PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The requirements of the General Conditions, Supplementary Conditions and the following Specification sections apply to all Work herein:
   1. Division 26 Specifications - All sections.
   2. Division 28 Specifications - All Sections.

1.2 SUMMARY

A. The Electrical Subcontractor shall provide all labor, materials, tools, scaffolding, machinery, equipment, appliances and services necessary to complete the Electrical Work under this Construction Contract. All systems and equipment shall be complete in every respect and all items of material, equipment and labor shall be furnished and installed for a fully operational system. The Electrical Subcontractor shall coordinate its Work with the Work of the other trades so as to resolve any conflicts without impeding job progress or the Schedule. Provide notice with the bid proposal to the Owner and Contractor with the bid proposal of any concrete Work required by this Division that is not indicated on the Structural, Architectural, HVAC, Plumbing, FDAC, Fire Suppression, or Electrical Drawings.

B. The Electrical Subcontractor shall examine all the Architectural, Structural and HVAC, Plumbing, FDAC, Fire Suppression Drawings and other Divisions and sections of the Specifications in order to determine the complete scope of the Work required to be completed under this Division. Failure to examine all the Contract Documents for this Project will not relieve the Electrical Subcontractor of the responsibility to perform all the Work required for a complete, fully operational and satisfactory electrical installation.

C. The Electrical Work to be performed under this Construction Contract is all in connection with the construction and erection of a Project located in San Francisco, California.

1.3 REFERENCE STANDARDS

A. All Work required by these Specifications shall comply with the latest applicable standards of the following:
   1. Underwriters Laboratories, Inc. (UL)
   2. Electrical Testing Laboratories (ETL)
   3. National Electrical Manufacturers Association (NEMA)
   4. American National Standards Institute (ANSI)
   5. National Fire Protection Association (NFPA)

B. In addition, all Work required by these Specifications shall comply with the applicable standards listed in the various sections of the Specifications as well as the requirements of the local authorities having jurisdiction.

C. All equipment and material to be furnished and installed on this Project shall be UL or ETL listed, in accordance with the requirements of the authorities having jurisdiction, and suitable for its intended use on this Project.

1.4 SUBMITTALS

A. The following submittal data shall be furnished according to the General Conditions and Section 26 00 10 and shall include, but not be limited to:
   1. Refer to specific Specification Sections for all submittal requirements.

B. All items or equipment listed with asterisks (*) shall be certified by the manufacturer using Manufacturer Certification “MCA” as set forth in Section 26 00 10. See Section 26 00 10 for certification requirements.

