CONTRA COSTA COMMUNITY COLLEGE DISTRICT

ADDENDUM #3
Drawings & Specification

Architect:
LPA
60 South market Street, Suite 150
San Jose, CA 95113

June 26, 2017
CONTRA COSTA COMMUNITY COLLEGE DISTRICT

L-636 Physical Education & Student Union Complex
Los Medanos College
ADDENDUM #3 Date: 6/26/17

NOTICE TO ALL PRE-QUALIFIED CONTRACTORS ONLY

You are hereby notified of the following changes, clarifications and/or modifications to the original Contract Documents, Project Manual, Drawings, Specifications and/or previous Addenda. This Addendum shall supersede the original Contract Documents and previous Addenda wherein it contradicts the same, and shall take precedence over anything to the contrary therein. All other conditions remain unchanged.

This Addendum forms a part of the Contract Documents and modifies the original Contract Documents dated May 8, 2017. Acknowledge receipt of this Addendum in space provided on the Bid Proposal Form. Failure to acknowledge may subject Bidder to disqualification.

A. ADDITIONS, DELETIONS, REVISIONS, REPLACE SPECIFICATIONS, DIV 0 & 1

1. REVISION: Table of Content
   Include added sections.

2. REVISION: 00100 Notice Inviting Bids
   Revised bid RFI submittal and last Addendum issue dates.

3. REPLACE: Section 00300 Bid Proposal Form
   Revised the description of Alternate # 1.

4. REPLACE: Section 00700 General Conditions
   Replaced in its entirety.

5. REPLACE: Section 01030 Alternates
   Revised the description of Alternate # 1.

6. REPLACE: Section 01250 Contract Modification Procedures
   Added Article K 1.c and Article K 2.d.

7. REPLACE: Section 01300 Labor Compliance Program
   Added Section 1.3 A regarding requirements for submitting Certified Payroll to the State.

8. REPLACE: Section 01552 Geotechnical Requirements
   Revised Article 1.1.6 regarding protection of open excavations and open trenches.
B. ADDITIONS, DELETIONS, REVISIONS, REPLACE TECHNICAL SPECIFICATIONS:
(All modifications in the specifications are in **bold** or *blue* text).

1. **REPLACE: Section 033100 Structural Concrete**
   Includes fibrous reinforcement to minimize structural concrete cracking and clarifies the stain for Alternate #1 that will work with the hydrophopic admixture.

2. **REVISION: Section 051200 Structural Steel Framing**
   Spec reference deleted.

3. **REPLACE: Section 072216 Roof Board Insulation**
   Description of material modified.

4. **REPLACE: Section 072221 Roof Board Underlayment**
   Description of material modified.

5. **REPLACE: Section 074243 Aluminum Composite Wall Panels (ACM)**
   Material description modified.

6. **REPLACE: Section 074273 Ultra-High Performance Concrete Panels**
   Clarification on the product per manufacturer's recommendations.

7. **DELETE: Section 083615 Sectional Glazed Aluminum Doors**
   Entire section deleted.

8. **DELETE: Section 084229 Automatic Entrances**
   Entire section deleted; refer to 087100.

9. **REVISION: Section 087100 Door Hardware**
   Push-n-go operators modified to “concealed”

10. **REPLACE: Section 093000 Tiling**
    Coordination with final finish selections in drawings.

11. **REPLACE: Section 096723 Resinous Flooring**
    Coordination with final finishes in drawings.

12. **REPLACE: Section 105113 Metal lockers**
    Coordination with product manufacturer.

13. **REVISION: Section 105126 Solid Plastic Lockers**
    References updated.

14. **REVISION: Section 230516 Expansion Fittings and Loops for HVAC Piping**
    References updated.

15. **REVISION: Section 230719 HVAC Piping Insulation**
    References updated
16. REVISION: Section 230913 Instrumentation and Controls
   References updated.

17. REVISION: Section 230923 Direct-Digital Control system for HVAC
   References updated.

18. REVISION: Section 233100 HVAC Ducts and Casings
   Updated pressure classification.

19. ADD: Section 233319 Duct Silencers
   New spec section added.

20. ADD: Section 233415 HVLS Fans
   New spec section added.

21. REVISION: Section 233600 Air Terminal Units
   Updated VAV and FP-VAV information.

22. ADD: Section 235233 Modulating Condensing Boilers
   New spec section added.

23. ADD: Section 237111 Packaged Rooftop AC Units
   New spec section added.

24. DELETE: Section 260536 Cable Trays for Electrical Systems
   Section was never issued and is removed from the Table of Content. (TOC)

25. ADD: Section 260914 Electrical Sensing and Measurements
   Section was included as part of the approved specifications, but was missing from the
   TOC. It is now shown in the TOC.

26. DELETE: Section 262713 Electrical Metering
   Section was never issued and is removed from the TOC.

27. REVISION: Section 323113 Chain Link Fences and Gates
   Removed spec reference.

28. DELETE: Section 323223 Segmented Retaining Walls
   Removed from specs.

C. REVISION TO DRAWINGS SHEETS:
   All drawing modifications are indicated on the drawings with a cloud graphic and a Delta 1 or 3.

1. G0.21 – GENERAL INFORMATION
   Add Abbreviation to Abbreviation List: A.C.M. = Aluminum Composite Metal Panel system.

2. G1.02 – ENLARGED CAMPUS PLAN
   a) Adjusted Limit of Work line to reflect referenced civil drawings. Refer to civil drawings.
   b) Added keynote 01.06
3. **C0.01**
Revised and coordinated over excavation notes.

4. **C1.01**
   a) Revised Keynote 06 with info on shallow swimming pool to be demolished
   b) Added Keynote 64 per District comments.

5. **C2.01**
   a) Revised Section A “Over excavation Limits”.
   b) Revised Keynote 06 with info on shallow swimming pool to be demolished
   c) Added Keynote 11 as coordinated with Landscape.

6. **C2.02**
   a) Revised Keynote 06 with info on shallow swimming pool to be demolished.
   b) Added Keynote 11 as coordinated with Landscape
   c) Revised top-of-wall elevations as coordinated with Landscape.

7. **C3.02**
   Added Keynote 27 related to as-built info received on existing gas line.

8. **C4.02**
   a) Added Keynote 62 necessitated to as-built info recently received on existing gas line
   b) Revised elevation of electrical conduit installed as part of Phase 1 Portables project.

9. **C4.03**
   Revised to show existing electrical vault constructed.

10. **C5.02**
    Revised northing/easting based on updated building grid.

11. **C7.02**
    Revised Detail 08 “Bollard” as coordinated with Landscape.

12. **L0.01**
    keynote 14 and 33 were removed from the legend (wall at west entry and actuator).

13. **L1.06**
    an alternative concrete walk, truncated domes and concrete curb have been designed to adequately tie into exiting paving.

14. **L2.06**
    New concrete walk, scoring and truncated domes have been dimensioned.

15. **L3.01**
    Bollard locations have been added and dimensioned.
16. L5.01
The Sawcut joint does not have a tooled radius. The expansion joint is a formed construction joint that is tooled; no saw cutting will occur at expansion joints, keynote 4 from detail 3 has been removed.

17. L5.03
Removed duplicate detail 24 of the actuator, refer to Arch.

18. L6.10
Notations on detail 8 were added to clarify where deep root bubblers are required. Detail 9 was adjusted to show the deep root bubblers outside the flood basin away from the root ball.

19. L7.02
Keynotes were added to missing shrub areas.

20. L7.05
Callout GC8 was replaced with OG8.

21. L7.06
The correct corresponding tree symbol was replaced to illustrate T-6.

22. AA2.11 – SLAB PLAN, LEVEL 1 - PE COMPLEX (BLDG A)
4” boiler pad added to boiler room.

23. AA2.21 – FLOOR PLAN, LEVEL 1 - PE COMPLEX (BLDG A)
a) Wall between boiler room PE-135 and fire sprinkler room PE-140 shifted east.
b) Elevation call-out for Equipment Storage PE-136 added.

24. AA2.22 – ROOF PLAN - PE COMPLEX (BLDG A)
Keynote 23.07 identified.

25. AA2.31 – FINISH PLAN, LEVEL 1 - PE COMPLEX (BLDG A)
a) Finish tag added
b) Finish material updated @ Locker Rooms
c) Base material updated @ Training Room PE-131

26. AB2.11– SLAB PLAN, LEVEL 1 – SU BLDG.
a) Dimension update for curb.
b) Tube supports for Service yard enclosure coordinated.

27. AB2.12– SLAB PLAN, LEVEL 2 – SU BLDG.
a) 4” boiler pad added.
b) Seismic joint identified.

28. AB2.21– FLOOR PLAN, LEVEL 1 – SU BLDG.
Keynotes clarified.
29. **AB2.22– FLOOR PLAN, LEVEL 2 – SU BLDG.**
   a) Boiler room SU-206 modified.
   b) Exterior elevation reference updated.

30. **AB2.23– ROOF PLAN – SU BLDG.**
    a) Keynote 23.07 noted.
    b) Extent of membrane roofing on parapet identified.

31. **AB2.31– FINISH PLAN, LEVEL 1 - SU BUILDING**
    a) Extent of base in Servery shown.
    b) Bookstore flooring Alternate number was corrected.

32. **AB2.32– FINISH PLAN, LEVEL 2 - SU BUILDING**
    Boiler room SU-206 modified.

33. **AB2.41- RCP, LEVEL 1 – SU BLDG.**
    Blade signage location adjusted.

34. **AB2.42- RCP, LEVEL 2 – SU BLDG.**
    a) Clarification on keynote 23.11
    b) Boiler room SU-206 and adjacent Storage modified.

35. **AA3.01 – EXTERIOR ELEVATIONS - PE COMPLEX (BLDG A)**
    Finish tag & keynotes revised.

36. **AB3.11- EXTERIOR ELEVATIONS – SU BLDG.**
    a) Keynotes added identifying elevation elements.
    b) General note added to coordinate with other drawings for device identifications.
    c) Added keynote 1.06 re: painting of portables.

37. **AB3.12- EXTERIOR ELEVATIONS – SU BLDG.**
    a) Keynotes added identifying elevation elements.
    b) General note added to coordinate with other drawings for device identifications.
    c) Clarify signage installation.

38. **AB3.51- WALL SECTIONS – SU BLDG.**
    Waterstop location at elevator pit shown.

39. **AB3.52- WALL SECTIONS – SU BLDG.**
    a) Metal stud in wall located.
    b) Extent of gypsum board clarified.

40. **AB3.53- WALL SECTIONS – SU BLDG.**
    a) Guardrail height increased 1/2 inch.
    b) Detail call-out at floor to wall location.
41. AB3.54- WALL SECTIONS – SU BLDG.
   Building signage mounting on top of parapet.

