

PROJECT MANUAL INCLUDING SPECIFICATIONS
FOR
**MATH-SCIENCE MODERNIZATION
BUILDING 1800
CHABOT COLLEGE**

CHABOT-LAS POSITAS COMMUNITY COLLEGE DISTRICT
5020 FRANKLIN DRIVE
PLEASANTON, CALIFORNIA

Chabot-Las Positas Community College District Bid #11-02
Steinberg Architects Project #09-112

**ADDENDUM #1
JULY 22, 2011**

CONSTRUCTION MANGER
Swinerton Management
25555 Hesperian Boulevard
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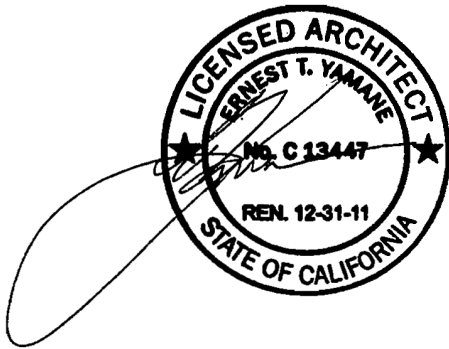
ADDENDUM #1

PROJECT MANUAL INCLUDING SPECIFICATIONS FOR MATH-SCIENCE MODERNIZATION – BUILDING 1800 CHABOT COLLEGE

CHABOT-LAS POSITAS COMMUNITY COLLEGE DISTRICT

DSA FILE #1-C2 DSA APPL. #01-111779

CHABOT-LAS POSITAS COMMUNITY COLLEGE DISTRICT BID #11-02
STEINBERG ARCHITECTS PROJECT #09-112



ARCHITECT
Steinberg Architects



STRUCTURAL ENGINEER
Forell/Elsesser



MECHANICAL/PLUMBING ENGINEER
Alfa-Tech



ELECTRICAL ENGINEER
Alfa-Tech

DIVISION OF THE STATE ARCHITECT STAMP:

ADDENDUM #1

**INVITATION FOR BID NO. 11-02.2
Math-Science Modernization, Building 1800 – Chabot College**

Chabot-Las Positas Community College District
Pleasanton, California

DSA File #1-C2, DSA Application #01-111779

(CFIS Reference #40.62.116)

Steinberg Architects Project #09-112

July 22, 2011

This addendum is issued to clarify, add, delete, correct and/or change the contract documents to the extent indicated and is hereby made a part of the above noted contract documents on which the contract will be based. Any modifications/changes made by this addendum affect only the portions or paragraphs specifically identified herein; all remaining portions of the proposal to remain in force. It is the responsibility of all bidders to conform to this addendum. Acknowledge receipt of this addendum in the space provided on the bid form. Failure to do so may subject Bidder to Disqualification.

CHANGES TO THE PROJECT MANUAL

Item	Specification Section	Description
AD1.01	01 41 10	<p>REGULATORY REQUIREMENTS – HAZARDOUS WASTE</p> <p>A. Add the following Article: “1.05 ADDITIONAL REQUIREMENTS</p> <p>A. Disturbance of existing hazardous materials to remain.</p> <ol style="list-style-type: none"> 1. Some asbestos and lead, as well as other hazardous material, will remain in/on Building 1800 while the General Contractor is conducting his renovation project. These materials must not be disturbed unless properly trained workers conduct the disturbance. 2. All personnel associated with the general contractor and any of his sub-contractors assigned to this project must attend an eight hour asbestos-lead-mold training course provided by Hazard Management Services, Inc. prior to starting work at the project site. If con-

tractor personnel are Asbestos Hazard Emergency Response Act trained and their accreditation is current, they are not required to attend this training.

3. The training will be provided at least once, possibly twice prior to the start of this project and then again as the general contractor and/or his sub-contractor require the training in order to work on the project. CLPCCD will cover the cost of the training (but not the cost of the attendee's salary) for the initial training. Additional training sessions, if necessary, will cost \$800 and must be set up at least three working days in advance.

B. Requirements for the General (Primary) Contractor and all non-remediation Sub Contractors regarding disturbance of environmental hazards on this project.

1. Comply with Exhibit 'A' and Exhibit 'B' at the end of this Section.

AD1.02 01 50 00 TEMPORARY FACILITIES

A. Add the following to Article 1.02, Paragraph A:

1. "Refer to Exhibit 'A' for Owner's approximate construction fencing lay down area at Building 1800. Coordinate final construction fencing lay down area locations with the Construction Manager prior to commencement of Work."

B. Add Exhibit 'A' construction fencing lay out area drawing to end of Section.

AD1.03 01 62 00 Delete Section 016200 in its entirety from the Project Manual and substitute with revised Section 016200 attached to this Addendum.

AD1.04 01 91 00 Delete Section 019100 in its entirety from the Project Manual.

AD1.05 01 91 13 Add Section 019113 GENERAL COMMISSIONING REQUIREMENTS in its entirety.

AD1.06 08 71 00 (Note: revised section not attached) DOOR HARDWARE

A. Add door hardware set 06B to Paragraph 3.7.D:

"HARDWARE SET 06B: For single interior Tutorial Center door without card reader; each door to have:

- | | | | | |
|---|----|----------------|------|---------------|
| 2 | EA | HINGE | 5BB1 | 4.5 X 4.5 NRP |
| 1 | EA | ELECTRIC HINGE | 5BB1 | 4.5 X 4.5 TW8 |

- 1 EA PRIMUS CORE ON- 20-740-XP EVEREST/PRIMUS
LY
- 1 EA EU STOREROOM ND80TDEU RHO
LOCK
- 1 EA SURFACE CLOSER 4041 EDA X TB
- 1 EA KICK PLATE 8400 10" X 2" LDW
- 1 EA DOME STOP FS436
- 3 EA SILENCER SR64
- 1 EA DOOR CONTACT BY SECURITY CONTRACTOR
- 1 EA POWER SUPPLY BY SECURITY CONTRACTOR
- 1 EA REQUEST TO EXIT BY SECURITY CONTRACTOR

NOTE: THIS DOOR HAS AN ELECTRIFIED LOCK, BUT NO CARD READER.”

- AD1.07 22 40 00 Revised Section 22 40 00. See attached revised specification section 22 40 00.
- AD1.08 23 07 16 Revised Section 23 07 16. See attached revised specification section 23 07 16. Title and footer section references have been corrected.
- AD1.09 23 09 00 Revised Section 23 09 00. See attached revised specification section 23 09 00.
- AD1.10 23 21 13 Revised Section 23 21 13. See attached revised specification section 23 21 13.
- AD1.11 23 21 23 Revised Section 23 21 23. See attached revised specification section 23 21 23.
- AD1.12 23 33 00 Added sub-section 2.13 for Air Flow Measuring System. See attached revised specification section 23 33 00.
- AD1.13 23 34 23 Revised Section 23 34 23. See attached revised specification section 23 34 23.
- AD1.14 23 41 00 Revised Section 23 41 00. See attached revised specification section 23 41 00.
- AD1.15 33 10 00 Section 33 10 00 – add section 2.15 BACKFLOW PREVENTERS
- AD1.16 The **BUILDING 1800 SCOPE OF WORK** is to include only the work described and associated with Building 1800; includes all associated demolition and installation of utility work, underground and overhead work, architectural, structural, mechanical, electrical, plumbing, fire protection, technology, security, audio visual, data and communications connections, so as to certify by DSA & authorities having local jurisdiction Building 1800 is ready and available for occupancy, useable per Chabot

College standards & requirements, and in compliance with all applicable codes and regulations.

The contract documents also include documents describing work related to: Building 1700, Courtyard Trellis, new paving/concrete flatwork between the buildings 1700 & 1800, landscape and irrigation for both buildings 1700 and 1800. Note: This work is excluded from the scope of work for Building 1800. The following is a list of contract documents describing the included work. This list is an attempt to assist the bidders and should not be misconstrued as being an all inclusive list of all the associated work described above. The General Contractor is responsible for all Building 1800 work whether it is described in the list or not.

Specifications ***Include*** all Specification Sections EXCEPT the following:
 Section 05 12 00 Structural Steel
 Section 05 31 00 Steel Decking
 Section 05 50 00 Metal Fabrications
 Section 14 27 16 Elevator Cab Renovation
 All Sections in Division 32

Civil Drawings ***Include*** the following with exceptions as noted:

Site Demolition:

Addendum 1 includes the renovation of Building 1800 and various utility connections (fire water and sanitary sewer).

Site Utilities:

Sewer

Two (2) sanitary sewer laterals are to be constructed, connecting Building 1800 to the existing 6-inch sanitary sewer line running north-south on the west side of Building 1800.

Fire Water

The existing campus fire water system is served by a dedicated 6-inch water loop. A portion of this system runs south of Building 1800 in the existing pedestrian walkway. The fire water service to Building 1800 will connect to this existing line. A 6-inch fire water line will extend north from the existing 6-inch water loop line to a point of connection on the east side of Building 1800.

A proposed fire hydrant assembly will also connect to the existing 6-inch water loop line located at south of Building 1800.

Trench Restoration:

Landscaped areas disturbed by utility construction are to be replaced in-kind or better, including irrigation.

