
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 23 Specification - All Sections

1.2 SUMMARY

- A. The Subcontractors shall provide all labor, materials, tools, scaffolding, machinery, equipment, appliances and services necessary to complete the Mechanical (HVAC) 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 Subcontractors shall coordinate their Work with the Work of the other trades so as to resolve conflicts without impeding job progress or the Schedule. Provide notice with the bid proposal of any concrete Work required by this Division that is not indicated on the Structural, Architectural, Mechanical, Plumbing, Fire Suppression, or Electrical Drawings.
- B. The Subcontractors shall examine all the Architectural, Structural and Electrical Drawings, Division 25 "Building Controls" and other Divisions and sections of the Specifications in order to determine the extent of Work required to be completed under this Division. Failure to examine all the Contract Documents for this Project will not relieve the Subcontractors of the responsibility to perform all the Work required for a complete, fully operational and satisfactory installation.
- C. The HVAC Work to be performed under this Construction Contract is all in connection with the construction and erection of a Project located in [City, County, State].

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 Suppression Association (NFPA)
 6. American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE)
- 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 23 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 23 00 10. See Section 23 00 10 for certification requirements.

1.5 WARRANTY

- A. Comply with the requirements of the General Conditions and Section 23 00 10.

1.6 WORK INCLUDED

- A. The Work includes but is not limited to the following systems, equipment and services:
1. A chilled water cooling system consisting of all items indicated on the Drawings and/or specified herein, such as:
 - a. Centrifugal type water chilling units
 - b. Chilled water pumps
 - c. Chilled water piping
 - d. Insulation, controls, safety devices, vibration isolation, etc.
 - e. Chilled water chemical treatment system
 - f. Chilled water filtration system
 - g. Heat exchangers
 - h. Installation of control devices required by Division 25 and modifications to the piping systems required to accommodate these control devices
 - i. Refrigerant leak monitoring system
 2. A condenser water system consisting of all items indicated on the Drawings and/or specified herein, such as:
 - a. Cooling towers
 - b. Cooling tower basin filtration system
 - c. Cooling tower basin heating system
 - d. Condenser water pumps
 - e. Condenser water piping
 - f. Condenser water chemical treatment system
 - g. Heat exchangers
 - h. Installation of control devices required by Division 25 and modifications to the piping systems required to accommodate these control devices
 3. Standby generator diesel engine exhaust piping.
 - 4.
 5. Custom Factory-built air handling units consisting of all items indicated on the Drawings and/or specified herein, such as:
 - a. Chilled water cooling coils
 - b. Hot water heating coils.
 - c. Vibration isolation, housing, blowers, sound attenuators, insulation, stainless steel drain pans with drains, air filters, etc.
 - d. Installation of control devices required by Division 25 and modifications to the piping systems required to accommodate these control devices
 6. Custom Factory-built tri path multizone air handling units, such as:
 - a. Chilled water cooling coils
 - b. Zone Dampers
 - c. Vibration isolation, housing, blowers, sound attenuators, insulation, stainless steel drain pans with drains, air filters, etc.
 - d. Installation of control devices required by Division 25 and modifications to the piping systems required to accommodate these control devices
 7. Air distribution systems consisting of all items indicated on the Drawings and/or specified herein, such as:
 - a. Sheet metal ductwork
 - b. Air terminal devices
 - c. Duct mounted heating coils
 - d. Grilles, registers, ceiling diffusers, floor outlets, duct insulation, manual dampers, smoke dampers, combination fire and smoke dampers, fire dampers, etc. All damper surfaces visible through architectural louvers shall be painted black under Architectural Division
 - e. Sound absorbing sections
 - f. Insulated sheet metal blank-offs behind unused sections of Architectural louvers. All visible surfaces of blank off sections shall be painted black under Architectural Division
 - g. Painted sheet metal blank offs or sight baffles between all active slot diffusers
 8. Ventilating systems consisting of all items indicated by the Drawings and/or specified herein, such as:
 - a. Exhaust fans
 - b. Supply fans
 - c. Manual dampers, ductwork, grilles, registers, diffusers, etc.
 - d. Acoustical treatment of ductwork