42. AB4.12- ENLARGED PLANS/ ELEVATIONS – SU BLDG.
   Boiler room SU-206 is updated.

43. AB4.14- ENLARGED PLANS– SU BLDG.
   Finishes revised in the details as noted.

44. AB5.12– INTERIOR ELEVATIONS – SU BLDG.
   Finish tag/keynotes revised as indicated.

45. A6.01– DOOR SCHEDULE
   Servery SU-124 door size updated.

46. A6.51– FINISH SCHEDULE
   Finish schedule revised as indicated.

47. A8.11– EXTERIOR DETAILS
   Top of parapet finishes and details clarified.

48. A8.12– EXTERIOR DETAILS
   Concrete bench dimensions clarified.

49. A8.15– EXTERIOR DETAILS
   Details and references updated as indicated.

50. A8.16– EXTERIOR DETAILS
   a) Details and references updated as indicated.
   b) Clarify signage installation.

51. A8.17– EXTERIOR DETAILS
   Details and references updated as indicated.

52. A8.21– ROOF DETAILS
   Details and references updated as indicated.

53. A8.31– OPENING DETAILS – DOORS
   Details and references updated as indicated.

54. A9.22 – INTERIOR DETAILS – CEILING
   Details and references updated as indicated.

55. A9.25- INTERIOR DETAILS – CEILINGS
   New detail added.
56. **A10.11– SIGNAGE PLAN, LEVEL 1 – SU BLDG.**
   Signage re-located as indicated.

57. **A10.12– SIGNAGE PLAN, LEVEL 2 – SU BLDG.**
   Signage added as indicated.

58. **A10.21- SIGNAGE DETAILS AND TYPES**
   Detail note clarified for exterior installation.

59. **A10.22– SIGNAGE TYPES**
   Detail note clarified for exterior installation.

60. **A10.23– SIGNAGE TYPES**
   Details revised as indicated.

61. **S0.01**
   a) Note added for AESS steel.
   b) Soil excavation section revised to match geotechnical report.

62. **S0.12**
   Detail 7 added.

63. **S0.21**
   Detail 6 – Round Column baseplate connection deleted.

64. **S0.26**
   Detail 3 Deleted.

65. **SA2.21**
   a) Relocated gridline A9.1 to match architectural.
   b) Added pads for relocated boilers.
   c) Added callout for low wall tube steel along gridline A3.
   d) Removed curb at exterior overhead door.

66. **SA2.51**
   Changed note 5 to say openings in “roof”.

67. **SB2.21**
   a) Adjusted footing depths around elevator pit to match arch (move up 1’ to -4’).
   b) Grade beam locations adjusted to avoid pipes.
   c) Removed footings and baseplate callout at revised pipes.

68. **SB2.22**
   a) Added pads for relocated boilers.
   b) Added hatches for food service equipment in mech well area.
69. SB2.51
   Added dimension to locate beam.

70. SB5.04
   a) Sections 13 & 14 – Revised parapet framing.
   b) Section 16 – Revised parapet framing & added kickers.

71. SB5.05
   Section 21 – Revised framing to reflect revised pipes.

72. S9.01
   Detail 1 – Revised boiler size and weight to match revised boiler.

73. S9.02
   Detail 1 – Removed “square” and revised joist framing.

74. M0.10
   Updated General note 15.

75. M0.20
   Updated boiler and pump schedules to account for new boiler configuration.

76. M0.21
   Updated boiler and pump schedules to account for new boiler configuration.

77. MA2.10
   a) Added keynote M-0037.
   b) Updated boiler room layout per new selected boilers. Boilers are now floor mounted and no longer wall mounted.

78. MA2.20
   Adjusted boiler ventilation roof penetrations per boiler changes.

79. MB2.10
   Updated ductwork above reception SU-139.

80. MB2.20
   Updated boiler room layout per new selected boilers. Boilers are now floor mounted and no longer wall mounted. Boiler room was expanded in to shaft space to address these changes.

81. MA3.10
   Updated boiler room layout per new selected boilers. Circulator pumps now piped above the floor mounted boilers.
82. MB3.20
Updated boiler room layout per new selected boilers. Boilers are now floor mounted and no longer wall mounted. Boiler room was expanded into shaft space to address these changes.

83. MA5.10
a) Updated boiler room layout per new selected boilers.
b) Updated boiler room piping diagram to interface with new floor mounted boilers.

84. MB5.10
a) Updated boiler room layout per new selected boilers.
b) Updated boiler room piping diagram to interface with new floor mounted boilers.
c) Boiler room was expanded into shaft space to address these changes.

85. M7.01
Updated detail 06/M7.01 to address boiler mounting changes to floor mount.

86. M7.02
Added detail 13/M7.02 to address concentric vent through roof for boiler flue ductwork.

87. M7.03
a) Updated flex duct information in details 02 & 04/M7.03
b) Added specification information for pipe thru fire rated partition detail (20/M7.03)

88. M7.05
Updated detail 01/M7.05 to include the BTU meter SOA and clarify scope/intent for existing boiler room.

89. P0.20 – PLUMBING SCHEDULES
a) Revised gas sub-meter (GSM-1) on Plumbing Fixture Schedule.
b) Added water sub-meter (WSM-1) to Plumbing Fixture Schedule.

90. PA-2.10 – PLUMBING SANITARY DRAINAGE FLOOR PLAN – PE COMPLEX
Revised hub drain location and associated piping to match new Mechanical layout.

91. PA-2.20 – PLUMBING DOMESTIC WATER FLOOR PLAN – PE COMPLEX
a) Revised gas and domestic water piping to match new Mechanical layout.
b) Revised gas sub-meter (GSM-1).
c) Added water sub-meter (WSM-1).

92. PB-2.10 – PLUMBING SANITARY DRAINAGE 1ST FLOOR PLAN – SU BUILDING
a) Added note: 3”SD, REFER TO DETAIL #20/A8.16 FOR MORE INFORMATION.
b) Added 3” storm and overflow drain piping from new roof drain.
c) Added 2” sanitary sewer piping from floor sink located on 2nd floor.
93. PB-2.20 – PLUMBING DOMESTIC WATER 1ST FLOOR PLAN – SU BUILDING
   a) Revised gas sub-meter (GSM-1).
   b) Added water sub-meter (WSM-1).
   c) Added missing 1"cold water piping and note to plans.

94. PB-2.30 – PLUMBING SANITARY DRAINAGE 2nd FLOOR PLAN – SU BUILDING
   Added 3" storm and overflow drain piping from new roof drain.

95. PB-2.50 – PLUMBING ROOF PLAN – SU BUILDING
   a) Added new roof drain per Architectural.
   b) Added missing 1-1/2" vent thru roof and keynote.

96. PB-3.10 – ENLARGED PLUMBING PLANS – SU BUILDING
   a) Revised gas and domestic water piping to match new Mechanical layout.
   b) Added floor sink (FS-1) and associated waste & vent piping to Boiler room.

97. PB-3.20 – ENLARGED PLUMBING PLANS – SU BUILDING
   a) Added missing 1"cold water piping and note to plans.
   b) Added 2" sanitary sewer piping from floor sink located on 2nd floor.
   c) Revised floor sink locations to match Food Service plan.
   d) Revised grease waste and vent below floor piping per Structural comments.

98. P4.01 – PLUMBING DETAILS
   a) Added detail #3: PENETRATION THRU ROOF DETAIL.
   b) Added detail #4: FLOOR / CEILING PENETRATION DETAIL.
   c) Added detail #5: FIRE RATED WALL PENETRATION DETAIL.

99. E1.00
   Updated notes to clarify LV/FA routing.

100. EA2.11
   Added power for TV locations to match architectural.

101. EB2.11
   Add junction boxes for urinal sensors per plumbing.

102. EB2.12
   Add junction boxes for urinal sensors per plumbing.

103. EB2.21
   Exterior Signage revisions.

104. EB2.22
   Shifted occupancy sensor per architectural hatch revision.
105. EA2.51
Updated boiler room power layout per mechanical boiler revisions.

106. EB2.52
Updated boiler room power layout per mechanical boiler revisions.

107. EB6.00
Revise Panel HBL1

108. EB6.01
Updated panel schedule per mechanical boiler revisions.

109. FA0.10
Added general note to coordinate device locations.

D. PRE-BID RFI’s

1. Question: Per Specification Section 01552, Item 1.6 states that the Contractor shall anticipate encountering excessively over-optimum (wet) soil moisture conditions during winter or spring grading or following periods of rain, and/or due to irrigation of adjacent areas. The Contractor shall mitigate wet soil conditions by any of the following as a part of their original Contract Price: (options follow). To quantify what may be required here is next to impossible and potentially very costly. Can this be eliminated and possible an allowance included to account for this potential cost? If not, the District may pay for work that may not even be required. We believe that is the most fair way to handle this situation.

Response: Section 01552, Geotechnical Requirements has been deleted in its entirety and replaced herein.

2. Question: When the building pads are lime treated, there will be an over-build distance per Section A on C2.01. These over-build areas will extend into landscape areas. Vegetation will not grow in soil that has been lime treated. To what depth shall this lime treated material be removed and replaced with non-lime treated material?

Response: Lime treatment is currently not approved for the project and shall not be included in the bid. If project conditions necessitate the use of lime treatment, this will be paid separately.

3. Question: Per Paragraph 2.06.C.1.a., panels to have one face perforated to absorb sound. Per Paragraph 2.10.C., Hufcor's Revelations vinyl fabric is desired. The vinyl finish will not allow sound to pass through it, making the perforated panels pointless. Also, Hufcor's Revelations finish is a fabric that is not vinyl based. Please clarify if a Hufcor's vinyl or Fabric based finish is desired and whether or not the perforated panels are desired with the fabric finish.

Response: Specified fabric is not vinyl material and is an acceptable fabric for acoustical requirements. (Confirmed with Hufcor)

4. Question: Please confirm track to be powder coated to match ceiling. (This will add to the cost compared to a clear anodized aluminum finish, specified manufacturer's standard.)

Response: Powder coated to match ceiling.

5. Question: Will Hufcor's Frameless Glass Operable Partition be an Acceptable substitute for this Section?

Response: Substitutions are not allowed prior to bid. Substitutions are allowed per section 01625 at the time of bid.
6. **Question:** Per Paragraph 2.05.A.2., panels to have maximum width of 3'-3"w. Per Door Type K/A6.01, system is shown with 2'-10" panels. Per the Floor Plan/AB2.21, pocket for system is shown with 2'-4" w inside clear. Do the panels have to fit in the 2'-4"w pocket, or can the pockets be increased to either 2'-10"w or 3'-3"w?
**Response:** Door type K is updated to reflect correct number of door panels. The clear pocket width is designed accordingly to fit existing number of door panels reflected on elevation 13/A5.13.

7. **Question:** Per Paragraph 2.06.C., it states to provide etched designs on interior surface of glass in accordance with graphic pattern provided by Architect. Per Door Type K/A6.01, no custom etching is shown. How would you like us to include custom etching in our pricing?
**Response:** The graphics on the glass partitions are vinyl graphic film, not etched. Revised specs. provided with Addendum #2.

8. **Question:** SECTION 10 11 23 TACKABLE WALL PANELS (** Mislabeled specification Section – No specification in TOC for Tackable Wall Panels) Please advise if these items are to be included in the table of contents and are indeed part of the contract documents, or are they to be removed from the contract documents?
**Response:** TOC has been corrected.

9. **Question:** SECTION 10 14 03 EXTERIOR SIGNAGE (** Specification listed as 10 11 23 Exterior Signage in TOC) Please advise if these items are to be included in the table of contents and are indeed part of the contract documents, or are they to be removed from the contract documents?
**Response:** TOC has been corrected.