Existing concrete and asphalt within the project site, includ-

ing all base material, will remain and be protected, unless disturbed by utility construction in which surface reconstruction will occur. Replacement of disturbed vertical curb and asphalt pavement will be per the Contract Documents.

Drawings:

- Sheet C0.0
- Sheet C1.0 – as required for Building 1800
- Sheet C2.0 – details relevant to Building 1800
- Sheet C2.1 – details relevant to Building 1800

Landscape Drawings

Exclude all landscape drawings in entirety:

- Sheet L1.00
- Sheet L3.00
- Sheet L4.00
- Sheet L5.00
- Sheet L6.00

Architectural Drawings

Include the following with exceptions as noted:

- Sheet A0.00
- Sheet A0.01
- Sheet A0.02
- Sheet A0.10
- Sheet A1.00
- Sheet A1.04
- Sheet A1.05
- Sheet A2.04
- Sheet A2.05
- Sheet A2.07
- Sheet A3.02
- Sheet A3.03
- Sheet A4.02
- Sheet A4.04
- Sheet A5.05
- Sheet A5.06
- Sheet A5.07
- Sheet A5.08
- Sheet A5.09
- Sheet A6.03
- Sheet A7.01 – doors/windows/finishes related to Building 1800
- Sheet A8.01
- Sheet A8.11
- Sheet A8.12
- Sheet A8.13
- Sheet A9.01
- Sheet A9.02
- Sheet A9.11
- Sheet A9.11a
- Sheet A9.12

Sheet A9.13
 Sheet A9.21
 Sheet A9.22
 Sheet A9.31
 Sheet A9.41
 Sheet A9.42

Structural
 Drawings

Include the following with exceptions as noted:

Sheet S0.01 - Entire sheet except for "Structural Steel"
 general notes
 Sheet S0.02 - Entire sheet
 Sheet S2.04 - Entire sheet
 Sheet S2.05 - Entire sheet
 Sheet S5.01 - Entire sheet
 Sheet S5.02 - Details 1, 2, 9, 10, & 11
 Sheet S8.01 - Entire sheet
 Sheet S8.02 - Entire sheet
 Sheet S8.03 - Details 1, 2, 3, 4, 5, 6, 9, 10, 11, 12, 14, & 16
 (Detail 13 is not part of scope)
 Sheet S9.01 - Details 2 & 3
 Sheet S9.02 - Details 1, 2, 3, 5, 6, 7, & 18
 Sheet S9.03 - Detail 4
 Sheet S9.04 - Elevations 4 & 16

Mechanical
 Drawings

Include the following with exceptions as noted:

Sheet M0.1
 Sheet M2.21D
 Sheet M2.21
 Sheet M2.22
 Sheet MP2.21
 Sheet M4.1 - Provide Equipment, Material, Accessories,
 Devices and Controls that are associated with
 Mechanical work for Building 1800 only.
 Sheet M4.2 - Provide Equipment, Material, Accessories,
 Devices and Controls that are associated with
 Mechanical work for Building 1800 only.
 Sheet M5.1 - Provide Equipment, Material, Piping, Valves,
 Accessories, Devices and Controls that are
 associated with Mechanical work for Building
 1800 only.
 Sheet M6.1 - All Mechanical Details except detail 7/M6.1
 are applicable to Mechanical work for Building
 1800.
 Sheet M6.2 - All Mechanical Details are applicable to Me-
 chanical work for Building 1800.
 Sheet M7.1 - All Mechanical Control diagrams except
 4/M7.1 are applicable to Mechanical work for
 Building 1800. Provide Equipment, Material,

Conduits, Wiring, Accessories, Devices and Controls that are associated with Mechanical work for Building 1800 only.

Sheet M7.2 - All Mechanical Control diagrams are applicable to Mechanical work for Building 1800. Provide Equipment, Material, Conduits, Wiring, Accessories, Devices and Controls that are associated with Mechanical work for Building 1800 only.

Plumbing Drawings

Include the following with exceptions as noted:

- Sheet P0.1
- Sheet P2.21D
- Sheet P2.21
- Sheet P2.22
- Sheet P3.1 - Provide Plumbing per #3 Plumbing Enlarged Floor Plan – Bldg 1800.
- Sheet P4.1 - All plumbing details except detail 4/P4.1.

Electrical Drawings

Include the following with exceptions as noted:

- Sheet E0.1
- Sheet E1.1 - provide power and fire alarm distribution for B1800 only.
- Sheet E2.21D
- Sheet E2.21L
- Sheet E2.21P
- Sheet E2.21F
- Sheet E4.1 - all fixtures except types "J", "J1", "CC", "DD" and "EE". Provide EMS-18 relay panel only.
- Sheet E4.3
- Sheet E5.1 - Provide B1800 related distribution only.
- Sheet E5.2 - exclude detail 6 for elevator control.
- Sheet E6.1
- Sheet E6.2 - exclude details 5 and 6 for court yard lighting.
- Sheet E7.1 - provide B1800 related connection only.
- Sheet E7.2 - include only B1800 related calculations.

Fire Protection Drawings

Include the following with exceptions as noted:

- Sheet FP 0.1
- Sheet FP 1.1 - underground work referring to Bldg. 1800 only
- Sheet FP 2.21 - reflected ceiling & Overhead piping plan for bldg. 1800 only
- Sheet FP 6.1 - details 1,3,4,6,7,8,9 & 10 belong to bldg. 1800

Technology Drawings

Include the following with exceptions as noted:

- Sheet T0.01

- Sheet T0.02
- Sheet T0.03
- Sheet T0.04
- Sheet T0.11 - Detail 3
- Sheet T0.12 - Detail 2
- Sheet T0.13 - Detail 1, 2, and 4
- Sheet T0.14 - All details except for detail 6
- Sheet T0.31 - Detail 2
- Sheet T0.32 - Include only the portion of block diagram associated with building 1800 IDF room
- Sheet T0.41
- Sheet T0.42
- Sheet T1.01
- Sheet T1.02
- Sheet T2.04
- Sheet T2.33
- Sheet T3.03
- Sheet T4.03
- Sheet T4.31 - Detail 2 and 3
- Sheet T5.01
- Sheet T5.02
- Sheet T5.11
- Sheet T5.31
- Sheet T5.32
- Sheet T5.33

CHANGES TO THE DRAWINGS

Item	Sheet Number	Addendum Drawing No.	Description
<u>CIVIL</u>			
AD1.17	C1.00	AD1-C1.00-01	On sheet C1.00, added Limit of Work Line for Building 1800 and relocated Building 1800 back flow preventer.
AD1.18	C1.00	AD1-C1.00-02	On sheet C1.00, added Limit of Work Line for Building 1800.
AD1.19	C1.00	AD1-C1.00-03	On sheet C1.00, added note for Limit of Work for Building 1800.

ARCHITECTURAL

AD1.20	A0.00	no drawing issued for this change	In the Sheet Index, revise the sheet name for sheet A1.05 to read "BUILDING 1800 – DEMOLITION ROOF PLAN." Add abbreviation "TBD – TO BE DETERMINED" to the abbreviations list.
AD1.21	A1.00	no drawing issued for this change	General Site Note #6 added that reads: "The Contractor shall exercise care when working in areas adjacent to existing planting and irrigation to remain. Existing trees, shrubs, lawns and other plant materials to remain shall be protected at all times. Irrigation lines servicing existing planting areas to remain shall be cut and temporarily capped during demolition and restored to full operation under this contract, unless specifically noted on the plans as being otherwise. Contractor shall provide temporary irrigation in these areas until irrigation can be fully restored. Existing plant materials shall be maintained in a healthy condition, unless otherwise noted on the plans as being removed or replaced. Surveys do not fully document the existing irrigation system. The Contractor shall consult with the Owner and their maintenance staff for irrigation requirements in areas where new construction affects existing irrigation that is to remain.
AD1.22	A1.04	AD1-A1.04	General Site Note #7 added that reads: "All trenched and excavated areas shall be compacted and patched to match original surface." Entire sheet reissued with modifications as clouded including, but not limited to: added and revised keynotes, added and revised general notes, revised legend, added concrete slab/footing demolition, added door demolition.
AD1.23	A2.04	AD1-A2.04	Entire sheet reissued with modifications as clouded including, but not limited to: added and revised keynotes, added and revised general notes, revised legend, added and revised wall type tags, added and revised interior elevation callouts
AD1.24	A3.03	AD1-A3.03-01	Revised detail references and notes.
AD1.25	A4.02	AD1-A4.02-01	Add 'SEMI-RECESSED" to keynote 10.114 napkin/tampon dispenser. Delete keynote 10.115 from keynote list. Add new keynote "22.204 SERVICE SINK, SPD". Add legend for locations of glazed/matte wall tile.
AD1.26	A4.02	AD1-A4.02-02	Add keynote 22.204 for service sink at Custodian room 1822 in Detail 4/A4.01 Enlarged