9. Smoke management ventilating systems for stairways, fire floors of incidence, elevator shafts, garage levels, etc., consisting of all items indicated by the Drawings and/or specified herein, such as:
 - a. Exhaust fans
 - b. Supply fans
 - c. Control dampers, manual dampers, ductwork, grilles, registers, diffusers, etc.
10. Air cooled split system air conditioning units and/or heat pumps consisting of all items indicated on the Drawings and/or specified herein, such as:
 - a. Refrigeration circuit and controls
 - b. Remote condensing units
 - c. Refrigeration piping
 - d. Vibration isolation, housing, blowers, insulation, drain pans with drains, air filters, etc.
11. Building Management and Control System will be provided by Division 25. Division 23 Subcontractor will install devices such as automatic control dampers, motorized control valves, water flow metering equipment, thermal wells, etc., furnished by Division 25. See the requirements of Divisions 23 and 25 for coordination and installation requirements.
12. Furnish and install all miscellaneous supports for Division 23 Work and equipment.
13. Furnishing of Coordination Drawings as specified herein.
14. Furnishing of Project Record Documents as specified herein.
15. Furnishing of Shop Drawings, Product Data and Samples.
16. Furnishing of Test Procedures, Test Reports, and Certifications as specified and required for all Division 23 Work.
17. Balancing and adjusting of mechanical systems as specified herein.
18. Performance and acceptance testing of equipment and systems as specified herein and as required by authorities having jurisdiction. Refer to Section 23 08 00 titled "Commissioning of HVAC Systems" for additional requirements. Participate in and provide labor as required for "off hour" testing of equipment and systems if required by job conditions or by the authorities having jurisdiction and as required to obtain the "Temporary Certificates of Occupancy (TCO)".
19. Furnishing of operating and maintenance books.
20. Miscellaneous items as required for complete and functioning systems as specified herein and as indicated on the Drawings.
21. Installation of the control devices, accessories, etc., on the terminal units as required for the Division 25 control devices.
22. All systems, equipment and services specified herein shall be furnished and installed complete and ready for use.
23. Provide all excavation and backfill required for Division 23 Work.
24. Furnish and install all sleeves for the Division 23 Work complete with seals and firestop as specified herein and as required by the authorities having jurisdiction.
25. Patching or replacement of all fireproofing if it is damaged or removed during the installation of the Division 23 Work.
26. The Mechanical and Fire Suppression Subcontractors shall participate in and assist in the operation of the fire safety ventilation equipment as required during the performance testing and startup of the Division 28 FDAC Systems. Refer to Division 28 for additional requirements.
27. Provide software communication interfaces between selected equipment and the BMCS. Provide HVAC equipment as specified to complete the "BMCS Mock-up" as specified in Section 25 07 00.
- 28.
29. Participate in and provide equipment, materials and labor as required to construct at the Project Site a complete HVAC "mock-up", in or out of sequence, of one (1) full typical floor. See Architectural Specification Section 09000 for details and construction requirements. The field "mock-up" will remain in place for use in the completed building systems. The "mock-up" will be reviewed and will serve as a model for the HVAC system installation and other similar typical floors.
30. Participate in and provide HVAC 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 HVAC systems. The "mockups" will be reviewed and will serve as a model for the HVAC installation on other similar typical floor toilet rooms.



1.7 PARTIAL LIST OF WORK NOT INCLUDED IN DIVISION 23

- A. Electrical connections for motors and mounting of loose motors.
- B. Individual motor controllers except motor controllers furnished as integral parts of pieces of equipment.

- C. Motor control centers.
- D. Individual disconnect switches except those furnished as integral parts of equipment.
- E. All concrete Work indicated on the Structural, Architectural, Mechanical or Electrical Drawings.
- F. Concrete equipment pads, concrete thrust blocks and concrete fill for equipment and inertia bases. The Mechanical Subcontractor shall be responsible for providing the Contractor with the correct dimensions, layout, etc. for all equipment.
- G. Metal architectural louvers (except as indicated on the Division 21 Drawings).
- H. Painting, except touch up painting and as otherwise specified herein.
- I. Installing access doors in General Construction.
- J. Wiring for Building Management and Control System and interlocks.
- K. Subsurface and landscape drainage.
- L. Utility mains and piping 5' beyond the foundation walls unless indicated otherwise by the Drawings.
- M. Building Management and Control System: Division 25.