10. **Question:** What doors does spec section 083615 Sectional Glazed Aluminum Doors applies too. Also on page A9.22 detail 19, mentions a coiling door, I need to know where this door is located, also there is no spec section for coiling grills also.
**Response:** Section 083615 is removed from the specs. Detail A9.22, detail 19 is removed from the drawings. The overhead coiling doors at the PE Equipment room (counter) and PE Training room (full-height) are detailed on sheet A8.31.

11. **Question:** Drawing AB3.12 – the detail 7.01 is called out the same for multiple items, please confirm these items. Also, the detail 10.47 (Bollards) is pointing to a wall type.
**Response:** Changed keynote 7.01 to 05.46 indicating the rolling gate. Will be issued as part of AB3.12 revisions.

12. **Question:** Drawing C2.01 shows over-excavation of 15' below the PE Building and 7.5' below the Student Union Building. Grading note 01 on the same sheet states that these over-excavated areas are to be backfilled with non-expansive fill or lime treated soil. The soils report, which is not part of the Contract Documents Per Section 1552, essentially states the same thing. However, under Earthwork Notes on Sheet C2.01, 3.03 Excavation of Fill Areas states that only the upper 24" of fill below the slab on grade shall consist of non-expansive soil. Which is correct? We understand that non-expansive soil is specified due to the expansive soils at the site but typically soils at a great depth do non-experience a large change in moisture content and thus little volume changes.
**Response:** The Earthwork Notes on C0.01 and the overexcavation requirements on C2.01 have been revised per Addendum 3. Backfill of the PE building no longer calls for Engineered Fill, but has site-specific requirements as now indicated on C0.01.

13. **Question:** Per Drawing G1.02, the existing Boiler Room to the west of the PE Building is to remain. The over-excavation for the PE building per the detail shown on C2.01 will encroach within the limits of this building. Is the intent to install shoring to protect this building or stop the over-excavation short of this building to eliminate the need to shore this area? Also, if any existing utilities to remain are within the over-excavation area, will the District pay to have these utilities relocated or will the over-excavation be modified?
**Response:** The overexcavation requirements on sheet C2.01 have been revised per Addendum 3. On the west and north side of the excavation for the PE building, shoring is required to protect the existing boiler room and utility corridor. Shoring shall be designed and submitted by the Contractor.
14. **Question:** On Sheet C0.01 Earthwork Note 5.02 Fill Work, paragraph 3, states that lime treatment of soil is not preferred and is not allowed unless specifically reviewed and approved by the Geotechnical Engineer. If approved by the Geotechnical Engineer, the Contractor shall, as a minimum, adhere to the Specification requirements for lime soil stabilization plus any additional requirements by the Geotechnical Engineer. 1. Is lime treatment approved under the building pads? 2. What “additional requirements by the Geo. Eng. will there be? We need to know that now to include in our bid. 3. Can lime treated material be used below the flatwork in lieu of non-expansive soil? If so, can it be treated, stockpiled, and then placed as needed?  
**Response:** Lime treatment is not currently approved for the project, and shall not be included in the bid. If project conditions necessitate the use of lime treatment, this will be paid separately.

15. **Question:** Drawing C1.01 – There is a 3’ deep pool to the east of the main pool which was filled with sand and covered with a 5” concrete slab. Include for removal  
**Response:** This is now reflected on C1.01 Demolition Plan and C2.01 Grading Plan.

16. **Question:** Drawing C1.01 and C2.10 – Earthwork note 8.3.03 on C.0.01 conflicts with General Grading Note on C2.01 regarding the depth of the engineering fill required under the building.  
**Response:** Overexcavation requirements identified on sheets C0.01 and C2.01 have been coordinated and updated.

17. **Question:** Specification Section 31 32 13 - Lime Soil Stabilization Section. Is Lime treatment required by the documents?  
**Response:** No, it is not required, and actually is not preferred. Sheet C0.01, Earthwork Note 8.5.02 (last paragraph) states that “Lime treatment of soil is not preferred and is not allowed unless specifically reviewed and approved by the Geotechnical Engineer. If approved by the Geotechnical Engineer, the Contractor shall, as a minimum, adhere to the Specification requirements for Lime Soil Stabilization plus any additional requirements by the Geotechnical Engineer.” Although lime treatment is not desired, we are concerned that the deep overexcavations required at the buildings may uncover damp soils that may prevent the Contractor shall meeting compaction. If this is the case, we will already have lime treatment requirements and controls in place as an option.

18. **Question:** What is the size of the wire to be installed from Man Hole #7 to the PE complex and the Student Union transformers? What is the size of the conduit to be installed?  
**Response:** (3)1/C 350KCMIL 115MIL XLPE 8000V AL. Size of the conduit is 4"C.

19. **Question:** What is the size of the existing conduits that Circuits CS-A1 & B1 are installed in?  
**Response:** 4"C.

20. **Question:** Are the 4-way junctions in Man Hole #1 existing or new? and are they 200a or 600a.?  
**Response:** All junctions are new for feeders CS-A1 and CS-B1.

21. **Question:** Are the 3-way junctions in Man Hole #2 existing or new? And are they 200a or 600a?  
**Response:** All junctions are new for feeders CS-A1 and CS-B1. All junctions are 600A

22. **Question:** Because the new HV cables for circuits CS-A1 & B1 are going from 3/0 al to 350 al. do we need Fused Elbow terminations  
**Response:** Provide Fused Elbow.

23. **Question:** On the service cables going out of man holes #1, 2 & 8 to protect the smaller size cables ?  
**Response:** Please see keynotes E0901 - E0907 on sheet E5.01.

24. **Question:** SECTION 26 05 36 CABLE TRAYS FOR ELECTRICAL SYSTEMS Please advise if these items are to be removed from the table of contents, or please provide the missing specifications.  
**Response:** This has been deleted from the Table of Contents.

25. **Question:** Feeder tag PE on E5.03 & SU on E5.03 are not specified on the Feeder Schedules. Please provide conduit & medium voltage cabling requirements for both of these feeder tags.  
**Response:** Feeder SU and PE: (3)1/C, 350KCMIL, AL, XLPE 8KV. To match loop CS-A1 and CS-B1 cable type.
26. **Question:** SECTION 26 27 13 ELECTRICITY METERING Please advise if these items are to be removed from the table of contents, or please provide the missing specifications.
   **Response:** This has been deleted from the Table of Contents.

27. **Question:** SECTION 26 09 14 ELECTRICAL SENSING AND MEASUREMENT. Please advise if these items are to be included in the table of contents and are indeed part of the contract documents, or are they to be removed from the contract documents?
   **Response:** This will be added to the Table of Contents.

28. **Question:** Drawing FS100 - General Note 10 says drawings are for bidding but not for construction
   **Response:** The stamped and approved drawings can be used for construction.

29. **Question:** Drawing FS100 - There are a high number of notes which refer you to Architectural, etc drawings. Were these requirements reviewed and addressed by LPA?
   **Response:** Yes, these were coordinated between Architectural and food service.

30. **Question:** Missing Specification Section on the "Rooftop Package Units". Please provide.
   **Response:** Specification section 237111 Packaged Rooftop Units is added in ADDENDUM#3.

31. **Question:** Missing Specification Section on the "Duct Silencer". Please provide.
   **Response:** Section 233319 Duct Silencers Added in ADDENDUM #3.

32. **Question:** Missing Specification Section on the "High Volume Low Speed Circulating Fan". Please provide.
   **Response:** Section 233415 High Volume Low Speed Fans added in ADDENDUM#3.

33. **Question:** Air Terminal Units Specification 23 36 00-3.02G states to provide minimum 5 feet of 1" Duct Liner downstream of Units. But the Plans clearly define what is lined, 10 feet length of Liner per Sheet Item M-0037, and "Duct Liner (where indicated)" per the Duct Insulation Schedule on Drawings M0.02 & M0.21. Can the Specification note be deleted to avoid confusion? Please clarify.
   **Response:** Section 3.02G removed from 233600 in ADDENDUM#3.

34. **Question:** Please provide further clarification as to what is to be provided for Existing Boiler room scope per M7.05 detail 1. The POC appears to be at the boiler with no pipe size given and no other POC symbol for what the piping is connected to. In the sheet notes, there are CFF connections noted with valves plus we are to provide a BTU meter equal to two turbine onicon meters. There are no supporting controls reference details that may help us identify what would be new work and what needs to be monitored. Provide updated piping and controls drawings so we can identify the work and price accordingly.
   **Response:** Detail 1/M7.05 updated, in ADDENDUM#3.

35. **Question:** Drawing MA2.10 depicts Round Duct with 1" Duct Liner and Sheet Item M-0037 with 10 feet of 1" Duct Liner, by gridlines AH & AM and A15 & A10, which I cannot locate a manufacturer that makes Polyester Duct Liner for Round Ductwork. The specified Product, Ductmate Poly Armor, stated it is not normally used in spiral duct since it is difficult to glue and pin in round duct. Can we use Round Fiberglass Liner instead? If not, provide a manufacture that makes such a product for Round Ductwork. Please clarify.
   **Response:** The first 10' of duct on the outlet of the 3 VAV boxes has been converted to rectangular lined ductwork, MA2010 was updated in ADDENDUM#3.

36. **Question:** Drawing M0.10, Details 02/M7.03, 04/M7.03, Specification Section 23 31 00-2.04A.5.b General Notes 15, states to use "Flexmaster 5M" or equal. Flexible Duct specification 23 31 00-2.04A.5 states to use "Flexmaster, Type 1M or 6M" or Casco. Detail 02/M7.03, Box Item 2 states to use Flexmaster 8M. Detail 04/M7.03 Box Item 2 states to use Flexmaster Type 6 or Casco Silent Flex II. Please clarify which Flexmaster or Casco type is applicable.
   **Response:** Updated General Note 15, Details 02&04/M7.03 to refer to “TYPE 1M or 6M”, included in ADDENDUM#3.
37. **Question:** Drawing M0.10, General Notes 15, states "Flexible Duct is not permitted on Negative Pressure Duct Systems", but Detail 04/M7.03 depicts and notes Flexible Duct on the Return Air Grilles. Please clarify.

**Response:** General note 15 updated, removed reference to negative pressure ductwork, included in ADDENDUM#3.

38. **Question:** Please review the attached detail from drawing M0.20. The specification being referenced for the boilers (23 52 53) does not exist in the contract documents. Please provide reference spec section.

**Response:** Specification section 235233 Modulating Condensing Boiler is issued in ADDENDUM#3.

39. **Question:** Specifications 051200 part 1.03 F, G & H references the AISC manual. AISC section 10.1 calls for “additional information shall be provided in the contract documents when AESS is specified”. Part 10.1 (a) calls for “Specific identification of members or components that are AESS” please furnish revised structural drawings identifying AESS members and components.

**Response:** Refer to spec section 051213 Architecturally Exposed Structural Steel, Section "2.02 DESIGN CRITERIA" that AESS are at all locations where structural steel members are exposed in finish construction.

40. **Question:** There is a specification (32 32 23 Segmented Retaining Walls) which refers to Keystone Walls. I cannot find these walls anywhere on the plans. Do you know if they exist, or is this a ghost spec?