AD1.27	A4.02	AD1-A4.02-03	Custodian Room Plan. Extent of glossy and matte wall tile shown on interior elevations at men restroom 1824.
AD1.28	A4.02	AD1-A4.02-04	Extent of glossy and matte wall tile shown on interior elevations at women’s restroom 1826.
AD1.29	A5.06	AD1-A5.06-01	Add Corridor 1800 south entry interior elevation
AD1.30	A5.07	AD1-A5.07-01	Add detail references and keynote 06.121 for partial height curved wall at Tutorial Center 1808. Add keynote 06.120 for island base cabinet open on both sides.
AD1.31	A5.09	AD1-A5.09-01	Add detail references and keynote for partial height curved wall at Tutorial Center 1805.
AD1.32	A7.01	no drawing issued for this change	Revise door hardware group designations as follows: <ul style="list-style-type: none"> Door 1806a to hardware group 03 Door 1806b to hardware group 04 Door 1808b to hardware group 06B Door 1808c to hardware group 06 Door 1810a to hardware group 04 Door 1810b to hardware group 03 Add the remark “EXISTING DOOR AND LOUVER TO REMAIN” to door 1828
AD1.33	A8.13	AD1-A8.13-01	New Detail: Ext. Window Sill at Fiber Cement Box (Building 1800)
AD1.34	A8.13	AD1-A8.13-02	New Detail: Ext. Window Jamb at Fiber Cement Box (Building 1800)
AD1.35	A8.13	AD1-A8.13-03	New Detail: Ext. Window Head at Fiber Cement Box (Building 1800)
AD1.36	A9.01	AD1-A9.01	Entire sheet reissued with modifications as clouded including, but not limited to gyp board and sealant modifications and drilling through asphaltic moisture barrier.
AD1.37	A9.11a	AD1-A9.11a-01	Revise / add detail references
AD1.38	A9.11a	AD1-A9.11a-02	Revise detail references
AD1.39	A9.13	AD1-A9.13-01	New Detail: Curved Wall Head / Sill
AD1.40	A9.13	AD1-A9.13-02	New Detail: Curved Wall Jamb

STRUCTURAL

AD1.41	S8.01	AD1-S8.01	Detail 14/S8.01 for the top connection a typical non-bearing stud wall has been added.
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MECHANICAL

AD1.42	M2.21	no drawing issued for this change	General Notes: a. Add General Note # 11 – “PROVIDE VANES FOR ALL ELBOWS IN THE HVAC DUCTWORK.”
AD1.43	M4.1	no drawing issued for this	Fan Coil Unit Schedule: a. Add NOTE # 7 -”PROVIDE VFD RATED

		change	FAN MOTORS". This note shall apply to all Fan Coil Units.
			b. Add NOTE # 8 -"PROVIDE EACH UNIT WITH SECONDARY CONDENSATE DRAIN PAN AND A CONDENSATE DRAIN PUMP AS INDICATED ON DETAIL 3/M6.1. NO EXEPTIONS". This note shall apply to all Fan Coil Units.
AD1.44	M4.1	no drawing issued for this change	<p>Exhaust Fan Schedule:</p> <p>a. Revise NOTE # 5 to read as -"EXHAUST FAN OPERATION SHALL BE CONTRLLED BY WALL MOUNTED LINE VOLTAGE THERMOSTAT INSIDE ELEC-TRICAL ROOM".</p> <p>b. Revise NOTE # 6 to read as -"RELIEF FAN OPERATION SHALL BE CONTRLLED BY EMS USING CORRIDOR PRESSURE SENSOR MOUNTED INSIDE CORRIDOR TO RELIEVE EXCESS BUILDING PRES-SURE".</p>
AD1.45	M4.2	AD1-M4.2	<p>Gravity Roof Ventilator Schedule</p> <p>a. Gravity Roof Ventilator Schedule is revised, see attached drawing AD1-M4.2</p>
AD1.46	M7.1	no drawing issued for this change	<p>Mechanical Controls</p> <p>a. Revise Temperature Control Scope of work note # 2 to read as -"MECHANICAL / TEMPERATURE CONTROL CONTRAC-TOR SHALL PROVIDE WALL MOUNTED TEMPERATURE CONTROL PANEL FOR EACH BUILDING. SEE NOTE # 1 OF DE-TAIL 1/M7.1".</p> <p>b. Revise Temperature Control Scope of work note # 7 to read as -"DIV. 26 CONTRAC-TOR SHALL PROVIDE CONDUITS AND WIRING FOR 120V AND GREATER.".</p> <p>c. Revise Temperature Control Scope of work note # 8 to read as -"DIV. 23 CONTRAC-TOR SHALL PROVIDE EMT CONDUITS AND WIRING FOR ALL INTERIOR EX-POSED TEMPERATURE CONTROL WORK".</p> <p>d. Revise Temperature Control Scope of work note # 9 to read as -"DIV. 23 CONTRAC-TOR SHALL PROVIDE EMT CONDUITS, JUNCTION BOXES AND WIRING FOR ALL TEMPERATURE CONTROL WORK RUNNING IN WALL SPACES".</p>

- e. Revise Temperature Control Scope of work note # 10 to read as –“DIV. 23 CONTRACTOR SHALL PROVIDE EMT CONDUITS AND WIRING FOR ALL EXTERIOR EXPOSED TEMPERATURE CONTROL WORK”.
- f. Revise Temperature Control Scope of work note # 14 to read as –“DIV. 23 CONTRACTOR SHALL INSTALL SMOKE DUCT DETECTOR FURNISHED BY DIV. 26. DIV. 23 SHALL CONTROL WIRING FOR AUTOMATIC UNIT SHUT DOWN INTERLOCK”.
- g. Revise Temperature Control Scope of work note # 21 to read as –“BLUE RIDGE LIGHTING CONTROL PANEL SHALL BE FURNISHED BY DIV. 23 CONTRACTOR AND SHALL BE INSTALLED AND WIRED BY DIV. 26 CONTRACTOR. ONLY EMS INTERGRATION AND PROGRAMMING SHALL BE PROVIDED BY DIV. 23 CONTRACTOR”.
- h. Revise note # 5 of Detail 2/M7.1 to read as – “RELIEF FAN OPERATION SHALL BE CONTROLLED BY EMS USING CORRIDOR PRESSURE SENSOR MOUNTED INSIDE CORRIDOR TO RELIEVE EXCESS BUILDING PRESSURE. EMS SYSTEM SHALL CYCLE THE RELIEF FAN ON AND OFF TO MAINTAIN CORRIDOR STATIC PRESSURE OF 0.06” H2O MAXIMUM”.

AD1.47	M7.1	AD1-M7.1-01	Mechanical Controls: a. Detail 3/M7.1 is revised; see attached drawing AD1-M7.1-01
AD1. 48	M7.1	AD1-M7.1-02	Mechanical Controls: a. Detail 5/M7.1 is revised; see attached drawing AD1-M7.1-02
AD1.49	M7.2	AD1-M7.2-01	Mechanical Controls: a. Detail 3/M7.2 is revised; see attached drawing AD1-M7.2-01
AD1.50	M7.2	AD1-M7.2-02	Mechanical Controls: a. Detail 5/M7.2 is revised; see attached drawing AD1-M7.2-02

ELECTRICAL

AD1.51	E2.21D	AD1-E2.21D	Added demolition notations of <E> power connection for emergency phone, site lighting, fire
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- e. Revise Temperature Control Scope of work note # 10 to read as –“DIV. 23 CONTRACTOR SHALL PROVIDE EMT CONDUITS AND WIRING FOR ALL EXTERIOR EXPOSED TEMPERATURE CONTROL WORK”.
- f. Revise Temperature Control Scope of work note # 14 to read as –“DIV. 23 CONTRACTOR SHALL INSTALL SMOKE DUCT DETECTOR FURNISHED BY DIV. 26. DIV. 23 SHALL CONTROL WIRING FOR AUTOMATIC UNIT SHUT DOWN INTERLOCK”.
- g. Revise Temperature Control Scope of work note # 21 to read as –“BLUE RIDGE LIGHTING CONTROL PANEL SHALL BE FURNISHED BY DIV. 23 CONTRACTOR AND SHALL BE INSTALLED AND WIRED BY DIV. 26 CONTRACTOR. ONLY EMS INTERGRATION AND PROGRAMMING SHALL BE PROVIDED BY DIV. 23 CONTRACTOR”.
- h. Revise note # 5 of Detail 2/M7.1 to read as – “RELIEF FAN OPERATION SHALL BE CONTROLLED BY EMS USING CORRIDOR PRESSURE SENSOR MOUNTED INSIDE CORRIDOR TO RELIEVE EXCESS BUILDING PRESSURE. EMS SYSTEM SHALL CYCLE THE RELIEF FAN ON AND OFF TO MAINTAIN CORRIDOR STATIC PRESSURE OF 0.06” H2O MAXIMUM”.