1.5 WARRANTY

A. Comply with the requirements of the General Conditions and Section 26 00 10.

1.6 WORK INCLUDED

A. The Work includes but is not limited to the following systems, equipment and services:
1. Normal electrical distribution system consisting of all items indicated on the Drawings and/or specified herein, such as:
   a. Any electrical Work required for power company service installation as shown on the Drawings. PG&E will furnish and install service transformers as required in the vaults shown on the Drawings.
   b. Installation and coordination of power company metering requirements.
   c. 600 volt switchboards.
   d. Power distribution and lighting panel boards.
   e. Transformers as indicated on the Drawings and as specified herein.
   f. Power wiring to the fire, smoke, and/or combination fire/smoke damper actuators.
2. Standby power system consisting of all items indicated on the Drawings and/or specified herein, such as:
   a. Standby electric generating system including diesel generators.
   b. Main distribution panel board.
   c. Automatic transfer switches.
   d. Power distribution and lighting panel boards.
   e. Emergency lighting and exit lighting.
   f. Transformers as indicated on the Drawings and as specified herein.
   g. Power wiring to the fire, smoke, and/or combination fire/smoke damper actuators.
   h. Electrical conductors and other connections as required for complete functioning of all lighting, power and other electrical requirements.
3. Individual motor controllers and motor control centers, except variable speed drives and integral system controllers provided by others.
4. Connection of all motors, equipment, interlocks, safety devices and other components as specified herein or indicated on the Drawings, including all motor controllers.
5. Lighting Control Relay Panels.
6. Provide conduit, sleeves, outlet boxes and other rough-in as required and related to the Fire Detection, Alarm and Communication System FDAC as specified in Division 28 and indicated on the Drawings including:
   a. Fire detection systems.
   b. Fire alarm systems.
   c. Fire communication systems.
   d. Miscellaneous alarms and supervisory switches. See Division 21, 22, 23, 25 and 28 for requirements.
7. Furnishing and installing all control power and interlock wiring associated with the electrical system equipment including interface to the FDAC System and the emergency power system.
8. Provide all 120V power circuits to the locations shown on the Drawings for the Division 25 BMCS, Division 28 Security System, and the Division 28 FDAC system. Provide software communication interfaces between selected equipment and the BMCS.
9. Provide all 120V power circuits to the locations shown on the Drawings for the security system. Provide all conduit back boxes, sleeves, rough-in, etc. for the security system specified in Division 28 and shown on the security drawings.
10. Connection of all equipment furnished under other Divisions and/or by the Owner.
11. Furnishing and installing all lighting fixtures, complete with lamps, including but not limited to Architectural Lighting Fixtures specified by the Lighting Consultant for the Project.
12. Lightning protection system.
13. All Work associated with providing the required wiring and conduit as well as required operating power, wiring and conduit to the preaction sprinkler systems, and dry pipe air compressors furnished by the Fire Suppression Subcontractor.
14. Furnishing of Coordination Drawings as specified herein.
15. Furnishing of Project Record Documents as specified herein.
16. Furnishing of Shop Drawings, Product Data and Samples.
17. Furnishing of Test Procedures, Test Reports, and Certifications as specified and required for all Division 26 Work.
18. Insulation resistance testing as described in Section 26 05 19 titled “Electrical Conductors – 600 Volts”.
19. Complete record of current and voltage on all feeders and for all motors during normal operation as described in Section 26 05 19 titled “Electrical Conductors – 600 Volts”.
20. Mounting, installing and aligning all loose motors, control panels, and drives not factory installed on equipment, including the typical floor variable speed drive air handling unit controllers.

21. Operation and maintenance books.
22. Miscellaneous items as required for complete and functioning systems as specified herein and indicated on the Drawings.
23. Provide all excavation and backfill required for Division 26 Work.
24. Performance and acceptance testing of electrical equipment and systems as specified herein and required by the authorities having jurisdiction. Participate in and provide labor for "off hour" testing of equipment and systems as required by working conditions or by the authorities having jurisdiction to obtain the "Temporary Certificate of Occupancy (TCO)".
25. The Division 26 Subcontractor shall provide all diesel fuel required for testing of the standby generators as specified and as required by the authorities having jurisdiction. This includes the Initial fill of the day tanks and remote storage tanks specified by Division 22. Upon Project completion and prior to Final Completion of the Project, the Division 26 Subcontractor shall fill the tanks.
26. Sleeves for all Electrical Work and Division 28 FDAC Work, complete with seals and firestop as specified herein and as required by the authorities having jurisdiction.
27. Patching or replacement of all fire proofing and/or firestop if it is damaged or removed during the installation of the Division 26 Work.
28. Participate in and provide equipment, materials and labor as required to construct at the Project Site, a complete electrical "mockup", in or out of sequence, of one (1) typical floor including the associated air handling unit rooms, electrical closets and telephone closets. See Architectural Specification Section 01 for details and construction requirements. The field "mockup" will remain in place for use in the completed building electrical systems. The "mockup" will be reviewed and will serve as a model for the electrical installation on other similar typical floors.
29. Participate in and provide electrical equipment, materials and labor as required to construct at the Project Site a toilet room "mockup" in or out of sequence, at the Project Site. See Architectural Specification Section 01 for details and construction requirements. The field "mockup" will remain in place for use in the completed building electrical systems. The "mockups" will be reviewed and will serve as a model for the electrical installation on other similar typical floor toilet rooms.
30. Working telephone cabling for all elevator systems, fire command center, fire alarm system, security system, and security desk at main lobby.

