and to employ separate contractors on portions of the Project limits the Contractor's use of the premises and the site.

3. Allow Owner access to maintain and operate temporary and existing facilities.

4. Permit unimpeded access by fire fighting or rescue equipment.

5. Access to and egress from construction site shall be in strict conformance to prearranged routes approved by the Owner, with the understanding that curtailment of traffic or revision of access routes may be required on short notice if the Owner's operations mandate such changes because of excessive noise, or problems with safety, service, or supply.
B. Partial Owner's occupancy: The Owner reserves the right to place and install equipment in areas of the Project prior to Substantial Completion provided that it doesn't interfere with the normal completion of the Work. This partial occupancy shall not constitute acceptance of the Work.

1.4 SPECIFICATION LANGUAGE AND INTERPRETATION

A. Gender: Whenever the context of the Contract Documents require, the neuter gender includes the feminine and masculine, the masculine gender includes the feminine and neuter, the singular number includes the plural, and the plural includes the singular.

B. Definitions: In addition to other definitions included in these Specifications, the following applies to the Work:

1. **Approved, approved equal, or equal**, mean as approved and accepted by the Owner’s Representative and Owner as defined in the General Conditions and Section 01 2513 of the Specifications.

2. **As necessary** means essential to the completion of the Work.

3. **As required** means as required by the Contract Documents.

4. **As selected, as approved, as directed** or words of similar import mean as selected by, as approved by, or as accepted by the Owner’s Representative. No implied meaning shall be interpreted to extend the Owner's Representative's responsibility into the Contractor’s area of Contractor's supervision.

5. **As shown, as detailed, as indicated** and words of similar import mean as indicated on the Drawings.

6. **Basis of Design**: Product/material selection by the Owner’s Representative.

7. **Building Department and Authorities Having Jurisdiction**: All agencies, individually or collectively, charged by statute with administration/enforcement of the requirements of the Building Code at the Project location.

8. **Computer Data Base** means the digital computer data issued by the Owner’s Representative as a part of the Contract Documents, including 2-dimensional and 3-dimensional computer model, and drawing files in CAD format.

9. **Concealed** means embedded in masonry, concrete or other construction, installed within furred spaces, within a wall/partitions or above suspended ceilings, in trenches, in crawl spaces, or in enclosures.

10. **Division** means Division of these Specifications except where the obvious intent is the act or process of dividing. **Divisions** are groups of related Sections.

11. **Equipment** means a product with operational parts, whether motorized or manually operated, that requires service connections such as wiring or piping. This definition is in addition to definition in the General Conditions.

12. **Exposed** means not installed underground or concealed as defined above.

13. **Exterior** means a space that does not meet the definition for "interior" below.

14. **Fabricated** means items specifically assembled or made out of selected materials to meet individual design requirements for the Project.
15. **Factory Finished/Prefinished** means finished under controlled environmental conditions off site, and requiring no additional finish, except for touchup, at the Project site.

16. **Furnish** (materials) means to supply and deliver to the Project ready for installation and in operable condition.

17. **Include/including** means inclusion without limitation.

18. **Install** (services or labor) means to place in final position, complete, anchored, connected, and in operable condition.

19. **Installer** means the Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

20. **Interior** means a space completely enclosed by walls, solid door(s), floor and ceiling.

21. **Manufactured** applies to standard units usually mass-produced.

22. **Manufacturer's directions, instructions, recommendations, specifications** means manufacturer's written directions, instruction, recommendations, specifications.

23. **Match** means providing a portion of the Work using the same product, technique, sequence, dimensions, finishes, color, texture, and degree of craftsmanship as (a) another portion of the Work, (b) existing conditions adjacent to the new portion of the Work, (c) as an approved sample, range of samples, or mockup or sample panel, or (d) as a control sample in the Owner's or Owner's Representative's possession.

24. **Materials** are products substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.

25. **Named products** are items identified by manufacturer's product name, including make or model designation, indicated in the manufacturer's published product literature current as of the date of the Contract Documents.

26. **Product(s)** means new materials, machinery, components, systems, fixtures, equipment, and terms of similar intent.

27. **Provide** means to supply, fabricate, deliver, place, and connect, complete in-place, ready for operation and use. When neither furnish, install nor provide is stated, provide is implied.

28. **Section** means Section of these Specifications, except where the obvious intent is one of several components, a piece. **Section** is usually a basic unit of Work.

29. **Shall** is mandatory.

30. **Similar** means a portion of the Work that matches the whole or part of another portion of the Work but has a different geometric configuration.

31. **Submit, submittal, submission** mean submit to the Owner's Representative for review, unless otherwise stated.

32. **Symmetrical** means a portion of the Work which matches adjacent work, or itself, but reversed about centerline(s) or the axis of a surface or a space.
C. Titling and arrangements:

1. Article, Paragraph, and subparagraph titles and other identifications of subject matter in the Specifications are intended as an aid in locating and recognizing various requirements in the beginning words of a sentence or where the title establishes the subject, the titles are subordinate to and do not define, limit, or otherwise restrict the Specification text.

2. Underlining, bolding or capitalizing of words in the text does not signify or mean that such words convey special or unusual meaning.

3. Specification text shall govern over titling and shall be understood to be and interpreted as a whole.

4. The order of articles, paragraphs, subparagraphs, and sub-subparagraphs in the Specifications text is defined by the sequence of indentations.

D. Interpretation:

1. Unless otherwise stated, technical words and abbreviations contained in the Contract Documents are used in accordance with commonly understood construction industry meanings; and non-technical words and abbreviations are used in accordance with their commonly understood meanings.

2. The Contract Documents may omit modifying words such as "all" and "any," and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

3. The use of the word "including," when following any general statement, shall not be construed to limit such statement to specific items or matters, whether or not non-limiting language (such as "without limitation," "but not limited to," or words of similar import) is used with reference thereto, but rather shall be deemed to refer to all other items or matters that could reasonably fall within the broadest possible scope of such general statement.

4. Whenever the context so requires, the use of the singular number shall be deemed to include the plural and vice versa.

5. The captions and headings of the various subdivisions of the Contract Documents are intended only as a matter of reference and convenience and in no way define, limit, or prescribe the scope or intent of the Contract Documents or any subdivision thereof.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements governing the Contractor's selection of products for use in the Project.

1.2 STANDARDS

A. Division 01 for applicability of industry standards to product specified.

1.3 GENERAL REQUIREMENTS

A. In agreeing to the terms and conditions of the Contract the Contractor has accepted the responsibility to schedule and verify that the specified products will be available when needed to comply with the accepted construction schedule, and to place orders for all required materials in timely manner to meet the accepted construction schedule, without delay in the Work.

1. Exceptions to the above are specified below.

B. It is the intent of the Contract Documents that products incorporated into the Project comply with the Contract Documents and the following:

   1. New and undamaged.
   2. Best of their respective kind.
   3. Furnished in a timely manner, in ample quantities to facilitate proper and timely execution of the Work.
   4. Of one manufacturer for each specific purpose, insofar as practicable.
   5. 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.
   6. Wherever possible of types that have been produced and used successfully in similar situations on other projects.

1.4 CONTRACTOR'S OPTIONS

A. Product selection is governed by the Contract Documents and governing regulations. Procedures governing product selection include the following.

B. When both the specified process and the guarantee of the results are specified, the Contractor shall, if in its judgment the process may not produce the required result, offer for review an alternative process that he would guarantee.

C. Where catalog numbers and specific brands or trade names not followed by the designation "or equal" are used in conjunction with material or equipment required by the Specifications, no substitutions will be approved.
D. For products specified only by reference standards, select any product meeting standards, by any manufacturer.

E. Where more than one manufacturer's product is specified, the first-named product is the basis for the design used in the Work and the use of alternative-name manufacturers' products or substitutes may require modifications in that design.

1. If such alternatives are proposed by Contractor and are approved by the Owner and Owner's Representative, Contractor shall assume all costs required to make necessary revisions and modifications to the design, including additional costs to Owner for evaluation of revisions and modifications of the design resulting from the substitutions submitted by Contractor to Owner's Representative.

F. For products specified by naming one or more products, but indicating the option of selecting equivalent products by stating "or equal," "equal to," "or approved equal," "equivalent to" before or after specified product, submit a request, as required for substitution, for any product not specifically named.

G. Where Specifications require matching an established sample or samples of a given color range, the Owner's Representative's decision will be final on whether or not a proposed product matches satisfactorily.

1. Where no visual match can be satisfactorily made, in the Owner's Representative's opinion, even though the product selected conforms to other specified requirements, comply with provisions of the Contract Documents concerning "substitutions" for selection of a matching product in another product category, or for non-compliance with specified requirements. Owner's Representative may reject products based solely on lack of visual match.

2. Where specified product requirements include the phrase "as selected from manufacturer's palette..." or "as selected from manufacturer's standard colors, patterns, textures..." or similar wording, the Owner's Representative will select the color, pattern and texture from the product line selected.

1.5 SUBSTITUTIONS

A. The Owner and Owner’s Representative will consider formal requests from the Contractor for substitution of products and processes in lieu of those specified only under one or more of the following circumstances:

1. When the Contractor ascertains that the specified product is not available. Proof shall be submitted that firm orders were placed in a timely manner or that the unavailability is due to strike, lockout, bankruptcy, discontinuance of manufacture, or an act of God.

2. When, in the opinion of the Contractor, the product or process will not fulfill the design intent.

B. Submit requests for substitutions by email to Owner’s representative and copy to the Owner’s Project Manager; include in request:

1. Reason for request.

2. Complete data substantiating compliance of proposed substitution with Contract Documents.

3. For products:
a. Product identification, including manufacturer's name and address.

b. Manufacturer's literature, including product description, performance and test data, and reference standards.

c. Samples.

d. Name and address of similar projects on which product was used, and date of their installation.

4. For construction methods:

a. Detailed description of proposed method.

b. Drawings illustrating methods.

5. Itemized comparison of proposed substitution with product or method specified.

6. Data relating to changes in construction schedule.

7. Accurate cost data on proposed substitution in comparison with product or method specified.

8. Approval from Authorities having jurisdiction of product submitted for substitution. Approval may be in the form of a research report, test report or other form acceptable to the Owner and Owner’s Representative.

C. In making request for substitution, Contractor represents:

1. Contractor has personally investigated proposed product or method, and determined that it is equal or superior in all respects to that specified.

2. Contractor will provide the same warranty for substitution of product or method specified.

3. Contractor will coordinate installation of accepted substitution into the Work, making such changes to adjacent materials as may be required for the Work to be complete in all respects without need for re-design of adjacent and supporting materials.

4. Contractor waives all claims for extension of time or time/sequence related consequences, and additional costs, that subsequently become apparent.

5. Cost data is complete and includes all related costs under Contractor's Contract, but excludes development and implementation costs which may be incurred by the Owner and Owner's Representative, and costs that affect separate contracts.

D. Substitutions will not be considered if:

1. They are indicated or implied on shop drawings or project data submittals without formal request submitted in compliance with the requirements of this Section. Make request for substitutions prior to the preparation of shop drawings, product data and samples; do not prepare shop drawings, product data and samples based on substitutions that have not been accepted by the Owner and Owner's Representative.

2. They are requested directly by a subcontractor or supplier.

3. Acceptance will require substantial revision of Contract Documents.
PART 2 - PRODUCTS

2.1 GENERAL

A. Certify that all materials incorporated into the Work are free from asbestos, radioactive waste, hazardous waste and any other material detrimental to human health, safety and conform to all codes for health, safety, ADA or environmental regulations and conform to the Specifications for the work.

B. Notify Owner, and request Owner's permission, before incorporating into the Project any materials specified by the Contract Documents which Contractor knows or has reason to know are contaminated by asbestos, radioactive waste, hazardous waste or any materials detrimental to human health and do not conform to all codes for health, safety, ADA or environmental regulations.

PART 3 - EXECUTION

NOT USED

END OF SECTION
Project: ________________________________

Location: ________________________________

Owner's Representative's project number: ________________________________

Substitution No. ___ (number consecutively)

**CONTRACTOR’S REQUEST AND SUBSTANTIATION**

1. This substitution is requested for the following reasons:

__________________________________________________________________

__________________________________________________________________

__________________________________________________________________

__________________________________________________________________

__________________________________________________________________

2. Section of specifications to which this request applies is ______________

3. In support of this request, product data for proposed substitution is attached, consisting of description of product or item, reference standards, and performance and test data, sample is attached, or sample will be sent if requested. (Cross out paragraphs not applicable).

4. Following is itemized comparison of original product or item specified with proposed substitution:

<table>
<thead>
<tr>
<th>Original</th>
<th>Substitution</th>
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<tbody>
<tr>
<td>Name or brand</td>
<td></td>
</tr>
<tr>
<td>Manufacturer</td>
<td></td>
</tr>
<tr>
<td>Catalog/Model No.</td>
<td></td>
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<tr>
<td>Significant variations</td>
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__________________________________________________________________

AC TRANSIT - EMERYVILLE
MAINTENANCE BAY UPGRADE PROJECT
EPC PROJECT NO. 1410-AC-13

SUBSTITUTION REQUEST FORM

01 2514-1
7/29/15
5. □ Unit costs, for product or item only, □ Product or item furnished and installed (*check one*) are as follows:

Original product or item: $_________ Per __________________________

Substitution: $_________ Per __________________________

6. Proposed credit to Owner for this substitution: $ __________________________

7. Effects of the proposed substitution on other parts of the work, or on separate contracts, are described as follows. This list is all inclusive:

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

8. The proposed substitution will □ will not □ (*check one*) affect dimensions shown on the drawings.

9. The undersigned, having thoroughly investigated the proposed substitution, hereby states that he (a) believes that it is equal or superior in all respects to the originally specified product except for the variations described in article 2, above, (b) will provide the same warranty or warranties as specified, (c) has included all cost data and cost implications of the proposed substitution, (d) will pay redesign and special inspection costs caused by the use of this substitution, (e) will reimburse separate contractors for additional costs caused by the use of this substitution, (f) will coordinate the incorporation of the proposed substitution in the work, (g) will modify other parts of the work as may be necessary and as approved by the Owner's Representative to make all parts of the work complete and functioning, (h) affirms that maintenance and service parts will be locally available for the proposed substitution, and (h) will waive future claims for added cost(s) to any party caused by the proposed substitution.

Contractor __________________________ Date __________________________

Contractor's signatory __________________________

Title __________________________

OWNER'S REPRESENTATIVE'S REVIEW AND ACTION

□ Furnish additional information in the following categories and resubmit:

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

□ Sign contractor's statement of conformance and resubmit.
☐ The proposed substitution is approved subject to the following conditions:

__________________________________________________________________________________________________

__________________________________________________________________________________________________

☐ A change order reflecting a deduction from the contract sum in the amount of
$________________________ Will be issued.

Owner’s Representative’s signature ____________________________

Date ____________________________

END OF DOCUMENT
PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general requirements for Contractor’s Requests for Information (RFI).
   1. Procedure for shop drawings, product data and samples submittals are specified in accordance with Section 01 3323.
   2. Procedure for substitutions are specified in accordance Section 01 2513.

1.2 CONTRACTOR’S REQUESTS FOR INFORMATION

A. Submit a Request for Information to the Owner’s Representative when:
   1. An unforeseen condition or constructibility question occurs.
   2. Questions regarding information in the Contract Documents arise.
   3. Information not found in the Contract Documents is required.

B. When possible, request such clarification either verbally or in writing at the next scheduled Project meeting.
   1. When the RFI is answered at the Project meeting, number the RFI and enter the response into the meeting minutes.
   2. When the urgency of the need, or the complexity of the item makes clarification at the next scheduled Project meeting impractical, prepare and submit a formal written RFI to the Owner’s Representative without delay.

C. RFI received directly from a subcontractor will be returned to the Contractor unprocessed.

1.3 SUBMITTAL

A. Submit RFIs within a reasonable time frame so as not to interfere with, or impede the progress of the Work.
   1. Keep the number of RFIs to a minimum.
   2. When the number and frequency of RFIs submitted becomes unwieldy, the Owner’s Representative may require the Contractor to abandon the process and submit requests as either submittals, substitutions, or requests for change.
   3. When an answer to an RFI has an effect on cost or time, notify the Owner’s Representative in accordance with the Contract Documents when the RFI is received. Notification shall occur prior to commencing such work, so that the change order process can be initiated.
   4. When submitting an RFI, alert the Owner’s Representative, in writing, to the time available before the response will cause an impact to the Project.
B. When submitted in writing, submit the RFI as follows:

1. Submit a legible written request (email and FAX are acceptable) on a standard CSI or AIA preprinted form or another form approved in advance by the Owner’s Representative. Include the following information:

   a. Project name, as listed on the Contract Documents, Owner’s Representative’s project number or other identifying number, if any.
   
   b. Date.
   
   c. Name, address, telephone and FAX numbers of the Contractor.
   
   d. Number and title of affected Specification Section or Sections.
   
   e. Drawing numbers and detail references, as appropriate.
   
   f. Clear, concise explanation of information or clarification requested.
   
   g. Blank, lined spaces for Owner’s Representative’s written response.

C. Each page of each attachment to the RFI shall bear the RFI number in the lower right corner.

D. Number submitted RFI’S consecutively.

E. Sign and stamp all RFI forms. RFI from subcontractors or material suppliers shall be submitted through, and be reviewed by the Contractor prior to submittal to the Owner’s Representative.

F. Unanswered RFI will be returned with a stamp or notation "NOT REVIEWED".

G. Prepare and maintain an RFI log. Update on a weekly basis. Log RFI number, brief description of content or subject discussed, date submitted, and date answered. Keep log current and furnish copy when so requested by the Owner’s Representative.

H. Allow a minimum of 5 working days for review and response time; the response time will be increased if more information is required, when the RFI is submitted out-of-sequence, or if in the opinion of the Owner’s Representative, more time is needed to answer the RFI.

1.4 QUALITY ASSURANCE

A. Carefully study the Contract Documents to assure that the requested information is not available therein.

1. RFI which requests information available in the Contract Documents may not be answered by the Owner’s Representative.

2. Before submitting RFI to the Owner’s Representative, verify that the information requested is not indicated in the Contract Documents, or cannot be determined from a careful review of same.

B. In all cases where a RFI is issued to request clarification of coordination issues, for example, pipe and duct routing, clearances, specific locations of work shown diagrammatically, and similar items, the Contractor shall fully lay-out a suggested solution using drawings or sketches drawn to scale, and submit same with the RFI. RFI which fails to include a suggested solution will not be answered.
C. Do not use RFI for the following purpose:

1. To request approval of submittals.

2. To request approval of substitutions.

3. To request changes to the Contract Documents and to confirm action taken by the Contractor for requested changes/substitutions to the Contract Documents.

D. If the Contractor believes that a clarification by the Owner’s Representative may result in a change in Contract price, the Contractor shall not proceed with the work indicated by the RFI until a Change Order or other acceptable tracking device is prepared and approved.

1. If the Contractor believes that a clarification by the Owner’s Representative results in additional cost, the Contractor shall identify in the RFI the basis of the Contractor’s bid as it relates to the RFI.

2. Answered RFI shall not be construed as approval to perform extra work.
PART 1 - GENERAL

1.1 SUMMARY
   A. Section includes Contractor’s responsibility for Project coordination.

1.2 DUTIES OF CONTRACTOR - GENERAL
   A. Coordinate the work of all subcontractors and with AC Transit.
   B. Establish lines of authority and communication. Schedule and conduct progress meetings between Owner’s Representative and subcontractors.
   C. Verify that specified cleaning is done.
   D. Verify that subcontractors have obtained all permits required for inspections and temporary facilities.
   E. Administer processing of submittals (shop drawings, product data, samples, etc.).
   F. Assemble documentation for handling claims and disputes.
   G. Assemble as built drawings and data for the O&M Manual.

1.3 CONSTRUCTION SCHEDULES
   A. Prepare detailed schedule of operations of all subcontractors on the Project.
   B. Monitor schedules as Work progresses:
      1. Identify potential variances between scheduled and probable completion dates.
      2. Recommend adjustments in schedules to meet required completion date.
      3. Provide summary reports of each monitoring.
      4. Document all changes in schedule.
   C. Observe Work to monitor compliance with schedule.
      1. Verify that labor and equipment are adequate for the work being performed, and to maintain the schedule.
      2. Verify that product deliveries are adequate to maintain schedule.
      3. Report non-compliance to Owner’s Representative, with recommendation for remedy.

1.4 TEMPORARY FACILITIES
   A. Allocate space for temporary structures furnished by each subcontractor.
B. Monitor use of temporary facilities.

C. Verify that adequate services are provided to comply with requirements for work and climatic conditions.

D. Verify proper maintenance and operation of temporary facilities.

E. Administer traffic and parking controls.

1.5 COST CONTROL

A. Maintain cost accounting records for authorized work performed under unit costs, actual costs for labor and materials, and other work requiring accounting records.

B. Develop and implement procedure for reviewing and processing applications for progress and final payments. Submit recommendations to Owner’s Representative for certification to Owner for payment.

1.6 CHANGES

A. Review subcontractor's requests for changes and for substitutions; submit recommendations to Owner’s Representative.

B. Process change orders.

1.7 INTERPRETATIONS OF CONTRACT DOCUMENTS

A. Consult with Owner’s Representative to obtain interpretations.

B. Assist in resolution of questions that arise.

C. Transmit written interpretations to concerned parties.

1.8 COORDINATION DRAWINGS

A. For the work listed below, prepare coordination shop drawings using the latest version of AutoCAD or equivalent software. Each element of the work listed shall be included in its own layer (or layers) within the electronic file. Provide CD or DVD with these files for use by the Owner's Representative when so requested.

1. Lighting.

2. Fire alarm.

3. Power and controls, including,
B. Coordination drawings:

1. Employ a coordination engineer who shall be responsible for piping, fire protection, and electrical work and shall bear full responsibility for the correctness of the coordination drawings submitted to the Owner’s Representative for review.