AD1.47	M7.1	AD1-M7.1-01	Mechanical Controls: a. Detail 3/M7.1 is revised; see attached drawing AD1-M7.1-01
AD1. 48	M7.1	AD1-M7.1-02	Mechanical Controls: a. Detail 5/M7.1 is revised; see attached drawing AD1-M7.1-02
AD1.49	M7.2	AD1-M7.2-01	Mechanical Controls: a. Detail 3/M7.2 is revised; see attached drawing AD1-M7.2-01
AD1.50	M7.2	AD1-M7.2-02	Mechanical Controls: a. Detail 5/M7.2 is revised; see attached drawing AD1-M7.2-02

ELECTRICAL

AD1.51	E2.21D	AD1-E2.21D	Added demolition notations of <E> power connection for emergency phone, site lighting, fire
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			alarm and IDF. Revised sheet note 2 and added sheet notes 4, 5, 6.
AD1.52	E2.21L	AD1-E2.21L	Added occupancy sensor controls in the hall way. Added circuitry connection for <E> site lighting connection at grid line A/1. Added lighting panel "18LL" and "LCP-18" in electrical room.
AD1.53	E2.21P	AD1-E2.21P	Added sheet note 5 and revised general note 4. Added notation at power outlets above bench to be mounted at +30" AFF. Added transformer "T18L", panel "18LL" and "LCP-18" in electrical room Added circuitry to <E> emergency phone connection at grid line A/15.
AD1.54	E4.1	AD1-E4.1	Revised relay control panel to be "LCP-18" in lieu of "EMS-18". Added two (2) 120V lighting circuits for control.
AD1.55	E4.3	AD1-E4.3	Added panel schedule "18LL".
AD1.56	E5.1	AD1-E5.1	Added distribution connection for transformer "T18L" and panel "18LL". Revised ground wire at transformer "18M" to 1#8 in lieu of 1#1/0. Revised sheet note 3 to Veris-Bacnet monitoring meter in lieu of Cutler Hammer per district standard.

TECHNOLOGY

AD1. 57	T0.02	AD1-T0.02	On sheet T0.02, added (2) additional data ports to outlet type F; this includes the addition of associated patch cords and an increase in the outlet pathway size from (1) 1-1/4" conduit to (2) 1-1/4" conduits.
AD1. 58	T1.01	AD1-T1.01	On sheet T1.01, revised layout to more accurately show the existing pathways that will accept the new campus OSP cabling.
AD1. 59	T1.02	AD1-T1.02	On sheet T1.02, revised layout to more accurately show the existing pathways that will accept the new campus OSP cabling.

If you have any questions regarding this Addendum No.1, please contact the Office of the Facilities Planning & Management in writing, via facsimile or email. All other terms and conditions of BID No. 11-02.2 are to remain the same.

END OF ADDENDUM

ATTACHMENTS:

Specifications:

Section 014110 Exhibit A and B
Section 015000 Exhibit A
Section 016200
Section 019113
Section 224000
Section 230716
Section 230900
Section 232113
Section 232123
Section 233300
Section 233423
Section 234100
Section 331000

Drawings:

AD1-C1.00-01
AD1-C1.00-02
AD1-C1.00-03
AD1-A1.04
AD1-A2.04
AD1-A3.03-01
AD1-A4.02-01
AD1-A4.02-02
AD1-A4.02-03
AD1-A4.02-04
AD1-A5.06-01
AD1-A5.07-01
AD1-A5.09-01
AD1-A8.13-01
AD1-A8.13-02
AD1-A8.13-03
AD1-A9.01
AD1-A9.11A-01
AD1-A9.11A-02
AD1-A9.13-01
AD1-A9.13-02
AD1-S8.01

AD1-M4.2
AD1-M7.1-01
AD1-M7.1-02
AD1-M7.2-01
AD1-M7.2-02
AD1-E2.21D
AD1-E2.21L
AD1-E2.21P
AD1-E4.1
AD1-E4.3
AD1-E5.1
AD1-T0.02
AD1-T1.01
AD1-T1.02

PART 1 – GENERAL**1.01 SUMMARY**

- A. Procedures are described for selecting products and requesting substitutions of unlisted materials in lieu of materials named in the specifications or approved for use in addenda.
- B. Related Sections
 - 1. Section 01 26 00: Contract Modification Procedures
 - 2. Section 01 33 00: Submittals

1.02 CONTRACTOR'S OPTIONS

- A. For products specified only by reference standard: Select any product meeting that standard.
- B. For products specified by naming one or more products or manufacturers:
 - 1. Select products of any named manufacturer meeting specifications.
 - 2. For any product or manufacturer, which is not specifically named, submit Request for Substitution (RFS).
- C. For products indicated or specified by naming only one product and manufacturer, followed by the words "no substitution allowed", there is no option.

1.03 SUBSTITUTIONS

- A. No substitutions shall be allowed for District standard systems, products, and/or materials unless approved in writing from the Architect's office five (5) days prior to bid. The entire District Standard systems, products, and/or materials can be found on the District's website at:

<http://www.clpccd.org/facilities/DistrictStandardsandGuidelines-ChabotCollege.php>

- B. Within a period of thirty-five (35) days after Award of Contract, Construction Manager and Architect/Engineer will consider RFS from Contractor for non-District standard systems, products and/or materials. After that period, requests will be considered only when product becomes unavailable due to no fault of Contractor. Requests for review of proposed substitute items will not be accepted from anyone other than Contractor. The RFS will state the extent, if any, to which the evaluation and acceptance of the proposed substitute will prejudice Contractor's achievement of substantial completion on time, whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with CLPCCD for work on the Project).
- C. Submit separate RFS for each product and support each request with:
 - 1. Product identification
 - 2. Manufacturer's literature

3. Samples, as applicable
 4. Name and address of similar projects on which product has been used, and date of installation
 5. Name, address and telephone number of manufacturer's representative or sales engineer
- D. Itemize a comparison of the proposed substitution with product specified and list significant variations. If variation from product specified is not pointed out in submittal, variation will be rejected even though submittal was favorably reviewed.
- E. State whether the substitute will require a change in any of the Contract documents (or provisions of any other direct contract with CLPCCD for work on the Project) to adapt the design of the proposed substitute, and whether or not incorporation or use of the substitute in connection with Work is subject to payment of any license fee or royalty. Submit data relating to changes in construction schedule.
- F. All variations of the proposed substitute from that specified will be identified in the RFS and available maintenance, repair and replacement service will be indicated.
- G. Include accurate cost data comparing proposed substitution with product and amount of net change in Contract price, including but not limited to, an itemized estimate of all costs or credits that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors effected by the resulting change, all of which will be considered by Construction Manager and Architect/Engineer in evaluating the proposed substitute. Construction Manager and Architect/Engineer may require Contractor to furnish additional data about the proposed substitute.
- H. Substitutions will not be considered for acceptance when:
1. They will result in delay meeting construction milestones or completion dates.
 2. They are indicated or implied on submittals without formal request from Contractor.
 3. They are requested directly by subcontractor or supplier.
 4. Acceptance will require substantial revision of Contract Documents.
 5. They disrupt Contractor's job rhythm or ability to perform efficiently.
- I. Substitute products shall not be ordered without written acceptance of Construction Manager and Architect/Engineer.
- J. Construction Manager and Architect/Engineer will determine acceptability of proposed substitutions and reserve right to reject proposals due to insufficient information.
- K. Accepted substitutions will be evidenced by a change order or Supplemental Instruction. All Contract requirements apply to Work involving substitutions.

1.04 CONTRACTOR'S REPRESENTATION AND WARRANTY

- A. Requests constitute a representation and warranty that Contractor:
 - 1. Has investigated proposed product and determined that it meets or exceeds, in all respects, specified product
 - 2. Will provide the same warranty for substitution as for specified product
 - 3. Will coordinate installation and make other changes, which may be required for Work to be complete in all respects
 - 4. Waives claims for additional costs, which may subsequently become apparent
 - 5. Will compensate CLPCCD for additional redesign costs associated with substitution, if required
 - 6. Will be responsible for Construction Schedule slippage due to substitution
 - 7. Will be responsible for Construction Schedule delay due to late ordering of available specified products caused by requests for substitution, which is subsequently rejected by Construction Manager
 - 8. Will compensate CLPCCD for all costs; including extra costs of Contract, extra cost to other contractors, and any claims brought against CLPCCD, caused by late requests for substitutions or late ordering of products.

1.05 CONSTRUCTION MANAGER'S AND ARCHITECT/ENGINEER'S DUTIES

- A. Review Contractor's RFS within seven (7) working days.
- B. Notify Contractor in writing of decision to accept or reject requested substitution within seven (7) working days.

1.06 COST OF REVIEW

- A. Construction Manager and Engineer will record time required in evaluating substitutes proposed or submitted by Contractor. Whether or not Construction Manager or Architect/Engineer accepts the substitute item so proposed or submitted by Contractor, Contractor shall reimburse CLPCCD for the charges of Architect/Engineer and Construction Manager for evaluating each such proposed substitute item.
- B. The CLPCCD reserves the right to waive the requirement of paragraph A above.

PART 2—PRODUCTS

Not used.

PART 3—EXECUTION

Not used.