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 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. Alternates: The Equipment Alternates M-1 through M-15 costs 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. Alternates M-16 through M-20 shall include the complete cost for equipment material and labor including all Subcontractor cost.
 - 1. **Alternate M-1**: Provide three (3) centrifugal water chilling units as manufactured by **Carrier** with a full load efficiency of 0.55 Kw/ton and NPLV of 0.45. Units shall be as

scheduled and as specified for two (2) 1,000 ton machines and one (1) 500 ton machine. To achieve the water chilling unit efficiencies listed herein the manufacturer must add surface or machine design enhancements. The specified condenser and evaporator water flows and temperatures shall not be altered to achieve the efficiencies listed herein.

2. **Alternate M-1A:** Provide one (1) 500 ton centrifugal water chilling unit as scheduled for "future" CH-2-4, exactly matching the 500 ton water chilling unit as requested in Alternate M-1 above manufactured by **Carrier**. This equipment alternate shall also include cost of installation, piping connections to valved headers at central plant, piping insulation, vibration isolation, installation of Division 25 BMCS valves and other "in-line" control devices provided by Division 25, so as to provide a complete and functioning system.
3. **Alternate M-2:** Provide three (3) centrifugal water chilling units as manufactured by **Trane** with a full load efficiency of 0.55 Kw/ton and NPLV of 0.45. Units shall be as scheduled and as specified for two (2) 1,000 ton machines and one (1) 500 ton machine. To achieve the water chilling unit efficiencies listed herein the manufacturer must add surface or machine design enhancements. The specified condenser and evaporator water flows and temperatures shall not be altered to achieve the efficiencies listed herein.
4. **Alternate M-2A:** Provide one (1) 500 ton centrifugal water chilling unit as scheduled for "future" CH-2-4, exactly matching the 500 ton water chilling unit as requested in Alternate M-2 above manufactured by **Trane**. This equipment alternate shall also include cost of installation, piping connections to valved headers at central plant, piping insulation, vibration isolation, installation of Division 25 BMCS valves and other "in-line" control devices provided by Division 25, so as to provide a complete and functioning system.
5. **Alternate M-3:** Provide three (3) centrifugal water chilling units as manufactured by **York** with a full load efficiency of 0.55 Kw/ton and NPLV of 0.45. Units shall be as scheduled and as specified for two (2) 1,000 ton machines and one (1) 500 ton machine. To achieve the water chilling unit efficiencies listed herein the manufacturer must add surface or machine design enhancements. The specified condenser and evaporator water flows and temperatures shall not be altered to achieve the efficiencies listed herein.
6. **Alternate M-3A:** Provide one (1) 500 ton centrifugal water chilling unit as scheduled for "future" CH-2-4, exactly matching the 500 ton water chilling unit as requested in Alternate M-3 above manufactured by **York**. This equipment alternate shall also include cost of installation, piping connections to valved headers at central plant, piping insulation, vibration isolation, installation of Division 25 BMCS valves and other "in-line" control devices provided by Division 25, so as to provide a complete and functioning system.
7. **Alternate M-4:** Provide three (3) centrifugal water chilling units as manufactured by **Carrier** with a full load efficiency of 0.60 Kw/ton and NPLV of 0.45. Units shall be as scheduled and as specified for two (2) 1,000 ton machines and one (1) 500 ton machine. To achieve the water chilling unit efficiencies listed herein the manufacturer must add surface or machine design enhancements. The specified condenser and evaporator water flows and temperatures shall not be altered to achieve the efficiencies listed herein.
8. **Alternate M-4A:** Provide one (1) 500 ton centrifugal water chilling unit as scheduled for "future" CH-2-4, exactly matching the 500 ton water chilling unit as requested in Alternate M-4 above manufactured by **Carrier**. This equipment alternate shall also include cost of installation, piping connections to valved headers at central plant, piping insulation, vibration isolation, installation of Division 25 BMCS valves and other "in-line" control devices provided by Division 25, so as to provide a complete and functioning system.
9. **Alternate M-5:** Provide three (3) centrifugal water chilling units as manufactured by **Trane** with a full load efficiency of 0.60 Kw/ton and NPLV of 0.45. Units shall be as scheduled and as specified for two (2) 1,000 ton machines and one (1) 500 ton machine. To achieve the water chilling unit efficiencies listed herein the manufacturer must add surface or machine design enhancements. The specified condenser and evaporator water flows and temperatures shall not be altered to achieve the efficiencies listed herein.