**Response:** Specification shall be removed.

41. **Question:** Planting plan L7.02 has shrub areas that are unidentified. Please provide shrub identification for these areas.

**Response:** Shrub areas have been identified.

42. **Question:** Planting plan L7.05 has a call out for GC8 as a shrub. There is no GC8 identified on the legend. Please provide shrub size and type.

**Response:** GC8 was replaced with OG8.

43. **Question:** Planting plan L7.06 has a tree designated as T6. But the symbol shown on the legend is identified as T2 – Quercus virginiana ‘Cathedral’. Please advise which tree is suppose to be.

**Response:** T6 symbols were inserted for clarification.

44. **Question:** Irrigation legend requires 2 Toro 570S/FB-50-PC bubblers per tree. Detail 9, L6.10 requires 1 bubbler and 1 deep watering bubbler. Detail 8 has notes for suggested bubbler per tree sizes. Please advise how many bubblers are required per tree and if any deep watering bubblers are required.

**Response:** Details 8 & 9 were amended to clarify where Deep root bubblers are required.

45. **Question:** Please provide the thickness of the steel required for the columns at F4.

**Response:** These pipe columns are deleted as part of ADDENDUM#3.

If you have any questions regarding this Addendum, please contact:

**Jovan Esprit**  
Contra Costa Community College District  
500 Court St., Martinez, CA 94553  
Email: jesprit@4cd.edu; Facsimile: 925-229-6959

All other terms and conditions of BID are to remain the same.

**Caroline Kwak** (Project Manager)

LPA, Inc.

60 South Market Street, Suite 150  
San Jose, CA 95113

**END OF ADDENDUM #3**
SECTION 00010
TABLE OF CONTENTS

VOLUME 00 – DIVISIONS 00-01

DIVISION 00   PROCUREMENT AND CONTRACTING REQUIREMENTS
SECTION 00001   TITLE PAGE
SECTION 00007   SEALS PAGE AND PROJECT DIRECTORY
SECTION 00008   DSA FORM 103
SECTION 00010   TABLE OF CONTENTS
SECTION 00016   LOS MEDANOS COLLEGE CAMPUS MAP
SECTION 00051   PROJECT MANUAL USER GUIDE
SECTION 00091   ELECTRONIC DRAWING REQUEST
SECTION 00100   NOTICE INVITING BIDS (ADDENDUM # 3)
SECTION 00200   INSTRUCTIONS TO BIDDERS
SECTION 00210   INFORMATION AVAILABLE TO BIDDERS
SECTION 00300   BID PROPOSAL FORM (ADDENDUM # 3)
SECTION 00350   NON-COLLUSION AFFIDAVIT
SECTION 00400   STATEMENT OF BIDDER’S QUALIFICATIONS (ADDENDUM 1)
SECTION 00450   CERTIFICATION OF SITE VISIT
SECTION 00500   PAYMENT AND PERFORMANCE BOND
SECTION 00510   NOTICE OF AWARD
SECTION 00600   CONSTRUCTION AGREEMENT (ADDENDUM 2)
PROJECT STABILIZATION AGREEMENT -Executed October 22, 2012
SECTION 00650   NOTICE TO PROCEED
SECTION 00700   GENERAL CONDITIONS (ADDENDUM # 3)

DIVISION 01 GENERAL REQUIREMENTS  *** Specifications Nos. below in parenthesis denote Specification Sections referenced in Div. 1 – 33 Specification Sections. Contractor shall utilize specification listed next to the referenced specifications.

SECTION 01010   SUMMARY OF WORK   (011100)
SECTION 01030   ALTERNATES   (012300) (ADDENDUM # 3)
| SECTION 01050 | FIELD ENGINEERING       | (017123) |
| SECTION 01055 | CONFORMANCE SURVEYING    | (017123) |
| SECTION 01250 | CONTRACT MODIFICATION PROCEDURES | (012613) (ADDENDUM # 3) |
| SECTION 01290 | PAYMENT PROCEDURES       | (015800) |
| SECTION 01300 | LABOR COMPLIANCE PROGRAM | (ADDENDUM # 3) |
| SECTION 01305 | DELAY AND EXTENSIONS TO THE WORK |
| SECTION 01310 | CONSTRUCTION SCHEDULING  | (013216 & 013226) |
| SECTION 01311 | PROJECT MANAGEMENT AND COORDINATION | (013113) |
| SECTION 01312 | PROJECT MEETINGS         | (013119) |
| SECTION 01318 | DOCUMENT MANAGEMENT SYSTEM |
| SECTION 01321 | PHOTOGRAPHIC DOCUMENTATION |
| SECTION 01330 | SUBMITTAL PROCEDURES     | (013300) |
| SECTION 01331 | DEFERRED SUBMITTAL PROCEDURES | (013315) |
| SECTION 01340 | ADMINISTRATIVE FORMS AND LOGS |
| SECTION 01351 | SPECIAL PROJECT PROCEDURES FOR SEISMIC AREAS | (013515) |
| SECTION 01400 | QUALITY CONTROL REQUIREMENTS | (014500) |
| SECTION 01405 | QUALITY ASSURANCE        | (014500) |
| SECTION 01410 | REGULATORY REQUIREMENTS  |
| SECTION 01411 | TESTING LABORATORY SERVICES | (014100) |
| SECTION 01412 | HAZARDOUS MATERIALS      |
| SECTION 01414 | GUIDELINES FOR OPERATIONS DURING A PROTEST |
| SECTION 01415 | MITIGATION MONITORING REGULATORY REQUIREMENTS |
| SECTION 01416 | SPECIAL PROCEDURES       |
| SECTION 01422 | REFERENCE STANDARDS SOURCES | (014224) |
| SECTION 01433 | MOCK UPS                 | (014339) |
| SECTION 01500 | TEMPORARY FACILITIES AND CONTROL | (015200 & 015213) |
| SECTION 01505 | CONSTRUCTION WASTE MANAGEMENT | (017419) |
| SECTION 01540 | SITE SECURITY AND SAFETY  | (013523) |
| SECTION 01552 | GEOTEchnICAL REQUIREMENTS (ADDENDUM # 3) |
| SECTION 01572 | STORM WATER POLLUTION PREVENTION |
| SECTION 01568 | TEMPORARY TREE AND PLANT PROTECTION | (015639) (ADDENDUM 1) |
| SECTION 01610 | BASIC PRODUCT REQUIREMENTS | (016600) |
| SECTION 01625 | PRODUCT OPTIONS AND SUBSTITUTIONS | (012500) |
| SECTION 01710 | CLEANING REQUIREMENTS    | (017413) |
| SECTION 01722 | EXECUTION REQUIREMENTS    |
SECTION 01730  CUTTING AND PATCHING  (017329)
SECTION 01740  WARRANTIES – GUARANTIES  (017836)
SECTION 01770  CONTRACT CLOSEOUT PROCEDURES  (017500 & 017700)
SECTION 01780  PROJECT RECORD DOCUMENTS  (017839)
SECTION 01785  OPERATIONS AND MAINTENANCE DATA  (017823)
SECTION 01810  GENERAL COMMISSIONING REQUIREMENTS  (019113)
SECTION 01811  SUSTAINABLE DESIGN REQUIREMENTS  (017900)
SECTION 01820  DEMONSTRATION AND TRAINING  (017900)

VOLUME 01 – DIVISIONS 02-14

DIVISION 02 - EXISTING CONDITIONS
SECTION 024113  SELECTIVE DEMOLITION
SECTION 024116  STRUCTURE DEMOLITION
SECTION 028400  POLYCHLORINATE BIPHENYL (PCB) REMEDIATION (ADDENDUM # 2)

DIVISION 03 - CONCRETE
SECTION 031000  CONCRETE FORMING AND ACCESSORIES
SECTION 032000  CONCRETE REINFORCING
SECTION 033100  STRUCTURAL CONCRETE (ADDENDUM # 3)
SECTION 033536  POLISHED CONCRETE SURFACE FINISHING (ADDENDUM # 2)
SECTION 033542  CONCRETE SEALING (ADDENDUM # 2)
SECTION 034800  PRECAST CONCRETE SPECIALTIES

DIVISION 04 - MASONRY
SECTION 042200  CONCRETE UNIT MASONRY

DIVISION 05 - METALS
SECTION 050513  SHOP-APPLIED COATINGS FOR METALS
SECTION 051200  STRUCTURAL STEEL FRAMING (ADDENDUM # 3)
SECTION 051213  ARCHITECTURALLY EXPOSED STRUCTURAL STEEL
SECTION 053100  STEEL DECKING
SECTION 054100  STRUCTURAL METAL STUD FRAMING
SECTION 055000  METAL FABRICATIONS
SECTION 055100  METAL STAIRS

DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES
SECTION 060573  WOOD TREATMENT
SECTION 064000  ARCHITECTURAL WOODWORK (ADDENDUM # 2)
SECTION 064116  PLASTIC LAMINATE-CLAD ARCHITECTURAL CABINET
SECTION 064150  CASEWORK COUNTERTOPS (ADDENDUM # 2)
SECTION 066400  PLASTIC PANELING (ADDENDUM # 2)
DIVISION 07 - THERMAL AND MOISTURE PROTECTION
SECTION 071353 ELASTOMERIC SHEET WATERPROOFING
SECTION 071416 COLD FLUID-APPLIED WATERPROOFING
SECTION 072100 THERMAL INSULATION (ADDENDUM # 2)
SECTION 072216 ROOF BOARD INSULATION (ADDENDUM # 3)
SECTION 072221 ROOF BOARD UNDERLAYMENT (ADDENDUM # 3)
SECTION 072710 AIR AND VAPOR BARRIERS
SECTION 074116 STRUCTURAL METAL ROOF PANELS (ADDENDUM 1)
SECTION 074243 COMPOSITE WALL PANELS (ADDENDUM # 3)
SECTION 074273 ULTRA-HIGH PERFORMANCE CONCRETE PANELS (ADDENDUM # 3)
SECTION 075423 THERMOPLASTIC POLYOLEFIN ROOFING (ADDENDUM # 2)
SECTION 076200 SHEET METAL FLASHING AND TRIM
SECTION 077233 ROOF HATCHES
SECTION 078400 FIRESTOPPING (ADDENDUM # 2)
SECTION 078443 FIRE RESISTIVE JOINT SEALANTS
SECTION 079200 JOINT SEALANTS (ADDENDUM # 2)
SECTION 079513 EXPANSION JOINT COVER ASSEMBLIES (ADDENDUM # 2)

DIVISION 08 - OPENINGS
SECTION 081113 HOLLOW METAL DOORS AND FRAMES
SECTION 081416 FLUSH WOOD DOORS
SECTION 083100 ACCESS DOORS AND PANELS
SECTION 083313 COILING COUNTER DOORS (ADDENDUM # 2)
SECTION 083615 SECTIONAL GLAZED ALUMINUM DOORS
SECTION 084000 ENTRANCES, STOREFRONTS AND CURTAIN WALLS
SECTION 084229 AUTOMATIC ENTRANCES
SECTION 084334 ALUMINUM FOLDING PANEL STOREFRONTS (ADDENDUM 1)
SECTION 084523 FIBERGLASS-SANDWICH-PANEL SKYLIGHTS
SECTION 086200 UNIT SKYLIGHTS (ADDENDUM # 2)
SECTION 086223 TUBULAR SKYLIGHTS
SECTION 087100 DOOR HARDWARE (ADDENDUM # 3)
SECTION 087105 DOOR AND HARDWARE INSTALLATION
SECTION 088100 GLASS GLAZING
SECTION 088300 MIRRORS
SECTION 089100 LOUVERS