2. Prepare transparencies, using AutoCAD, as the basis for coordination of work between plumbing, fire protection, process, lighting, special system, electrical power work and hydrogen gas piping and processing. The work of each of the referenced trades shall be incorporated into a single composite set of transparencies, and shall clearly indicate all interfaces, clearances, and related construction.

3. Prepare coordination drawings from the electronic files to a minimum scale of 1/4-inch to a foot (1:48) on tracing medium of the same size as the Contract Drawings. With these layouts, coordinate the work of other trades. Such detailed work shall be clearly identified on the coordination drawings as to the area to which it applies. Clearly show the work and its relation to the work of other trades, before commencing shop fabrication or erection in the field.
   a. Coordination drawings shall show information necessary to demonstrate that the work can be installed without interferences with other elements including, but not limited to, structural elements, finished construction, etc.
   b. Coordination drawings shall indicate hanger and anchorage locations.
   c. CAD backgrounds will be made available to the Contractor to facilitate the coordination drawings. However, this is intended to be a convenience only and the Contractor shall not rely on the accuracy of information contained within the electronic files. Contractor will not be provided with the Contract Drawings.
   d. The Contractor shall not scan images of the Contract Documents for use in producing the coordination drawings.
   e. Work shall not commence for the systems documented in the coordination drawings without submittal of fully executed coordination drawings.

4. Prepare layout drawings of system and assemblies, including, but not limited to, plumbing, hydrogen gas piping, special purpose systems, lighting systems, control systems, and electrical systems.

5. Provide layout drawings of the mechanical rooms, electrical equipment rooms, closets, busways, and underfloor conduits. Include dimensioned plans drawn to scale. Coordinate work with that of all trades/subcontracts.

6. Show elevations and sections indicating locations of equipment, piping, ductwork, drains, controls, conduits, and other items with reference to columns, walls, slabs, beams, and to components of other systems and assemblies.

C. Revisions: Revise and update shop drawing layouts for each trade in accordance with the coordination drawings prior to submittal to the Owner’s Representative.
D. Submittal:

1. Submit a copy of the mechanical and electrical coordination drawings to the Owner’s Representative no later than time of submittal of the individual trades’ shop drawing submittals. The individual trades’ shop drawings will not be reviewed without submission of the coordination drawings with a completely executed sign-off table.

2. The Contractor and each subcontractor for the above work shall certify by endorsement on the coordination drawings that they represent a complete and accurate record of the work to be executed.

1.9 AFTER MECHANICAL/ELECTRICAL COORDINATION DRAWINGS ARE COMPLETED, SUBCONTRACTORS SHALL DATE AND SIGN EACH COORDINATION DRAWING WITH THE UNDERSTANDING THAT THE SIGNATURE SIGNIFIES THAT THE WORK SHOWN THEREUPON HAS BEEN FULLY COORDINATED AND IS READY FOR CONSTRUCTION. MAINTAIN THE FOLLOWING AT SITE

A. Records:

1. Daily log of progress of work, available to Owner’s Representative and Owner. The log shall include photos taken every day to show equipment and people on site, in operation or idle and major activities in progress or completed. Photos shall be organized electronically by date and each photo shall be titled to indicate the subject displayed.


3. Contracts.

4. Purchases.

5. Materials and equipment records.

6. Applicable handbooks, codes and standards.

7. Shop drawing log.

8. Record documents.

9. Permits and test reports.

B. Deliver records to Owner at completion of Project.

1.10 START-UP

A. Direct the check out of utilities, systems and equipment.

B. Assist in initial start-up and testing.

C. Assist, and instruct when specified, the Owner's designated personnel in the operation, emergency repair and operation, and maintenance of utilities, systems and equipment.

D. Record dates of start of operation of systems and equipment.

E. Submit to Owner written notice of beginning of warranty period for equipment put into service.

AC TRANSIT - EMERYVILLE
MAINTENANCE BAY UPGRADE PROJECT
EPC PROJECT NO. 1410-AC-13

PROJECT COORDINATION
01 3113-4
7/29/15
1.11 SUBSTANTIAL COMPLETION

A. Upon determination of Substantial Completion of the Work, or portion thereof, prepare a list of incomplete or unsatisfactory items for the Owner's Representative's review.

B. Prior to Owner's Representative's certification of date of Substantial Completion, promptly make corrections noted on the list, and other corrections determined by the Owner's Representative, and complete defective and incomplete work.

1.12 FINAL COMPLETION

A. Upon determination that the Work is finally complete, submit written notice to Owner's Representative and Owner that Work is ready for final inspection and secure and transmit required closeout submittals to Owner's Representative.

B. Turn over to Owner items identified as "closeout submittals" in Divisions 2 through 41 of these Specifications and in Section 01 7700.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Scheduling and administration of progress meetings as follows:


3. Distribute written notice of agenda of regular scheduled and called meetings a minimum of 3 days in advance of meeting date.

4. Record minutes, include significant proceedings and decisions.

5. Distribute copies of minutes to participants, within 1 day after meetings. Furnish copy of minutes to the Owner’s Representative.

1.2 PRE-CONSTRUCTION MEETINGS

A. Schedule a meeting within 14 days after date of Notice to Proceed. As a minimum, preparation of the initial schedule, critical work sequence, and review and updating procedures shall be on the agenda.

1. Attendance:

a. Owner’s Representative and his consultants.

b. Major subcontractors.

c. Safety representative.

2. Minimum agenda:

a. Safety

b. Owner rules, regulations and procedures.

c. Distribute and discuss list of major subcontractors, and construction schedule updating frequency.

d. Insurance.

e. Critical work sequencing.

f. Designation of responsible personnel.

g. Procedure for progress payments, including handling of retainage, payments for materials on hand, and withholding of payment until shop drawings review is complete.

h. Restrictions to site use and access.
i. Temporary facilities.

j. Testing and inspections.

k. Surveys and layout.

l. Public relations; policies regarding statements to media, and other public related activities.

m. Proceeding of field decisions and Change Orders.


o. Shop drawing log. Submittal of shop drawings, product data and samples.

3. RFI log. Submittal of RFI.

a. Procedures for maintaining project record documents.

b. Use of premises, parking, office and storage areas.

c. Major equipment deliveries and priorities.

d. Safety and first-aid procedures, security procedures, and housekeeping procedures.

4. Minimum Contractor submittals:

a. Preliminary construction schedule.

b. Emergency telephone list.

1.3 PROGRESS MEETINGS

A. Thereafter schedule regular progress meetings weekly.

B. Meetings shall be held as job progress dictates, at construction office, or as indicated in notice.

C. Attendance:

1. General Contractor project manager.

2. General Contractor’s jobsite superintendent.

3. Owner’s Representative.

4. Owner’s Project Manager.

5. Subcontractors, as pertinent to agenda.
D. Minimum agenda:

1. Review, approve minutes of previous meeting and open action items.
2. Review work progress since last meeting.
3. Note field observations, problems and decisions.
4. Identify problems which impede planned progress.
5. Review any off-site fabrication problems.
6. Develop corrective measures and procedures to regain planned schedule.
7. Revise construction schedule as indicated.
8. Plan progress during next work period.
9. Review submittal schedules, expedite as required to maintain schedule.
11. Review any changes proposed for effect on construction schedule and completion date.
12. Complete other current business.

1.4 DAILY TOOL BOX SAFETY MEETINGS

A. Contractor shall hold a Daily Safety Meeting on site with all craft workers. All attendees must sign an attendance sheet. Workers not present at this meeting shall not be permitted to work that day. The sign in sheet shall also be filled in to document topics covered, in general. A copy of the meeting record shall be provided to the Owner’s representative within an hour of the daily start time.

B. Agenda shall include all activities planned for that day, such as bus travel routes, deliveries, pours, lifts, hot work or welding, open excavations, energizing circuits, or elevated work. All workers must be informed of activities that could result in surprise or pose danger so that they can keep themselves safe. All workers shall be given the opportunity to express any concerns they have regarding safety of themselves or others and these concerns should be addressed.

C. Agenda will always include at least one topic of general interest – such as trips and falls, PPE, job safety rules, or weather related concerns which will be recorded in the meeting record.

D. No smoking will be allowed on site.

1.5 REVISIONS TO PUBLISHED MINUTES

A. Unless published minutes are challenged in writing prior to the next regularly scheduled progress meeting, they will be accepted as properly stating the activities and decisions of the meeting.

B. Persons challenging published minutes shall reproduce and distribute copies of the challenge to all indicated recipients of the particular set of minutes.
C. Challenge to minutes shall be settled as priority portions of "old business" at the next regularly scheduled meeting.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Prepare network analysis system using the Critical Path Method to assure adequate planning and execution of the Work so that the Work is completed within the respective number of calendar days allotted in the Contract, and to assist the Owner’s Representative in appraising the feasibility of the proposed schedule and evaluating the Progress of the Work.

1.2 QUALITY ASSURANCE

A. Network analyst's qualifications: Individuals(s) thoroughly trained and experienced in compiling construction schedule data and analyzing by use of the Critical Path Method.


C. Submittal and resubmittal procedures: In accordance with Section 01 3323.

D. Preliminary network analysis: Within 10 days after receipt of the Notice to Proceed, submit 4 prints and electronic copy of a preliminary network analysis prepared in compliance with Article 1.3 below.

E. Network analysis: Within 30 days after receipt of Notice to Proceed, submit one reproducible and 4 prints of the network analysis prepared in compliance with Article 1.3 below.

F. Revised analyses: Within 10 days after receipt of the Owner’s Representative's review comments, submit 4 prints and electronic copy of the network analysis revised in compliance with those comments.

G. Periodic reports: On the first working day of each month following submittal of the above revised analysis, submit 4 prints of analysis and 7 prints of sort number 3 (see paragraph 1.3, C, 3 below), updated in compliance with this Section.

1.3 NETWORK ANALYSIS

A. Diagram: Graphically show the order and interdependence of all activities necessary to complete the Work, and the sequence in which each such activity is to be accomplished, as planned by the Contractor and his project field superintendent in coordination with all subcontractors whose work is shown on the diagram. Activities shown on the diagram shall include, but are not necessarily limited to the following.

1. Project mobilization.

2. Submittal and approval of product data, shop drawings and samples.

3. Procurement of equipment and critical materials.
4. Projected delivery dates of all materials.

5. Activities of all Contractors.

6. Fabrication of special material and equipment, and their installation and testing.

7. Projected dates of required inspections and approvals.

8. Final cleanup.

9. Final inspection and testing.

10. All activities of the Owner which may affect progress and/or affect required dates for completion of all or part of the Work.

B. The detail of information shall be such that duration times of activities will normally range from 1 - 15 days.

1. The selection and number of activities shall be subject to the Owner’s Representative’s approval. Show on the diagram, as a minimum for each activity, preceding and following event numbers, description of each activity, cost, and activity duration in calendar days.

2. Submit diagram in color on a sheet size 24-inch high x 36 inch width required.

C. Mathematical analysis: Furnish the mathematical analysis of the network diagram by computer printout, including a tabulation of each activity. Show the following information as a minimum for each activity.

1. Preceding and following event numbers.

2. Activity description.

3. Estimated duration of activities.

4. Earliest start date (by calendar date).

5. Earliest finish date (by calendar date).

6. Latest start date (by calendar date).

7. Latest finish date (by calendar date).

8. Slack or float (in calendar day).

9. Monetary value of the activity.

10. Percentage of activity completed.

11. Contractor’s earnings based on portion of activity completed.

D. The means used in taking the mathematical computation shall be capable of compiling the total value of completed and partially completed activities and be capable of accepting modifications approved for time and logic adjustments.
E. Computer printout: In the computer printout, list the activities in sorts as follows.

1. By the preceding event number from lowest to highest and then in the order of the following event number.

2. By the amount of float then in order of preceding event numbers, and then in order of succeeding event numbers.

3. In order of preceding event numbers, and then in order of succeeding event numbers.
   Show the total dollar amount and dollars spent to date for each activity.

4. All other sorts requested by the Owner’s Representative.

F. The schedule shall be coordinated with the Schedule of Values per the General Conditions.

PART 2 - PRODUCTS

USE MS PROJECT, PRIMAVERA OR OTHER APPROVED CPM SCHEDULING SOFTWARE.

PART 3 - EXECUTION

3.1 PERIODIC REPORTS

A. Contents:

1. Report actual progress by updating the mathematical analysis.

2. Note on the summary network or clearly show on a revised issue of affected portions of the detailed network revisions causing changes in the detailed network.

3. Revise the summary network as necessary for clarity.

4. Activities or portions of activities completed during the reporting period and their total value.

5. State the percentage of the Work actually completed and scheduled as of the report date and the progress along the critical path in terms of days ahead of, or behind the allowable dates.

6. If the Project is behind schedule, also report progress along other paths with negative slack.

7. Include a narrative report which shall, but is not necessarily limited to; a description of the problem areas, current and anticipated delaying factors and their impact; and an explanation of corrective actions taken or proposed.

8. Show the date of latest revision.

B. Submittal: Submit in accordance with paragraph above.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. A requirement for submittal of shop drawings, product data, samples and other submittals so specified below.

B. In addition to other requirements of the Contract Documents pertaining to submittals, submit shop drawings, product data, samples, and similar submittals required by the Contract Documents for the Owner's Representative's review before proceeding with the work affected by these submittals.

C. Submittals made by the Contractor to the Owner's Representative that are not required by the Contract Documents may be returned without review.

D. Do not perform any portion of the Work requiring submittal and review of shop drawings, product data and samples, and similar submittals required by the Contract Documents, until the Owner's Representative has approved the respective submittal. Such work shall be in compliance with the approved submittals.

E. Related work:

1. Section 01 3216 for construction schedules.
2. Section 01 7700 for closeout submittals.
3. Section 01 7839 for record documents.

1.2 SCHEDULING

A. Designate in construction schedule, specified in Section 01 3216, dates for submittal and suggested dates when approved shop drawings, product data and samples are expected to be returned by the Owner's Representative.

1.3 LOG

A. Prepare, and update on a regular basis, a shop drawing log using AIA Form G712, or similar form acceptable to the Owner's Representative, listing all the required shop drawings by reference to Specification Section number and their submittal date coordinated with the construction schedule.

1.4 DEFINITIONS

A. The terms "shop drawings" and "product data" as used herein also include, but are not limited to, fabrication, erection, layout and setting drawings, manufacturers' standard drawings, descriptive literature, catalogues, brochures, performance and test data, wiring and control diagrams, all other drawings and descriptive data pertaining to materials, equipment, piping, duct and conduit systems, and methods of construction as may be required to show that the materials, equipment, or systems and the positions thereof conform to the Contract Documents.
1. Shop drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

2. Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

3. Product data are illustrations, schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

1.5 SUBMITTALS

A. Prior to the first submittal, submit for review the proposed submittal transmittal form and an impression of the Contractor's approval stamp or signature block to be used on submittals.

1.6 SHOP DRAWINGS

A. Identify details by reference to sheet and detail numbers shown on the Drawings.

B. Shop drawings shall show in detail, materials, dimensions, including thickness, methods of assembly, attachments, relation to adjoining work, and all other pertinent data and information.

C. Shop drawings with the notation "VERIFY DIMENSIONS" will not be reviewed.

D. Prepare composite shop drawings and installation layout drawings, where required, to depict proposed solutions for tight or critical field conditions. These composite shop drawings or installation layout drawings shall be coordinated by the Contractor and subcontractors for proper relationship with the work of all other trades based on field conditions.

1.7 PRODUCT DATA

A. Manufacturer standard schematic drawings:

1. Modify drawings to delete information not applicable to Project.

2. Supplement standard information to provide additional information applicable to Project.

B. Manufacturer catalog sheets, brochures, diagrams, schedules, performance charts, illustrations and other standard descriptive data.

1. Clearly mark each copy to identify pertinent materials, products or models.

2. Show dimensions and clearances required.

3. Show performance characteristics and capacities.

4. Show complete wiring diagrams and controls.
1.8 SAMPLES

A. Unless otherwise specified, submit samples of sufficient size and quantity to clearly illustrate characteristics of product or material, and full range of colors and/or texture. Whenever possible provide color and texture samples on product specified.

B. Label each sample to indicate the Project name, Contractor, manufacturer, brand, quarry, job number, color, type, and similar required information. Label shall be solidly attached or adhered to the samples; samples received without labels will be returned without action.

C. Erect field samples and mockups at Project site, unless specified otherwise, in locations acceptable to the Owner’s Representative. Construct each sample or mockup complete, including work of all trades required in finished work.

1.9 STRUCTURAL CALCULATIONS

A. Where required by the Contract Documents, submit calculations signed and sealed by a California-licensed civil or structural engineer for the material or assembly specified to demonstrate compliance with provisions of the Contract Documents and Code.

1.10 TEMPORARY FACILITIES AND CONTROLS

A. Submittals for temporary facilities and controls, when made to the Owner’s Representative, are for information only and will not be returned.

1.11 CERTIFICATES AND AFFIDAVITS

A. Statements made by the Contractor, subcontractor, manufacturer, supplier, fabricator, or distributor to certify that certain requirements of the Specifications have been met.

B. Review certificates before submitting to Owner’s Representative, to ensure that the affidavit is properly worded and signed.

C. Each certificate shall be signed by an official authorized to certify on behalf of the Contractor, subcontractor, manufacturer, supplier, fabricator, or distributor of the and shall contain the name and address of the Contractor, the Project name and location, reference to products, systems, shop drawings, and product data, and the quantity and date or dates of shipment or delivery to which the certificates apply.

1. Copies of laboratory test reports submitted with certificates shall contain the name and address of the testing laboratory and the dates of tests to which the report applies.

D. Certification shall not relieve the Contractor from providing satisfactory material if, after tests are performed on selection samples, the material is found not to meet the specified requirements.

1.12 SUBMITTAL REQUIREMENTS

A. Submittals dates shall be staggered to correspond to the chronological sequence of construction. Early submittals for products or assemblies, such as finishes, unless they affect the critical path, will not be reviewed and will be returned to the Contractor for later re-submittal.

B. Submittals not in compliance with the milestone dates accepted by the Owner’s Representative in the construction and submittal schedule (out-of-sequence submittals), will not be reviewed and will be returned to the Contractor.
C. Review, approve, and submit shop drawings, product data and samples, and similar submittals required by the Contract Documents, to the Owner’s Representative with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors, and to allow Owner’s Representative ample time for review before the date approved submittals will be needed to maintain construction schedule. Contractor shall allow 10 full working days for Owner’s Representative to review and return submittals; additional time may be required for certain submittal items.

D. Submit 3 prints of shop drawings, and number of copies of project data that Contractor requires for distribution, plus 3 copies, which will be retained by Owner’s Representative. Electronic (email) submission is acceptable but must be documented in the log.

E. Submit 3 samples, unless specified otherwise. By pre-arrangement with the Owner’s Representative, or where so specified, submit a single sample for review; this sample, when approved, shall be installed in the Work where it can easily be referenced for future comparison with work of the same kind.

F. Submit 3 copies of structural calculations, bound in sequence.

G. Accompany submittals with transmittal letter, in duplicate, containing the following information. Number all submittals, and the accompanying transmittal, sequentially.
   1. Date.
   2. Project title and number.
   3. Contractor name and address.
   4. The number of each shop drawing, product data and sample submitted.
   6. Other pertinent data.

H. Normally a separate transmittal form shall be used for each specific item or class of material or equipment for which a submittal is required.
   1. Transmittal of a submittal for more than one item using a single transmittal form will be permitted only when the items taken together constitute a manufacturer “package” or are so functionally related that expediency indicates a review of the group or package as a whole.
   2. Collate multiple-page submittal into sets and staple or bind each set as appropriate prior to transmittal to the Owner’s Representative.

I. Submittals shall include the following:
   1. Date and revision number.
   2. Project title and number.
   3. The names of: Owner’s Representative, Contractor, subcontractor, supplier, manufacturer, and separate detailer, when pertinent.
   4. Identification of product or material.
   5. Relation to adjacent structure or materials.
6. Field dimensions, clearly identified as such.

7. Specification Section number.

8. Applicable standards, such as ASTM or Federal Specification number.

9. Two 2 -inch by 4 -inch blank spaces for the Contractor and Owner’s Representative stamp.

10. Identification of deviations from Contract Documents. Contractor stamp, initialed or signed, certifying to review of submittal, verification of field measurements and compliance with Contract Documents.

J. By approving and submitting shop drawings, product data, samples and similar submittals the Contractor represents that the Contractor has determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

K. Informational submittals upon which the Owner’s Representative is not expected to take responsive action may be so identified in the Contract Documents.

L. When professional certification of performance criteria of materials, systems or equipment is required by the Contract Documents, the Owner’s Representative shall be entitled to rely upon the accuracy and completeness of such calculations and certifications furnished by the Contractor.

1.13 RESUBMISSION REQUIREMENTS

A. Revise initial shop drawings, when required, and resubmit as specified for initial submittal. Indicate on drawings changes made, other than those requested by Owner’s Representative, clearly by clouding or similar acceptable method.

B. Submit new product data and samples as required for initial submittal.

C. Submit revised calculations as required for initial submittal.

D. Identify resubmittal with the original submittal number followed by an alphabetic suffix (i.e. 10A).

1.14 DISTRIBUTION OF SUBMITTALS

A. Distribute copies of shop drawings, product data and other required submittals to Contractor Project site file and project record documents file, and to subcontractors, supplier and fabricator, as applicable.

B. Distribute samples to manufacturer, distributor, supplier or subcontractor, as applicable.
1.15 OWNER’S REPRESENTATIVE DUTIES

A. The Owner’s Representative will review submittals with reasonable promptness and approve them or take other appropriate action, when applicable, for design concept of Project and information given in Contract Documents.