END OF SECTION

PART 1 GENERAL**1.1 SECTION SUMMARY**

- A. This section describes the building systems commissioning process including detailed administrative and procedural requirements covering individual responsibilities, submittals, meetings, documentation, equipment inspections, startup and testing procedures, training, operating and maintenance manuals, and any related work during the Warranty Period.
- B. Drawings and general provisions of the Contract, including General and Supplementary Conditions are fully applicable to this Section, as if repeated herein.
- C. Related Sections
 - 1. 22 08 00 Commissioning of Plumbing Systems
 - 2. 23 08 00 Commissioning of Mechanical Systems
 - 3. 26 08 00 Commissioning of Electrical Systems

1.2 REFERENCES

- A. ASHRAE:
 - 1. Guideline 0 – 2005: The Commissioning Process.
 - 2. Application Handbook – 2003: Chapter 42 – New Building Commissioning.
 - 3. Guideline 4 – 1993: Preparation of Operation and Maintenance Documentation for Building Systems.
- B. USGBC:
 - 1. LEED Reference Guide – 2009: EA Prerequisite 1 and Credit 3 requirements for Building Systems Commissioning

1.3 DEFINITIONS

- A. Acceptance Phase: Phase of construction after Startup and initial checkout when Functional Performance Tests, operation and maintenance documentation review and training occurs.
- B. Approval: Acceptance that a piece of equipment or system has been properly installed and is functioning in tested modes according to the Contract Documents and Commissioning Plan.
- C. Basis of Design (BOD): The documentation of design criteria and assumptions for systems, components, and methods chosen to meet the Owner's Project Requirements and applicable regulatory requirements.
- D. Building Management System (BMS): The automated building system providing control and user interaction with select building systems.
- E. Commissioning Authority (CxA): An independent agent hired directly by the owner and not otherwise associated with the Design Professional(s) or the Contractor. The CxA assists the Contractor with coordinating commissioning and witnesses the commissioning activities on behalf of the owner.
- F. Commissioning Issue: A condition that affects, prevents or inhibits commissioning, and must be resolved to complete the commissioning process. Commissioning Issues are documented on the Commissioning Issues Log.
- G. Commissioning Issues Log: A log maintained by the CxA listing all Deficiencies

and Commissioning Issues documented during the commissioning process. All issues require action, correction and closure, and will be categorized as Open or Closed.

- H. Commissioning Plan (Cx Plan): A document that outlines the organization, coordination, allocation of resources, and documentation requirements of the commissioning process.
- I. Contractor: The Contractor directly contracted to the owner with overall responsibility for the project, and all commissioning activities described. The Contractor is responsible for all work within its contract scope, including that the Installation Contractors.
- J. Contractor's Commissioning Coordinator (CxC): Individual designated by the Contractor who plans, schedules, directs and coordinates all the Contractor's commissioning activities, and serves as the Commissioning Authority's (CxA) single point of contact for all administrative and coordination issues.
- K. Data Logger: A stand-alone measuring device installed separate from the BMS to monitor and record flow, current, status, pressure, temperature and the likes.
- L. Deferred Testing: Any Pre-Functional Checks & Tests or Functional Performance Testing which cannot be completed when scheduled due to building structure, required occupancy condition or other Deficiency causing delay. CxA and owner must approve deferral of testing.
- M. Deficiency: A condition in the installation or function of a component, piece of equipment or system that is not in compliance with the requirements of the Contract Documents. A Deficiency will be considered a Commissioning Issue and documented on the Commissioning Issues Log.
- N. Design Professional: The Design Professional(s) responsible for design of each portion of the project being commissioned.
- O. Functional Performance Test (FPT): A test of the dynamic function, operation and control sequences of equipment and systems under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, alarm, power failure, etc. The FPTs can include Monitoring or Trending the system performance over time to verify integrated operation and system performance to the fullest extent.
- P. Indirect Indicators: Indicators of a response or condition, such as reading from a control system screen reporting a damper to be 100 percent open.
- Q. Installation Verification: Field verification and documentation of proper installation of system components. Process is complete when systems are ready for startup. Installation Verifications are organized under the System Readiness Checklist (SRC) forms.
- R. Manual Test: Using hand-held instruments, immediate control system readouts or direct observation to verify performance (contrasted with analyzing monitored data taken over time to make the observation).
- S. Monitoring: The recording of parameters (flow, current, status, pressure and the like) of equipment operation using data-loggers or the Trending capabilities of BMS.
- T. Non-Compliance: See Deficiency
- U. Non-Conformance: See Deficiency

- V. Owner's Project Requirements (OPR): Written narrative describing the operational, functional, aesthetic, and energy efficiency requirements for the project, and expectations of how the facility will be used and operated, as defined by the owner. This document provides an explanation of the ideas, concepts, goals, criteria, and supporting information that are considered to be important to the owner and is often the documented outcome of the budgeting, programming, and pre-conceptual project phases.
- W. Pre-Functional Checks & Tests: Based primarily on the manufacturer's detailed installation, startup and checkout sheets, these are the various checks and tests performed on a piece of equipment or system after preparing the equipment and system for initial operation. They are typically done to confirm that equipment and individual components are working properly, such as electrical spot measurements on motors, spot flow measurements, pressure testing, pipe flush-out and cleaning, control point-to-point checks, sensor calibration, actuator testing, etc., and include such things as mechanical system test and balance. Pre-Functional Checks & Tests are organized under the System Readiness Checklist (SRC) forms and must be completed prior to Functional Performance Testing.
- X. System Readiness Checklist (SRC): A checklist covering Installation Verification, Startup and Pre-functional checks & tests to conduct and verify proper installation and Startup of the equipment prior to Functional Performance Testing. System Readiness Checklists are essentially a summary checklist, ideally a one-page cover sheet, governing all necessary static inspections and procedures to prepare equipment and systems for Functional Performance Testing. SRCs include simple testing of the function of a component, a piece of equipment or system (such as measuring the voltage imbalance on a three phase pump motor). Vendor standard installation, Startup and Pre-functional checklists shall be attached to the related SRC.
- Y. Percent Sampling: Inspecting or testing only a fraction of the total number of identical or near-identical pieces of equipment such as VAV boxes.
- Z. Seasonal Tests: Functional tests that are deferred until conditions closer to design are experienced.
- AA. Startup: Initial starting or activating of equipment usually performed by the Installation Contractor.
- BB. TAB: Testing, Adjusting, and Balancing or Test and Balance
- CC. Installation Contractor: Typically a subcontractor to the Contractor who provides and installs specific building components and systems.
- DD. Test Procedures: The step-by-step process which must be executed to fulfill the Test Requirements.
- EE. Test Requirements: Requirements, indicating what modes and functions shall be tested.
- FF. Trending: Monitoring using the Building Management Systems (BMS) to aid in functional testing and verify system operation and performance under actual operating conditions.
- GG. Warranty Issues: Operational and outstanding issues and deficiencies identified during the Warranty Period.
- HH. Warranty Period: Warranty Period for the entire project, including components. Refer to General Conditions, Warranty, Guaranty, and Inspection of Work, for War-

ranty, Extended Guarantees, and Correction Period provisions.

1.4 SYSTEMS TO BE COMMISSIONED

- A. This specification section is applicable to the following systems and equipment to be commissioned in this project:
1. HVAC systems and associated control systems;
 2. Lighting and lighting control systems;
 3. Domestic hot water systems.

1.5 SUMMARY DESCRIPTION OF LEED BUILDING SYSTEMS COMMISSIONING

- A. Commissioning is a systematic process of ensuring that building systems are installed and perform functionally and interactively as intended according to the Owners Operational Requirements (OPR), Basis of Design (BOD), and the requirements of the contract documents.
- B. Commissioning during the design phase is intended to achieve the following specific objectives in development of the Contract Documents:
1. Provide for review the OPR and BOD for clarity and completeness. The design team shall update the OPR and BOD as required.
 2. Provide for formal review of the Design Documents, prior to mid-phase construction documents completion, for adherence to the OPR and BOD.
 3. Incorporate commissioning requirements into the Contract Documents.
 4. Verify Commissioning Authority's (CxA) design review comments are incorporated into subsequent design documents.
- C. Commissioning during the construction phase is intended to achieve the following specific objectives according to the Contract Documents:
1. Finalize the Commissioning Plan.
 2. Review contractor submittals applicable to the systems being commissioned. This review shall be concurrent with the A/E reviews and submitted to the design team and owners.
 3. Verify that applicable equipment and systems are installed according to the manufacturer's recommendations and to industry-accepted minimum standards and that they receive adequate operational checkout and testing by the Installation Contractors.
 4. Verify and document proper performance of equipment and systems.
 5. Verify that operation and maintenance documentation is provided and is complete.
 6. Assist contractors in developing a Systems Manual that provides future operating staff the information necessary to optimally operate the commissioned systems.
 7. Verify that the owner's facilities and operations personnel are trained per the contract document requirements.
- D. Commissioning during the warranty phase is intended to achieve the following specific objectives according to the Contract Documents:
1. Perform off-season of deferred testing.