DIVISION 09 - FINISHES
SECTION 092216 NON-STRUCTURAL METAL FRAMING (ADDENDUM 1)
SECTION 092900 GYPSUM BOARD
SECTION 093000 TILING (ADDENDUM # 3)
SECTION 095100 ACOUSTICAL CEILINGS
SECTION 095300 ACOUSTICAL CEILING SUSPENSION ASSEMBLIES
SECTION 095424 MODULAR METAL CEILINGS
SECTION 095425 LINEAR WOOD CEILINGS (ADDENDUM # 2)
SECTION 096466 WOOD ATHLETIC FLOORING (ADDENDUM # 2)
SECTION 096513 RESILIENT BASE AND ACCESSORIES (ADDENDUM # 2)
SECTION 096524  VINYL FLOORING
SECTION 096536  STATIC CONTROL RESILIENT FLOORING  (ADDENDUM # 2)
SECTION 096566  RESILIENT ATHLETIC FLOORING
SECTION 096723  RESINOUS FLOORING  (ADDENDUM # 3)
SECTION 096813  TILE CARPETING  (ADDENDUM # 2)
SECTION 097200  WALL COVERING
SECTION 098100  ACOUSTIC INSULATION  (ADDENDUM 1)
SECTION 098433  SOUND ABSORBING WALL UNITS
SECTION 099100  PAINTING  (ADDENDUM # 2)
SECTION 099600  HIGH PERFORMANCE COATINGS
SECTION 099623  GRAFFITI-RESISTANT COATINGS

DIVISION 10 - SPECIALTIES
SECTION 101100  VISUAL DISPLAY UNITS
SECTION 101123  TACKABLE WALL PANELS  (ADDENDUM # 3)
SECTION 101403  EXTERIOR SIGNAGE  (ADDENDUM # 3)
SECTION 101404  INTERIOR SIGNAGE
SECTION 102113  TOILET COMPARTMENTS
SECTION 102116  PLASTIC SHOWER COMPARTMENTS
SECTION 102226  OPERABLE PARTITIONS  (ADDENDUM # 2)
SECTION 102241  FOLDING GLASS PARTITIONS  (ADDENDUM # 2)
SECTION 102602  WALL AND CORNER PROTECTION
SECTION 102813  TOILET ACCESSORIES
SECTION 104300  EMERGENCY AID SPECIALTIES
SECTION 104400  FIRE PROTECTION SPECIALTIES
SECTION 105113  METAL LOCKERS  (ADDENDUM # 3)
SECTION 105126  SOLID PLASTIC LOCKERS  (ADDENDUM # 3)
SECTION 105143  WIRE MESH STORAGE LOCKERS  (ADDENDUM # 2)
SECTION 105151  METAL STORAGE SHELVING  (ADDENDUM # 2)
SECTION 106523  WIRE STORAGE SHELVING

DIVISION 11 - EQUIPMENT
SECTION 112300  COMMERCIAL LAUNDRY EQUIPMENT
SECTION 113100  RESIDENTIAL APPLIANCES
SECTION 114000  FOODSERVICE EQUIPMENT  (ADDENDUM 1)
SECTION 115213  PROJECTION SCREENS
SECTION 117900  THERAPY EQUIPMENT

DIVISION 12 - FURNISHINGS
SECTION 121113  PHOTO MURALS
SECTION 122413  ROLLER WINDOW SHADERS  (ADDENDUM 1)
SECTION 123616  METAL COUNTERTOPS
SECTION 123661  SIMULATED STONE COUNTERTOPS
SECTION 124816  ENTRANCE FLOOR MATS  DELETED  (ADDENDUM # 2)
SECTION 124823  ENTRANCE FLOOR GRIDS  (ADDENDUM # 2)
SECTION 126723  BENCHES

DIVISION 13 - SPECIAL CONSTRUCTION ................................................... NOT USED
VOLUME 02 – DIVISIONS 21-33

DIVISION 14 - CONVEYING EQUIPMENT
SECTION 142400 - HYDRAULIC PASSENGER ELEVATORS (ADDENDUM # 2)

DIVISION 21 - FIRE SUPPRESSION
SECTION 211313 AUTOMATIC SPRINKLER SYSTEMS

DIVISION 22 - PLUMBING
SECTION 220516 EXPANSION FITTINGS AND LOOPS FOR PLUMBING PIPING
SECTION 220533 HEAT TRACING FOR PLUMBING PIPING
SECTION 220548 VIBRATION AND SEISMIC CONTROLS FOR PLUMBING PIPING AND EQUIPMENT
SECTION 220553 IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT (ADDENDUM # 2)
SECTION 220716 PLUMBING EQUIPMENT INSULATION (ADDENDUM # 2)
SECTION 220719 PLUMBING PIPING INSULATION
SECTION 221005 PLUMBING PIPING (ADDENDUM # 2)
SECTION 221006 PLUMBING PIPING SPECIALTIES
SECTION 223000 PLUMBING EQUIPMENT
SECTION 224000 PLUMBING FIXTURES (ADDENDUM # 2)

DIVISION 23 - HEATING, VENTILATION, AND AIR-CONDITIONING
SECTION 230513 COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT
SECTION 230516 EXPANSION FITTINGS AND LOOPS FOR HVAC PIPING (ADDENDUM # 3)
SECTION 230519 METERS AND GAGES FOR HVAC PIPING
SECTION 230548 VIBRATION AND SEISMIC CONTROLS FOR HVAC PIPING AND EQUIPMENT
SECTION 230553 IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT
SECTION 230713 DUCT INSULATION
SECTION 230719 HVAC PIPING INSULATION (ADDENDUM # 3)
SECTION 232113 HYDRONIC PIPING
SECTION 232114 HYDRONIC SPECIALTIES
SECTION 232123 HYDRONIC PUMPS
SECTION 232500 HVAC WATER TREATMENT
SECTION 233100 HVAC DUCTS AND CASINGS (ADDENDUM # 3)
SECTION 233300 AIR DUCT ACCESSORIES
SECTION 233319 DUCT SILENSERS (ADDENDUM # 3)
SECTION 233415  HVLS FANS (ADDENDUM # 3)
SECTION 233423  POWER VENTILATORS
SECTION 233600  AIR TERMINAL UNITS (ADDENDUM # 3)
SECTION 233700  AIR OUTLETS AND INLETS
SECTION 235233  MODULATING CONDENSING BOILERS (ADDENDUM # 3)
SECTION 237111  PACKAGED ROOFTOP UNITS (ADDENDUM # 3)
SECTION 238127  SMALL SPLIT-SYSTEM HEATING AND COOLING

DIVISION 25 - INTEGRATED AUTOMATION ................................................. NOT USED

DIVISION 26 - ELECTRICAL
SECTION 260501  MINOR ELECTRICAL DEMOLITION
SECTION 260513  MEDIUM-VOLTAGE CABLES
SECTION 260519  LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES
SECTION 260526  GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS
SECTION 260529  HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS
SECTION 260534  CONDUIT  (ADDENDUM # 2)
SECTION 260536  CABLE TRAYS FOR ELECTRICAL SYSTEMS  DELETED (ADDENDUM # 3)
SECTION 260537  BOXES  (ADDENDUM # 2)
SECTION 260553  IDENTIFICATION FOR ELECTRICAL SYSTEMS  (ADDENDUM # 2)
SECTION 290914  ELECTRICAL SENSING AND MEASUREMENTS  (ADDENDUM # 3)
SECTION 260919  ENCLOSED CONTACTORS
SECTION 260923  LIGHTING CONTROL DEVICES
SECTION 260924  NETWORK LIGHTING CONTROLS
SECTION 261200  MEDIUM-VOLTAGE TRANSFORMERS
SECTION 262200  LOW-VOLTAGE TRANSFORMERS
SECTION 262413  SWITCHBOARDS (ADDENDUM # 2)
SECTION 262416  PANELBOARDS  (ADDENDUM # 2)
SECTION 262713  ELECTRICITY METERING  DELETED (ADDENDUM # 3)
SECTION 262717  EQUIPMENT WIRING
SECTION 262726  WIRING DEVICES
SECTION 262813  FUSES  (ADDENDUM # 2)
SECTION 262818  ENCLOSED SWITCHES  (ADDENDUM # 2)
SECTION 263305  BATTERY EMERGENCY POWER SUPPLY
SECTION 265100  INTERIOR LIGHTING
SECTION 265600  EXTERIOR LIGHTING

DIVISION 27 - COMMUNICATIONS
SECTION 270526  GROUNDING AND BONDING COMMUNICATION SYSTEM
SECTION 270528  CABLE TRAY
SECTION 271000  STRUCTURED CABLE SYSTEM
SECTION 271116  CABINETS, ENCLOSURES AND RACKS
SECTION 271123  LADDER RACKING
SECTION 275126  ASSISTIVE LISTENING SYSTEM
DIVISION 28 – ELECTRONIC SAFETY AND SECURITY
SECTION 281300 ACCESS CONTROL
SECTION 282300 VIDEO SURVEILLANCE
SECTION 283100 FIRE DETECTION AND ALARM (ADDENDUM 1)

DIVISION 31 – EARTHWORK
SECTION 311000 SITE CLEARING
SECTION 312200 GRADING
SECTION 312316.00 EXCAVATION
SECTION 312316.13 TRENCHING (ADDENDUM 1)
SECTION 312323 FILL
SECTION 313213.19 LIME SOIL STABILIZATION

DIVISION 32 – EXTERIOR IMPROVEMENTS
SECTION 320190 LANDSCAPE MAINTENANCE
SECTION 321123 AGGREGATE BASE COURSES
SECTION 321216 ASPHALT PAVING
SECTION 321313 CONCRETE PAVING (ADDENDUM 1)
SECTION 321373 PAVEMENT JOINT SEALERS
SECTION 321713 PARKING BUMPERS
SECTION 321723 PAINTED PAVEMENT MARKINGS
SECTION 323223 SEGMENTED RETAINING WALLS DELETED (ADDENDUM # 3)
SECTION 323300 SITE FURNISHINGS
SECTION 323310 ARCHITECTURAL SITE CONCRETE
SECTION 323313 BICYCLE RACKS
SECTION 328423 IRRIGATION SYSTEM
SECTION 329119 LANDSCAPE GRADING
SECTION 329300 LANDSCAPE WORK

DIVISION 33 – UTILITIES
SECTION 330513 MANHOLES AND STRUCTURES
SECTION 331116 SITE WATER UTILITY DISTRIBUTION PIPING
SECTION 331300 DISINFECTING OF WATER UTILITY DISTRIBUTION
SECTION 333111 SITE SANITARY UTILITY SEWERAGE PIPING (ADDENDUM 1)
SECTION 334111 SITE STORM UTILITY DRAINAGE PIPING
SECTION 334600 SUBDRAINAGE

DIVISION 34 TO 35 .............................................................. NOT USED
PROCESS EQUIPMENT SUBGROUP
DIVISIONS 40 TO 45, & 48 ..................................................... NOT USED

DRAWINGS PREPARED BY LPA INC.