B. Approval of separate item will not constitute review of an assembly in which item functions.

C. The Owner’s Representative will stamp and initial or sign submittals indicating review of same, and will return submittals to Contractor for distribution.

D. The term “informational submittals” means that Contractor-furnished data and drawings are for Owner’s Representative’s review only, and do not require Owner’s Representative’s approval.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section includes special project procedures.
B. The site will remain open to the Owner employees while the work of this Contract.

1.2 EXISTING CONDITIONS

A. The Contractor shall accept the site in the condition in which they exist at the time he is given access to begin work.
B. Before starting work, make a detailed survey of existing conditions, verify governing dimensions at the premises against the Drawings, and examine adjoining work on which the work of this Contract is dependent.

1. No "Extra" or additional compensation will be allowed on account of differences between actual measurements and dimensions shown.

2. Submit differences discovered during the Work to Owner’s Representative for interpretation before proceeding with the associated work.

1.3 PROTECTION

A. While work of this Contract is in progress, protect adjacent areas, facilities, grounds, contents and occupants, whether private or public, from damage or harm due to the work of this Contract.

B. Cover and protect all surfaces of areas turned over to Contractor for the Work as required to prevent soiling or damage by dust, dirt, water, fumes or otherwise, and protect other areas where Work is performed in the same manner, all as deemed adequate by the Owner. Prior to Owner’s re-occupancy of any such area, clean all surfaces as specified in Section 01 7400 and according to such other cleaning instructions as may be specified in other Sections or issued by the Owner.

C. Fire prevention:

1. Ensure that flammable solvents are not being used in the area.

2. In addition, examine existing construction and backing for all combustible materials and finishes and for conditions where heat conduction in metals may bring adjoining materials to ignition temperature.

3. Use positive fire prevention measures including, without limitation, removal and reinstallation of combustible materials, installation of temporary shields and/or heat sinks, and all other necessary measures.

D. No utility services, such as water, gas, sewers, electricity, telephone, communication, and fire protection system serving the site, shall be interrupted without prior written approval of the Owner, and other authorities having jurisdiction.
1.4 ACCESS

A. During the life of the Contract, maintain access to the site, and within the site for fire-fighting equipment, ambulance and law enforcement vehicles.

B. Do not block required accessways, and other accessways not required but so designated by the Owner or the Contract Documents, so as not to interfere with access to adjacent areas, facilities or new work area and to cause the least possible interference with activities of other contractors, the Owner's personnel, occupants or the public.

C. Contractor shall access to the site from 0700 hours to 1600 hours, Monday thru Friday subject to agreement between the Owner and Contractor.

1.5 SURVEY AND RE-SURVEY OF EXISTING CONDITIONS

A. Intent of Drawings is to show existing site conditions with information developed from original construction documents, field surveys, and Owner's records, and to generally show the extent and type of demolition required to complete the Work.

1. The information shown on the Drawings is not a guaranty of existing conditions.

2. Contractor/Bidder is invited to survey the site after making arrangements to do so with the Owner.

B. After award of Contract and before starting work, the Contractor, the Owner's Representative, shall together make a thorough survey of the existing facilities, and areas to be used for staging, storage or accessways to or from the Work.

1. The Contractor may list, and photograph if he desires, existing conditions not requiring alterations, note discrepancies between Drawings and existing conditions, and shall designate areas of storage and routes of access agreed upon by the Owner.

2. Where necessary, the Owner's Representative will issue clarifications and instructions.

3. Do not proceed where such conflicts or discrepancies occur prior to receipt of Owner's Representative's instructions.

C. At a mutually agreed upon time before completion of the Work, the Contractor, the Owner and Owner's Representative shall re-survey the same areas.

1. The Contractor shall furnish a report on conditions then existing compared with conditions as first noted.

2. The report of re-survey shall be signed by the Owner's Representative, and forwarded by the Contractor to the Owner.

3. Damage indicated in the report that was caused by the Contractor, or anyone employed by or under contract to the Contractor, shall be repaired by the Contractor at his expense and left in as good condition as existed before the damaging.

1.6 NOISE CONTROL
A. Exercise caution to prevent generation of unnecessary noise and keep work-generated noise levels to minimum possible. Do not exceed CAL/OSHA standards at any time. Discontinue noise producing operations, when requested by the Owner, and reschedule at a mutually acceptable time.

B. Equip internal combustion engines with suitable mufflers.

C. Mount rolling equipment on pneumatic tires.

1.7 DUST CONTROL

A. Control dust by continuous vacuuming when dust generating work is in progress, by tenting, or by other methods acceptable to the Owner.

B. Assume liability for claims related to flying dust.

1.8 WATER CONTROL

A. Control the use of water to prevent damage to the existing site improvements to remain.

1.9 SECURITY

A. Coordinate security with the Owner; refer to Section 01 5000.

B. Take all necessary precautions to keep trespassers out of work and demolition areas.

C. Properly secure work and demolition areas from entry when work is not in progress but do not block required exitways.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general requirements for quality control of the Work, including test and inspection procedures.

B. Related work:
   1. Section 01 4523 for tests and inspections.
   2. Divisions 2 through 41 for specific test procedures to be performed in compliance with this Section.

1.2 ADMINISTRATIVE STAFF

A. Provide a competent and adequate staff for the administration, coordination, supervision, and superintendence of the Work.

B. Do not change key members of this staff without the consent of the Owner, unless such staff members prove to be unsatisfactory to the Contractor and cease to be in his employ. If the Contractor intends to change a key staff member, he shall give the Owner written notice at least 15 days prior to the intended change.

C. Key staff members shall be full time employees, stationed at the site.

D. Project staff shall include, but shall not be limited to, the following:

   1. Project Manager: The person who has responsibility for the prosecution of the work and who has the authority to act in matters for the coordination, direction, and technical administration of the work. Prior to commencement of the work, provide the Owner with the name of the project manager.

   2. Superintendent: The person who shall be in attendance at the Project site during the performance of the work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

   3. Additional staff: In addition to the general project superintendent required above, provide the services of coordinating engineer for ductwork and electrical Work: The full time person who has the responsibility for the coordination of the mechanical and electrical work with the work of other trades, for the review of mechanical and electrical shop drawings, for the resolution of conflicts and interferences between trades, for directing adjustments in the work that shall be required to comply with the Contract Documents, and for commissioning the mechanical and electrical systems. This individual shall have previous experience in coordinating these areas of work on projects of similar scale and complexity.
1.3 CONTRACTOR QUALITY CONTROL SYSTEM

A. Establish a quality control system to perform sufficient inspections and tests of all items of Work, including that of all subcontractors, to ensure conformance with the Contract Documents for materials, workmanship, construction, finish, functional performance and identification.

B. Quality control system shall ensure that the Work complies with the requirements of the Contract Documents. Controls shall be adequate to cover all construction operations.

C. Apply, install, connect, erect, use, clean, adjust, and condition articles, materials and equipment in compliance with their manufacturer latest published instructions, unless more restrictive or stringent requirements are specified in the Specifications.

1. When specified or requested, furnish the Owner’s Representative 2 copies of such printed instructions prior to introduction of such items.

2. If product manufacturer instructions are in conflict with the Contract Documents, notify the Owner’s Representative for clarification before proceeding.

3. Keep a clean, legible copy of the various product manufacturers instructions applicable to the Work at the Project site.

D. Certificates:

1. When specified, deliver to the Owner’s Representative 2 signed certificates from suppliers of materials, equipment and manufactured items stating that such materials and manufactured items meet or exceed the standards specified.

2. In lieu of such certification, the Contractor may submit reports of current tests made and attested by a reputable and recognized testing laboratory.

1.4 CONTRACTOR ASSISTANCE

A. Cooperate with individual or firm performing required inspections, tests and similar services and provide reasonable auxiliary services as requested. Notify the individual or firm sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include but are not limited to:

1. Providing access to the work to be tested or inspected and furnishing incidental labor and facilities necessary to facilitate inspections and tests.

2. Taking adequate quantities of representative samples of materials that require testing or assisting the agency in taking samples.

3. Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.

4. Providing the individual or firm with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.

5. Providing security and protection of samples and test equipment at the Project site.
1.5 VERIFICATION OF CONDITIONS

A. Prior to installation of any product, inspect existing supports and assemblies to receive materials to be installed and arrange for correction of defects in the existing workmanship, material or conditions that may adversely affect work to be installed.

B. Installation of materials will constitute acceptance of existing conditions as being in proper condition to receive the materials to be applied and waiver of claim that existing conditions are defective as pertains to warranty requirements.

C. Where the Specifications require a product to be installed under the supervision or inspection of the material manufacturer or its representative, manufacturer or its representative shall also inspect the work in place and issue a letter to Owner's Representative verifying that this procedure was followed without exception.

1.6 INSTALLER QUALIFICATIONS

A. Where the Specifications dictate a certain level of experience or expertise from the subcontractor/installer by requiring a minimum number of years of experience in the successful installation of a product or a minimum number of successful installations for the product specified, it shall be the Contractor responsibility to verify the installer's competence and track record before signing a subcontract to perform the affected work.

1.7 MANUFACTURER FIELD SERVICES

A. An experienced, competent, and authorized representative of the manufacturer of each item of equipment for which field services are required in the Specifications shall visit the site of the Work and inspect, check, adjust if necessary, and approve the equipment installation.

B. In each case, the representative shall revisit the job-site as often as necessary until all problems are corrected and the equipment installation and operation are satisfactory, in the opinion of the Owner's Representative.

C. Each manufacturer representative shall furnish to the Owner's Representative a written report certifying that the equipment has been properly installed, and lubricated; is in accurate alignment; is free from any undue stress imposed by connecting piping or anchor bolts; and has been operated under full load conditions and that it operated satisfactorily.

D. All costs for these services shall be included in the Contract.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general requirements for quality control of the Work, including test and inspection procedures.

B. Related work includes specific test procedures to be performed in compliance with this Section and specified in Divisions 2 through 41 of these Specifications.

C. Definitions and qualifications:
   1. Testing laboratory or agency: Licensed testing laboratory or agency certified as meeting the requirements of ASTM D 3666, E 329, E 543 and E 548 as applicable to the tests and inspections performed, approved by the Owner, and referred to hereafter as the Testing Laboratory.
   2. Registered Deputy Inspector (RDI): Deputy or Special Inspector (hereinafter referred to as the Inspector) registered with the Building Department.
   3. Disqualified material: Any material shipped or delivered to the site by the Contractor from the source of supply prior to having satisfactorily passed the required test and inspection, or prior to the receipt of a notice from the Owner’s Representative that such test and inspection will not be required, shall not be incorporated in the Work.

1.2 CONTRACTOR’S QUALITY CONTROL SYSTEM

A. Establish a quality control system to perform sufficient inspections and tests of all items of Work, including that of all subcontractors, to ensure conformance with the Contract Documents for materials, workmanship, construction, finish, functional performance and identification.

B. Quality control system shall ensure that the Work complies with the requirements of the Contract Documents. Controls shall be adequate to cover all construction operations.

1.3 GENERAL QUALITY CONTROL REQUIREMENTS

A. Materials to be furnished under the Contract are subject to test and inspection for compliance with Contract Documents.

B. Testing required by the Contract Documents shall be performed under the supervision and control of California-licensed professional engineer(s).

C. Manufactured articles, materials and equipment shall be applied, installed, connected, erected, used, cleaned, adjusted, and conditioned in compliance with their manufacturer latest published instructions, unless more restrictive or stringent requirements are specified in the Specifications.

1. When specified or requested, furnish the Owner’s Representative 2 copies of such printed instructions prior to introduction of such items.
2. If product manufacturer’s instructions are in conflict with the Contract Documents, notify the Owner’s Representative for clarification before proceeding.

3. Keep a copy of the various product manufacturers instructions applicable to the Work at the Project site.

D. Certificates:

1. When specified, deliver to the Owner’s Representative 2 signed certificates from suppliers of materials, equipment and manufactured items stating that such materials and manufactured items meet or exceed the standards specified.

2. In lieu of such certification, the Contractor may submit reports of current tests made and attested by a reputable and recognized testing laboratory.

E. None of the firms or individuals performing tests and inspections are authorized to accept or reject any work, to modify any Contract Document requirement, to advise or instruct Contractor or his/her employees as to prosecution of the Work, or to perform any duty or service for the Contractor. Inspections shall not relieve the Contractor of the obligation to fulfill all requirements of the Contract Documents.

1.4 COORDINATION OF TESTS AND INSPECTIONS

A. Schedule, initiate and coordinate tests and inspections required by the Contract Documents and public authorities having jurisdiction over the Work.

B. Notify the firm(s) or individuals, who will perform the tests and inspections, a sufficient time in advance of the manufacture of materials to be supplied, which by requirements of the Contract Documents, must be tested at the source of supply so that the Laboratory may arrange for testing. Proceed in the same manner for tests to be performed at the site.

1.5 TEST SAMPLES AND PROCEDURES

A. Test samples:

1. Furnish and deliver samples of materials to be tested at no additional cost to Owner.

2. Test samples will be selected by the firm(s) or individual performing the tests and inspections.

B. Test procedures:

1. Tests shall be performed according to method(s) of test specified in these Specifications.

2. If no procedure or test method is specified, testing shall conform to material specification referenced unless otherwise directed by Owner’s Representative.

3. The firm(s) or individual performing the test shall tag, seal, label, record or otherwise suitably identify the materials for testing. No such materials shall be used in the Work until the test reports are submitted and approved, excepting only the materials specified to be placed or installed prior to testing.

C. Re-testing: Applicable tests shall be repeated at specified intervals whenever the source of supply is changed, or whenever the characteristics of the materials change or vary during the course of construction.
1.6 TEST COSTS

A. In general, Contractor shall arrange and pay for materials qualification and conformance tests, concrete and masonry mix designs, and other tests specified to be paid for by the Contractor in the Contract Documents.

B. In general Owner will pay for special tests and inspections to be performed at the jobsite, unless otherwise specified.

C. Even though not required by public agencies or the Contract Documents, the Owner may request that materials be tested; if materials are found to be in compliance with the Contract Documents, then the Owner will pay for the tests; if the materials are not, then the cost of tests shall be paid by the Contractor or deducted from payments due to him.

D. The Contractor shall reimburse the Owner all or any part, as the Owner may deem just and proper, of the test and inspection costs incurred by the Owner due to the following:

1. Retesting costs caused by failure of materials to pass initial tests.

2. Contractor failure to complete the Work within the Contract time, and any previously authorized extensions thereof.

3. Claims between separate contractors.

4. Covering of work before the required inspections or tests are performed.

5. Additional inspections required for Contractor's correction of defective work.

6. Overtime costs for acceleration of work done for Contractor's convenience.

1.7 TEST REPORTS

A. Firm(s) or individual performing the tests or inspections shall furnish signed and certified copies of each test result, as follows.

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<td>Owner</td>
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<td>Owner’s Representative</td>
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<tr>
<td>Structural Engineer</td>
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<td>Mechanical and Electrical Engineers</td>
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<td>Civil Engineer</td>
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<td>Contractor</td>
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<td>Building Department</td>
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* Provide when involved.

B. Reports shall include the following:

1. Date issued and date of test.

2. Project title and number.

3. Name and address of firm responsible for performing test and inspection.

4. Name and signature of individual performing test and inspection.

5. Date of inspection and sampling.
6. Record of temperature and weather.

7. Identification of product and Specification Section where test is specified.

8. Location on Project.

9. Type of inspection and test.

10. Observation regarding compliance with Contract Documents.

1.8 CONTRACTOR’S RECORDS

A. Maintain accurate, current records on an appropriate form for all inspections and tests performed, instructions received from the Owner’s Representative, firm or individual performing test, and actions taken as a result of those instructions.

B. These records shall include evidence that the required inspections or tests have been performed (including type and number of inspections or tests, nature of defects, causes for rejection, etc.), proposed or directed remedial action, and corrective action taken.

C. Document inspections and tests as required by each Section of the Specifications.

1.9 APPROVAL REQUIRED BY OTHERS

A. If laws, ordinances, rules, regulations or orders of public agency having jurisdiction require work to be inspected, tested or approved by some authority other than the Owner, Owner’s Representative or Contractor, the Contractor shall give required notices and make arrangements, deliver to the Owner’s Representative the certificates of inspection, test, or approval of such public agency, and pay costs therefore unless otherwise provided in the Contract Documents.

1.10 CONTRACTOR’S ASSISTANCE

A. Cooperate with individual or firm performing required inspections, tests and similar services and provide reasonable auxiliary services as requested.

B. Notify the individual or firm sufficiently in advance of operations to permit assignment of personnel.

C. Auxiliary services required include but are not limited to:

1. Providing access to the work to be tested or inspected and furnishing incidental labor and facilities necessary to facilitate inspections and tests.

2. Taking adequate quantities of representative samples of materials that require testing or assisting the agency in taking samples.

3. Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.

4. Providing the individual or firm with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.

5. Providing security and protection of samples and test equipment at the Project site.
1.11 VERIFICATION OF CONDITIONS
   A. Prior to installation of any product, inspect existing supports and assemblies to receive materials to be installed and arrange for correction of defects in the existing workmanship, material or conditions that may adversely affect work to be installed.
   B. Installation of materials will constitute acceptance of existing conditions as being in proper condition to receive the materials to be applied and waiver of claim that existing conditions are defective as pertains to warranty requirements.
   C. Where the Specifications require a product to be installed under the supervision or inspection of the material manufacturer or its representative, manufacturer or its representative shall also inspect the work in place and issue a letter to Owner’s Representative verifying that this procedure was followed without exception.

1.12 INSTALLER’S QUALIFICATIONS
   A. Where the Specifications dictate a certain level of experience or expertise from the subcontractor/installer by requiring a minimum number of years of experience in the successful installation of a product or a minimum number of successful installations for the product specified, it shall be the Contractor's responsibility to verify the installer's competence and track record before signing a subcontract to perform the affected work.

1.13 MANUFACTURER’S FIELD SERVICES
   A. An experienced, competent, and authorized representative of the manufacturer of each item of equipment for which field services are required in the Specifications shall visit the site of the Work and inspect, check, adjust if necessary, and approve the equipment installation.
   B. In each case, the representative shall revisit the job-site as often as necessary until all problems are corrected and the equipment installation and operation are satisfactory, in the opinion of the Owner’s Representative.
   C. Each manufacturer representative shall furnish to the Owner's Representative a written report certifying that the equipment has been properly installed, and lubricated; is in accurate alignment; is free from any undue stress imposed by connecting piping or anchor bolts; and has been operated under full load conditions and that it operated satisfactorily.
   D. All costs for these services are included in the Contract.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section includes furnishing, installing and maintaining temporary facilities and controls required for the performance of the Work.

B. Supervise the use of temporary facilities and controls. Enforce compliance with applicable standards. Prevent abuses of services.

C. Temporary facilities include, but are not limited to:

1. Temporary utilities:
   a. Temporary electric lighting and power.
   b. Temporary water.
   c. Temporary heat and ventilation.
   d. Temporary telecopy, printer and plotter and telephone service.
   e. Temporary sanitary facilities.
   f. Temporary first aid, fire protection and other temporary facilities in compliance with legal requirements.

2. Construction aids.


4. Traffic regulations and controls.

5. Field offices and storage sheds.

6. Construction fence.

7. Temporary grading, drainage, erosion and dust control.

8. Temporary project sign.


D. Unless otherwise noted elsewhere in the Contract Documents, costs of installation, operation, maintenance and removal of temporary facilities and controls shall be borne by the Contractor.
1.2 DESIGN REQUIREMENTS
   A. Provide design and engineering for construction facilities and temporary controls (including but not limited to shoring, bracing and guyin, temporary barricades and signage) in accordance with applicable codes, standards and industry practices.

1.3 SUBMITTALS
   A. Submit the following at least 2 days before preconstruction conference, and before beginning construction of any temporary facilities.
   B. Information and drawings required to fully describe the facilities, and their proposed locations on the site for review. Show the proposed activity in each portion of the Work area and identify the areas of limited use or non-use.
   C. Proposed vehicle access route(s) to and from the site and expected frequency of use on adjacent streets.
   D. Shop drawings of site fence showing gate(s) and site signs.

PART 2 - PRODUCTS

AS SELECTED BY THE CONTRACTOR.

PART 3 - EXECUTION

3.1 LIGHT AND POWER
   A. Furnish, install and maintain temporary electric power required throughout the construction period, so that power can be secured at any desired point within the work area.
   B. Maintain in a safe manner and utilize so as not to constitute a hazard to persons or property.
   C. Comply with legal requirements.

3.2 WATER
   A. Furnish, install and maintain temporary water services for drinking and construction purposes for all parts of the work. Owner’s representative will identify location of on site water connection(s) to be used by Contractor.

3.3 TELEPHONE AND DATA SERVICE
   A. Provide and maintain telephone service to field office for duration of construction, including speaker phone capability on all telephone instruments.
   B. If cellular service is not available, provide telephone voice mail capabilities through local telephone company or with separate equipment.

3.4 TEMPORARY SANITARY FACILITIES
A. Furnish, install and maintain for workers on the Project as required by, and in compliance with, legal requirements.

3.5 FIRST AID/FIRE PROTECTION/OTHER TEMPORARY FACILITIES

A. Furnish, install and maintain as required by, and in compliance with, legal requirements.

3.6 MISCELLANEOUS TEMPORARY CONSTRUCTION AIDS

A. Furnish, install and maintain miscellaneous temporary construction aids required for proper execution of the Work, such as stairs, ladders, ramps, railings, canopies, scaffolds and hoists, chutes, barricades, enclosures, platforms, swing staging and walks.

B. Locate in and about the Project as is practicable and where they will not interfere with the progress of the Work. Relocate when necessary during construction, and remove promptly when no longer needed.

C. Provide openings where required for moving in large pieces of equipment. Close openings after the equipment is in place. Restore finishes to match adjacent surfaces, as approved by the Owner’s Representative.