10. **Alternate M-5A:** Provide one (1) 500 ton centrifugal water chilling unit as scheduled for "future" CH-2-4, exactly matching the 500 ton water chilling unit as requested in Alternate M-5 above manufactured by **Trane**. This equipment alternate shall also include cost of installation, piping connections to valved headers at central plant, piping insulation, vibration isolation, installation of Division 25 BMCS valves and other "in-line" control devices provided by Division 25, so as to provide a complete and functioning system.
 11. **Alternate M-6:** Provide three (3) centrifugal water chilling units as manufactured by **York** with a full load efficiency of 0.60 Kw/ton and NPLV of 0.45. Units shall be as scheduled and as specified for two (2) 1,000 ton machines and one (1) 500 ton machine. To achieve the water chilling unit efficiencies listed herein the manufacturer must add surface or machine design enhancements. The specified condenser and evaporator water flows and temperatures shall not be altered to achieve the efficiencies listed herein
 12. **Alternate M-6A:** Provide one (1) 500 ton centrifugal water chilling unit as scheduled for "future" CH-2-4, exactly matching the 500 ton water chilling unit as requested in Alternate M-6 above manufactured by **York**. This equipment alternate shall also include cost of installation, piping connections to valved headers at central plant, piping insulation, vibration isolation, installation of Division 25 BMCS valves and other "in-line" control devices provided by Division 25, so as to provide a complete and functioning system.
 13. **Alternate M-7:** Provide one (1), four (4) cell, all stainless steel induced draft cooling tower as indicated on the Drawings, as specified herein and as manufactured by **Baltimore Air Coil** (BAC). The Subcontractor shall review the structural steel cooling tower support steel shown on the Drawings. If any changes to the structural steel support framing are required it should be priced by the Contractor and included in the cost for this alternate as a breakout price. This Alternate shall include the complete installed cost of the specified open basin cleaning system with associated pump, sand filter and controls.
 14. **Alternate M-8:** Provide one (1), four (4) cell, all stainless steel induced draft cooling tower as indicated on the Drawings, as specified herein and as manufactured by **Evapco**. The Subcontractor shall review the structural steel cooling tower support steel shown on the Drawings. If any changes to the structural steel support framing are required it should be priced by the Contractor and included in the cost for this alternate as a breakout price. This Alternate shall include the complete installed cost of the specified open basin cleaning system with associated pump, sand filter and controls
 15. **Alternate M-9:** Provide one (1), four (4) cell, all stainless steel induced draft cooling tower as indicated on the Drawings, as specified herein and as manufactured by **Marley**. The Subcontractor shall review the structural steel cooling tower support steel shown on the Drawings. If any changes to the structural steel support framing are required it should be priced by the Contractor and included in the cost for this alternate as a breakout price. This Alternate shall include the complete installed cost of the specified open basin cleaning system with associated pump, sand filter and controls
- D. **Miscellaneous Alternates:**
1. **Alternate M-10A:** Provide a factory installed refrigerant filter drier contaminate removal system in each centrifugal water chilling unit, manufactured by **Carrier**, as specified in the Section 23 64 16 titled "Centrifugal Water Chilling Units".
 2. **Alternate M-10B:** Provide a factory installed refrigerant filter drier contaminate removal system in each centrifugal water chilling unit, manufactured by **Trane**, as specified in the Section 23 64 16 titled "Centrifugal Water Chilling Units".
 3. **Alternate M-10C:** Provide a factory installed refrigerant filter drier contaminate removal system in each centrifugal water chilling unit, manufactured by **York**, as specified in the Section 23 64 16 titled "Centrifugal Water Chilling Units".