2. Review operational issues prior to end of warranty period so that warranty items are identified and mitigated.
 - E. The commissioning process does not take away from or reduce the responsibility of the Contractor to provide a finished and fully functioning product. The Contractor has overall responsibility to assure that all systems are properly tested and commissioned, and that all required commissioning documents are completed and provided to the owner.
 - F. Project will meet the Commissioning Requirements of LEED-2009, Energy & Atmosphere, Prerequisite 1 & Credit 3. Contractor, Installing Contractors, and suppliers are responsible to ensure all requirements for commissioning are met in their respective work.
- 1.6 COMMISSIONING TEAM
- A. Owner's Representatives
 - B. Design Professionals (DP) and Architects/Engineers (A/E).
 - C. Commissioning Authority (CxA).
 - D. Contractor
 - E. Contractor's Commissioning Coordinator (CxC)
 - F. Installing Contractors responsible for specific types of systems being commissioned:
 1. Mechanical Contractor
 2. Electrical Contractor
 3. HVAC Controls Contractor
 4. Testing and Balance (TAB) Contractor

1.7 COMMISSIONING PROCESS OVERVIEW

The following narrative provides an overview of the typical commissioning tasks during construction and the general order in which they occur:

- A. The Commissioning Authority (CxA) prepares a Preliminary Cx Plan during the project final design phase. The Cx Plan provides guidance in the execution of the commissioning process.
- B. Commissioning during construction begins with a kickoff meeting conducted by the CxA where the commissioning process and systems to be commissioned are reviewed with the commissioning team members, including the Contractor and Installation Contractors. The Preliminary Cx Plan is presented and reviewed, and specific requirements are discussed. The Contractor will designate the CxC at or before this meeting.
- C. The CxA shall review contractor submittals applicable to systems being commissioned for conformance to the BOD and OPR. This review shall run concurrent with A/E design reviews and submitted to the Design team and the Owner.
- D. As part of normal submittal, the Contractor shall submit to the CxA additional equipment documents and forms including manufacturer installation checklists, detailed startup procedures, proposed Functional Performance Testing procedures, and equipment warranty information. The CxA reviews these submittal documents and forms for completeness, and may request additional data and uses these

- documents to develop specific check-lists and test procedures for the equipment and systems to be commissioned.
- E. The CxA will update the Cx Plan with equipment specific documentation, check-lists, and test forms.
 - F. Additional meetings will be conducted throughout construction with Commissioning Team members, as required, to plan, scope, coordinate, and schedule commissioning activities, review documentation, and resolve Commissioning Issues and Deficiencies.
 - G. The CxA develops commissioning verification forms which summarize and track the Installation Completeness, Systems Startup, Test & Balance (where applicable for systems); Pre-Functional Checks and Functional Performance (sequence) Tests required for each system and equipment to be commissioned. The Contractor shall complete the forms for Installation Verification, Startup, and Pre-functional Checks and Functional Performance Test forms to document that systems and equipment are ready for operation. The CxC shall submit the Systems Readiness Checklist (SRCs) and associated documents to the CxA and owner for approval before proceeding to Functional Performance Testing.
 - H. CxA will perform the Installation Verification and forward completed forms to the CxC for inclusion with the SRC.
 - I. Installing Contractors, as directed by the CxC, shall perform Startup, and Pre-Functional Checks & Tests. The CxC shall document completion of the Installation Verification, Startup and Pre-Functional Checks & Tests on the System Readiness Checklists. The CxA will witness select Start-up and Pre-Functional Checks & Tests, and perform a sample number of inspections and back-checks where determined to be necessary.
 - J. The CxA will develop final equipment and system Functional Performance Test (FPT) procedures and forms. These test procedures are submitted to the Contractor and Installation Contractors for review and comment.
 - K. Once systems to be commissioned are verified ready for FPTs by the completion of the SRCs, FPTs are executed by the Installation Contractors under direction of the CxC, and witnessed by the CxA. The FPTs may be achieved by, or any combination of: Manual Testing; Monitoring via the BMS system Trending capabilities; or by stand-alone Data Loggers and analyzing the results.
 - L. During Installation Verification, Pre-Functional Checks & Tests, and Functional Performance Testing, all Deficiencies and Commissioning Issues are recorded by the CxA on the Commissioning Issues Log. The Contractor and its Installation Contractors shall correct Commissioning Issues and retest the system(s) without delay at no additional cost to the owner.
 - M. The Contractor shall compile and complete the Operations & Maintenance Manuals per the contract documents requirements. The CxA will review for completeness and provide comments to the owner and Contractor on the Operation and Maintenance documentation.
 - N. The CxA will review and provide comment to the owner and Contractor on the specified training provided by the Installation Contractors and shall verify that it has been completed.
 - O. The CxA will review the LEED Systems Manual requirements with the CxC and will provide assistance to the CxC in preparing this document.

- P. The CxA will complete the Final Construction Phase Commissioning Report for the owner.

1.8 SUBMITTAL REQUIREMENTS FOR COMMISSIONING**A. Normal Submittals:**

1. The CxA shall receive from Contractor or Architect a copy of submittals for equipment and systems to be commissioned at the same time a copy is sent to the Architects/Engineers for concurrent review.
2. The CxA shall receive any copies of resubmittals for equipment and systems to be commissioned at the same time a copy is sent to the Architects/Engineers for concurrent review.

B. Additional submittal data required for Commissioning shall be submitted to CxA for use in developing the Cx Plan and all commissioning forms:

1. Detailed manufacturer installation and startup manuals with checklists, troubleshooting procedures, operating and maintenance procedures.
2. Installation and checkout materials actually shipped with equipment, including actual field checkout forms to be used by factory or field technicians.
3. Shop drawings including detailed sequences of operation.
4. Warranty information.

1.9 OPERATING AND MAINTENANCE MANUALS**A. The Contractor shall compile Operation and Maintenance Manuals as specified in the contract documents. The O&M manual documents shall be clearly marked to highlight the actual equipment and features installed. In addition, the following shall be included for all systems and equipment commissioned:**

1. Specification sections copied from the design documents including any addenda.
2. Approved submittal data, cut sheets and appropriate shop drawings.
3. Manufacturer's Operation and Maintenance Instructions which shall include:
 - a. Installation, startup and break-in instructions.
 - b. All starting, normal shutdown, emergency shutdown, manual operation, seasonal changeover and normal operating instructions.
 - c. Operation, Maintenance and Installation instructions originally shipped with the unit.
 - d. Detailed preventative maintenance and service procedures including a schedule matrix checklist (checked as weekly, monthly, quarterly, etc.).
 - e. Troubleshooting procedures.
 - f. Parts list, edited to omit reference to items which do not apply.
 - g. Lists of special tools required to service or maintain the equipment.
 - h. Performance data, ratings and curves, etc.
 - i. Warranty documents clearly identifying conditions required to maintain warranty, and specific conditions which may void the warranty.
 - j. Any service contracts issued.

4. The BMS Installation Contractor shall include control drawings and detailed sequences of operation for each piece of equipment and its components.
- B. For all systems and equipment commissioned, CxA will review for required content inclusion and completeness, and approve O&M manuals.
- C. For all systems and equipment commissioned. Provide a separate "Systems Manual" which focuses on operating rather than maintaining equipment, particularly the interaction between equipment to include the following;
 1. The final version of the BOD.
 2. System single line diagrams.
 3. As-built "Sequences of Operation", control drawings and original setpoints.
 4. Operating instructions for integrated building systems.
 5. Recommended schedule of maintenance requirements and frequency if not already included in the project O&M manuals.
 6. Recommended schedule for retesting of commissioned systems with blank test forms from the original Commissioning Plan.
 7. Recommended schedule for calibrating sensors and actuators.

1.10 RESPONSIBILITIES

- A. General:
 1. The Commissioning Team and all others involved in the commissioning process shall follow the Commissioning Plan, attend commissioning kickoff meeting, and additional commissioning meetings as necessary.
- B. Commissioning Authority (CxA) (For reference only - not to be included in Contractor's bid):
 1. The primary role of the CxA is to organize and lead the commissioning team, to develop the Commissioning Plan, and assist the CxC in coordination and execution of the commissioning process.
 2. Provide a 50% design review of the BOD, OPR, and design documents and backcheck the review comments.
 3. Prepare the Cx Plan and work with the Owner and Contractor to schedule commissioning activities.
 4. Review submittals for compliance with the Cx Plan and the need for developing commissioning forms.
 5. Convene commissioning team meetings, prepare meeting agendas and distribute meeting minutes.
 6. Perform Installation Verification and author all associated forms.
 7. Observe and inspect system and equipment installation, start-up, checkout, and testing for compliance with the OPR, BOD, and Contract Documents, review completion of commissioning documentation, and record any Deficiencies and Commissioning Issues on the Commissioning Issues Log.
 8. Review and comment on Operation and Maintenance documentation and training plans.
 9. Assist the CxC in developing the LEED Systems Manual

10. Assemble the commissioning documents and include in a Commissioning Report.
 11. The CxA is not responsible for:
 - a. Design concept or design criteria
 - b. Review for code compliance
 - c. Design and construction scheduling
 - d. Cost estimating
 - e. Construction management
 - f. Providing tools and test equipment used for commissioning and data collection.
 - g. Scheduling Startup or Functional Performance Testing
 - h. Coordinating the work of Installation Contractors, vendors and any special testing agents
 - i. Performing Pre-functional checks and tests, Startup and Functional Performance Tests.
- C. Contractor:
1. Contractor is responsible for all commissioning tasks to be performed, including tasks assigned to Installation Contractors. The Contractor shall ensure that all commissioning responsibilities are assigned to and completed by competent personnel.
 2. Include the cost for the Contractor and Installation Contractor's support of the commissioning process in the total contract sum.
 3. Schedule and coordinate the commissioning kickoff meeting and other selected meetings with the CxA to facilitate the commissioning process.
 4. Plan, schedule, coordinate and facilitate the commissioning work performed by Contractor and Installation Contractors. Provide sufficient lead-time and notify CxA well in advance of commissioning activities. Update the master construction schedule periodically with commissioning progress and required activities.
 5. Review, comment and accept the Cx Plan prepared by the CxA.
 6. Furnish a copy of the construction documents, addenda, change orders, approved submittals, and shop drawings related to commissioned systems to the CxA.
 7. Include requirements for submittal data, installation manuals, Operation and Maintenance data, commissioning tasks, and training in each purchase order or subcontract written for commissioned systems.
 8. Ensure that all Installation Contractors execute commissioning responsibilities according to the Contract Documents, Cx Plan, and schedule.
 9. Using SRC forms, document and certify that all work is complete and systems are operational according to the Contract Documents, including calibration of instrumentation and controls.
 10. Evaluate installation and performance deficiencies identified on the Commissioning Issues Log and any inspection and test reports. Collaborate with

Installation Contractors responsible for system and equipment installation and recommend corrective action for Deficiencies. Assure all Deficiencies and Commissioning Issues are resolved.