3.7 BARRIERS

A. Security:
   1. The Owner may provide such watchman service as he deems necessary to protect his interest during the progress of the work. Any protection provided by the Owner will not relieve the Contractor of the responsibility for the safety of the Work and the acceptance thereof.
   2. The Contractor shall employ such watchman service as he may deem necessary to properly protect and safeguard the work. The Owner shall not in any way be liable or responsible for the damage or loss to the work due to trespass or theft.
   3. Furnish, install and maintain protection for materials, tools and equipment employed on the Project including workers’ tools. The Owner shall not be held to have incurred any liability for loss of, and damage to, materials, tools and equipment of the Contractor, or of those employed by him, by contract or otherwise.

B. Protection: Continuously maintain protection as necessary to protect the Work as a whole and in part, and adjacent property and improvements from accidents, injuries or damage.
   1. Properly protect the Work:
      a. With lights, guard rails, temporary covers, and barricades.
      b. Enclose excavations with proper barricades.
      c. Brace and secure all parts of the Work against storm and accident.
      d. Furnish, install and maintain such additional forms of protection which may be necessary under existing circumstances.
   2. Furnish, install and maintain in good condition protective measures as may be required to adequately protect the public from hazards resulting from the work and to exclude unauthorized persons from the work. When regulated by authorities having jurisdiction,
such legal requirements for protection shall be considered as minimum requirements; be responsible for the protection in excess of such requirements as required.

C. Comply with pollution control regulations in effect at site for materials, equipment and work procedures used on the Project.

3.8 TRAFFIC REGULATION

A. Traffic maintenance:

1. Determine the routing of construction vehicles before starting work, based on restrictions indicated on the Drawings and the safeguards and procedures necessary to carry out the work.

2. Maintain all-weather temporary access to the site and to the designated truck unloading area or areas, available to all the trades.

3. In addition:
   a. Be responsible for controlling construction traffic within and adjacent to the site.
   b. Provide entrances, lifts and safeguards required or necessary to the progress of the work, and effectively control such traffic to provide minimum hazard to the work and all persons.
   c. Route construction equipment, trucks, and similar vehicles via existing public streets to and from the site as approved by the governing authorities.
   d. Maintain constant access for Law enforcement agencies, fire and ambulance service.
   e. Furnish, install and maintain for proper control of traffic and safety of all concerned:
      1) All necessary barricades, suitable and sufficient lights, reflectors, and danger signals.
      2) Warning and closure signs, directional and detour signs.
      3) And whatever additional measures necessary.
   f. Indicate on a 24 hour basis restricted and dangerous conditions existing on or adjacent to the site.
      1) Illuminate barricades, danger signals, warning signs and obstructions at night.
      2) Keep warning lights burning from one hour before sunset until one hour after sunrise.

B. Parking: Parking for workers employed on the work is available at the site where acceptable to the Owner, but must not interfere with Owner’s activities or activities related to performance of the Work.

   1. Maintain and control parking area.

3.9 PROJECT IDENTIFICATION SIGN
A. Furnish, install and maintain a temporary project sign, as indicated in Section 01 5813. Locate where directed by the Owner’s Representative at the site. Sign shall be prepared by an experienced professional sign painter.

B. Keep the premises free from other posters, signs, and miscellaneous decorations, except those required by Code and to indicate unsafe conditions.

3.10 REMOVAL

A. Remove temporary facilities and controls upon completion of construction operations or when they are no longer needed, whichever occurs first but no later than 15 days after Substantial Completion.

B. Before Project closeout procedures start, or earlier when they are no longer needed, remove temporary fencing, signs, foundations, debris; grade to required elevations, clean area of debris and restore to original condition.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section establishes general requirements for product handling and storage, whether on or off the site, and supplements similar provisions found elsewhere in the Contract Documents.

B. Related work:

1. Section 01 5000 for storage of materials on site.

1.2 QUALITY ASSURANCE

A. In the Contractor’s quality control program include procedures required to insure protection of work and materials.

1.3 HANDLING

A. General:

1. Transport, deliver, handle, and store all materials and equipment used on the Project to prevent the intrusions of foreign matter, moisture, and to prevent damage. In all cases comply with the following.

2. Material and equipment manufacturer's instructions regarding temperature limitations.

3. Other environmental conditions required to maintain the original quality of the materials and equipment.

B. Packaging:

1. Provide packaged materials in their manufacturer’s original containers with seals unbroken and labels intact until incorporating into the Work.

   a. Where this information is not provided by the manufacturer on the container, it shall be provided by the supplier, fabricator or subcontractor of these materials.

2. Wrapped or bundled materials shall clearly bear the manufacturer's name and trade mark.

C. Damaged materials: Remove damaged or otherwise unsuitable material and equipment promptly from the site. Do not install damaged materials.

1.4 STORAGE

A. Inspect products upon delivery to ensure compliance with the Contract Documents, and to ensure that products are undamaged and properly protected.

B. Store products at the site to facilitate inspection and measurement of quantity or counting of units.
C. Store products subject to damage by the elements above ground, under cover in weathertight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

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

E. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other losses.

F. Locate storage piles, stacks or bins to avoid being disturbed, and protect from damage of any sort.

G. Store materials and equipment in accord with their manufacturer's instructions, above grade, and properly protected from weather and construction activities.

H. Payment may be withheld for improperly packaged and stored materials.

1.5 PROTECTION

A. Protect finished surfaces, including floors, jambs and soffits of all openings used as passageways or through which materials and equipment must travel.

B. Carts, hand trucks, wheelbarrows and similar wheeled conveyances used on or in any portion of the structure shall be equipped with pneumatic tires, unless otherwise authorized by the Owner's Representative.

C. Keep finished surfaces clean and unmarred until the date of acceptance.

D. Refer to individual Specification Sections for additional specific product handling and protection requirements.

1.6 MAINTENANCE

A. Maintain periodic system of inspection of stored products on a scheduled basis to assure that:

1. State of storage facilities is adequate to provide conditions recommended by the product manufacturer.

2. Required environmental conditions are maintained on a continuing basis.

3. Surfaces of products exposed to the elements are not adversely affected.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general requirements for cleaning Project site.

B. Keep premises, and adjacent private and public properties free from accumulations of waste, debris and rubbish caused by construction operations.

C. At completion of Work, remove waste materials, rubbish, tools, equipment, machinery and surplus materials, and clean all exposed surfaces. Remove remaining mockups and mockups.
   1. Leave Project clean and ready for use.

1.2 SAFETY REQUIREMENTS

A. Standards: Maintain Project in accord with State and local safety and insurance standards.

B. Hazard control:
   1. Store volatile wastes in covered metal containers, and remove from premises daily.
   2. Prevent accumulation of wastes, which create hazardous conditions.
   3. Provide adequate ventilation during use of volatile or noxious substances.

C. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
   1. Do not burn or bury rubbish and waste materials on Project site.
   2. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains. Store in containers with tight-fitting lids and remove to legal dumpsite or to recycling center.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. As appropriate for this work, and as follows.

B. Use only commercial grade sweeping compounds with broom cleaning.

C. Use only materials recommended by manufacturers for surfaces to be cleaned.

D. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.
PART 3 - EXECUTION

3.1 DURING CONSTRUCTION

A. Keep premises, and adjacent private and public properties free from accumulations of waste materials and rubbish.

1. Remove debris and dirt from public property promptly; sweep sidewalks and adjacent streets daily when soiled by work performed under this Contract.

2. Remove waste materials, debris and rubbish from the Project site at least weekly.

3. Legally dispose of waste and rubbish at legal public or private dumping areas or recycling center off Owner's property.

B. Wet down materials and rubbish to lay dust and prevent it from blowing.

C. At least once a week, or more often if required, clean site and dispose of waste materials, debris and rubbish off the site. Remove combustible materials such as paper and cardboard daily.

D. Provide on-site containers for collection of waste materials, debris and rubbish. Provide collection can at each location used as eating areas. Pick-up all garbage daily.

E. Do not allow debris and combustible materials to accumulate in, voids, cavities, interstitial spaces, and plenums. These areas must be thoroughly cleaned out before being sealed or closed off by installation of finish materials.

F. Do not allow debris to clog drains. Clean floor drains and area drains free of debris. Verify that they drain properly. Keep drains clean of debris at all times.

G. Handle materials in a controlled manner with as few handling as possible; do not drop or throw materials from heights.

H. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.

I. Restore damaged, including stained materials, and finishes that cannot be satisfactorily repaired, or that show evidence of repair unacceptable to the Owner's Representative, with new, undamaged materials.

1. Repair and restoration of damaged finishes shall be done by the original installers or experienced craftsmen thoroughly familiar with the work at hand.

3.2 FINAL CLEANING

A. Except as may be otherwise specified elsewhere, "clean" for the purpose of this Article means a level of cleanliness provided by experienced workers or professional cleaners using commercial quality building maintenance equipment and materials.

B. In preparation for Substantial Completion or Occupancy conduct final inspection of sight-exposed interior and exterior surfaces, and of concealed spaces.

C. Remove non-permanent labels.
D. Clean exposed exterior hard-suraced finishes to a dust-free condition, free of stains, films and similar foreign substances.
   1. Restore reflective surfaces to their original reflective condition.
   2. Leave concrete slab broom clean.
   3. Where rust is present, remove it without damaging substrate, and refinish area.

E. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean light fixtures and lamps.

F. Clean the site, including landscaped areas, of rubbish, litter and other foreign substances.
   1. Contaminated earth:
      a. Final clean-up operation includes the removal and disposal of earth contaminated or unsuitable for support of plant life in planting areas, and filling of resulting excavations with suitable soil.
      b. Contaminated areas include those used for disposal of waste concrete, mortar, plaster, masonry, and similar materials, areas in which washing out of concrete and plaster mixers or washing of tools and like cleaning operations have been performed, and areas that have been oiled, paved or chemically treated.
      c. Do not dispose of waste oil, solvents, paints, solutions, or like penetrating material by depositing or burying on Owner's property.
   2. Sweep paved areas broom clean; remove stains, spills and other foreign deposits.
   3. Wash down paved surfaces.
   4. Rake grounds that are neither paved nor planted, to a smooth even-textured surface.

G. Keep Project clean until occupied by Owner.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Starting systems.
   2. Demonstration and instructions.
   3. Testing, adjusting, and balancing.

B. Related work:
   1. Section 01 7823 for system operation and maintenance data and extra materials.

1.2 STARTING SYSTEMS

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify Owner’s Representative 7 days prior to start-up of each item.

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

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

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

F. Execute start-up under supervision of responsible manufacturer's representative and Contractors' personnel in compliance with manufacturers' instructions.

G. 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.

H. Submit a written report that equipment or system has been properly installed and is functioning correctly.

1.3 DEMONSTRATION/INSTRUCTIONS

A. Demonstrate operation and maintenance of products to Owner's personnel 14 days prior to date of Substantial Completion.

B. Demonstrate Project equipment instructed by a qualified manufacturers' representative knowledgeable about the Project.

C. Demonstrate Project equipment and instructed by a qualified manufacturers' representative knowledgeable about the Project.
D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owners’ personnel in detail to explain all aspects of operation and maintenance.

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

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

G. The amount of time required for instruction on each item of equipment and system is that specified in individual Sections.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. When Contractor determines that the Project is substantially complete, Contractor shall:
   a. Submit written certification to Owner’s Representative that Project, or designated portion of Project, is substantially complete.
   b. Submit list of major items to be completed or corrected (punch list).
   c. Submit written certification that:
      1) Contract Documents have been reviewed.
      2) Project has been inspected for compliance with Contract Documents.
      3) Work has been completed in accord with Contract Documents.
      4) Equipment and systems have been tested in Owner’s presence and are operational.
      5) Project is completed, and ready for final review.

2. Determination that Project is, or is not substantially complete rests with the Owner and Owner’s Representative.

B. The Owner and Owner’s Representative will make a review of the Project, and if they determine that the Project is substantially complete they will advise the Contractor to prepare and submit to Owner’s Representative a list of items to be completed or corrected, as determined by the review.

C. The Owner will then file and record a Notice of Completion to reduce the lien period to the time prescribed by law. The Notice of Completion shall be complete with signatures of the Owner and Contractor, accompanied by Contractor’s list of items to be completed or corrected, as verified and amended by the Owner’s Representative.

D. Owner occupancy of Project or designated portion of Project:

1. Contractor shall:
   b. Perform final cleaning in compliance with Section 01 7400.

2. Owner will occupy project under provisions stated in Certificate of Substantial Completion.

3. Contractor shall complete work listed for completion or correction, within designated time.
1.2 CLOSEOUT SUBMITTALS

A. Submit the following:

1. Project record documents.
2. Operation and maintenance data.
3. Warranties and bonds.
4. Keys and keying schedules.
5. Tools, spare parts and maintenance materials.

B. Deliver evidence of compliance with requirements of governing authorities:

1. Certificates of inspection for mechanical and electrical work.

C. Deliver certificate of insurance for products and completed operations.

1.3 INSTRUCTIONS

A. Instruct Owner's designated personnel in operation of all systems, mechanical, electrical and other equipment.

1.4 EVIDENCE OF PAYMENTS, AND RELEASE OF LIENS

A. Submit Contractor's affidavit of payment of debts and claims and release of liens.

B. All submittals shall be duly executed before delivery to Owner's Representative.

1.5 FINAL ADJUSTMENT OF ACCOUNTS

A. Submit final statement of accounting to Owner. Statement shall reflect the following.

1. Original Contract Sum.
2. Additions and deductions resulting from changes to the authorized Contract sum.
3. Total Contract sum, as adjusted.
4. Previous payments.
5. Sum remaining due.

B. Final Change Order shall reflect approved adjustments to Contract sum not previously made by Change Orders.
1.6  FINAL APPLICATION FOR PAYMENT

A.  Submit final application in compliance with Contract requirements.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Compilation of product data and related information appropriate for Owner's maintenance and operation of products furnished under the Contract.
   2. Instruction of Owner's personnel in the maintenance of products and in the operation of equipment and systems.

B. Related work:
   1. Section 01 3323 for submittals of shop drawings, product data and sample.

1.2 SUBMITTALS

A. Preliminary:
   1. Submit 3 copies of proposed manual or manuals to the Owner's Representative for review and approval at least 14 days prior to request for final inspection or acceptance.
   2. Show general arrangement, nature of contents in each portion, and proposed method of binding and covering for the manual.

B. Final:
   1. Following instruction of operating and maintenance personnel, make necessary revisions of the manual.
   2. Submit specified number of copies of approved data in final form at final inspection or acceptance.

1.3 QUALITY ASSURANCE

A. Preparation of data shall be done by personnel trained and experienced in maintenance and operation of the described products.

1.4 FORMAT

A. Prepare data in the form of an instruction manual for use by Owner's personnel.

B. Text: 20 lb. white bond paper, 8-1/2 -inch x 11 -inch
C. Drawings: Provide reinforced punched binder tab. Bind drawings with text.
   1. Fan-fold larger drawings to size of text pages.

D. Flyleaf: For each separate product or each piece of operating equipment provide the following.
   1. Brief description of product, and major component parts of equipment.
   2. Indexed tabs.

E. Cover: Identify each volume with typed or printed tile OPERATING AND MAINTENANCE INSTRUCTIONS. List the following.
   1. Title of Project.
   2. Identity of separate structures as applicable.

F. Binders:
   2. When multiple binders are used, correlate the data into related groupings.

G. Labels: Provide front and end spine labels for each manual clearly identified with the following information.

   OPERATING AND MAINTENANCE INSTRUCTION
   Name and address of Work
   Name of Contractor
   General subject of the manual
   Space for approval date

1.5 CONTENT OF MANUAL

A. Table of contents:
   1. List of each product required to be included, indexed to the content of the volume.
   2. List, with each product, the name, address and telephone number of (a) subcontractor and installer, (b) maintenance contractor, as appropriate, and (c) local source of supply for parts and replacement.

B. Product data:
   1. Include only those sheets pertinent to the specific product.
   2. Annotate each sheet to clearly identify the data applicable to the installation. Delete references to inapplicable information.
C. Drawings: Supplement product date with drawings as necessary to illustrate the following.
   1. Relations of component parts of equipment and systems.
   2. Project record drawings shall not be used as maintenance drawings.

D. Instructions: Written text as required to supplement product data for the particular installation.

E. Copy of each warranty, guaranty, bond, and service contract issued. Provide information sheet for Owner’s personnel, giving the following information:
   1. Proper procedures in the event of failure or emergency.
   2. Instances which might affect the validity of warranties, guaranties, or bonds.

1.6 MANUAL FOR MATERIALS AND FINISHES
A. Instructions for care and maintenance including:
   1. Manufacturer’s recommendation for types of cleaning agents and methods.
   2. Cautions against cleaning agents and methods, which may be detrimental to the product.
   3. Recommended schedule for cleaning and maintenance.

1.7 MANUAL FOR EQUIPMENT AND SYSTEMS
A. Content, for each unit of mechanical equipment and system, as appropriate:
   1. Description of unit and component parts:
      a. Function, normal operating characteristics, and limiting conditions.
      b. Performance curves, engineering data and tests.
      c. Complete nomenclature and commercial number of all replaceable parts.
   2. Operating procedures:
      a. Start-up, break-in, routine and normal operating instructions.
      b. Regulation, control, stopping, shutdown and emergency instructions.
      c. Summer and winter operating instructions.
   3. Maintenance procedures:
      a. Routine operations.
      b. Guide to "trouble-shooting."
      c. Disassembly, repair and reassembly.
      d. Alignment, adjusting and checking.
4. Servicing and lubrication schedule: List of lubricants required.

5. Manufacturer's printed operating and maintenance instructions.

6. Description of sequence of operation by control manufacturer.

7. Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance.
   a. Predicted life of parts subject to wear.
   b. Items recommended to be stocked as spare parts.

8. Control diagrams by manufacturer of controls as installed in Project.

9. Coordination drawings of color-coded piping diagrams as installed by each subcontractor.

10. Charts of valve tag numbers with the location and function of each valve.

11. List of original manufacturer's spare parts, manufacturer's current prices and recommended quantities to be maintained in storage.

B. Content, for each electric and electronic system, appropriate:

1. Description of system and component parts:
   a. Function, normal operating characteristics, and limiting conditions.
   b. Performance curves, engineering data and test.
   c. Complete nomenclature and commercial number of replaceable parts.

2. Circuit directories of panelboards:
   a. Electrical service.
   b. Controls.
   c. Communications.

3. As-installed color-coded wiring diagrams.

4. Operating procedures:
   a. Routine and normal operating instructions.
   b. Sequences required.
   c. Special operating instructions.

5. Maintenance procedures:
   a. Routine operations.
   b. Guide to "trouble-shooting."
   c. Disassembly, repair and reassembly.
d. Adjustment and checking.

6. Manufacturer's printed operating and maintenance instructions.

C. Prepare and include additional data when the need for such data becomes apparent during instruction of Owner's personnel.

1.8 INSTRUCTION OF OWNER'S PERSONNEL

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

B. Provide services of factory-trained instructors from the manufacturer of each major item of equipment or system.

C. Operating and maintenance manual shall constitute the basis of instruction.

D. Review contents of manual(s) with personnel in full detail to explain all aspects of operations and maintenance.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general requirements for preparation, maintenance and delivery of record documents.

1.2 SUBMITTALS

A. Deliver record documents to Owner’s Representative at completion of Project

B. Accompany submittal with transmittal letter, in duplicate, containing date, Project title and number, Contractor's name and address, title and number of each record document, certification that each document as submitted is complete and accurate, and signature of Contractor or its authorized representative.

PART 2 - PRODUCTS

NOT USED.

PART 3 - EXECUTION

3.1 DOCUMENT MAINTENANCE

A. Maintain one copy of the following in Contractor's field office at the site:

1. Contract Drawings, including the Building Department stamped set.

2. Specifications and Addenda.

3. Reviewed shop drawings and submittal log.

4. Change orders, field change authorization and notice of clarification, and other modifications to Contract.

5. Field test records.

B. File record documents apart from constructions documents and maintain in clean, dry, legible condition. Make record documents available for review by the Owner and Owner’s Representative during regular business hours.

C. Do not use record documents for construction purpose.

D. Record documents will be subject to a review by the Owner’s Representative prior to approval of each progress payment.
3.2 RECORDING

A. Clearly label each document "PROJECT RECORD."

B. Keep record documents current.

C. Record and properly dimension deviations on the record drawings within 24 hours after work in affected area is completed. Dimensions shall be accurate to within 1-inch

1. Use a fine felt or nylon tip pen with waterproof colored ink for marking.

2. Legibly mark to record actual construction of the following:
   a. Depths of various elements of foundation in relation to first floor level.
   b. Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements. Cut-off points and point of connections of utilities.
   c. Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.
   d. Field changes of dimension and detail.
   e. Changes made by Change Order, Field Change Authorization and Notice of Clarification.
   f. Details not on original Contract Drawings.
   g. Do not permanently conceal any work until required information has been recorded.

D. Legibly mark-up each Section of the Specifications to record the following:

1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment installed.

2. Changes made by change order, field change authorization and notice of clarification.

3. Other matters not originally specified.

E. Maintain shop drawings as record documents. Legibly annotate to record changes made after approval.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Selective demolition, dismantling, cutting and alterations as indicated, specified, and necessary for the completion of the Contract.
2. Rerouting or offsetting existing utilities, such as piping, ducts, conduit and wiring.
3. Removing demolished materials not indicated to be salvaged, from the site.
4. Protection of work to remaining.
5. Disconnecting, cutting and capping or sealing site utilities.

1.2 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during demolition operations. All impacts on bus operations and parking shall be minimized and must be approved by the Owner.

1. Do not close or obstruct streets, parking lots, walks, or other adjacent occupied or used facilities without permission from the Owner.
2. Provide alternate routes around closed or obstructed traffic ways if required by Owner.