4. **Alternate M-10D**: Provide a factory installed refrigerant filter drier contaminate removal system in each centrifugal water chilling unit, manufactured by **Carrier**, as specified in the Section 23 64 16 titled "Centrifugal Water Chilling Units" for fourth centrifugal water chilling unit listed in Alternate M-1A or Alternate M-4A.
5. **Alternate M-10E**: Provide a factory installed refrigerant filter drier contaminate removal system in each centrifugal water chilling unit, manufactured by **Trane**, as specified in the Section 23 64 16 titled "Centrifugal Water Chilling Units" for fourth centrifugal water chilling unit listed in Alternate M-2A or Alternate M-5A.
6. **Alternate M-10F**: Provide a factory installed refrigerant filter drier contaminate removal system in each centrifugal water chilling unit, manufactured by **York**, as specified in the Section 23 64 16 titled "Centrifugal Water Chilling Units" for fourth centrifugal water chilling unit listed in Alternate M-3A or Alternate M-6A.
7. **Alternate M-11A**: Provide a field vibration analysis for each **Carrier** water chilling unit as specified in the Section 23 64 16 titled "Centrifugal Water Chilling Units".
8. **Alternate M-11B**: Provide a field vibration analysis for each **Trane** water chilling unit as specified in the Section 23 64 16 titled "Centrifugal Water Chilling Units".
9. **Alternate M-11C**: Provide a field vibration analysis for each **York** water chilling unit as specified in the Section 23 64 16 titled "Centrifugal Water Chilling Units".
10. **Alternate M-11D**: Provide a field vibration analysis for each **Carrier** water chilling unit as specified in the Section 23 64 16 titled "Centrifugal Water Chilling Units" for fourth centrifugal water chilling unit listed in Alternate M-1A or Alternate M-4A.
11. **Alternate M-11E**: Provide a field vibration analysis for each **Trane** water chilling unit as specified in the Section 23 64 16 titled "Centrifugal Water Chilling Units" for fourth centrifugal water chilling unit listed in Alternate M-2A or Alternate M-5A.
12. **Alternate M-11F**: Provide a field vibration analysis for each **York** water chilling unit as specified in the Section 23 64 16 titled "Centrifugal Water Chilling Units" for fourth centrifugal water chilling unit listed in Alternate M-3A or Alternate M-6A.
13. **Alternate M-12A**: Provide a cost for witnessed factory performance testing of the **Carrier** water chilling units.
14. **Alternate M-12B**: Provide a cost for witnessed factory performance testing of the **Trane** water chilling units.
15. **Alternate M-12C**: Provide a cost for witnessed factory performance testing of the **York** water chilling units.
16. **Alternate M-13**: Provide a complete refrigerant monitoring system including code approved monitor, refrigerant leak sensors with field installed sensor cabling, all associated controls and emergency trip button. System to be installed complete and functional. Refer to Section 23 05 30 titled "Miscellaneous Equipment" for additional information.
17. **Alternate M-13A**: Provide extension of refrigerant monitoring system components as described in Alternate M-13 above to include connections to "future" centrifugal water chilling unit CH-2-4 described in Alternates M-1A thru M-6A.
18. **Alternate M-14**: Provide the services of a specialist acceptable to the Engineer and Owner trained in eddy current to perform field eddy current testing of all evaporator and condenser tubes for each water chilling unit at the end of the Project warranty period.