END OF TABLE
NOTICE IS HEREBY GIVEN that the Governing Board of the Contra Costa Community College District (District), Martinez, California, will receive sealed bid proposals for the furnishing of all labor, materials, equipment, transportation and services for the construction of the project entitled **L-636 Physical Education & Student Union Complex**.

The District has pre-qualified General Contractors for this project, and the list of pre-qualified General Contractors can be found on the District’s web site: [https://insite.4cd.edu/webapps/PurchasingViewbids/](https://insite.4cd.edu/webapps/PurchasingViewbids/) Only Pre-Qualified Contractors are allowed to bid as Prime Contractors on this project. The District does not prequalify Subcontractors.

Construction Cost Estimate (Range): $35,000,000.00 to $50,000,000.00;
License Required: B - General Building Contractor

In general, the Work consists of the Physical Education building, which is a 30,000 gsf one-story building with weight room, fitness spaces, dance studios, locker rooms, equipment room, faculty offices, trainer’s office, and supporting building spaces and the Student Union building is a 35,400 gsf two-story building with a bookstore, small food services, a large conference room that can be subdivided to smaller rooms, a student activity space, faculty offices, student lounge, and supporting building spaces as well as extensive sitework. Work is to be completed in two phases: Phase II is for the completion of the two buildings plus associated sitework; Phase III is for the completion of the sitework following the removal of the existing portable buildings. (Phase I has been completed)

Hard copies of plans and specifications shall be available for purchase at ARC located at 5753 Pacheco Blvd., Pacheco, California, Phone: (925) 682-6930. Payment for hardcopies shall be the responsibility of the bidder, and shall be made directly to ARC. The District does not provide hardcopies of bid documents or reimburse cost of printing, delivery, or any expenses related to the bidding process.

For information directly from the District, you may also log on to the District Website: [http://www.4cd.edu/webapps/PurchasingViewBids/default.aspx](http://www.4cd.edu/webapps/PurchasingViewBids/default.aspx). Project documents available include, but are not limited to, plans, specifications, addenda, bidders lists, bid results, etc., and can be viewed on this District webpage. Builders Exchanges around Northern California are also notified.

This project is subject to the terms and conditions of a Project Stabilization Agreement (PSA) executed between the Contra Costa Community College District and the Contra Costa County Building & Construction Trades Council ("Council") and its affiliated local signatory unions.

All questions related to this project must be in writing and are directed to:

**Jovan Esprit – Contracts Manager (CCCCD)**  
Contra Costa Community College District  
500 Court St., Martinez, CA 94553  
Email: jespirit@4cd.edu
Each bid shall be made on the bid form, which is included in the Bid Documents and when submitted, shall be accompanied by a Bid Bond or Certified Cashier’s Check in the amount of 10% of bid (made payable to the Contra Costa Community College District). The District reserves the right to forfeit Bid Bond submitted for failure of the successful bidder to secure Payment & Performance Bonds.

**IMPORTANT INFORMATION:**

- **Pre-Bid Meeting and Job Walk, Date / Time:** Thursday, May 25, 2017 at 1:30 PM (MANDATORY)
- **Pre-Bid Meeting and Job Walk, Location:** Los Medanos College  
  2700 East Leland Dr. Pittsburg, CA 94565  
  Meet in Room CC3-336 (See Attached Map)
- **Last Date / Time for Bidder’s Requests for Information:** Friday, June 30, 2017
- **Last Day/Time to Issue Addendum:** Thursday, July 6, 2017
- **Bids Due No Later Than, Date / Time:** Tuesday July 11, 2017 prior to 2:00 PM
- **Bids Must Be Received at:** Contra Costa Community College District (Lobby)  
  500 Court St, Martinez, CA 94553  
  Attn: Jovan Esprit – Contracts Manager (CCCCCD)

Bids must be received by the District prior to the time and by the date noted above. Bids that are not received by the District prior to the time and by the date noted above will not be accepted, and will be returned to the Bidder unopened.

The successful bidder will be required to furnish a labor and material bond in an amount equal to one hundred percent (100%) of the contract price and a faithful performance bond in an amount equal to one hundred percent (100%) of the contract price, said bonds to be secured from a surety company acceptable to the Contra Costa Community College District and authorized to execute such surety in the State of California.

This project is a public works project and is subject to prevailing wage rate laws. A copy of the prevailing rates of wages is on file with the Contracts & Purchasing Office of the Contra Costa Community College District. Said rates of wages shall be included in the contract for the work by this reference.

Attention is directed to Section 4100 through 4113 of the Public Contract Code concerning Subcontractors, with emphasis on Section 4104, known as the “Subletting and Subcontracting Fair Practices Act, effective July 1, 2014.

Attention is directed to Labor Code Section 1725.5 regarding Department of Industrial Relations (DIR) contractor registration process including registration criteria and implementation of DIR registration requirements. Labor Code Section 1771.7 establishes contractor’s obligation to submit Certified Pay Roll (CPR) to the Department of Labor and Standards Enforcement (DLSE) and public works monitoring and enforcement. Labor Code Section 1773.3 requires the District to submit a PWC-100 to DIR for all public works contract awarded effective January 1, 2015.

Attention is directed to Section 00600, Construction Agreement, Article 5, and GENERAL CONDITIONS, Article 8, paragraphs 8.4.1 and 8.4.2, regarding liquidated damages. Liquidated Damages shall be set for $5000 Dollars for each calendar day the work is delayed beyond the Contract Substantial Completion date. The Governing Board of the Contra Costa Community College District reserves the right to reject any and all bids and/or waive any informality or irregularity in any bid received. No bidder may withdraw their Bid for a period of ninety (90) days after the date set for opening thereof.

**END OF SECTION 00100**
SECTION 00300
BID PROPOSAL FORM

PROJECT NUMBER / NAME: L-636 Physical Education & Student Union Complex

CAMPUS / LOCATION: Los Medanos College 2700 East Leland Road Pittsburg, CA 94565

DISTRICT: CONTRA COSTA COMMUNITY COLLEGE DISTRICT
500 Court St, Martinez, CA 94553

Herein Referred to as "District"

1. INTRODUCTION

   A. The Bidder proposes to perform the Work for the Contract Sum and within the proposed Contract Time, based upon an examination of the site and the Bid and Contract Documents.

   B. The Bidder certifies this Bid is submitted in good faith.

   C. The Bidder agrees that the Contract Sum and other proposed terms will be considered in evaluating Bids and may be negotiated and adjusted before awarding of Contract.

   D. The signed copy of the Certification of the Visit to the Site shall be attached to the Bid Form Submittal.

   E. A fully executed Statement of Bidder's Qualifications signed by an authorized officer of the Bidder submitting the Bid shall be attached to the Bid Form.

   F. A fully executed Non-Collusion Affidavit signed by an authorized officer of the Bidder submitting Bid shall be attached to the Bid Form.

   G. The lowest responsive and responsible bidder will be determined based on the total of Item 2.A Base Bid plus Additive Alternates 2.B1, 2.B2 and 2.B3. Award will be made for Item 2.A plus any, all, or none of the Additive Alternates at the District's sole discretion.

   H. The District reserves the right to award the other Additive Alternates through change orders as budget allows.

2. CONTRACT SUM

   A. BASE BID: L-636 Physical Science and Student Union Complex

   For labor, materials, bonds, fixtures, equipment, tools, transportation, services, sales taxes and other costs necessary to complete the general construction in accordance with the Contract Documents, for a stipulated Contract Sum in the amount of:
B. ADDITIVE ALTERNATES

1. Provide stain for polished floor surfacing at SU-134 Bookstore as specified in Section 033100 instead of medium gloss finish specified as Baser Bid as specified in Section 033536. (ADD. # 3)

Provide all labor, materials, bonds, fixtures, equipment, tools, transportation, services, sales taxes and other costs necessary to complete this Alternate construction in accordance with the Contract Documents:

____________________________________________ Dollars ($______________________)

2. Install ultra-high performance concrete (UHPC) panels specified in Section 074273 with concealed fasteners instead of exposed fasteners as indicated in Drawing Detail 4/A8.11, except at the Loading Yard.

Provide all labor, materials, bonds, fixtures, equipment, tools, transportation, services, sales taxes and other costs necessary to complete this Alternate construction in accordance with the Contract Documents:

____________________________________________ Dollars ($______________________)

3. Install ultra-high performance concrete (UHPC) panels specified in Section 074273 on the south side of the Student Union Loading Dock Enclosure with concealed fasteners instead of exposed fasteners as indicated in Drawing Detail 4/A8.11.

Provide all labor, materials, bonds, fixtures, equipment, tools, transportation, services, sales taxes and other costs necessary to complete this Alternate construction in accordance with the Contract Documents:

____________________________________________ Dollars ($______________________)

TOTAL BASE BID PLUS ALTERNATES

____________________________________________ DOLLARS ($______________________)

Contra Costa Community College District
Los Medanos College
L-636 Physical Education & Student Union Complex

Section 00300 - Page 2 of 6
Bid Proposal Form
ADDENDUM #3
3. COMPLETION TIME

A. For establishing the Date of Substantial Completion the contract time for the Base Bids and Alternates selected shall be **790 calendar days** after date of the Notice To Proceed (Phase II is 730 C/D's, Phase III is 60 C/D's). This time may be subject to modification to facilitate the work as mutually agreed upon at a later date.

B. For establishing the Date of Final Completion, the contract time for the base bid plus selected Alternates shall be **30 calendar days** after the date of Phase III Substantial Completion.

C. The Bidder certifies that the Bid is based on the Contract Time for completion as stated above and in the Contract Documents. Bidder further certifies that the Base Bid (plus alternates if selected) amount is sufficient to cover all labor, materials, central office and construction site overhead, profit, and all other costs related to the completion of the Project for the entire Project construction time for both the General Contractor and all Subcontractors, as stated above in paragraphs 2 and 3.

4. ADDENDA

A. The Bidder acknowledges receipt of the following Addenda, and certifies the Bid has provided for all modifications and considerations required therein.

   None [ ]

   Addendum No.: ________ dated _________________

   Addendum No.: ________ dated _________________

   Addendum No.: ________ dated _________________

   Addendum No.: ________ dated _________________

   Addendum No.: ________ dated _________________

B. List of Additional Addenda Attached: Yes [ ] No. [ ].

5. DESIGNATION OF SUBCONTRACTORS

A. The Bidder has set forth a complete list indicating the type of work, name, and business address of each Subcontractor who will perform work in excess of one-half of one percent of the Contract Sum.

B. Any portion of the work in excess of the specified amount having no designated Subcontractor shall be performed by the Bidder.
C. Substitution of listed Subcontractors will not be permitted unless approved in advance by the District.