1.3 SUBMITTALS

Refer to Section 01 3323, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES for procedures.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 GENERAL

A. Protection:

1. Do not begin demolition until barricades, warning signs and other forms of protection are installed.
2. Protect utilities and existing improvements that are not to be removed from injury or damage resulting from the Contractor's operation. Replace improvements and utilities in kind.

3. During demolition supply safeguards, including warning signs and lights, barricades, and the like, for protection of the public, Contractor's employees, AC Transit's employees and existing improvements to remain.

4. Protect and maintain benchmarks and survey control points from disturbance during construction.

5. Blasting will not be allowed as a method of demolition.

B. Noise control:

1. Exercise caution and care to prevent generation of unnecessary noise.

2. Keep noise levels to the minimum possible. Noise levels shall comply with all local ordinances.

3. Discontinue noise producing operations, when requested by the Owner, and reschedule at a mutually acceptable time.

C. Dust control: Control dust at all times.

1. Assume liability for claims related to flying dust caused by this work.

D. Water control: Control the use of water to prevent damage to the existing facility and improvements to remain. Disposal of water shall conform to all applicable regulations and be approved by the Owner.

E. Security: Coordinate security with the Owner.

1. Take necessary precautions to keep trespassers out of demolition areas.

2. Properly secure demolition areas from entry when demolition is not in progress.

F. Safety:

1. If at any time the safety of existing construction appears to be endangered, take immediate measures to support such endangered construction; cease operations and immediately notify the Owner's Representative.

2. Do not resume demolition until Owner's Representative's instructions are received.

3.2 UTILITIES

A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed or abandoned in place.

1. Arrange with utility companies to shut off indicated utilities if necessary.

B. Existing utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
1. Notify Owner’s Representative not less than 2 days in advance of proposed utility interruptions.

2. Do not proceed with utility interruptions without Owner’s Representative's written permission.

3.3 DEMOLITION

A. Areas of demolition are maintenance bays room 125 and 126.

B. Demolition – Electrical

1. Fluorescent Lighting – Existing overhead fluorescent lighting mounted at ceiling height shall be removed including existing conduit and wire. New hazardous area lighting shall be installed in-kind using the existing circuits with new rigid galvanized conduit.

2. Emergency Lighting – Existing emergency battery pack lighting installed above eight feet shall be moved down to eight feet or below. Confirm battery charge and operation under battery power.

3. Exit Lighting – Existing exit lighting shall be moved down to eight feet or below.

4. Receptacles – Existing 120V AC receptacles shall be moved down to eight feet or below.

5. Cameras, Fire Alarm Devices, Paging System, Telephone, Signal – All equipment above shall be relocated to 8 ft. AFF or lower.

6. Dynamometer (DY07) – Remove motor, starter, control cabinet(s), conduit and wiring back to Main Switchboard (MS).

7. Bay Door Motors – Replace existing non-explosion-proof 2 HP door motor with same rating Class I, Div. II, group B rated motor.

C. Demolition – Mechanical

1. Space Heaters (wall mounted) – Existing wall mounted space heaters will be removed. Natural gas supply shall be capped.

2. Space Heaters (longitudinal) – Existing ceiling longitudinal space heaters will be disconnected. The igniter will be removed and natural gas supply shall be capped.

D. Existing conditions:

1. Intent of Drawings is to show existing conditions with information developed from field surveys and to generally show the extent and type of demolition required.

2. Make a detailed survey of existing conditions prior to commencing demolition, and report discrepancies or conflicts between Drawings and actual conditions in writing to the Owner’s Representative for clarifications and instructions.

3. Do not proceed where such conflicts or discrepancies occur prior to receipt of Owner’s Representative's instructions.

E. The Contractor shall be fully responsible for the adequacy and installation of temporary shoring and bracing systems used during demolition.

F. Demolition shall be performed by skilled and properly equipped personnel.
G. Remove existing construction only to the extent necessary for the proper installation of new construction and junction with existing materials. Cut back finished surfaces to straight, plumb or level lines as required.

H. If unanticipated conditions which conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict.
   1. Submit report to Owner’s Representative in written, accurate detail.
   2. Pending receipt of directive from Owner’s Representative, rearrange demolition schedule as necessary to continue overall job progress without delay.

I. Coordinate demolition with other trades to assure the proper sequence, limits, methods and time of performance. Schedule demolition so as to impose a minimum of hardship on the present operation of the facilities and the performance of the work of other trades.

J. In general remove materials as follows:
   1. Portland cement concrete:
      a. Locate and identify reinforcing bars in concrete prior to drilling and cutting, and protect structural integrity of existing work. Prestressing wires in concrete tees shall not be cut for any reason.
      b. Use removal methods that will not crack or structurally affect adjacent concrete constructions.

K. Materials not mentioned to be removed that interfere with new construction, except where structural integrity of the assembly is at risk, shall be cut to clean cut lines to assure proper interface with new construction, or patching and repair, as required.

3.4 SALVAGE

A. Title to materials:
   1. Except where indicated or specified otherwise, materials and equipment removed and not reused shall become the property of the Contractor and shall be removed from the site and properly disposed of.
   2. The Owner will not be responsible for the condition or loss of, or damage to, such property after notice to proceed.
   3. Material and equipment shall not be viewed by prospective purchasers or sold on the site.

3.5 PATCHING

A. Patch materials to remain when damaged by demolition. Finish material and appearance of the patch or repair shall match the existing contiguous materials and finishes in all respects, as approved by the Owner’s Representative.

3.6 CLEAN-UP/DISPOSAL

A. Debris, waste, and removed materials, other than items to be salvaged, are Contractor's property for legal disposal off the site.
B. Continuously clean-up and remove these items and do not allow to accumulate.

END OF SECTION
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

NOT USED

1.2 SUMMARY

A. This Section includes:

1. Existing telescoping doors to be upgraded to having explosion proof motors

1.3 PERFORMANCE REQUIREMENTS

A. Product Data: Four (4) motors are currently installed at the East and West ends of each bay. The Nerimotori asynchronous motors are 2.0 HP each and must be replaced with explosion proof motors that is acceptable for operation in a Class 1 Division 2 Group B environment. The contractor or Simplex Grinnell will need to control the motor starters to automatically open the doors in response to a signal from the combustible gas detectors or manual pull stations from Section 28 3100.

1.4 SUBMITTALS

Refer to Section 01 3323, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES for procedures.

1.5 QUALITY ASSURANCE

A. Listed and labeled as defined in NFPA 70 Section 501- Electrical Area Classification by a testing agency acceptable to authorities having jurisdiction. Motors must be explosion proof with Class 1, Div 2, Group B label.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Interior and exterior panel signs will be posted at all access points for both rooms, Room 125: Brake Inspection and Room 126: Diagnostic.

1.2 SUBMITTALS

A. General: Signage schedule in manufacturer’s format for verification of text/copy

B. Product Data: Approval drawings showing materials, construction detail, lay-out, copy, size and mounting methods.

C. Sample of two sign types (minimum) for verification of materials, color, pattern, overall quality, and for adherence to requirements indicated.

1.3 QUALITY ASSURANCE

Signs and their installation shall comply with applicable provisions of the latest edition of the following standards with requirements of authorities having jurisdiction:


PART 2 - PRODUCTS

2.1 SIGNS

A. Access doors shall have warning signs with the words “WARNING – NO SMOKING – FLAMMABLE GAS.” “Non-odorized Gas.” The wording shall be in plainly legible, bright red letters not less than 1 in. (25 mm) high on a white background.

B. Signs prohibiting smoking or open flames within 25 ft (7.6 m) of area perimeters shall be provided in areas where toxic, highly toxic, corrosive, unstable reactive, flammable, oxidizing, or pyrophoric gases are produced, stored, or used.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Warning Signs: Hazard identification signs shall be placed at all entrances to locations where compressed gases are produced, stored, used, or handled in accordance with NFPA 704: Standard System for the Identification of the Hazards of Materials for Emergency Response.

1. East and West ends of Room 125
2. East and West ends of Room 126

B. No Smoking Signs: These shall be placed outdoors next to each exit door.

C. Signs shall not be obscured or removed

3.2 CLEANING AND PROTECTION

A. At completion of the installation, clean soiled sign surfaces in accordance with the manufacturer’s instructions. Repair or replace damaged signs as directed by the Site Manager.

END OF SECTION
PART 1 - GENERAL

1.1 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals and install and place a mobile work platform as shown on the drawings and as specified herein.

B. Design of the platform shall be confirmed by the mobile work platform manufacturer.

1.2 SUBMITTALS

A. Product Data: Manufacturer’s catalog data sheets shall be provided for the mobile work platform, marked-up or supplemented with additional sheets to clearly identify the model or size, selected options, features, and/or modifications to demonstrate compliance with specification requirements. Catalog cut sheets which show modifications beyond the standard options and all supplemental pages shall bear original signatures and dates of the equipment manufacturer’s authorized representative.

Contractor must submit manufacturer’s data sheets to Engineer for approval showing the manufacturer, model, and dimensions for all equipment prior to purchase.

1.3 REFERENCE STANDARDS

A. Requirements of REGULATORY AGENCIES: Comply with all applicable Federal, State and local codes, and with requirements of all authorities having jurisdiction.

B. Occupational Safety and Health Administration (OSHA)

1.4 QUALITY ASSURANCE

A. Manufacturer’s Qualification: A firm regularly engaged in the manufacturer of major components for mobile work platforms of the type specified for this project.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Materials shall be free from defects and imperfections that might affect the serviceability and appearance of the finished product. All materials shall be new and unused.

B. Two end swing-gates should be used to connect the two platforms on each end to ensure full enclosure of the bus top.

C. Maximum standing height of 11’5” with guard rails no higher than 16’

D. At least one staircase with handrails and mid-rails.

E. Braking casters
2.2 RECOMMENDED MANUFACTURER:

A. General Steel Products Co.

1. 16’ to 20’ long Gentex BusTop™ (for bus rooftop access/maintenance).

2. No electrical and control equipment required.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Furnish the services of a manufacturer’s engineering representative, specially trained in the type of equipment to be furnished herein. The manufacturer’s representative shall perform the installation of the mobile work platform and check location of bracing and supports, clearances, and other critical components.

B. Install in strict conformance with recommendation of manufacturer and under direct supervision of manufacturer’s representative.

C. Obtain approval before attaching any rigging or hoisting equipment to any part of building structure.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY
A. Section includes ductwork.

1.2 SUBMITTALS
A. Submit the following:
   1. Catalog data for duct materials, flexible duct/connectors, sealing materials
   2. Layout drawing showing details of materials and installations

1.3 QUALITY ASSURANCE
A. Construct ductwork in accordance with NFPA 90A

1.4 QUALIFICATIONS
A. Manufacture: Company specializing in manufacturing products specified in this section with minimum 3 years' experience.
B. Installer: Company specializing in performing work of this section with minimum 3 years' experience approved by manufacture.

1.5 ENVIRONMENTAL REQUIREMENTS
A. Do not install duct sealant when temperatures are less than those recommended by sealant manufacturers.
B. Maintain temperatures during and after installation of duct sealant.

PART 2 - PRODUCTS

2.1 PRODUCT OPTIONS AND SUBSTITUTIONS
A. Alternate products may be accepted.

2.2 DUCT MATERIALS
A. Aluminum ducts or galvanized steel.

PART 3 - EXECUTION

3.1 EXAMINATION
A. Verify sizes of equipment connection before fabricating transitions.

3.2 INSTALLATION

A. Install, seal, and support ductwork in accordance with NFPA 90A

B. Use double nuts and lock washers on threaded rod supports

C. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

D. Size duct work based on required flows in each room.

E. Air flow shall be balanced with dampers so equal air flow rate discharges into each ceiling bay pocket.

F. Test installation to demonstrate equal discharge air flows. Submit a test plan to confirm equal flow rate of air into each ceiling bay pocket. Plan must be reviewed and approved by Owner and Owner's representative before testing. Test must be witnessed by Owner's representative.

G. Refer to drawing S-110 to see duct design.

3.3 CLEANING

A. After completing system installation and inspection, clean duct system in accordance with National Air Duct Cleaners Association (NADCA) specification

3.4 DUCTWORK PRESSURE CLASSIFICATION

A. Construct each duct system for a minimum pressure classification of 1 inch w.g.

END OF SECTION
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

NOT USED

1.2 SUMMARY

A. This Section includes the following:

   1. Floor-mounting ventilators

1.3 PERFORMANCE REQUIREMENTS

A. Project Altitude: Base air ratings on a site elevation slightly above sea level (under 150 feet ASL)

B. Product Data: Two (2) fans will be used in each of the separate bays.

   Room 125 will have two (2) Greenheck Model SWB-110-10 Backward Inclined Centrifugal Utility Fans, or equal, rated for 1,750 CFM with a static point of 1.0 inches of water. The fans must be two-speed in order to flow half the maximum flowrate, 875 CFM during normal operations.

   Room 126 will have two (2) Greenheck Model SWB-115-20 Backward Inclined Centrifugal Utility Fans, or equal, rated for 3,125 CFM with a static point of 1.0 inches of water. The fans must also be two-speed in order to flow half the maximum flowrate, 1,562.6 CFM during normal operations.

1.4 SUBMITTALS

Refer to Section 01 3323, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES for procedures.

1.5 QUALITY ASSURANCE

A. Motors will be operated with Class B insulation and Spark C Construction: aluminum inlet cone and rub ring where shaft passes through housing.

B. NEMA Compliance: Motors and electrical accessories shall comply with NEMA standards

2.0 INSTALLATION

Each fan shall include a local Test Switch to demonstrate ability to operate at the higher speed.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. This Section supplements all Sections of this Division and shall apply to all Work specified, indicated in the Drawings, and as required to furnish a complete installation of electrical systems for the Project. Review all Sections of the Specifications for related work and coordinate the work of this Section with all other Sections.

B. Furnish all labor and services, and furnish all materials, tools, equipment, appliances, facilities, and transportation necessary for and incidental to performing the Work complete, as shown on the drawings and specified herein. All electrical systems and equipment shall be in proper operating order upon completion of the work. Work includes the following:

1. Furnish all incidental work required to furnish a complete properly operating system.

2. Furnish the Following:
   a. All construction power and lighting and all power for testing of equipment and systems through final acceptance tests.
   b. Electric power conduits, conductors and cables, signal and fire alarm conduits and cables, from their respective terminal locations.
   c. Service switchboards, metering, distribution panelboards, transformers, motor controls, surge protective devices (SPD), disconnect switches, and equipment, as indicated on Drawings.
   d. Conduits and feeders for power and light from the distribution switchboards to panelboards, and loads.
   e. A complete system of switchboards, panelboards, conduits, outlet boxes, switches, receptacles, plates and wiring for power and light. All conductors shall be in conduit.
   f. Outlet, junction and pull boxes, plaster rings, plates, plywood backboards conduit, and complete wiring for electrified alarms and building entry devices.
   g. Surge protective devices.
   h. A complete fire alarm (design-build) systems including fire alarm control panels, fire alarm annunciators (graphic and touch screen types), remote operators control panels, smoke and heat detectors, manual pull stations, other alarm and trouble devices as noted on drawings, outlet, junction and pull boxes, plaster rings, conduits and wire, including all field devices, programming, testing, complete, as specified in Section 28 3100 by EPC (Engineering Procurement & Construction).
   i. All light fixtures, and lamps, complete with controls (switching, photocells, time switches, and low voltage relays), including switch packs, maintenance key switches, lighting control system, lighting control panels and all conduit and wiring.
   j. Outlet, junction and pull boxes, conduits, wiring and connections of all motors and equipment for fire protection and all other equipment.
k. Complete grounding systems for power system neutrals and equipment for normal power system.

l. Testing, adjusting and cleaning of the completed work.

m. All line-voltage (120V) control system conduit and wiring, and all low-voltage control conduit and wiring, required for automatic temperature control systems, in accordance with equipment submittals.

n. Provide 120V, 20A power from power panelboard to each electrified item. Refer to equipment and cable/conduit schedules. Include all conduit and wires.

o. Demolition and removal of existing electrical systems, including conduits, wiring, equipment, wiring devices, disconnects and connections, as required for implementing new construction. All demolition done with complete coordination and scheduled with an AC Transit Representative prior to commencing any demolition. All systems that are not in the area of work are to be maintained in operation; provide temporary equipment, conduits and wiring as required.

p. Cutting, core-drilling patching, and painting of the structure, and finishes as required by Contractor in the performance of the work.

q. All sleeves, hangers, supports, inserts, anchors, bolts, etc., required for the installation of this work, including design of supports and seismic restraints.

r. All concrete required for this Division of the work including steel reinforcement, patching and repairing at core-drill locations, duct banks, concrete pads for floor mounted electrical equipment.

s. Certified report including seismic calculations for anchorage or support of all electrical system equipment (as indicated in appropriate Specification Section), signed by a Structural Engineer registered in California. Report shall carry the approval of State Fire Marshal.

t. Shop drawings and technical data; operation and maintenance (O&M) manuals.

u. "As-Built" Drawings:

1) At the completion of the project furnish the as-built drawings and furnish the drawings on digital CD (compact disc) in the 2010 version of AutoCAD and in hard copy (bond paper print).

2) Include panelboard directories, and accurately indicate and dimension all conduit runs (including those discovered during construction), and conduit stub outs and all pullboxes from building walls on all As-built Drawings.

v. Contractor shall be responsible to coordinate with the AC Transit Representative regarding the protection of the AC Transit existing installation, including installed telecommunications and security cabling/wiring, including replacement of these items damaged by Contractor, but not limited to submittals, lead times, procurement, delivery and installation.

w. Furnish training to AC Transit personnel, as scheduled by the AC Transit Representative, for the operation of the following:

1) Power distribution equipment.
2) Lighting controls (if required).

3) Fire Alarm system – as indicated in Section 28 3100 by EPC.

4) Other training as required by other Sections of these Specifications.

5) Coordinate all training with the AC Transit Representative.

x. Furnish temporary equipment, and wiring, as needed during the construction phase. Remove temporary items after use.

y. Schedule all outages with the AC Transit Representative, and with Utility companies.

z. Include adjustments for installation of electrical equipment and systems. Note that drawings are diagrammatic in nature and do not show all incidental items required for the complete and operating systems. Contractor shall review all the drawings and specifications for the project and include all code required bends, pull boxes, penetrations through walls, floors and concrete slabs with approved penetration assemblies. Such penetrations and routing of conduits in slabs shall comply with restrictions indicated in structural drawings and related specifications. All the above shall be included in bid at no additional cost to AC Transit, including all items for compliance with 2010 California Electrical Code and National Fire Protection Association (NFPA) code.

aa. Guarantee: 1-year Guarantee to Repair Period. For items requiring longer guarantee periods, refer to individual Sections of the Specifications.

bb. On completion of the installation, furnish operation and maintenance (O&M) manuals. O&M manuals shall include complete instructions from manufacturer for operation and maintenance of equipment and devices, and shall be furnished for lighting fixtures, lighting controls, power distribution equipment, fire alarm system, and other items in this Division. Each manual shall include installation and operations instructions, all reports, calculations, settings, as-built shop drawings, and product data, wiring diagrams, guarantees, calculations, settings for each device, all tabulated with device designations, locations and settings available, and selected for each device.

c. Operation and Maintenance manual shall be provided and include instructions, all respective reports, and all its contents in electronic PDF (Printable Document File) files on compact disk (CD-Rom), in each binder. Include names, addresses, telephone number of contractor (and sub-contractors) the respective data. Submit organized manuals on each system in separate piano-hinged binders. Contents of O&M manual shall be as approved by the AC Transit Representative.

d. Electrical power system shall be a fully rated system. Each protecting device, including all disconnect switches, shall have AIC rating of 110% of calculated value. Series connected breaker ratings are not acceptable.

1.2 REFERENCE STANDARDS

A. The Following Abbreviations Apply to All Sections of Division 26:

1. AC: Alternating Current.

2. AIC: Ampere Interrupting Capacity.
7. AWG: American Wire Gauge.
8. CCR: California Code of Regulations.
10. CBM: Certified Ballast Manufacturers.
11. NEC: California Electrical Code.
12. DC: Direct Current.
13. ETL: Electrical Testing Laboratory.
15. HID: High Intensity Discharge.
16. HP: Horsepower.
17. ICEA: Insulated Cable Engineers Association
18. IEEE: Institute of Electrical and Electronic Engineers.
23. OSHA: Occupational Safety and Health Act.
24. PVC: Polyvinyl chloride.
26. UL: Underwriters' Laboratories, Inc.

1.3 QUALITY ASSURANCE

A. General Requirements:

1. Work performed under this Division shall be installed by craftsmen skilled in the trade involved, and apprentices as indicated in the General Conditions.
2. Furnish all control equipment for electrically operated equipment except when equipment is furnished with control equipment.

3. Furnish all electrical Work required for the service and connection of electrically operated and controlled equipment specified in other Divisions of the Specification.

4. All electrical power, signal, alarm and communication systems shall be complete, tested, and ready for use.

B. Requirements of Regulatory Agencies:

1. Codes and Ordinances: All materials shall bear the UL label.

C. Factory Tests:

1. Test Reports Shall Include the Following:
   a. Description of equipment tested.
   b. Description of tests.
   c. Test results.

2. The AC Transit Representative shall be notified fourteen (14) days in advance of when tests shall be performed. The AC Transit Representative shall witness tests.

3. Submit factory test reports, a minimum of fourteen (14) days prior to shipping equipment to project site.

Electrical Acceptance Tests:

4. General Scope:
   a. Contractor shall engage the services of a qualified testing laboratory for the purpose of performing inspections and tests of installed Work as herein specified and specified in other Sections of Division 26 of these Specifications.
   b. The testing laboratory shall furnish all material, equipment, labor and technical supervision to perform such tests and inspections and shall submit the draft test report to the ACT representative for approval and comment prior to starting the work.
   c. All tests shall be performed in compliance with the recommendations and requirements of the NETA, per Applicable Code Requirements.
   d. Upon completion of the tests and inspections noted in these specifications, a label shall be attached to all serviced devices. These labels shall indicate date serviced and the service company responsible.
   e. The tests and inspections shall determine suitability for continued reliable operation.
   f. All tests shall be conducted in the presence of the AC Transit Representative.