19. **Alternate M-14A:** Provide field eddy current testing services as described in Alternate M-14 above for fourth centrifugal water chilling unit listed in Alternate M-1A thru Alternate M-6A.
20. **Alternate M-15A:** Provide a maintenance agreement, during the warranty period, for each **Carrier** water chilling unit as specified in the Section 23 64 16 titled "Centrifugal Water Chilling Units".
21. **Alternate M-15B:** Provide a maintenance agreement, during the warranty period, for each **Trane** water chilling unit as specified in the Section 23 64 16 titled "Centrifugal Water Chilling Units".
22. **Alternate M-15C:** Provide a maintenance agreement, during the warranty period, for each **York** water chilling unit as specified in the Section 23 64 16 titled "Centrifugal Water Chilling Units".
23. **Alternate M-15D:** Provide a maintenance agreement, during the warranty period, for each **Carrier** water chilling unit as specified in the Section 23 64 16 titled "Centrifugal Water Chilling Units" for fourth centrifugal water chilling unit listed in Alternate M-1A thru Alternate M-6A.
24. **Alternate M-15E:** Provide a maintenance agreement, during the warranty period, for each **Trane** water chilling unit as specified in the Section 23 64 16 titled "Centrifugal Water Chilling Units" for fourth centrifugal water chilling unit listed in Alternate M-1A thru Alternate M-6A.
25. **Alternate M-15F:** Provide a maintenance agreement, during the warranty period, for each **York** water chilling unit as specified in the Section 23 64 16 titled "Centrifugal Water Chilling Units" for fourth centrifugal water chilling unit listed in Alternate M-1A thru Alternate M-6A.
26. **Alternate M-16:** Provide a floor-by-floor cost for perimeter zone ductwork, perimeter slot diffusers, flex duct, fan powered terminal units, **heating hot water piping run outs**, primary air ductwork, insulation, testing and balancing, etc., as required to provide a complete and functioning air side system for each typical floor. Scope-of-work for this alternate is shown on the floor plans as dashed lines. Cost for interior zone secondary ductwork downstream of fan powered terminal units and associated interior zone supply grilles for Levels 3, 4, 5 (overhead air systems) is not shown and shall not be included in your base bid or this alternate. Typical floor base building ductwork cost shall be included in your base bid, not in this alternate, and shall consist of all solid line ductwork shown on the plans, including all ductwork within the core area, risers, zone ductwork to point marked "capped for future" (CFF), outside air ductwork, outside air and relief air plenums and connections to curtain wall louvers, core area C/VAV terminals, fire smoke dampers, fan coils, and miscellaneous core area floor diffusers. All ductwork shall be as specified in the Section 23 31 00 titled "Ductwork and Sheet Metal". Provide a cost per General Contractor's Bid Form for each floor or groups of floors as indicated. Costs to be a stand-alone per floor cost. Typical floor costs are grouped in the Bid Form to allow for different productivity factors. See Bid Form for floor grouping.
27. **Alternate M-17:** Level 61 Overhead Air Distribution Scheme. Provide a cost for perimeter zone ductwork, perimeter slot diffusers, flex duct, fan powered terminal units, heating hot water piping run outs, primary air ductwork, overhead air handling units as scheduled, hot water piping, chilled water piping, insulation, outside air ductwork, outside air and relief air plenums and connections to curtain wall louvers, fire smoke dampers and miscellaneous core area diffusers, core area C/VAV terminals, testing and balancing, etc., as required to provide a complete and functioning air side system for each typical floor. Scope-of-work for this alternate is shown on the floor plan M- and the equipment schedules. Cost for interior zone secondary ductwork downstream of fan powered terminal units and associated interior zone supply grilles is not shown and shall not be included in your base



bid or this alternate. All ductwork shall be as specified in the Section 23 31 00 titled "Ductwork and Sheet Metal".

28. **Alternate M-18:** Multi-Tenant Corridors. Provide a stand alone cost on a per floor basis for the development of the Multi-Tenant corridors on Architectural drawings A36.01 through A36.12. Refer to mechanical drawings M3-10 and M3-11 for the appropriate scope.
29. **Alternate M-19:** Multi-Tenant Elevator Lobbies. Furnish and install 2 floor swirl diffusers for each multi-tenant office elevator lobbies as shown on Architectural drawings A36.01 through A36.12. Costs to be a stand-alone per floor cost.
30. **Alternate M-20:** Low Rise Tenant Elevator Lobby and tenant space up through level 61. Furnish and install 2 floor swirl diffusers. Costs to be a stand-alone per floor cost
31. **Alternate M-21:** 30 kW Capstone Turbine Cogeneration System. Furnish and install engine exhaust piping for Cogeneration unit described in Electrical alternate E-8. Furnish and install cogeneration room ventilation heat relief system including intake opening, exhaust fan and ductwork to exterior exhaust plenum. Fire rate exhaust ductwork where it passes through life safety generator room. Refer to drawing M3-03.

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 23 00 10.
 4. On or before two (2) months after Notice to Commence, the Subcontractor shall submit a Log of all Division 23 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 three (3) months after Notice to Commence, the Division 23 Subcontractor shall furnish Composite Wiring Diagrams to the Division 25 and Division 28 Subcontractor.
6. The Division 25 and Division 28 Subcontractor shall complete its Work on the Composite Wiring Diagrams and shall return them within one (1) month after receiving them from the Division 23 Subcontractor.
7. On or before four (4) months after Notice to Commence, the Contractor shall submit Coordination Drawings to the Architect and Engineer for review.
8. On or before six (6) months after Notice to Commence, the Subcontractor shall provide a detailed schedule of completion indicating when each system is to be completed and outlining when tests will be performed.
9. Submit two (2) initial copies of the operation and maintenance books to the Owner on or before six (6) months after Notice to Commence.
10. Submit proposed test procedures, recording forms, test equipment, and personnel and qualifications for review six (6) months prior to execution of testing.
11. Submit balancing and performance testing procedures and recording forms for all testing at least six (6) months prior to commencing any air and/or water balance Work.
12. Submit air and water testing and balance reports for each individual system within two (2) weeks after completion of the testing and balancing.
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