11. Prepare a training plan, submit to CxA and owner for review and acceptance. Execute training of owner's personnel per approved training plan.
12. Prepare Operation and Maintenance Manuals in accordance with the Contract Documents.
13. Prepare a LEED Systems Manual.
14. For all systems commissioned, document Warranty Issues for the owner.
15. Pay additional costs and back-charges for additional CxA services resulting from excessive retests.

D. Installation Contractors:

Installation Contractors responsibilities may be re-assigned as seen fit by the Contractor.

1. Include and itemize all cost for Installation Contractors commissioning tasks.
2. Provide additional submittal data, installation manuals, manufacturer's detailed installation checks and startup procedures Operation and Maintenance data, required warranty procedures, and any other requested documentation for equipment and systems to be commissioned.
3. Attend commissioning meetings as directed by the CxC to facilitate the commissioning process.
4. Assign personnel with expertise and authority to act on behalf of the Installation Contractor and schedule them to participate in and perform assigned commissioning tasks.
5. Assist CxA in preparing the Functional Performance Test Procedures, clarifying the operation and control of commissioned equipment where the specifications, control drawings or equipment documentation is not sufficient for writing detailed testing procedures. Review the Functional Performance Test procedures to ensure feasibility, safety and equipment protection, and provide necessary written alarm limits to be used during the tests.
6. Provide owner training for systems commissioned. Submit a training plan for CxA and owner review and approval.
7. Perform and document Startup and checkout. Complete all Pre-Functional Checks & Testing documentation clearly and legibly. Provide a copy of all forms to the CxC and CxA as part of completing the System Readiness Checklists.
8. Address Installation Contractor applicable Commissioning Issues Log items and Deficiencies promptly. All installation and Startup issues must be resolved before Function Performance Testing can proceed.
9. Coordinate with CxA and perform Functional Performance Testing. Execution of tests shall be witnessed by the CxC and CxA.
10. Assist the CxA in collecting all requested Monitoring / Trending data associated with FPTs.
11. Prepare Operation and Maintenance Manuals according to the Contract

- Documents, including all additional documentation required by these specifications.
12. Assist CxC in developing criteria for LEED Systems Manual
 13. During construction, maintain as-built red-line drawings and make available for CxA review during the commissioning process.
- E. Testing and Balancing (TAB) Contractor:
1. The commissioning responsibilities of the TAB Contractor for commissioning in addition to those listed in "Installation Contractors" section are:
 - a. Submit the TAB plan and approach for each system and component to the CxA and Contractor prior to starting TAB. This plan shall be developed after the TAB contractor is familiar with all control systems and will be project specific with pre-populated values.
 - b. Coordinate with CxA a minimum of 5 working days prior to test and balance activity for CxA witnessing.
 - c. Immediately report any Deficiencies discovered which may affect or delay the commissioning process.
 - d. Provide draft TAB report within 5 days to CxA and CxC for review.
 - e. Provide final TAB report within 30 days to CxA and CxC for review.
- F. Equipment Suppliers:
1. Provide all requested submittal data, including detailed installation checks, startup and checkout procedures and forms.
 2. Assist in equipment testing per any agreements with Installation Contractors.
 3. Include in the base bid all special tools and instruments specific for a piece of equipment which are only available from equipment supplier, and required for testing the equipment according to Contract Documents.
 4. Provide information and support requested by the CxA regarding equipment sequences of operation and testing procedures.

PART 2 PRODUCTS**2.1 TEST EQUIPMENT**

- A. All standard testing equipment required to perform Startup, Pre-Functional Checks & Tests and Functional Performance Testing shall be furnished by the Installation Contractor responsible for the equipment and systems being commissioned.
- B. Special equipment, tools and instruments (only available from the vendor, specific to a piece of equipment) required for testing equipment shall be included in the base bid price, and turned over to the owner at project completion.
- C. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerance specified in the Contract Documents. If not otherwise specified, the following minimum requirements apply:
 1. Temperature sensors and digital thermometers shall have a certified calibration within the past year to an accuracy of 0.5 degree F and a resolution to + or - 0.1 degree F.

2. Pressure sensors shall have an accuracy of + or – 2.0 percent of the value range being measured (not full range of meter) and have been calibrated within the last year.
3. All equipment shall be calibrated according to the manufacturer's recommended intervals and recalibrated when dropped or damaged.
4. Calibration tags shall be affixed or certificates readily available for all test equipment.

2.2 COMMISSIONING FORMS

A. Installation Verification Form:

1. Forms will be developed by the CxA referencing the contract documents and manufacturer provided documentation provided during submittal.

B. Startup and Pre-Functional Checks & Tests forms

1. Forms primarily consist of manufacturer field installation and Startup check-out sheets, and shall be used where required and appropriate. The CxA will review all forms to ensure manufacturer-recommended procedures and tests are fully included. Forms shall include:
 - a. manufacturer's standard written installation and startup checkout procedures
 - b. check boxes by each procedure
 - c. Signatures and date block at the end of the form.
 - d. If applicable, controls point to point checks, sensor calibrations, and actuator testing.
2. Controls Installation Contractor or controls manufacturer shall provide point to point checkout, sensor calibration and actuator test forms, and shall use where required or appropriate.

C. System Readiness Checklist:

1. SRCs are developed by the CxA with input from the CxC and Installation Contractors.

D. Functional Performance Test (FPT) forms:

1. The CxA will develop FPT forms with procedures to verify and document proper operation of each piece of equipment and system. FPT forms may contain:
 - a. System and equipment or component name(s), location and identification number
 - b. Reference to system readiness checklist and start-up documentation
 - c. Date of testing and list of participating parties
 - d. Excerpt of the specification section describing the test requirements
 - e. A copy of the specific sequence of operations or other specified parameters being verified
 - f. Points list
 - g. Formulas used in any calculations

- h. Required pre-test field measurements
 - i. Instructions for setting up the test
 - j. Special cautions, alarm limits, etc.
 - k. Specific step-by-step procedures to execute the test in a clear, sequential and repeatable format, including any control system point value or setpoint overrides required to simulate a test condition or sequence mode.
 - l. Definitions of control system trend data to be collected and provided to the CxA in electronic format for analysis and review
 - m. The expected system response and acceptance criteria of proper performance with a Yes/No check box to allow for clearly marking whether or not proper performance of each part of the test was achieved
 - n. A section for recoding actual system response, notes and comments
 - o. Signatures and date block for the CxA approval.
2. Installation Contractor shall use Functional Performance Test forms provided by CxA.
 3. The CxC and Contractor shall review all Functional Performance Tests (FPT) documents provided by the CxA prior to including them in the final Commissioning Plan.

PART 3 EXECUTION

3.1 SCHEDULING AND COORDINATION

- A. The CxA will provide an initial schedule of commissioning events to the CxC at the commissioning kickoff meeting.
- B. Contractor shall develop a detailed Start-up Schedule for all systems to be commissioned and coordinate with CxA to include commissioning milestones. The Contractor shall integrate all commissioning activities into the master construction schedule.
- C. The CxC shall provide sufficient notice to the CxA and owner for scheduling and coordinating commissioning activities. A minimum two-week's notice shall be provided to the CxA for witnessing equipment Start-ups, Pre-Functional Checks & Tests, and Functional Performance Testing.
- D. The Commissioning Team shall address scheduling problems and make necessary notification in a timely manner in order to expedite the commissioning process.

3.2 MEETINGS

- A. When commissioning team member attendance is required, as determined by the CxA and CxC, be punctual and attentive during the meeting.
 1. The CxA will conduct a commissioning kick-off meeting, usually within 60 days of the commencement of construction. All team members involved in the commissioning process shall attend the kick-off meeting.
 2. The CxA will plan other commissioning meetings as deemed necessary as construction progresses. These meetings will cover planning and coordination, and Commissioning Issues resolution.