5. Qualifications of Testing Agency:
   a. The testing laboratory shall meet the Federal OSHA criteria for accreditation of testing laboratories, Title 29, Part 1907.
b. Contractor shall submit proof of the above qualifications.

c. All instruments used to evaluate electrical performance shall meet NETA’s Specifications for Test Instruments.

6. Test Reports Shall Include the Following:

a. Description of equipment tested.

b. Description of test, and applicable test standards used.

c. Test results.

d. Conclusions and recommendations, including corrective measures performed.

e. Appendix, including appropriate test forms, and related NETA Specifications.

f. List of test equipment used and calibration date.

7. A copy of all test reports shall be included in the Operation and Maintenance binder submittal.

8. All tests to be performed and test reports submitted for review by the AC Transit Representative, minimum of ten (10) working days prior to energization of equipment.

D. Furnish specified materials and products.

1.4 SUBMITTALS

A. Shop Drawings and Product Data:

1. Refer to Section 01 3323, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES for procedures.

2. Identify each item by manufacturer, brand, trade name, number, size, rating, or whatever other data is necessary to properly identify and check materials and equipment.

3. Identify each submittal item by reference to Specification Section paragraph in which item is specified, or Drawing and Detail reference, identify deviations, if any.

4. Organize submittals in same sequence as they appear in Specification Sections, articles or paragraphs. Prepare and make submittal individually for each specification section separately.

5. Shop Drawings shall show physical arrangement, construction details and finishes:

a. Drawings shall be drawn to scale and dimensioned where applicable.

b. Catalog cuts and published material shall be included to supplement scale drawings.

6. Internal wiring diagrams of equipment shall show wiring as actually furnished for this project, with all optional items clearly identified as included or excluded. Clearly identify external wiring connections. Identify and obliterate superfluous material.

7. Binders: Prepare submittal material in accordance with the following:
a. Insert all literature in standard 3-ring binders for 8-1/2 inch by 11-inch pages with individual tabs. Do not staple literature on different products together.

b. Number all binders on the outside of the cover, and spine, and indicate the Specification Section.

c. Furnish an index with binder. This index shall follow the same sequence as the Specifications. Each binder shall include a compact disk (CD Rom – Compact disk Read only memory) in hard plastic case, containing electronic PDF files of all contents in the binder. CD shall be labeled with the Project Name and Number, Submittal Number and Title, as well as date.

8. Submittal literature, drawings and wiring diagrams shall be specifically applicable to this Project and shall not contain extraneous material or optional choices. Clearly mark literature to indicate the proposed item. Submittals shall include, but not be limited to those items listed in individual Sections:

a. Include all physical and performance data, including materials, manufacturer's names, model numbers, weights, sizes, capacities, performance curves, finishes, colors, accessories, installation instructions, and all other data required to completely describe equipment and to indicate complete compliance with Specifications and Drawings.

b. Include with complete submittals above, complete, large scale, dimensioned Shop Drawings, certified by manufacturer, of all major equipment and other equipment as directed by the AC Transit Representative.

c. The following are required:

1) Time Schedules for Submission and Ordering: The Contractor shall prepare, review and coordinate his schedule of submissions carefully, determining the necessary lead time for preparing, submitting, checking, ordering and delivery of all materials and equipment for timely arrival. The Contractor shall be responsible for conformance with the overall construction schedule.

2) Submittals shall be reviewed for general compliance with Specifications only. The Contractor shall be responsible for deviations from the Drawings or Specifications and for errors or omissions of any sort in submittals.

3) Submit for review to the AC Transit Representative, within fourteen (14) calendar days of Notice to Proceed date, a complete list of material and equipment proposed for the project, including manufacturers' names and catalog numbers. Submission on all materials and equipment shall be made, even if they are as specified or shown on the Drawings.

4) The Contractor shall add and sign the following paragraph on all equipment and materials submitted for review.

   a) "It is hereby certified that the equipment, material shown and marked in this submittal is that proposed to be incorporated into the project; is in compliance with the Contract Drawings and Specifications and can be installed in the allocated spaces."

   b) Failure to add the above written statement for compliance shall result in return of submittals to be reviewed.

   c) Failure to include the properly labeled CD-Rom disc in each Submittal binder shall result in Submittal being returned without review.
5) The Contractor shall verify dimensions of equipment and be satisfied per Applicable Code Requirements for fit prior to submitting Shop Drawings for approval.

6) Where current limiting devices are specified, submit technical data to substantiate adequate protection of equipment cascaded downstream. Submittals shall not be reviewed unless supporting calculations and data are submitted therewith.

7) For any material specified to meet Underwriters' Laboratories, Inc. (UL) or trade standards, furnish the manufacturer's or vendor's certification that the material furnished for the work does in fact equal or exceed such Specifications.

8) Submit on all materials and equipment even if they are as specified or shown on the Drawings.

d. Resubmittals shall include written response to each item in review of previous submittal.

9. Submit to the AC Transit Representative Three (3) Certified Copies of the Following:

a. Documentation that the electrical equipment being furnished for the project complies with the calculations, results and recommendations of the professional electrical engineer.

1) AIC ratings shall be a minimum of 110% of calculated fault current values. Reports by Contractor shall include actual lengths and materials for each feeder as installed by Contractor. It shall also include a tabular comparison of equipment withstand and AIC ratings, and calculated fault current at each equipment and each disconnect switch.

2) All submittal copies of studies shall include PDF electronic files on CD-Rom disc.

b. Documentation that the adjustable and fixed settings of the protective devices in equipment have been adjusted to and tested at the settings. Contractor shall set and test (per NETA) all devices at agreed-upon settings and furnish a data sheet to the AC Transit Representative indicating final settings for all adjustable devices. Switchgear and distribution equipment shall comply with recommendations of short circuit calculations. Subsequent to review by the AC Transit Representative, submit report of NETA testing at the settings of each protective device, at least 14 days prior to energization of equipment.

c. Service and operating manuals for all equipment.

d. Three phase voltage test at each panelboard, each elevator, switchboard, and each motor location.

e. Report showing test voltage L-N and L-L on the secondaries of all transformers.

f. Grounding system tests.

g. Polarity test each receptacle connection.

h. Test reports.
10. Special Submissions:
   a. Test reports for the following:
      1) Ground fault devices, including ground fault interrupter (GFI) receptacles.
      2) Megger Readings: Ground system, motors, feeders and switchgear.
      3) Voltage Readings: Distribution, service and motors.
      4) Fire Alarm system, as required by Section 28 3100.
      5) Acceptance testing per NETA Specifications (2011 Edition) for all power system equipment including each circuit breaker, each disconnect switch, and each motor starter in the project. Include manufacturer’s testing standards used to verify the test results.
   b. Test reports required by the AC Transit Representative.
   c. Comply with Section 26 0500, COMMON WORK RESULTS FOR ELECTRICAL.

1.5 SUBSTITUTIONS
   A. Should the Contractor submit a manufacturer under the "or equal" provisions of these specifications, the following information shall be included in the submittal:
      1. A complete statement addressing the systems compliance with each requirement noted in each paragraph of this section, and each paragraph of specification section for respective equipment.
      2. For equipment other than that specified, the Contractor shall supply proof that such substitute equipment equals or exceeds the features, functions, performance and quality of the specified equipment; include the technical data of the specified equipment and that of the substitute equipment, as well as a tabular comparison between the two equipments. The submittal acceptance shall not relieve the Contractor of obligation to furnish the specified equipment or equal.
      3. Should the substituted equipment be determined not to be in compliance with this specification at any time during the course of the project, it will be the Contractor’s responsibility to remove non-compliant substitute products and furnish the specified products at Contractor’s expense, with no additional compensation by AC Transit.

1.6 COORDINATION DRAWINGS
   A. Furnish the following information on, but not limited to scale drawings in plan, sections with minimum ½” scale or ¼” scale as appropriate:
      1. Vertical and horizontal conduit type, route and size.
      2. Cabinet type, locations and size.
      3. Junction box type, location and size.
      4. Electrical equipment type, location and size.
      5. Pullbox type, locations and size (both internal and external).
6. Light fixture type, location and size, and connection details.
7. All equipment, electrical boxes and equipment.
8. Fire alarm system, including conduit layouts.
9. Submit in time so as not to impact project schedule.

1.7 LOCATION AND ROUTING

A. The Drawings indicate diagrammatically the desired location or arrangement of conduit runs, outlets, equipment, etc., and shall be followed as closely as possible. Execute the Work so as to secure the best possible installation in the available space and overcome local difficulties due to space limitations or interference with structural conditions, at no additional cost to AC Transit.

B. Verify dimensions and the correct location of equipment before proceeding with the roughing-in of connections.

C. Lighting fixtures are shown in their approximate locations only. Do not install light outlets or fixtures until structural elements are installed; then lighting fixtures shall be installed in locations best suited for equipment arrangement and as approved by the AC Transit Representative. Verify locations of fixtures with architectural drawings before installation.

D. All scaled and figured dimensions are approximate of typical equipment of the class indicated. Before proceeding with any Work, check and verify all dimensions, sizes, etc., with the Drawings to see that the equipment being installed shall fit into the spaces furnished.

E. Locations of Openings: Locate all chases, shafts and openings required for the installation of the electrical Work during framing of the structure. Do any cutting and patching required due to incorrectly located or omitted openings as approved and at no additional cost to AC Transit. Cutting or drilling in any structural member is prohibited without prior written approval of the AC Transit Representative. Where additional steel reinforcement is required due to grouping of conduit penetrations in walls and floors and concrete slabs, cutting and core drilling for conduit penetrations of building construction, it shall be included at no cost to AC Transit.

F. Access to Equipment. Locate starters, switches, receptacles, and pull boxes to provide easy access for operation, repair, and maintenance and, if concealed, furnish access doors.

G. Rough-in locations for all electrical equipment shall be determined from approved shop drawings or from the equipment itself, and shall be coordinated with work specified in other sections.

1.8 MATERIAL STANDARDS

A. All materials and equipment shall be new. All power distribution equipment shall be approved for seismic zone and requirements.

B. All Work shall comply with Applicable Codes Requirements and the following:
   1. CEC.
   2. NFPA.
   3. UL.
   4. NEMA.
5. ANSI.

6. EEE.

7. ICEA.

C. Items for similar application shall be of the same manufacturer.

D. The label of listing by UL shall appear on all materials and equipment for which standards have been established by the agency.

E. Where Codes, establish label or approval requirements, furnish all materials and equipment with either the required labels affixed or the necessary written approval.

F. Furnish the type and quantity of electrical materials and equipment necessary to complete Work and all systems in operation, tested and ready for use.

G. Furnish all incidental items that belong to the Work described and which are required for complete systems.

1.9 TESTING

A. Upon completion of the Work and adjustment of all equipment, conduct an operating test for each system approval. Conduct the test in the presence of the AC Transit Representative and the City Electrical Inspector if required by permit conditions. Demonstrate all systems and equipment to operate in accordance with all requirements of the Contract Documents and to be free from all electrical and mechanical defects. Furnish all systems free from short circuits and incorrect grounds and show an insulation resistance between phase conductors and ground not less than 250,000 ohms. Test all circuits and terminations for correct neutral connection, as well as phase connections.

B. Conduct resistance to ground tests by journeymen electricians and the required number of apprentices to measure resistance to ground at all grounding electrodes. If the resistances exceed values specified in Section 26 0526, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS, perform all corrective measures as approved and at no additional cost to AC Transit.

C. Prior to energizing any motors, measure the service voltage for phase balance and report immediately to the AC Transit Representative if unbalance exceeds 1% from mean.

D. Measure the three-phase voltage at no load and at maximum load conditions.

E. Complete all tests prior to final field observation of Project, including corrective Work based on the results of the tests.

1.10 SETTING OF PROTECTIVE DEVICES

A. Perform the settings of all protective devices in accordance with the coordination study, prior to final inspection by the City Inspectors.

B. Inspection and subsequent corrections shall be completed within one (1) week after project completion.

1.11 TRAINING
A. Furnish training programs and instructions to AC Transit personnel, unless indicated otherwise in individual specification sections.

PART 2 - PRODUCTS

2.1 GENERAL

A. Whenever possible, all materials and equipment used in the installation of the work shall be of the same brand or manufacturer for each class of material or equipment, and be U.L. Listed.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Be responsible for and install electrical equipment as specified in individual specification sections, and in accordance with manufacturers' recommendations, and per Applicable Code Requirements, for safe installation.

3.2 DEMOLITION

A. General:
   1. The work involves demolition of existing conduit, conductors and equipment.
   2. Coordinate with the AC Transit Representative regarding specific items that are to be demolished or removed and retained, otherwise, all demolished or Contractor removed materials become the property of the Contractor, unless otherwise indicated. Contractor shall be responsible for removing such materials from the job site.
   3. Contractor to dispose of hazardous waste, including ballasts and lamps, per Applicable Code Requirements.
   4. Furnish temporary equipment and wiring as required.
   5. Existing materials and construction that are not to be demolished shall be protected. Any such materials that are damaged shall be replaced with new to match existing.

B. Equipment: All the existing equipment to be removed shall be disassembled or cut into pieces to allow removal through available existing openings.

C. Conduits (Feeder and Branch): Conduit shall be capped for all abandoned installations, and indicated on As-Built drawings.

3.3 PROTECTION AND CLEANING

A. Protection: Fully protect all finished parts of the materials and equipment against physical damage from whatever cause during the progress of this work and until completion.

B. During construction, cap all conduits so as to prevent the entrance of sand and dirt.

C. Cleaning: After installation has been completed, the Contractor shall clean all systems as follows:
1. Equipment with factory finish: Clean exterior thoroughly to remove grease, oil, plaster, cement and dirt, and leave surfaces clean and polished.

2. Equipment to be painted: Clean exterior of piping and equipment exposed in completed structure, removing rust, plaster, cement and dirt by wire brushing. Remove grease, oil and similar materials by wiping with clean rags and solvents.

3.4 CUTTING AND PATCHING

A. Include all cutting, patching, painting, removal of existing construction, and reconstruction of same, for completing the electrical installation. Coordinate with architectural and electrical drawings and specifications for scope of demolition.

B. Sleeves and Inserts: Furnish all sleeves, inserts, and openings necessary for the installation of the electrical work. Sleeves shall be as approved by the AC Transit Representative.

C. Openings for All Electrical Equipment Shall be Field Verified:
   1. Special forming, recesses, chases, and curbs, as necessary for the correct reception and installation of the electrical equipment, as shown on the Drawings, are specified in other Divisions.
   2. The Contractor shall examine all Drawings to ascertain that correct provisions have been made for the work. If such provisions are not made in time, the Contractor shall bear all extra costs incurred in later cutting and patching to accommodate this work.

3.5 SEISMIC RESTRAINTS AND VIBRATION ISOLATION

A. Furnish seismic restraints and supports for equipment and work as specified in Division 26, other specification sections, and as noted on drawings. Seismic restraints and supports shall be installed directly after installation of any work requiring them, so as to avoid concealment or difficulty of access. Contractor shall be responsible for any costs and delays associated with gaining access to any installation needing restraints or supports.

B. Contractor shall furnish vibration isolators for all electrical equipment that emits noise and vibration.

C. Equipment Supports: Contractor shall furnish seismic calculations, and submit to the AC Transit Representative for review, for each location. Calculations to be stamped and signed by California registered Structural Engineer.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Grounding system as shown on the Drawings and as specified, complete.

1.2 QUALITY ASSURANCE

A. Testing: Contractor shall pay for the services of a qualified testing laboratory to perform the specified tests. Refer to Section 26 0500, COMMON WORK RESULTS FOR ELECTRICAL, for detailed requirements, in addition to requirements of this Section.

1.3 SUBMITTALS

A. Refer to Section 01 3323, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES for procedures and Section 26 0500, COMMON WORK RESULTS FOR ELECTRICAL for additional requirements.

B. Tests and Reports:

1. Testing laboratory shall report results of tests to the AC Transit Representative who shall approve or disapprove Contractor's Work.

   a. Conduct resistance-to-ground tests by Journeymen Electricians and the required number of Apprentices to measure resistance-to-ground at all grounding electrodes. Make tests before slabs of affected areas are poured in order that corrective measures, if required, may be taken. If the resistances exceed values specified, perform all corrective measures as approved by AC Transit's Representative.

C. Product Data:

1. Wire and cable.

2. Splice details.

3. Connectors.

1.4 QUALITY ASSURANCE

A. Furnish specified materials and products. Proposed product substitutions shall be submitted during the bid period as specified in Section 01 2513, PRODUCTS AND SUBSTITUTIONS.
PART 2 - PRODUCTS

2.1 MATERIALS

A. Grounding and bonding conductors shall be soft-drawn stranded copper conductors.

B. Buried or concealed joints shall be made by exothermic welding. All such joints shall be inspected and approved by AC Transit's Representative.

C. System grounding conductors shall be a minimum of #4/0 AWG unless otherwise indicated, and shall be continuous without joints or splices.

D. Bonding conductors shall be in accordance with the NEC.

E. Ground connection plates shall be 4-hole, Burndy Type YGF29-4N, O.Z. or equal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. In addition to the requirements of the Codes, furnish grounding and bonding in accordance with all requirements of NEC, Drawings and following descriptions.

B. Metallic conduits, wireways, metal enclosures of busways, electrical equipment housing and all non-current metallic parts shall be grounded. The metallic conduit system shall be used for equipment and enclosure grounding but not as a system ground conductor.

1. Low resistance contacts, with high mechanical strength, shall be made between conduits and boxes and at all panels, panelboards, terminal cabinets, outlet boxes, junction and pull boxes and wherever the conduit run is broken. Permanently and effectively ground all conduits, fixtures, motors, and other apparatus and equipment.

C. Transformers, and other isolated neutrals shall be grounded from the neutral bushing or connector to main ground electrode bus which is also connected to ground rods, cold water pipe, building steel. Generator neutral shall be grounded to the local ground rod system.

D. The interior metallic cold water system and metallic components of raised access floors shall be bonded to the building steel.

E. All conduit stub-ups shall be grounded and where multiple stub-ups are made within an equipment enclosure, such as a switchboard, they shall be equipped with grounding bushings and bonded together and to the enclosure and the enclosure ground bus, and connect to cold water ground.

F. All feeder runs and branch circuit wiring in non-metallic conduit shall carry a green TW insulated NEC sized ground conductor per circuit correctly connected for electrical ground continuity.

G. An equipment ground conductor shall be installed in each raceway with branch circuit wiring, adjust conduit size as required per Applicable Code Requirements.

H. Each feeder conduit shall be furnished with an equipment ground conductor with 600 volt insulation, adjust conduit size as required per Applicable Code Requirements.
I. Flexible conduit shall not be used as a ground path. Include NEC sized green conductor in all flex conduit.

J. Furnish NEC approved bonding devices, fittings or jumpers at expansion fitting, isolation sections or wherever continuity of ground is broken.

K. The electrical ground electrodes and its connections shall be tested.

L. Furnish bonding devices, fittings, jumpers, at expansion fittings, isolation sections or wherever continuity of ground is broken.

M. Each remote isolated ground connection shall be routed and terminated at the main ground electrode bus in main electrical equipment room.

N. Install grounding and bonding conductors with sufficient slack to prevent breaking due to settlement and movement of conductors at attached points.

O. Resistance to ground for electrical systems shall not exceed 5 ohms measurement and additional grounding shall be furnished to attain this value or less.

P. The resistance to ground for all systems shall be measured by the "direct" method or "fall-of-potential" method.

1. Perform fall of potential test per IEEE Standard No. 81, Section 9.04 on the main grounding electrode or system.

2. Perform the two (2) point method test per IEEE No. 81, Section 9.03 to determine the ground resistance between the main grounding system and all major electrical equipment frames, system neutral and derived neutral points.

3. The earth electrode under test must be far enough away from the water pipe system to be outside its sphere of influence. Rule of thumb: Distance from the earth-electrode system to the water pipe system shall be 10 times the radius of the electrode or grid to obtain a measurement within an accuracy of (±) 10%.
PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Outlet and junction boxes as shown on the Drawings and as specified, complete.

1.2 SUBMITTALS

A. Refer to Section 01 3323, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES for procedures and Section 26 0500. COMMON WORK RESULTS FOR ELECTRICAL for additional requirements.

B. Shop Drawings and Product Data: The following list includes the required shop drawings that shall be submitted.

1. Outlet and junction box construction, size and finish.

1.3 QUALITY ASSURANCE

A. Furnish specified materials and products. Proposed product substitutions shall be submitted during the bid period as specified in Section 01 2513, PRODUCTS AND SUBSTITUTIONS.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Outlet boxes and covers shall be galvanized pressed steel and plugged holes, and shall be hot dipped galvanized or sherardized. All boxes shall be of NEC size for the number of wires or conduits passing through or terminating therein, but in no case shall any box be less than 4 inch square by 2-1/8 inches deep, unless specifically noted as smaller on the Drawings. For boxes concealed in walls or ceiling, furnish the solid gang, galvanized or sherardized pressed steel knockout type. Sectional boxes shall not be used. Boxes in hazardous areas shall have the applicable thread requirements for termination of conduits.

B. Lighting fixture outlet boxes shall be equipped with fixture-supporting devices, as required by the unit to be installed.

C. Exposed boxes in mechanical areas or exposed to weather shall be cast iron weatherproof boxes with grounding terminal, threaded hubs and gaskets, Type "FS" or "FD" Series with 3/4 inch and 1" hubs, manufactured by Crouse-Hinds, Appleton, or equal. Pot metal boxes are not acceptable. Boxes located within hazardous areas shall be approved and listed for such use.