1.7 PARTIAL LIST OF WORK NOT INCLUDED IN DIVISION 26

A. Concrete equipment pads and concrete fill for equipment bases. The Electrical Subcontractor shall be responsible for providing the Contractor with the correct dimensions, layout, equipment anchor bolts, etc., for all equipment.

B. Installing access doors in General Construction. Provide quantity of access doors being provided in the bid proposal.

C. Painting except touch up painting and as otherwise specified herein.

D. All formed concrete Work indicated on the Structural, Architectural, Mechanical, or Electrical Drawings.

E. Furnishing of motors.

F. Furnishing of individual motor controllers that are factory mounted and integral parts of pieces of equipment, variable speed drives, and integral system controllers such as water chilling unit controllers, etc., provided by Division 21, 22, and 23.

G. Furnishing, installing and connecting telephone wiring, cables and equipment except as required for fire alarm and elevator communication systems.

H. Compaction testing.

I. Building Control System: Division 25 - except for power provisions as indicated on the Drawings.

J. Security System: Division 28 – except for power provisions, conduit, sleeves, and raceway systems as shown on the Drawings.

K. FDAC System: Division 28 except for power provisions, conduit, sleeves, and raceway systems as shown on the Drawings.

1.8 PROPOSALS AND ALTERNATES

A. See Contractor's or Owner's "Instructions to Bidders" and Section 01 for additional proposal requirements and for additional information related to Allowances, Unit Prices and Alternates.

B. Compliance Reviews: The FDAC Subcontractor and equipment vendor shall provide a Compliance Review with the bid proposal of the applicable Drawings, Specifications and Addenda for each "Equipment Alternate" listed hereinafter for this Project. The Compliance Review will be a paragraph-by-paragraph review of the Specifications with the following information, "C", "D", or "N/A" marked for each Specification section paragraph in the margin of the Specification and any applicable Addenda.
   1. "C": Comply with no exceptions.
   2. "D": Deviation. Equipment, product or material does not comply. For each and every deviation, provide a numbered footnote with reasons for the deviation for the Owner's consideration and possible alternatives.
   3. "N/A": The Specification paragraph does not apply to the proposed equipment, material or product.
   4. The compliance review is intended to be a confirmation that the proposed equipment is in complete compliance with the requirements of the Contract Documents. In the event that a listed manufacturer cannot meet the requirements of the Contract Documents because of limitations of their manufacturing process or their equipment, such deviations must be detailed for review by the Owner. Any and all deviations to the requirements of these Specifications must be identified and may impact the Owner's acceptance of the Alternate.
   5. Unless a deviation is specifically noted in the Compliance Review, it is assumed that the equipment proposed is in complete compliance with the Contract Documents. Deviations taken in cover letters, subsidiary documents, by omission or by contradiction do not release the Subcontractor from being in complete compliance, unless the deviation has been specifically noted (explicitly, not by implication) in the Compliance Review.

C. Equipment Alternates: The Equipment Alternate cost shall include only the equipment cost, sales tax, warranty cost, startup costs and the Subcontractor's markup and fee. The complete material and labor installation costs including testing and service shall be included in the Subcontractor's base bid proposal.