D. Prior to signing the Contract, the District reserves the right to reject any listed Subcontractor.

<table>
<thead>
<tr>
<th>Type of Work</th>
<th>Subcontractor’s Name</th>
<th>Business Address</th>
<th>License #</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(5)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

E. Complete list of Subcontractors is attached: Yes [ ] No [ ]

F. Continuation list of Subcontractors is attached: Yes [ ] No [ ]

6. ACCEPTANCE AND AWARD

A. The District reserves the right to reject this Bid and to negotiate changes before or after execution of the Contract. This Bid shall remain open and shall not be withdrawn for a period of 90 days after Bid Opening date.

B. If written notice of acceptance of this Bid is mailed or delivered to the Bidder within 90 days after the date set for the receipt of this Bid, or other time before it is withdrawn, the Bidder will execute and deliver to the District a Contract prepared by District with the required Surety Bonds and Certificates of Insurance, within 10 days after personal delivery or deposit in the mail of the notification of acceptance.

C. Notice of acceptance or request for additional information may be addressed to the Bidder at the address provided.

7. BID SECURITY

A. The required 10 percent (10%) Bid Security for this Bid is attached in the form of:

   ( ) Bid Bond Issued By: ________________________________

   ( ) Certified or Cashier’s Check No. ____________________

   Issued by: ____________________________________________
8. **BIDDER'S BUSINESS INFORMATION**

**A. Individual [ ]**: ________________________________

Personal Name: ________________________________

Business Name: ________________________________

Address: ______________________________________

__________________ Zip Code: ______________

Telephone: ____________________________________

Fax Number: ____________________________________

**B. Partnership [ ]**: ______________________________

Co-partners' Names: ______________________________

Business Name: ________________________________

Address: ______________________________________

________ Zip Code: ______________

Telephone: ____________________________________

Fax Number: ____________________________________

**C. Corporation [ ]**: ______________________________

Firm Name: ____________________________________

Address: ______________________________________

________ Zip Code ______________

Telephone: ____________________________________

Fax Number: ____________________________________

State of Incorporation: ______________________________
President: ________________________________

Secretary: ________________________________

Treasurer: ________________________________

Manager: ________________________________

D. Power of Attorney: 
   Name: ________________________________
   Title: ________________________________

E. Contractor License No. __________ State of ______

F. Bidder is submitting this proposal on behalf of a Joint Venture. Names, license numbers, and relevant information are given on a separate attachment:
   Yes [ ] No [ ].

G. Upon request, furnish appropriate documentation to substantiate and/or support the data given.

9. The undersigned hereby certifies under penalty of perjury under the laws of the State of California that all the information submitted by the Bidder in connection with this Bid and all the representations herein made are true and correct.

Executed this day of __________________________

______________________________
Contractor’s License No. Expiration Date

______________________________
Firm Name

______________________________
Signature

______________________________
By (Print or Type Name)

______________________________
Title

End of Section 00300
00700

GENERAL CONDITIONS

Table of Contents

ARTICLE 1  GENERAL CONDITIONS ................................................................................................................... 1
  1.1  BASIC DEFINITIONS................................................................................................................................. 1
  1.2  EXECUTION, CORRELATION AND INTENT ............................................................................................... 5
  1.3  OWNERSHIP AND USE OF ARCHITECT’S DRAWINGS, SPECIFICATIONS AND OTHER DOCUMENTS .................................................................................................................. 9

ARTICLE 2  DISTRICT .............................................................................................................................................. 10
  2.1  INFORMATION AND SERVICES REQUIRED OF THE DISTRICT .......................................................... 10
  2.2  DISTRICT’S RIGHT TO CARRY OUT THE WORK ..................................................................................... 13

ARTICLE 3  THE CONTRACTOR ............................................................................................................................ 15
  3.1  SUPERVISION AND CONSTRUCTION PROCEDURES ........................................................................... 15
  3.2  SUPERVISION ........................................................................................................................................... 16
  3.3  LABOR AND MATERIALS ......................................................................................................................... 17
  3.4  NOISE CONTROL ..................................................................................................................................... 19
  3.5  WARRANTY ............................................................................................................................................... 19
  3.6  TAXES .................................................................................................................................................... 20
  3.7  PERMITS, FEES AND NOTICES .................................................................................................................. 20
  3.8  DSA VERIFIED REPORTS AND CERTIFICATE OF COMPLIANCE ...................................................... 21
  3.9  (Not used.) .............................................................................................................................................. 21
  3.10  DOCUMENTS AND SAMPLES AT THE SITE .......................................................................................... 21
  3.11  SUBSTITUTIONS ..................................................................................................................................... 22
  3.12  INTEGRATION OF WORK ....................................................................................................................... 23
  3.13  CLEANING UP ....................................................................................................................................... 24
  3.14  ACCESS TO WORK ................................................................................................................................. 25
  3.15  ROYALTIES AND PATENTS .................................................................................................................... 25
  3.16  INDEMNIFICATION ............................................................................................................................... 25
  3.17  SUBMISSION OF DAILY REPORTS ......................................................................................................... 27

ARTICLE 4  ADMINISTRATION OF THE CONTRACT ............................................................................................. 28
  4.1  ARCHITECT ............................................................................................................................................. 28
  4.2  ARCHITECT’S ADMINISTRATION OF THE CONTRACT .......................................................................... 28
  4.3  INSPECTOR OF RECORD ......................................................................................................................... 30
4.4 RESPONSIBILITY FOR ADDITIONAL CHARGES INCURRED BY THE DISTRICT FOR PROFESSIONAL SERVICES .................................................................31
4.5 DISPUTES ........................................................................................................31

ARTICLE 5 SUBCONTRACTORS ..............................................................................36
5.1 DEFINITIONS .....................................................................................................36

ARTICLE 6 CONSTRUCTION BY DISTRICT OR BY SEPARATE CONTRACTORS ..............................................................37
6.1 DISTRICT’S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS ..........................................................37
6.2 CONSTRUCTIVE OWNERSHIP OF PROJECT SITE AND MATERIAL ..................................................................................39
6.3 DISTRICT’S RIGHT TO CLEAN UP ................................................................39

ARTICLE 7 NOT USED .................................................................................................39

ARTICLE 8 TIME ........................................................................................................39
8.1 DEFINITIONS .....................................................................................................39
8.2 HOURS OF WORK ...............................................................................................40
8.3 PROGRESS AND COMPLETION ........................................................................41
8.4 EXTENSIONS OF TIME – LIQUIDATED DAMAGES ........................................41

ARTICLE 9 NOT USED .................................................................................................43

ARTICLE 10 NOT USED ...........................................................................................43

ARTICLE 11 INSURANCE AND BONDS ................................................................43
11.1 CONTRACTOR’S LIABILITY INSURANCE .........................................................43
11.2 WORKERS’ COMPENSATION INSURANCE .......................................................45
11.3 BUILDER’S RISK/ “ALL RISK” INSURANCE ................................................46
11.4 FIRE INSURANCE .............................................................................................46
11.5 OTHER INSURANCE ........................................................................................44
11.6 PROOF OF INSURANCE ...................................................................................46
11.7 COMPLIANCE ..................................................................................................47
11.8 WAIVER OF SUBROGATION ...........................................................................47
11.9 PERFORMANCE AND PAYMENT BONDS ......................................................47

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK ..................................48
12.1 UNCOVERING OF WORK ..................................................................................48
12.2 CORRECTION OF WORK ..................................................................................48
## ARTICLE 13  MISCELLANEOUS PROVISIONS ................................................................. 49

13.1 GOVERNING LAW ................................................................................................. 49
13.2 SUCCESSORS AND ASSIGNS .............................................................................. 49
13.3 WRITTEN NOTICE ............................................................................................... 49
13.4 RIGHTS AND REMEDIES ..................................................................................... 50
13.5 TESTS AND INSPECTIONS .................................................................................... 50
13.6 TRENCH EXCAVATION ......................................................................................... 51
13.7 WAGE RATES, TRAVEL, AND SUBSISTENCE .................................................... 52
13.8 NOT USED ............................................................................................................. 53
13.9 APPRENTICES ....................................................................................................... 55
13.10 ASSIGNMENT OF ANTITRUST CLAIMS ............................................................. 56
13.11 STATE AUDIT ...................................................................................................... 57
13.12 STORM WATER POLLUTION PREVENTION PLAN .......................................... 57

## ARTICLE 14  TERMINATION OR SUSPENSION OF THE CONTRACT .................. 60

14.1 TERMINATION BY THE CONTRACTOR FOR CAUSE ......................................... 60
14.2 TERMINATION BY THE DISTRICT FOR CAUSE .................................................. 60
14.3 TERMINATION OF CONTRACT BY DISTRICT (CONTRACTOR NOT AT FAULT) .... 61
14.4 REMEDIES OTHER THAN TERMINATION ............................................................ 62
ARTICLE 1

GENERAL CONDITIONS

1.1 BASIC DEFINITIONS

- Action of the Governing Board is a vote of a majority of the District’s governing board.

- Approval for a Contract, Agreement, or Change Order means written authorization through action of the governing board unless specific delegation of approval authority is delegated to a District representative.

- Approved. The term “approved,” when used to convey Architect’s action on Contractor’s submittals, applications, and requests, is limited to Architect’s duties and responsibilities as stated in the Conditions of the Contract.

- Architect means the architect, engineer, or other design professional engaged by the District to design and perform general observation of the work of construction and interpret the drawings and specifications for the Project.

- As shown, as indicated, as detailed refer to drawings accompanying this specification.

- Bid/Bidders. The term Bid and Proposal have the same meaning, and the same is true for Bidders and Proposers.

- Contract or Agreement. When the terms are used in these General Conditions shall be references to the Contract Documents as defined herein.

- Contract Price. The price stated in the Construction Agreement including authorized adjustments, the total amount payable by the District to the Contractor for performance of the Work. The Contract Price is also referred sometimes to as the Contract Sum or Contract Amount.

- Contract Time. Contract Time means the number of consecutive calendar days specified in the contract immediately after the date to commence work issued by the District in the Notice to Proceed, and includes both the time allowed for the work required to achieve Substantial Completion and the time allowed to complete the Remaining Work from Substantial Completion to Final Completion.

- Contractor. Whenever the term “Contractor” is used in the Contract or elsewhere in the Contract Documents, it refers to a person or entity that has an agreement directly with the District to perform any of the work for the Project. The term Contractor is referred throughout the Contract Documents as if singular in number and masculine in gender.
and means a Contractor or his authorized representative. The term Contractor does not include any contractors under separate and direct contract with the District. A Subcontractor is a person or entity that has a direct or indirect contract with the Contractor to perform any of the Work at the site.

- **Contractor’s Construction Schedule.** The document prepared by the Contractor, which details the events of construction and establishes completion dates for the various stages of the Work and the entire project. The Contractor’s Construction Schedule is also referred to as the Baseline CPM Schedule, Initial CPM Schedule or Baseline CPM Schedule update.

1.1.12 **The Contract Documents.** The Contract Documents consist of the Agreement between District and Contractor (hereinafter the Agreement or Contract), Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, addenda issued prior to bid, instructions to bidders, notice to bidders, and the requirements contained in the Bid Documents, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is a written amendment to the Contract signed by parties, a Change Order, a Construction Change Directive, or a written order for a minor change in the Work issued by the Architect. The Contract Documents collectively form the Contract. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a written Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind between the Architect and Contractor, between the District and any Subcontractor or Sub-subcontractor, or between any persons or entities other than the District and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect’s duties.