D. Telephone connection outlets shall be a minimum of 4-11/16 inches square by 2-1/8 deep.

E. Outlet boxes in hazardous areas, and outdoor locations, shall be cast metal with threaded hubs, approved for class of hazardous area where installed.
F. **Switch Outlets:** Use solid gang boxes for three or more switches for mounting behind a common single plate, with barriers to separate voltages where required.

G. **Fire alarm boxes shall be 4 inch square with plaster rings to suit type of device, painted red, inside and outside. Special boxes shall be as specified in Section 28 3100, DETECTION AND ALARM.**

H. **Condulets shall be cast iron with threaded hubs for 3/4 inch and 1 inch conduits. Type "FS" or "FD" Series, manufactured by Crouse-Hinds, or equal. Condulet-type fittings shall not be used in hazardous areas.**

I. **Floor boxes shall be cast metal with adjustable height boxes, and shall comply with U.L. 514A. Manufacturer: Hubbell No. B-2537 and B-2529; for flush duplex outlets S3925 brass duplex flap cover, or equal.**

J. **Acoustic pads shall be pliable, putty-like pads, 1/4 inch thick. Manufacturer: Harry A. Lowrey Associates, or equal.**

K. **Fire rated putty pads for boxes, U.L. Listed, located in fire-rated walls, ceilings, and partitions, Hilti #CP617, or equal.**

**PART 3 - EXECUTION**

3.1 **INSTALLATION**

A. Furnish all boxes necessary for installation of the electrical Work in compliance with NEC requirements.

B. Secure recessed boxes for ceiling outlets with galvanized steel bar hangers, specifically manufactured for the purpose, to ceiling channels to permit the installation of the box.

C. Single gang wall outlet boxes located at metal studs shall be screwed to the stud with sheet metal screws.

D. Single or multiple wall outlet boxes located between studs shall be secured in place to bar hangers between studs.

E. Nails shall not be used to support outlet boxes.

F. Secure recessed, pressed steel boxes in place with steel hangers specifically manufactured for the purpose. Fully or partially hammer driven screws are not permitted.

G. Use extension rings with blank covers for making exposed conduit connections to flush wall or ceiling boxes.

H. For boxes not specified or indicated, use boxes and mounting height as required by equipment and recommended by equipment manufacturer.

I. For outlets flush in exterior walls, use weatherproof joints and connections all around. Outlets shall have cast covers and be fitted with gaskets.

J. Do not locate outlet boxes not containing a circuit device in any public space. Place these boxes in storage rooms, electrical closets, or above accessible ceilings.
K. Place boxes which must be exposed to public view in a location approved by the AC Transit Representative. Furnish covers or plates to match adjacent surfaces as approved by the AC Transit Representative.

L. Covers for flush outlets shall finish flush with plaster or other finished surface.

M. Where both emergency and normal circuits feed a single light fixture, furnish an outlet box for each system.

N. For boxes installed in concrete, furnish the type specifically designed for the purpose to prevent entrance of concrete and to permit placement of box and conduit without displacing reinforcing steel.

O. Use boxes sized to legally accommodate all devices and conductors contained therein. Use no box smaller than 4 inch square by 2-1/8 inches deep, unless otherwise indicated.

P. Securely fasten all outlet boxes to the structural members. In concrete or drywall construction, set recessed boxes so that the front of the plaster ring or front of the box for those without plaster rings is not more than 1/4 inch behind the final finished surface. Set all recessed boxes in other types of construction so that the fronts are flush with the finished surface. Where these settings are not achieved, furnish a 24-gauge or heavier galvanized steel liner flush with finished surface.

Q. Furnish UL approved factory made knockout seals in the boxes where unused knockouts are not intact. Furnish recessed threaded plugs in all unused hubs of cast boxes.

R. Label the cover of each accessible junction box with panel and circuit designation and function, per specification Section 26 0553, IDENTIFICATION FOR ELECTRICAL SYSTEMS.

S. Multiple gang boxes containing switches on different circuits shall have barrier between such switches.

T. Paint the outside and inside of all boxes containing fire alarm devices with red paint.

U. Where boxes are mounted back-to-back in any wall, the minimum offset shall be 24”, edge-to-edge in fire rated walls, and minimum 18” with a stud in-between, in non-rated walls.

V. Furnish acoustic pads around all outlet boxes and switches located in walls, and furrings, and fire rated pads in new fire rated construction.

W. Furnish and maintain sufficient access and working space to permit access and safe maintenance to all boxes.

X. Paint panel and circuit number of all branch circuit wiring contained within box on the back inside surface of box.

Y. Each box shall have a device plate or blank coverplate, as applicable.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Interior pullboxes and wireways as shown on the Drawings and as specified, complete.

1.2 SUBMITTALS

A. Refer to Section 01 3323, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES for procedures and Section 26 0500. COMMON WORK RESULTS FOR ELECTRICAL for additional requirements.

B. Shop Drawings and Product Data: The following list includes the required shop drawing information that shall be submitted.
   1. Pullbox construction, size and finish.
   2. Seismic support and calculations signed by Structural Engineer, registered in State of California, including detail drawings.

1.3 QUALITY ASSURANCE

A. Furnish specified materials and products. Proposed product substitutions shall be submitted during the bid period as specified in Section 01 2513, PRODUCTS AND SUBSTITUTIONS.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Sheet steel pullboxes shall be fabricated of the gauge of sheet metal required by the NEC, galvanized after fabrication, furnished with required knockouts and removable screw cover. Finish with prime coat ready for painting, where exposed to public view; ANSI 61 light gray in other locations. Covers for pullboxes larger than 30” shall be two sections with handles, Cooper B-Line or equal. All exterior pull boxes shall be rain-tight, drip tight, weather –proof and in NEMA 3R enclosures, all UL Listed.

B. Furnish cast iron pullboxes with gasketed screw cover and drilled and tapped holes as required. Furnish boxes as manufactured by O.Z. Gedney, or equal.

C. Furnish galvanized sheet metal wireway and gutters with standard factory finish. Furnish wireways with hinged coverplate and accessories as required for full cable access, manufactured by Cooper B-Line, or equal.
PART 3 - EXECUTION

3.1 INSTALLATION

A. Pullboxes shall be installed in all conduit runs wherever indicated, and where necessary to facilitate the pulling of wires and cables.

B. Securely fasten to structural members or channel supports, per Applicable Code Requirements.

C. Do not install pullboxes in public areas unless specifically indicated on Drawings.

D. Install sheet metal pullboxes in dry protected locations.

E. Furnish access panels for pull boxes located above ceilings.

F. Install cast iron pullboxes in wet and damp locations. Boxes shall be flush with grade or above roof slab.

G. Furnish tight fitting bore or punch holes, through which rigid conduit shall be secured to boxes with a double lock nut and bushing.

H. Furnish nameplates on covers of interior wireways and pullboxes, describing system and function. Tag all conductors to identify circuits and origin, per specification Section 26 0553, IDENTIFICATION FOR ELECTRICAL SYSTEMS.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Nameplates and warning signs for all new and existing equipment, as specified, complete.

1.2 SUBMITTALS

A. Refer to Section 01 3323, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES for procedures and Section 26 0500. COMMON WORK RESULTS FOR ELECTRICAL for additional requirements.

B. Shop Drawings and Product Data: The following list includes the required shop drawings that shall be submitted.

1. Complete data, organized by system and respective equipment.

C. Refer to Section 02 4113, SELECTIVE DEMOLITION for disposal of waste resulting from demolition of existing electrical installation, and waste resulting from installation of new electrical materials.

1.3 QUALITY ASSURANCE

A. Furnish specified materials and products. Proposed product substitutions shall be submitted during the bid period as specified in Section 01 2514, PRODUCT OPTIONS & SUBSTITUTIONS.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Fabricated Nameplates Shall Clearly State the Following:

1. Manufacturer's name and equipment design ratings including current, voltage, KVA, HP, bus bracing rating or as applicable.

2. System usage and purpose, system nominal voltage, equipment rating KVA, amperes, HP and RPM as applicable. Designation data per Drawings or supplied with shop drawings.

3. Panel designation, voltage and phase.

B. Manufacturer's Device Nameplates: Device usage, purpose, or circuit number; manufacturer and electrical characteristic ratings including the following:

2. Switches: Voltage, continuous current, horsepower or maximum current switching. If fused, include nameplate stating "Fuses must be replaced with current limiting type of identical characteristics."

3. Contactors: Voltage, continuous current, horsepower or interrupting current, and whether "mechanically held" or "electrically held."

C. Nameplates – General:

1. Furnish laminated, engraved plastic nameplates with 1/2" high letters for all switchgear, switchboards, motor control centers, transfer switches, panelboards and signal system equipment cabinets and terminal cabinets. Furnish similar nameplates with 3/8" high letters for transformers, time switches, individually mounted breakers, switches and controls, and switchboard and motor center branch devices. Attach nameplates to gear with sheet metal screws. Adhesive mounted nameplates are not acceptable. Refer to single line diagrams and schedules for actual designations and circuit numbers.

2. Include nameplate schedule on shop drawing submittals.

3. Indicate equipment and/or equipment controlled and designation on component nameplates. Example:

   Switchboard Breaker: CIR 3 – PANEL 3AA  
   Submeter: kWHR SUBMETER AIR CONDITIONING  
   Time Switch: TSA – PARKING LIGHTS (served from Panel A)  
   Fire Alarm Terminal Cabinet: FIRE ALARM SYSTEM 24V DC

4. Install panelboard nameplates behind panel door in public area and on panel face in equipment rooms.

D. Nameplate Color Schedule:

1. Over 600V: Brown letters on white label.

2. 277 through 600V: Green letters on white label.

3. 120 through 240V: Black letters on white label.


5. Devices Connected Ahead of Service Mains and Substation Secondary Mains: Letter color as for switchboard on yellow label.


7. Communication or Signal Systems: White letters on black label. Identify system and voltage.


E. Stenciled Designations: Furnish readily visible block letter stenciled designations for the following with 1/2" high minimum letters on background of contrasting color, colors as outlined under nameplates. Fabricate stencils of brass and deliver to the AC Transit Representative on completion of work. Obtain receipt and include in maintenance manual:

1. Junction and pull boxes of signal and communication systems identifying system and voltage.
2. 277V Lighting Outlet and Junction Boxes: 480/277V.

3. 480V Outlet and Junction Boxes: 480V.

4. Each 10' length of medium voltage conduit, exposed or in accessible ceiling space and associated junction and pull boxes: DANGER HIGH VOLTAGE

5. Feeder conduit runs on 25’ centers and on both sides of wall and floor penetrations, where visible from floor and above demountable ceilings. Indicate circuit designation and number on all feeders. Indicate system on all signal and communications system conduit sized 1-1/2” and larger.

F. Labels:

1. At all fusible devices, either individually mounted or part of gear, furnish a label (as supplied by fuse manufacturer) or nameplate inside each switch cover, indicating specific type of fuse required for replacement.

2. Furnish label, in addition to UL label, for each switchgear, switchboard, panelboard, transfer switch, and motor control center indicating the short circuit rating of the gear as constructed and the minimum rating of devices allowable. Submit with shop drawings.

G. Conduit and Conductors:

1. Tag feeders at panels, switchboards, pull boxes, and other accessible enclosures, indicating source, voltage, circuit number, and conductor ampere rating. Tags to be readily readable after installation.

2. Identify medium voltage conductors with phase and circuit number.

3. In exterior or wet locations and for medium voltage conductors in all locations, furnish 1-1/2” diameter brass discs engraved or embossed with 3/16” minimum high letters and tied with No. 16 gauge galvanized wire.

4. In interior dry locations, furnish metal or laminated plastic discs as above, attached with nylon cord.

5. Tag exposed ends of conduit stubs indicating system, name of panel, switchboard, etc., of origin and conduit size.

6. Identify all branch circuit system conductors with premarked self-adhesive, wraparound cloth wire markers, indicating circuit number and name of panel, cabinet, etc., or origin, at panelboards, motor centers, switchboards, isolated power panels, terminal cabinets, wireways, junction boxes, and at outlet boxes containing more than one neutral wire.

7. Identification Format Example:

   Switchboard Feeder - SAA-1 480/277V-225A
   Panel AA Branch Circuit - AA-10
   Motor Control Center Circuit - MCCA-4 480V

H. Devices: Engrave on each device plate with 3/16” high block letters filled with black enamel where noted and as follows:

1. Lock switch and switch with pilot light – device controlled.

2. Switch for fan, motor, unit heater – equipment controlled.
3. Switch where lights or equipment are out of sight – equipment controlled.

4. Switches in gangs of three or more – description of lights or equipment switched.

5. All receptacles and switches – panel and circuit number reflecting installed condition.

6. All equipment on the normal and emergency systems – panel and circuit number reflecting installed condition.

7. Receptacles over 150V to ground and/or 30A and higher rating – voltage and ampere rating.

8. Where wording is not indicated, allow for ten letters per device and use wording as directed.

9. For switch cabinets engrave each device or furnish engraved nameplate.

I. Warning Signs: Conform with the latest edition of NEC. Furnish 18 gauge steel, white porcelain enameled signs with 1" high red letters to read DANGER! – HIGH VOLTAGE, AUTHORIZED PERSONNEL ONLY! Post on doors or entries to all rooms or areas containing equipment rated over 600V and on front of such equipment enclosures. Furnish similar signs with 1" high black letters in all electrical and communication rooms and closets reading ELECTRICAL (or SIGNAL) ROOM – NO STORAGE PERMITTED. Submit shop drawings.

J. Panel Schedules: Furnish printed panel schedules on inside of panel doors behind clear plastic. Indicate as-built number and type of outlets served and general location of outlets or fixtures and/or item of equipment served.

K. Diagrams and Posted Signs.

L. For signal and communication systems, furnish block wiring and location diagram mounted behind clear plastic and posted at system equipment location or in locations as designated by AC Transit Representative. Submit diagram from review with shop drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Nameplates shall be mounted by self-tapping, threaded screws and bolts, or by rivets.

B. Signs shall be permanently mounted with cadmium plated, steel screws or nickel-plated brass bolts.

C. Furnish single line power diagram under clear plastic cover in metal frame, located in each electrical room in main electrical room. Coordinate exact locations with AC Transit Representative.

D. Furnish signs as required by C.E.C.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Cabinets as shown on the Drawings and as specified, complete.

1.2 SUBMITTALS

A. Refer to Section 013323, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES for procedures and Refer to Section 260500. COMMON WORK RESULTS FOR ELECTRICAL for additional requirements.

B. Shop Drawings and Product Data: The following list includes the required shop drawing information that shall be submitted.

1. Cabinet construction and finish.

1.3 QUALITY ASSURANCE

A. Furnish specified materials and products. Proposed product substitutions shall be submitted during the bid period as specified in Section 01630, PRODUCT OPTIONS & SUBSTITUTIONS.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cabinets shall be surface mounted type as indicated. Cabinets shall be constructed of the gauge of sheet steel required by the NEC, with hinged lockable doors, common keyed with panelboards, equipped with 3/4" fire retardant plywood backboard; terminal blocks for connection; index card holders; and cards mounted behind heavy plastic on the inside of the cabinet doors. Size as indicated on the Drawings. Finish with a zinc primer when located in interior or exterior areas exposed to public view and ANSI 61 factory enamel. Furnish cabinets manufactured by Eaton Cutler-Hammer, or equal. All cabinets located outdoors shall be UL listed, rain-tight, drip-proof and in NEMA4X enclosures. Minimum depth of cabinets shall be 6".

PART 3 - EXECUTION

3.1 INSTALLATION

A. Securely fasten to structural members or channel supports.

B. Furnish nameplates in accordance with Section 260553.
PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Wiring devices, as shown on the Drawings and as specified, complete and in weatherproof enclosures.

1.2 SUBMITTALS

A. Refer to Section 01 3323, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES for procedures and Section 26 0500. COMMON WORK RESULTS FOR ELECTRICAL for additional requirements.

B. Shop Drawings and Product Data: The following list includes the required shop drawings that shall be submitted.

1. Each device indicating FS number, amperage and voltage rating, materials, color and manufacturer's catalog sheet.

2. Each device plate indicating materials and thickness or gauge of materials, color and manufacturer's catalog sheet.

3. All switches and receptacles shall be of same manufacturer.

4. Wiring and connection diagrams for sensors.

1.3 QUALITY ASSURANCE

A. Furnish specified materials and products. Proposed product substitutions shall be submitted during the bid period as specified in Section 01630, PRODUCT OPTIONS & SUBSTITUTIONS.

PART 2 - PRODUCTS

2.1 MATERIALS

A. All devices shall conform to NEMA standards, shall be UL listed and labeled, and shall be "Specification Grade," meeting the requirements of FS WC-596-F and switches meeting the requirements of FS WS-896-E. Devices in finished areas shall be Decora style.

B. Switches:

1. Wall switches shall be fully enclosed, heavy duty, quiet type tumbler Decora Style switches rated 20 amperes, 120 or 277-volt, nylon or composition.

2. Quiet switches, 20 ampere type, may be used in quiet locations at full rating for inductive or non-inductive loads and incandescent or fluorescent lighting loads.

4. Double Pole Quiet Switches: Hubbell 1222-I Series, or equal.


6. Wall switch and pilot lights shall be flush mounted combination wall type with switch and pilot light equipped with a 6-watt, 125-volt candelabra base lamp. The pilot light shall have a green jewel with brass rim flush mounted in the wall plate.

7. Contact momentary Control switches for lighting shall be 3-position, 2-circuit, center off, normally open, momentary contact, tumbler switches, Hubbell 1557W Series, or equal. The switch shall be wired so that the lights shall be “ON” when the switch is moved to the “UP” position.

8. Remote control motor switches shall be standard duty, momentary contact, push button, or selector switches, with pilot lights and jewels. Manufacturer shall be Square D, or equal.

9. Switches in outdoor locations shall have weatherproof plates: Hubbell HLB-1795, or equal.

C. Manual motor control switches for single-phase motors shall be flush or surface mounted, as required, full-voltage type with thermal overload protection and with pilot light and jewel where specified. Manufacturer shall be Cutler-Hammer, or equal.

D. Remote control switches shall be standard duty, momentary contact, push button or selector switches, equipped with pilot light and jewel, where specified. Manufacturer shall be Cutler-Hammer, or equal, and shall be mounted in the NEMA type enclosure most applicable for the location.

E. Limit switches shall be Square D, or equal.

F. Contactors for the control of lighting circuits shall be mechanically held, NEMA Size 2 or larger, with the number of poles as required by the schedules or diagrams. Contactors shall have coil clearing contacts. Manufacturers shall be Cutler-Hammer, or equal.

G. Receptacles:

1. Single and duplex convenience receptacles shall be U-grounded type, 125 volts, side and back wired with binding screws only. Rating 15 or 20 amperes as indicated, Hubbell 5361 and 5362, or equal.

2. The grounding contact shall be internally connected to the frame with ground terminal for external ground.

3. Ground fault Interrupter (GFI) receptacles, tamper-resistant, self-testing type, shall be 20 amperes, 125 volt, duplex, three wire grounding with pilot lights and test and reset buttons, suitable for self-testing type, suitable for feed-through, tamper-resistant, color to be as selected by University's Representative from manufacturer's standard colors, Hubbell GFR-5362SG-WSTR, or equal.

4. Convenience Cleaning Receptacles shall be 20 ampere, Hubbell 5362, or equal.

5. Wiring devices in exposed weatherproof boxes shall be the devices specified in this Section but weather-resistant type, and shall be installed in "FS" or "FD" series condulets with weatherproof cast metal covers, and gaskets as required.
6. Receptacle wireway (prewired plugmold) shall be Hubbell 4000 Series with device retention brackets, or equal.

7. All receptacles shall have matching plates.

H. Floor Outlets: Not used.

I. Plates:

1. Furnish engraved plates for all switches, receptacles, junction boxes, telephone and other outlets.

2. Stainless steel plates shall be AISI Type 302, with beveled edges, 0.040" thick with satin finish. Hubbell S Series, or equal.

3. Where outlets are indicated to be weatherproof, furnish AISI Type 302 stainless with double hinged covers.

4. Galvanized steel plates shall be square or rectangular and hot dipped galvanized or sherardized, beveled edges and 0.040" thick.

5. Furnish plates equipped with close fitting openings for the exact device to be used. Furnish plates for telephone outlets equipped with bushed openings.

6. Finish of Plates and Devices Shall be as Follows:

   a. Plates: Stainless Plates for emergency lighting and receptacles shall be with red engraving.

7. Finish of Plates and Devices Shall be as Follows:

<table>
<thead>
<tr>
<th>Location</th>
<th>Plate</th>
<th>Device Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Interior, Finished Areas</td>
<td>Stainless Steel</td>
<td>White</td>
</tr>
<tr>
<td>On Exterior</td>
<td>Cast Aluminum with Spring Loaded Cover</td>
<td>Brown</td>
</tr>
<tr>
<td>In Equipment Rooms or Other Generally Unfinished Areas</td>
<td>Stainless Steel</td>
<td>Brown</td>
</tr>
<tr>
<td>Janitor and Utility Rooms</td>
<td>Stainless Steel</td>
<td>Brown</td>
</tr>
<tr>
<td>Emergency Circuits</td>
<td>Stainless Steel</td>
<td>Red</td>
</tr>
</tbody>
</table>

* NOTE: Device colors except for emergency (red) may be changed at University's Representative's request if desirable to match building color scheme.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Mount switches 4’ (to the top edge of cover plate) above finished floor vertically in all locations unless indicated otherwise.
B. All convenience outlets shall be mounted 18" above the floor vertically. Install receptacle with the grounding terminal up. For horizontally mounted receptacles with the ground slot to the left. Refer to Architectural drawings.