D. Miscellaneous Alternates:
The cost of the following Miscellaneous Alternates shall include all labor and material cost, sales tax, warranty cost, testing, startup costs and the Subcontractor's markup and fee.
   1. Alternate E-1: In lieu of the electrical service to the water chilling units shown on the Drawings, provide electrical service to water chilling units with efficiencies of 0.45 NPLV and 0.55 kW per ton at full load as specified in HVAC Alternates M-1, M-1A, M-2, M-2A, M-3, AND M-2A. This Alternate cost shall only include any revisions required to the service shown on the Division 26 Drawings to accommodate the water chilling unit efficiency specified in these Alternates. This Alternate cost shall include all equipment, material, labor cost, sales tax, warranty cost, startup cost and the Subcontractor's markup and fee.
   2. Alternate E-2: In lieu of the electrical service to the water chilling units shown on the Drawings, provide electrical service to the water chilling units with efficiencies of 1.45 NPLV and 0.60 kW per ton at full load as specified in HVAC Alternates M-4, M-4A, M-5, M-5A, M-6, M-6A. This Alternate cost shall only include any revisions required to the service shown on the Division 26 Drawings to accommodate the water chilling unit efficiency specified in these Alternates. This Alternate cost shall include all equipment, material, labor cost, sales tax, warranty cost, startup cost and the Subcontractor's markup and fee.
   3. Alternate E-3: Perform thermograph testing as described in Specification Section 26 08 13 titled "Testing".
   4. Alternate E-4: Provide busway end tap box fittings as described in Specification Section 26 25 00 titled "Busways".
   5. Alternate E-5: Provide maintenance and service agreements as described in Section 26 32 13 "Engine Generators".
      a. Alternate E-5A - Generator Initial Maintenance Service.
      b. Alternate E-5B - Generator Extended Maintenance Service.
   6. Alternate E-6: Provide all security card access, CCTV, intercom and parking controls system raceway, junction boxes, and other miscellaneous rough-in as described on the Security Drawings and

Specifications. All work associated with this installation shall be coordinated with the work of the Security Contractor for the Project, and comply with the Security System installation schedule.

7. Alternate E-7: Provide two (2) additional 4,000 amp copper bus ducts, identified on plans as Bus Risers 7 and 8, from P2 Level main switchgear rooms through the electrical closet on floor 53. Modify bus taps on floors 42 through 61 as identified on drawing E5.04. Bus duct routing as shown on plans.
8. Alternate E-8: Provide 30kW microturbine, associated wiring, controls and accessories as identified on drawing E5.01 and Specification 26 32 15.
9. Alternate E-9: Provide pricing for lighting, power, and fire alarm devices required for a multi-tenant corridor.
    a. Alternate E-9A: Provide typical low-rise multi-tenant corridor (floors 4, 6 through 14) as shown on drawing E4.06.
    b. Alternate E-9B: Provide typical low mid-rise multi-tenant corridor (floors 15 through 30) as shown on drawing E4.07.
    c. Alternate E-9C: Provide typical high mid-rise multi-tenant corridor (floors 31 through 34) as shown on drawing E4.08.
    d. Alternate E-9D: Provide typical high mid-rise multi-tenant corridor (floors 35 through 46) as shown on drawing E4.09.
    e. Alternate E-9E: Provide typical high-rise multi-tenant corridor (floors 47 through 49) as shown on drawing E4.10.
    f. Alternate E-9F: Provide typical high-rise multi-tenant corridor (floors 50 through 61) as shown on drawing E4.11.
10. Alternate E-10: Provide pricing associated with the tower top lighting layout and all associated drivers and controllers required, as identified on drawing E3.71.
    a. Alternate E-10A: Provide low density layout.
    b. Alternate E-10B: Provide high density layout.
11. Alternate E-11: Provide electrical connections to pumps associated with Gray Water system, as identified in Alternate P-1.
12. Alternate E-12: Provide electrical connections to fan powered boxes on floors 3, 4, 5, and 61 associated with Alternate M-16.
13. Alternate FDAC (1-4): Refer to Specification 28 31 20 “FDAC Scope of Work”. The cost of the FDAC Equipment Alternates including the equipment cost, labor and installation costs, sales tax, warranty cost, startup costs, testing, and the Subcontractor’s markup and fee shall be provided in accordance with Specification Sections 28 21 10, 28 31 20, 28 31 30 and 28 31 40 and as indicated on the Contract Documents. All work associated with this installation shall be coordinated with the work of the FDAC Contractor for the Project, and comply with the FDAC System installation schedule.
14. Alternate FDAC-5: Refer so Specification 28 31 20 “FDAC Scope of Work”.
15. Alternate FDAC-6: Refer to Specification 28 31 20 “FDAC Scope of Work”.