3. The frequency of meetings will vary through construction, but generally increase during start-up and commissioning activities.
 - B. The CxA will write and distribute meeting minutes documenting the meeting discussion, conclusions, and actions for each team member.
- 3.3 SYSTEM READINESS: INSTALLATION VERIFICATION, STARTUP, PRE-FUNCTIONAL CHECKS & TESTS
- A. Contractor shall utilize and complete System Readiness Checklists (SRC) to ensure equipment and systems are complete, operational, and ready for Functional Performance Testing. The SRCs are checklists which summarize and track the completion of Installation Verification, Startup, and Pre-Functional Checks & Tests.
 1. SRCs are developed by the CxA with input from the CxC and Installation Contractors.
 2. Contractor shall document the progress and completion of Installation Verification, Startup, and Pre-Functional Checks & Test on the SRC. Upon completion, Contractor shall attach all associated Installation Verification, Startup and Pre-Functional Checkout & Testing forms to the SRCs and submit to the CxA for approval.
 3. Approval of completed SRC by the CxA is required prior to Functional Performance Testing of equipment and system.
 4. Each SRC may have more than one Installation Contractor responsible for its execution.
 - B. Contractor shall provide complete Installation Verification, Startup and Pre-Functional Checkout & Testing forms for each commissioned system.
 1. Each piece of equipment and system shall receive a full Installation Verification, Startup, and Pre-Functional Checks & Tests.
 2. The CxA shall perform the Installation Verification. The Contractor shall be responsible for the completion of all Startup and Pre-Functional Check & Tests and associated forms.
 3. All completed forms shall be attached to the SRC and submitted for CxA and approval before proceeding with Functional Performance Testing.
 4. At the discretion of the CxA and per the approved Cx Plan, Percent Sampling may be used for multiple identical pieces of non-life-safety or non-critical equipment (example: VAV boxes).
 - C. All tests and start-up procedures shall be conducted without compromise to human or equipment safety. The Contractor shall be responsible for the liability and safety of conducting all tests.
 - D. Contractor shall clearly identify and list any Deficiencies resulting from the Installation Verification, Start-up and Pre-Functional Checks & Tests on the SRC forms and immediately notify the CxA. Once Deficiencies are corrected and verified or tested, update and resubmit SRC and associated forms.
- 3.4 FUNCTIONAL PERFORMANCE TESTING (FPT)
- A. The CxA will develop test procedures and Function Performance Test (FPT) forms for each piece of equipment and system to be commissioned.
 1. Contractor shall assist the CxA in development of FPT forms by providing

- the required submittal data and updates, and providing additional equipment and system operation information when requested by CxA.
2. Prior to execution, the CxA will provide a copy of the test procedures to the Contractor and Installation Contractor. The Contractor and Installation Contractor shall review and approve the tests procedures for feasibility, safety, equipment and warranty protection.
- B. Installation Contractor shall execute all Functional Performance Tests per the approved test procedures on the FPT forms. All testing results shall be documented on the FPT forms; the forms shall be signed and dated by the representative performing the tests.
- C. The CxA shall witness all FPT procedures per the Cx Plan. Contractor shall coordinate all Functional Performance Tests with the CxA, and provide a minimum of two (2) week's notice prior to conducting each system test.
- D. Functional Performance Testing for each system must be successfully completed and signed by the CxA prior to formal Approval of system commissioning.
- E. Functional Performance Tests may be conducted using these approved test methods:
1. Manually manipulating the equipment settings and observe performance and/or monitoring performance by analyzing results using the control system's trending capabilities and/or stand-alone Data Loggers.
 2. Overwriting control system sensor values to simulate a condition, such as overwriting the outside air temperature to be something other than it actually is.
 3. Altering setpoints to force equipment into a mode of operation to verify a sequence. For example, to see the AC compressor lockout work at an outside air temperature below 55 degrees F, when the outside air temperature is above 55 degrees F, temporarily change the lockout setpoint to be 2 degrees F below the current outside air temperature.
 4. Using Indirect Indicators for testing responses will be allowed only after the actual conditions represented by the Indirect Indicators have been visually and directly verified, calibrated and documented on the SRC.
- F. Setup:
1. Each function and test shall be performed under conditions that simulate actual conditions as close as is practically possible.
 2. The Installation Contractor executing the test shall provide all necessary materials, system modifications, etc. to produce the necessary flows, pressures, temperatures, etc. necessary to execute the test according to the specified conditions.
 3. At completion of the test, the Installation Contractor shall return all affected building equipment and systems to their pre-test normal condition.
- G. Functional testing shall be performed and documented for 100% of all equipment in the scope of commissioning. At the discretion of the CxA, the CxA may witness a sampling of the functional tests.
- H. Where the CxA requires BMS trending, the CxA will provide with the FPT form a points list that may include both hardware (inputs, outputs) and virtual / software

points, and appropriate trending intervals.

1. The Contractor shall provide trend data to the CxA in electronic format. As an owner approved alternative, the Contractor can provide the CxA remote access to the control system and provide training that will allow the CxA to directly download trend data.

3.5 DEFICIENCIES AND COMMISSIONING ISSUES

- A. During the Installation Verification, Startup, and Pre-Functional Checks & Tests, all Deficiencies and Commissioning Issues will be documented on the inspection and test forms in use, and will additionally be documented by the CxA on a Commissioning Issues Log.
- B. Immediate correction of minor Deficiencies identified during testing may be allowed at the discretion of the CxA. In such cases the Deficiency and identified resolution must still be documented on the commissioning form in use.
- C. When Commissioning Issues are identified during Functional Performance Testing, the CxA will discuss with the executing Installation Contractor and/or CxC and determine whether testing can proceed or be suspended. The Commissioning Issue and any identified resolution will be documented on the commissioning test form in use in addition to the Commissioning Issues Log.
- D. The CxA will maintain and update the Commissioning Issues Log, and document the issues resolution process. Copies will be distributed to the Contractor, Owner, and Installation Contractors as appropriate.
- E. All Deficiencies and Commissioning Issues shall be corrected promptly. The responsible party shall correct the issue and inform the Contractor and CxA in writing of the resolution and completion date. The CxA will record completion on the Commissioning Issues Log and the CxC shall reschedule testing with the CxA and Installation Contractor. Testing shall be repeated until passing performance is achieved or the owner accepts the noted issue.
- F. When there is a dispute regarding a Commissioning Issue, whether it is valid or who is responsible, additional parties may be brought into the discussion as appropriate. The CxA shall have the final interpretive authority and the owner will have the final approval authority.
- G. The CxA may recommend solutions to Deficiencies and Commissioning Issues. However, the burden of responsibility to solve, correct and perform required retests is with the Contractor, Installation Contractors, and the Design Professional(s).
- H. Retesting:
 1. For all Commissioning Issues identified during Functional Performance Testing, retesting is required to verify the resolution of the issue and to complete the FPT.
 2. The time for the CxA and the owner to direct and witness retesting will be back-charged to the Contractor and Installation Contractor responsible for the Commissioning Issue as follows:
 - a. If the Commissioning Issue is not related to any previous SRC inspection, Start-up or checklist deficiency, no cost will be assessed by the CxA or owner for the first retest. Cost for additional required retests after the first retest will be back-charged.

- b. If the Commissioning Issue is related to any previously reported SRC inspection, Start-up or checklist Deficiency and reported resolved and determined during Functional Performance Testing to be faulty, additional costs will be assessed for all required retests.
3. Any required retesting shall not be considered a justified reason for a claim of delay or for a time extension.

3.6 TRAINING OF OWNER PERSONNEL

- A. The CxC shall coordinate and schedule the training for owner Personnel. The CxC shall ensure that training is completed per the requirements of the construction documents and specifications.
- B. Installation Contractors responsible for specific equipment and system training shall submit a written training plan to the Contractor for all equipment and systems to be commissioned no less than (30) days prior to start of training. Contractor shall submit training plan(s) to CxA and owner for review and approval. The training plan(s) will cover the following elements:
 1. Equipment and/or systems included in training
 2. Intended audience
 3. Location of training
 4. Subjects covered (description, duration of discussion, presentation methods, etc.)
 5. Instructor's name and qualifications
- C. The CxA shall review the training plans to verify compliance with the Specifications.
- D. Contractor shall submit to CxA an 'attendee signed' attendance sheets for each training session conducted.

3.7 DEFERRED & SEASONAL TESTING

- A. Before or during the Warranty Period, any Seasonal Testing or Deferred Testing shall be completed as part of this contract. Tests shall be conducted by the Installation Contractor responsible for the equipment and systems, completed in the same manner as all other commissioning tests, and shall be witnessed and by the CxA.
- B. Contractor shall coordinate with CxA and owner and schedule all Deferred and Seasonal Testing.
- C. Contractor shall make final adjustments to the Operations and Maintenance Manual and as-builts needed for any modifications made during Deferred or Seasonal Testing.

3.8 PROJECT CLOSEOUT

- A. Upon completion of all commissioning activities, the CxA will prepare and submit to the owner a Final Commissioning Report detailing the Cx Plan and all commissioning activities. The CxC shall support this effort by providing all Contractor coordinated commissioning documentation.

3.9 NEAR-WARRANTY-END REVIEW

- A. Within the three last months of the Warranty Period, the Contractor shall schedule and participate in a review of the commissioned systems with the owner, design

team, appropriate Installation Contractors, and the CxA to identify any Warranty Issues.

- B. A list of Warranty Issues will be developed by the owner and CxA. The Contractor shall be responsible for and ensure the cooperation of appropriate Installation Contractors to resolve Warranty Issues prior to the end of the Warranty Period.
- C. After correcting noted Warranty Issues, the Contractor shall notify the CxA in writing, the CxA will back-checking and verify Warranty Issue as resolved.
- D. Issues identified during the Warranty Period will remain Warranty Issues until satisfactory completion by Contractor and back-check verification by CxA, even if the Warranty Period expires during the correction and back-check period.

END OF SECTION