C. CEC sized (#12 minimum) bonding jumper shall connect grounded outlet box to receptacle grounding terminal on all flush mounted units.

D. Align and plumb all devices and plates. Plates shall fit flat against wall and tight against device surface without strain on plate.

E. Each class of device shall be furnished by one manufacturer for total Project. Mixing devices of different suppliers shall not be permitted.

F. Coordinate exact placement of occupancy sensors with other trades, and per manufacturer’s recommendations.

G. Locate all devices coordinated with other trades, for the AC Transit Representative review.

H. Operation and Maintenance manuals, six (6) copies, shall be furnished including all product submittal data, installation instructions, wiring diagrams, for each type of sensor, warrantee. Each manual shall have a compact disk with electronic files in PDF format of all contents of manual.

I. Provide Ground Fault Circuit Interrupter type receptacles within 6’ radius of any sink, and outdoor locations, as indicated on Drawings for other locations, and in addition to GFCI’s at required locations per CEC 210.12B.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Furnish fire alarm system UV/IR detectors, H2 detectors, pull stations complete and operable and as specified.

1.2 SUBMITTALS

A. Shop Drawings and Product Data:

1. Building entry system, garage door wiring, and wiring diagrams.
3. Complete wiring diagrams and sequence of operation for each location.
4. Submittals shall comply with Division 01.
5. Test reports.

1.3 QUALITY ASSURANCE

A. Furnish specified materials and products. Proposed product substitutions shall be submitted during the bid period as specified in Division 01.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cabinets: Refer to Division 26.
B. Outlet Boxes: Refer to Section 26 0533.16.
C. Fire alarm system components shall be Simplex-Grinnell (no substitutes).

PART 3 - EXECUTION

3.1 INSTALLATION

A. Fire Alarm System – contractor subcontract with Simplex Grinnell to provide outlet boxes, conduit, pull stations, UV/IR detectors, H2 detectors cabling and wiring to customers existing system located at the fueling island communications room.
B. Furnish NEC sized ground conductor from each telephone cabinet and backboard to communication ground bus.

C. Equip all junction boxes with plaster rings, each outlet box for telephone/data shall have single gang plaster ring.

D. Furnish pullbox after each 180 degree bends.

E. Conduit/raceway installation to comply with EIA/TIA (Electronic Industries Alliance / Telecommunications Industry Association) specifications. Conduits to be routed within furrings at walls and ceilings.

F. Coordinate all work with the AC Transit Representative.

G. Make ground connection to equipment and conductive flooring.

H. Demonstrate to AC Transit personnel that the installations operate correctly.

I. Provide training to AC Transit personnel, schedule with AC Transit Representative.

J. Submit O&M manuals in accordance with Section 26 0500, COMMON WORK RESULTS FOR ELECTRICAL.

K. Perform testing for correct sequence of operation in presence of AC Transit’s Representative.

L. Perform all testing required by Fire Marshal, including door release upon fire alarm signal.

M. Rectify all deficiencies and retest until rectified.

N. Provide and make all wiring connections, including conduit and boxes.

O. Provide interconnection between door controllers, card readers, and security panel(s) in accordance with the equipment approved shop drawing submittal.

P. Demonstrate that all operations at door entry and electrified doors with card readers are correct, submit written report, and obtain the written acceptance from AC Transit prior to building occupancy.
PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Contractor shall subcontract with Simplex Grinnell to design and install fire alarm and hydrogen gas detection system and accessories.

2. The area of work includes bus maintenance bays room 125 and room 126. New pull stations, hydrogen gas detectors, warning beacons and horn, new exhaust fan control panels and existing bay door control panels shall be connected to the existing Simplex-Grinnell FACP (fire alarm control panel). Refer to SECTION 1.5 Sequence of Operations below.

3. The CONTRACTOR shall submit system design and product information to the fire prevention agency having jurisdiction for approval.

4. The requirements of Section 260500 - Common Work Results for Electrical, apply to the WORK of this Section.

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Commercial Standards

1. NEC National Electrical Code; Article 800 Communication Circuits.

2. NFPA National Fire Protection Association; No. 72.

1.3 CONTRACTOR SUBMITTALS

A. Furnish submittals in accordance with Section 01300 - Contractor Submittals.

B. Shop Drawings

1. Block diagram showing system relationships of major components and quantities and interconnecting cable requirements.

2. Plans showing equipment locations, raceway, and conductor requirements.

3. Control console and panel arrangements, equipment outlet devices, and special mounting details.

4. Wiring diagrams showing terminal identification for field-installed wiring.

5. Catalog literature for gas detectors, manual pull stations, beacons, strobes, and control panel components.

6. Control logic, electrical schematic, and connection diagrams for the entire system.

C. Stamp of approval: Furnish one copy of the system design and product information stamped with approval of the fire prevention agency having jurisdiction.
D. The CONTRACTOR shall furnish 3 copies of the operating and service manuals for the system. The manuals shall be bound in flexible binders with data therein printed or typewritten. Each manual shall include instruction necessary for proper operation of the system and shall include a complete block diagram of the system, a complete circuit diagnosis of the system, and a wiring designation schedule for each device as well as other major components and a replacement parts list.

1.4 QUALITY ASSURANCE

A. Manufacturer’s Qualifications: Fire alarm system components shall be manufactured by Simplex-Grinnell. Gas detection system components shall be manufactured by General Monitors model SC4000H or equivalent. Installer’s Qualifications: The CONTRACTOR shall post a typewritten notice at the fire alarm panel for the name, address, and telephone number of the firm to call when service is necessary. Notice shall be mounted in a glass-faced metal frame attached to the panel case.

B. Operation of the fire alarm and gas detection system shall be demonstrated to the Owner and Owner’s representative to prove that the system operates properly and complies with these requirements.

1.5 SEQUENCE OF OPERATIONS

A. Manual Pull Stations – The new manual pull stations shall tie into the existing Simplex-Grinnell FACP (fire alarm control panel) and shall alarm upon activation. Refer to electrical drawing GAS DETECTOR PLAN 1410AC13-E-110 for location.

B. Exterior Warning Beacons and Horn – The new yellow/blue warning beacon and horn installed at the east and west ends of the bays shall tie into the existing Simplex-Grinnell FACP (fire alarm control panel) and shall alarm upon activation. Refer to electrical drawing GAS DETECTOR PLAN 1410AC13-E-110 for location.

C. Circulation Fans – The new two-speed fans, two per bay, shall tie into the existing Simplex-Grinnell FACP (fire alarm control panel). Fans shall operate continuously at LOW speed and upon alarm shall operate at HIGH speed. Fans shall have HIGH/LOW speed manual control on panel front. Refer to electrical drawing ELECTRICAL PLAN 1410AC13-E-111 for location.

D. Hydrogen Gas Detectors – The new gas detectors shall tie into the existing Simplex-Grinnell FACP (fire alarm control panel) and shall alarm upon activation. Refer to electrical drawing GAS DETECTOR PLAN 1410AC13-E-110 for location.

1. If a hydrogen gas detector senses 25% LEL (lower explosive limit) the circulation fans shall go to HIGH speed, telescoping doors shall OPEN, yellow warning beacon shall activate, notification shall be sent to Facility/Manager and audible alarm will sound at the Maintenance Supervisor’s office.

2. If a hydrogen gas detector senses 40% LEL (lower explosive limit) the fire department shall be called, blue beacon shall activate and notification shall be sent to Facility/Manager and audible alarm will sound at the Maintenance Supervisor’s office. Fans shall continue to operate at HIGH speed and doors shall remain OPEN until reset at the FACP.

E. FACP – The existing fire alarm control panel shall be further modified to accomplish the following:

1. An ACKNOWLEDGE button and horn SILENCE with key access shall be provided on the fire panel located in the Maintenance Supervisor’s Office.
2. A separate key accessed RESET button will exist that will return the fans back to LOW speed upon ALARM RESET.

1.6 MAINTENANCE DURING CORRECTION OF DEFECTS PERIOD

A. The CONTRACTOR shall arrange for the installing firm to respond to trouble calls with a competent repair person at the Site within 24 hours of telephone notice; the installing firm shall also maintain a full inventory of replacement parts so that routine repairs can be completed within 24 hours.

PART 2 - PRODUCTS

2.1 EQUIPMENT

A. Manual Fire Alarm Pull Station: Manual fire alarm stations shall be of single action break glass rod type, with recessed pull lever, positive action pull switch, and double screw wiring terminals. Enclosure shall be cast metal finished in fire alarm red, surface or semi-flush mounted. Manual stations shall be Simplex-Grinnell.

B. Fire Alarm Control Panel: The existing fire alarm control panel shall contain alarm-receiving circuits with double zone capability. Each zone circuit shall be suitable for connection to manual fire alarm stations, heat detectors, and smoke detectors as indicated. Upon receipt of an alarm, the receiving circuit shall lock into alarm and pulse its individual red zone LED, and signal the common control unit. An alarm output on a zone basis shall be supervised through an end-of-line resistor. In addition, any number of heat or smoke detectors or manual stations can be added and intermixed on each 2 wire detector circuit. Initiating devices shall be able to operate on a 24 volt dc power supply integral to the fire alarm control panel. Provisions for accepting alarm input through the computer from the HVAC system shall be included.

C. Fire Alarm Circuits and Gas Detection: Circuits shall be electrically supervised so that a trouble signal shall indicate the occurrence of a single open or a single ground fault that would prevent proper alarm operation.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Fire alarm system installation shall be performed in accordance with manufacturer's written recommendations.

B. Electrical WORK involving connections, controls, stations, etc, shall be performed in accordance with the applicable section of Division 26.

END OF SECTION
PART 1 - GENERAL

1.1 SCOPE OF WORK

    A. Furnish all labor, materials, equipment and incidentals and install, test and place in satisfactory operation the electric overhead traveling bridge crane with controls and appurtenances, as shown on the Drawings and as specified herein. The work includes, but is not limited to, columns, runways, bracing, tie-backs, hoist, bridge, crane rail end stops, trolleys, electrification, motor starters, limit switches and push-button controls.

    B. Design of the crane rails shall be confirmed by the crane manufacturer.

1.2 RELATED WORK

    A. The 480 Volt, 3 Phase power supply, including a safety disconnect switch and junction box adjacent to the end of the crane rail are included in Division 26. All other electrification and control systems including but not limited to conduit and wire beyond the junction box shall be furnished and installed under this Section.

1.3 SUBMITTALS

    A. Contractor must submit manufacturer’s data sheets to Engineer for approval showing the make, model, dimensions, lifting capability, and performance information for all equipment (crane, trolley, and hoist) prior to purchase. If necessary, include the following:

    1. Certified shop and erection drawings showing all important details of construction, dimensions, erection and support locations. Submit calculations for the design of the bridge crane for record purposes. Shop drawings and calculations shall be stamped by a Professional Engineer registered in the State of California.

    2. Descriptive literature, bulletins and catalogs of the equipment.

    3. A complete bill of materials for all equipment.

    4. A list of the manufacturer’s recommended spare parts with the manufacturer’s price for each item. Prices shall be guaranteed for not less than 1 year from the date of submittal. Include fuses, wire rope, contactors, etc., on the list.

    5. Complete date on motors.


    B. In the event it is not possible to conform with certain details of this Section, describe completely all non-conforming aspects.

    C. Operations and Maintenance Data

    1. The manuals shall be prepared specifically for this installation and shall include all required cuts, drawings, equipment lists, descriptions that are required to instruct operating and maintenance personnel unfamiliar with such equipment.
2. Provide services of factory-trained service engineer, specifically trained on type of equipment specific. Submit qualifications of service engineer for approval. Man-day requirements listed are exclusive of travel time and do not relieve Contractor of obligation to provide sufficient service to place equipment in satisfactory operation.

   a. Installation: to assist in location of anchor bolts; setting, leveling, field erection, coordination of piping, electrical, miscellaneous utility connections: Two 8 hour-man-days
   
   b. Start-up, testing and calibration: One 8-man-day
   
   c. Operation and maintenance orientation: 30 min to 1 hour (after load test).

D. Design Responsibility

1. Certification by the Contractor, signed by registered professional engineer licensed to practice engineering in the State of California, stating that all members, elements, and connections including runway end stops, are designed to withstand required loads and forces. Design shall conform to the 2013 California Building Code and any other applicable codes.

2. Codes and standards to which structural design conforms

1.4 REFERENCE STANDARDS

A. Requirements of REGULATORY AGENCIES: Comply with all applicable Federal, State and local codes, and with requirements of all authorities having jurisdiction.

B. Underwriters Laboratories (UL)

C. Occupational Safety and Health Administration (OSHA)

D. California Electrical Code (NEC)

1.5 QUALITY ASSURANCE

A. Design of the overhead bridge crane shall be in general conformance to CMAA 74, except as otherwise specified herein.

B. Permanently mark the capacity of the hoist, trolley, and crane on each unit, in easy to read letters and a prominent position.

C. Equipment of manufacturer’s latest and proven design, compatible with functions required.

1.6 OPERATING INSTRUCTIONS

A. Qualified manufacturer’s representatives shall be provided to instruct the Owner’s operating personnel in the proper operation and maintenance of the equipment for at least 30 mins to 1 hour exclusive of travel time. This work may be done in conjunction with the requirements for start-up and testing under PART 3.

1.7 DELIVERY, STORAGE AND HANDLING
A. Suitably cover equipment and crate to provide protection against weather and possible damage in handling, transporting and storage. Protect controls and electrical equipment from moisture and block, brace and otherwise restrain to prevent damage.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. All equipment herein specified shall be as manufactured by American Equipment Inc. (801-269-0896), Salt Lake City, UT; ACCO Industries Inc. – Hoist & Crane Division, York, PA; or equal

2.2 CRANE RUNWAY

A. Provide any additional structural steel bracing required to assure rigidity of construction and to maintain accurate gauge of the length of crane.

B. Verify all dimensions and clearances in field prior to erection and take responsibility for proper fitting and operation of equipment.

C. Runway rail and j-bolts shall be furnished and installed.

D. Furnish and install end stops and accessories on the crane runway rail designed to withstand the impact imposed by stopping of fully loaded crane. The end stops shall be securely anchored and positioned to protect adjacent construction, materials, equipment or similar obstructions.

2.3 CAPACITY

A. Electrically operated bridge crane shall meet the following requirements:

- Capacity……………………………………………1 Ton
- Hoist Make & Model………………………………..ACCO Electric Wire Rope
- Crane Span…………………………………………18’
- Lifting Height………………………………………..14’-4”
- Hoist Speed…………………………………………15 / 5 FPM
- Trolley Speed………………………………………..50 / 17 FPM
- Bridge Speed………………………………………..100 FPM 2 Step Variable
- Power………………………………………………...480v / 3ph / 60hz
- Duty Cycle…………………………………………CMAA Class C
- Environment……………………………………….Class 1, Division 2, Group B above 8’

Mechanically Spark Resistant Features are NOT INCLUDED

AmQuip Yellow Industrial Enamel Paint

8-Button Pendant from Hoist
2.4 BRIDGE

A. Single girder top running type crane bridge. Crane girders designed to resist all vertical, lateral and torsional forces combined as specified in CMAA 74

B. Girders rigidly connected with end trucks. Connections in both vertical and horizontal planes, and designed and constructed to keep entire bridge structure square and aligned under all operating conditions. Furnish and install end stops designed to withstand the impact imposed by stopping of a fully loaded hoist trolley. The end stops shall be securely anchored and positioned to protect adjacent construction, materials, equipment, or similar obstructions.

C. Bridge end trucks shall be of box steel construction providing rigid structure. End truck minimum wheel base shall be 4-ft. Bridge trucks shall have ball or roller bearings and medium or high carbon steel or high strength alloy steel fixed or rotating type steel axles. Provide for easy removal of wheels and axles. Entire truck shall be machined as a unit to ensure perfect alignment. Provision shall be made to prevent drop of more than 1-in in case of axle failure.

D. Double flanged rolled bridge truck wheels of graphite ductile iron or cast steel with hardened treads. Wheels designed to carry maximum wheel load under normal operating conditions without undue wear. Diameter not less than that shown for maximum load in CMAA 74.

E. The bridge drive shall be in accordance with the CMAA service classification specified herein, and shall consist of dual drives, with one drive connected to one wheel of each end truck. Design driving mechanism so travel will be steady and free from vibration or racking in any part of structure while traveling under maximum load. Prevent any tendency for crane structure to get out of line while traveling along runway under any operating condition.

2.5 HOIST AND TROLLEY

A. Hoist shall be close headroom type. Welded steel or cast steel trolley frame construction or a combination of both. Rigid construction designed to transmit load to bridge rails without undue deflection. Provision shall be made to prevent drop of more than 1-in in case of axle failure.

B. Two speed electric hoist with spur-, helical-, or herringbone-gears and anti-friction bearings throughout, including a mechanical load brake and a separate electrically operated motor brake. Shafts of motor drum and drum pinion shall run in grease-lubricated ball or roller bearings. Gear train and bearings shall be oil-bath or splash lubricated.

C. Trolley wheels similar in design and construction to bridge truck wheels.

D. Trolley drive consists of fully enclosed electric motor driving through spur or worm gears driving one wheel on each side of trolley. Geared transmission completely enclosed in oiltight housing. Ball or roller bearings used throughout.

E. Steel or high grade cast iron drum designed to withstand combined crushing and bending loads and not less than two complete wraps of hoisting rope to remain in grooves when hook is at lowest position for lift specified and no overlapping of rope when hook is at highest point.

F. Provide limit switch at upper and lower limits of hook travel.

G. The non-twisting type hoisting ropes shall be of flexible high strength plow steel with a load safety factor of 5 to 1.

H. Load block frames of steel construction with rolled steel or forged steel hook, supported on ball or roller thrust bearing and hook rotating freely on bearing.

I. Provide only safety-type hooks.
2.6 BRAKES
A. Brakes shall be provided on driving motor shaft or gear train to stop rotation of armature without causing driving wheels to lock too quickly.

B. Bridge motor furnished with self-adjusting A.C. or DC rectified disc-type brakes. Hoist motor furnished with A.C. disc brakes which holds load and is applied automatically on power removal. Provide mechanical load brakes for hoist motion to prevent overspeeding. Brakes shall be easily accessible for external adjustment by removing cover plates.

2.7 MOTORS
A. Motors installed above 8 feet AFF for Hoists, Trolley, and Bridge: Totally enclosed, reversible, Class F insulation, induction motors, Class 1, Div 2, Group B, especially adapted to crane service and suitable for operation on 480 Volt, 3 Phase, 60Hz, alternating current.

2.8 ELECTRICAL CONTROLS
A. Supply complete integral electrical control system with the electric bridge crane equipment (by crane manufacturer) consisting of starters, circuit breakers, overload relays, limit switches, control transformer for a 120 Volt control circuit, control relays and controlling devices.

B. Furnish dual speed magnetic contactor controls for hoist & trolley. Furnish VFD controls for bridge motion. Controls shall permit “inching” in both forward and reverse directions under full load.

C. Compliance: All electrical equipment including motors, controls, resistors, brakes plus all conduit, wiring, panels, and enclosures shall be in accordance applicable requirements for materials, workmanship, construction and installation of NEC.

2.9 PUSH BUTTON CONTROL
A. Crane shall be operated from a manually operated pendant push-button control station suspended from the hoist.

B. The pendant push-button control station shall be provide with the following push buttons. Each push button shall be clearly marked to indicated its function.

   1. Hoist
      a. Up, Down, Low Speed, High Speed

   2. Trolley
      a. Left, Right

   3. Bridge
      a. Forward, Reverse

C. Pendant pushbutton station shall have a grounding conductor between a ground terminal in the station and the crane.

D. Mount bridge control equipment in an enclosed compartment which forms an integral part of bridge crane and includes transformer for a 120 Volt control circuit. Mount hoist and trolley controls in an enclosed compartment on the hoist trolley.
2.10 CONDUCTORS AND COLLECTORS
A. C-Track festoon systems are required for the bridge and trolley electrification.
B. Terminate runway festoon conductors to the junction box installed under Division 26. Conduit and wire shall conform to all applicable provisions of Division 26.

2.11 PAINTING
A. All components of the bridge crane shall be primed and finish painted in the manufacturer’s shop. Paint system shall be the manufacturer’s standard for indoor applications. Furnish at least one quart of each color paint for future touch-up by the Owner.

PART 3 - EXECUTION

3.1 INSTALLATION
A. Prior to construction of the crane, the Contractor shall layout the proposed bridge crane in the garage to confirm that the crane will fit within the intended space. Interferences with existing utilities, structure and any other items shall be checked. Any problems or conflicts shall be brought to the attention of the Engineer.
B. Furnish the services of a manufacturer’s engineering representative, specially trained in the type of equipment to furnished herein. The manufacturer’s representative shall be present during installation of the crane bridge and hoist to check location of bracing and supports, setting and leveling, clearances, electrical connections and other critical components.
C. Verify all dimensions and clearances in field prior to erection and be responsible for proper fitting and operation of equipment.
D. Install crane in strict conformance with recommendation of each manufacturer and under direct supervision of manufacturer’s representative.
E. Obtain approval before attaching any rigging or hoisting equipment to any part of building structure.
F. Prepare surfaces as approved, prime and touch-up finish paint all areas of crane equipment and components where paint has been damaged. Perform this work to the satisfaction of the Engineer.

3.2 FIELD ACCEPTANCE TESTS
A. Perform field tests before final acceptance under supervision of manufacturer’s representative.
B. Test crane after installation is complete to ensure compliance with this Section and standards. The crane shall be tested at its rated load. Furnish test load. The crane functions such as hoisting and lowering, trolley travel, bridge travel, limit switches, locking and safety devices shall be tested to determine that the equipment will perform satisfactorily and safely without failure of any parts. Any defects in the equipment indicated by the tests shall be replaced/ corrected and retested.
C. Include a check of horizontal and vertical alignment of rails.