PART 2 PRODUCTS

2.1 GENERAL

A. Refer to the specific sections of the Specifications for equipment requirements.

PART 3 EXECUTION

3.1 GENERAL

A. Installation shall be in accordance with the Specification section pertaining to the individual equipment.

3.2 SUBCONTRACTOR SCHEDULING PROCEDURES

A. The following is a summary of the scheduling described in the text of the Specifications.
    1. Immediately after Notice to Commence, the Contractor, together with the major Subcontractors, shall have a preconstruction meeting with the Architect, Engineer, and Owner.
    2. An expedited submittal review process shall be utilized on this Project. The Subcontractor shall prepare the following upon receiving Notice to Commence.
        a. On or before two (2) weeks after Notice to Commence, the major Subcontractors shall submit to the Engineer a complete, typed list of the manufacturers and suppliers for the equipment and

materials intended to be furnished on this Project that will be provided for review at the expedited submittal review meetings.

b. Approximately six (6) to eight (8) weeks after Notice to Commence, the expedited submittal review meetings will be conducted with the Owner, Architect, Engineer, Contractor, and all major Subcontractors. Subcontractors shall provide complete, certified, documented, and coordinated Product Data submittals for the equipment and material intended to be reviewed and processed at the expedited submittal review meetings. It is anticipated that the majority, if not all, of the equipment and material submittals that will be furnished on this Project will be processed at these meetings.

3. Shop Drawings, Product Data, Samples, Test Procedures, Test Reports, Certifications, Composite Wiring Diagrams, and Coordination Drawing submissions not included in the expedited submittal review process will follow a normal sequential review by the Engineer as detailed in Section 26 00 10.
4. On or before two (2) months after Notice to Commence, the Subcontractor shall submit a Log of all Division 26 Shop Drawings, Product Data, Samples, Test Procedures, Test Reports, Certifications, Composite Wiring Diagrams, and Coordination Drawings for the Project including all that were processed at the expedited Submittal review meetings.
5. On or before two (2) months after Notice to Commence, five (5) copies of the motor control center Shop Drawings shall be transmitted to the Contractor by the Division 26 Subcontractor for verification of controller sizes by the Division 22 and 23 Subcontractors and for transmittal to the Division 25 Subcontractor. The Division 23 Subcontractor shall certify in writing to the Architect and Engineer that the motor controller and overload relay sizes shown on the motor control center Shop Drawings are acceptable to him and agree with the motors actually on order. A copy of this certification shall be furnished to the motor control center manufacturer.
6. On or before three (3) months after Notice to Commence, the Division 21, 22, 23 and 26 Subcontractors shall furnish Composite Wiring Diagrams to the Division 25 and Division 28 FDAC Subcontractors.
7. The Division 25 and Division 28 FDAC Subcontractors shall complete its Work on the Composite Wiring Diagrams and shall return them within one (1) month after receiving them from the Division 21, 22, 23 and 26 Subcontractors.
8. Within one (1) month after receiving the Composite Wiring Diagram back from the Division 25 and Division 28 FDAC Subcontractors, the Division 21, 22, 23, and 26 Subcontractors shall submit the completed Composite Wiring Diagrams to the Architect and Engineer for review.
9. On or before four (4) months after Notice to Commence, the Contractor shall submit Coordination Drawings to the Architect and Engineer for review.
10. On or before six (6) months after Notice to Commence, the Subcontractor shall provide a detailed schedule of completion, when each system is to be completed and outlining when tests will be performed.
11. Submit two (2) initial copies of the operation and maintenance books to the Owner on or before six (6) months prior to Substantial Completion.
12. Submit proposed test procedures, recording forms, test equipment and personnel and qualifications for review six (6) months prior to execution of testing.
13. Submit a proposed schedule of Owner instruction and training as required in specific specification sections for review by the Architect and Engineer six (6) months before Substantial Completion.
14. Submit four (4) final copies of the Operation and Maintenance books to the Engineer for review at least ten (10) weeks before Substantial Completion of the Project.
15. Submit testing reports for each individual system within two (2) weeks after completion of the testing.

END OF SECTION