1.1.13 **Contractor, District, and Architect** are those mentioned as such in the Agreement. They are treated throughout the Contract Documents as if they are of singular number and neuter gender. Any reference to “Owner” shall mean “District.”

1.1.14 **Construction Manager.** Whenever the term “Construction Manager” or “CM” is used in the contract or elsewhere in the Contract Documents, it refers to the District assigned Construction Manager, or the District Project Manager if no CM is assigned.

1.1.15 **Days** means calendar days, unless otherwise noted as working days.

1.1.16 **Directed.** Terms such as “directed,” “requested,” “authorized,” “selected,” “approved,” “required,” and “permitted” mean directed by the Architect or the District, requested by the Architect or District, and similar phrases.

1.1.17 **District.** Whenever the term “District” is used in the Contract Documents, it refers to the Contra Costa Community College District or those persons designated by the District to act in/on its behalf.
1.1.18 **The Drawings** are graphic and pictorial portions of the Contract Documents prepared for the Project and approved changes thereto, wherever located and whenever issued, showing the design, location, and scope of the Work, generally including plans, elevations, sections, details, schedules, and diagrams as drawn or approved by the Architect.

1.1.19 **Emergency** shall be defined as a sudden, unexpected occurrence, involving a clear and imminent danger, demanding immediate action to prevent or mitigate loss of, or damage to, life, health, property, or essential public services. Emergency includes such occurrences as fire, flood, earthquake, or other soil or geologic movements, as well as such occurrences as riot, accident, or sabotage.

1.1.20 **Exposed.** Whenever this term is used it shall be understood to mean any item or surface, exterior, or interior, which can be seen by a person outside the building, or seen by a person inside any usable space within the building during normal activity. Mechanical and electrical rooms, utility and service tunnels, air handling rooms, and penthouses or platforms shall be considered to have exposed surfaces, as shall the mechanical and electrical construction within them. The interior of closets and alcoves shall be considered exposed surfaces, and shall be finished to match the finish of the adjoining room or space, unless another finish is shown. The interiors of cabinets shall be considered exposed, but a finish different from that of the exterior may be permitted or specified. Spaces which are not normally occupied or used by occupants or building staff, such as shafts, hoistways, ceiling plenums, attics and crawl spaces shall be considered “concealed” spaces, unless finishes are shown or specified for their surfaces.

1.1.21 **Final Completion.** The date when all Work for the total project has been completed in accordance with the terms of the Contract Documents and has been inspected following completion of Work identified in the Punchlist Inspection and accepted by the Architect and the District. Final Completion is also sometimes referred to as Final Acceptance.

1.1.22 **Furnish.** Whenever this term is used it shall be understood to mean “purchase and deliver to the project site” ready for unloading, unpacking, assembly, installation, and similar operations.

1.1.23 **Governing Dictionary.** The definitions of words used in these Specifications, which are not defined, The General Conditions, or in referenced standards, are as given in “The American Heritage Dictionary of the English Language”.

1.1.24 **Indicated.** The term “indicated” refers to graphic representations, notes, or schedules on Drawings or to other paragraphs or schedules in Specifications and similar requirements in the Contract Documents. Terms such as “shown,” “noted,” “scheduled,” and “specified” are used to help the user locate the reference.

1.1.25 **Inspector of Record** is the individual retained by the District in accordance with titles 21 and 24 of the California Code of Regulations and who will be assigned to the Project. May also be referred to as the Project Inspector.
1.1.26 **Install.** Whenever this term is used it shall be understood to mean “receive, unload, inventory, store and be responsible for at the project site, transport from point of receipt to final destination, protect, unpack, erect, install in place, anchor, connect, apply, and place in operation or finish, cleaning, complete for intended use.”

1.1.27 **Installer.** An installer is the Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations. Using a term such as “carpentry” does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as “carpenter.” It also does not imply that requirements specified apply exclusively to trades people of the corresponding generic name.

1.1.28 **Locality in which the work is performed** means the county in which the Project is located.

1.1.29 **Option.** Whenever this term is used it shall be understood to mean a choice from among the specified products or procedures which shall be made by the Contractor. The choice is not “whether” the work is to be performed, but “which” product or “which” procedure is to be used. The product or procedure chosen by the Contractor shall be provided at no increase in the cost to the District with no lessening of the Contractor’s responsibility for its performance. All or any options selected or proposed are still subject to all requirements for submittals and for approval of same.

1.1.30 **Or Equal and Or Approved Equal.** The terms “or equal” and “or approved equal” shall mean “or equal as approved in writing by the Architect”.

1.1.31 **The Project** is the complete construction of the Work performed in accordance with the Contract Documents.

1.1.32 **The Project Manual.** The Project Manual is the volume assembled for the Work which may include, without limitation, the bidding requirements, sample forms, Conditions of the Contract, and Specifications.

1.1.33 **The Project Site.** Project Site is the space available for performing construction activities. The extent of Project Site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built. The Project Site is also referred to as the Site.

1.1.34 **Provide** shall include “provide complete in place,” that is “furnish and install.” Complete and ready for the intended use.

1.1.35 **Punch List Inspection.** The inspection performed by the Construction Manager, Architect and the District upon written notification by the Contractor that the Work is substantially complete.
1.1.36 **Regulations.** The term “regulations” includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.

1.1.37 **Remaining Work.** Remaining Work means the work required by the Contract, but not required for Substantial Completion, that the District or Architect determines has not been satisfactorily completed at the time of Substantial Completion, deferred commissioning requirements, deferred and seasonal testing, and all maintenance and operating instructions, schedules, reports, guaranties, warranties, bonds, certificates of inspection, marked-up record documents, prevailing wage compliance reports and all other documents as required by the Contract Documents. Remaining Work may also be referred to as Punch List work.

1.1.38 **Safety Orders** are those issued by any cognizant city, county, state or federal agency.

1.1.39 **Site** refers to the grounds of the Project as defined in the Contract Documents and such adjacent lands as may be directly affected by the performance of the Work. Site is also referred to as the Project Site.

1.1.40 **The Specifications.** The Specifications are that portion of the Contract Documents consisting of the written requirements for material, equipment, construction systems, instructions, quality assurance standards, workmanship, and performance of related services.

1.1.41 **Specification Language.** These Specifications are written in the imperative mood, as defined in the Construction Specifications Institute’s Manual of Practice. Imperative language is directed to the Contractor. The indicative mood is employed on occasion when such sentence structure is necessary to convey the intended meaning in a more accurate or understandable form. The text is streamlined, with the colon (:) employed as a symbol for the words “shall be”, “shall have”, “shall conform with”, “shall comply with”, or “shall meet the requirements of”. The colon is also used to separate a paragraph title or heading from the text that follows.

1.1.42 **Standards, Rules, and Regulations** referred to are recognized printed standards and shall be considered as one and a part of these specifications within limits specified. Federal, state and local regulations are incorporated into the Contract Documents by reference.

1.1.43 **Subcontractor,** as used herein, includes those having direct or indirect contracts with Contractor and ones who furnished labor, material or services for a special design according to drawings and specifications of this Work, but does not include ones who merely furnish material not so worked.

1.1.44 **Substantial Completion.** The date on which the Work or designated portion thereof, as certified by the District and Architect, is sufficiently complete, in accordance with the Contract Documents, so the District, may occupy or utilize the Work or designated portion thereof for which it is intended.
1.1.45 **Surety** is the person, firm, or corporation that executes as surety the Contractor’s Performance Bond and Payment Bond.

1.1.46 **Work of the Contractor or Subcontractor** shall include all labor, materials and equipment necessary for the Contractor to fulfill all of its obligations pursuant to the Contract Documents. It shall include the initial obligation of any Contractor or Subcontractor who performs any portion of the Work, to visit the Site of the proposed Work (a continuing obligation after the commencement of the Work), to fully acquaint and familiarize itself with the conditions as they exist and the character of the operations to be carried out under the Contract Documents, and make such investigation as it may see fit so that it shall fully understand the facilities, physical conditions, and restrictions attending the Work under the Contract Documents. Each such Contractor or Subcontractor shall also thoroughly examine and become familiar with the Drawings, Specifications, and associated bid documents before preparing and submitting any bid.

1.1.47 **Workers** includes laborers, workers, and mechanics.

1.2 **EXECUTION, CORRELATION AND INTENT**

1.2.1 **Correlation and Intent**

1.2.1.1 **Documents Complementary and Inclusive.** The Contract Documents are complementary and are intended to include all items required for the proper execution and completion of the Work. All Contract Documents form the Contractor’s contract with the District. Any item of Work mentioned in the Specifications and not shown on the Drawings, or shown on the Drawings and not mentioned in the Specifications, shall be provided by Contractor as if shown or mentioned in both

1.2.1.2 **Coverage of the Drawings and Specifications.** The Drawings and Specifications generally describe the Work to be performed by Contractor. Generally, the Specifications describe Work which cannot be readily indicated on the Drawings and indicate types, qualities, and methods of installation of the various materials and equipment required for the Work. It is not intended to mention every item of Work in the Specifications, which can be adequately shown on the Drawings, or to show on the Drawings all items of Work described or required by the Specifications even if they are of such nature that they could have been shown. All materials or labor for Work, which is shown on either the Drawings or the Specifications (or is reasonably inferable therefrom as being necessary to complete the Work), shall be provided by the Contractor to provide a complete project. It is intended that the Work be of sound, quality construction, and the Contractor shall be responsible for the inclusion of adequate amounts to cover installation of all items indicated, described, or implied in the portion of the Work to be performed by them.
1.2.1.3 **Conflicts.** In the event there is a discrepancy between the various Contract Documents, the more stringent, higher quality, and greater quantity of Work shall apply.

1.2.1.4 **Conformance With Laws.** Each and every provision of law required by law to be inserted in this Contract shall be deemed to be inserted herein, and the Contract shall be read and enforced as though it were included herein, even if through mistake or otherwise any such provision is not inserted, or is not correctly inserted.

1.2.1.5 Before submitting its Bid, Contractor shall check and review the Drawings and Specifications for such portion for conformance and compliance with all laws, ordinances, rules, and regulations of all governmental authorities and public and municipal utilities affecting the construction and operation of the physical plant of the Project, all quasi-governmental and other regulations affecting the construction and operation of the physical plant of the Project, and other special requirements, if any, designated in the Contract Documents. Such checking shall include Title 21 and Title 24 of the California Code of Regulations, California Building Code, local utility, local water connection, local grading and all other applicable agencies. In the event Contractor observes any violation of any law, ordinance, code, rule or regulation, or inconsistency with the Contract Documents prior to submitting its bid or after submitting its bid if discovered thereafter, Contractor shall, within five (5) days, notify Architect and District in writing of same and shall ensure that any such violation or inconsistency shall be corrected in the manner provided hereunder prior to the construction of that portion of the Project.

1.2.1.6 The Contractor shall bear all expenses of correcting Work done contrary to said laws, ordinances, rules, and regulations if the Contractor performed same (1) without first consulting the Architect for further instructions regarding said Work or (2) disregarded the Architect's instructions regarding said work.

1.2.1.7 **Ambiguity and Inconsistency.** Before submitting its Bid, Contractor shall carefully examine all Drawings and Specifications and other information given to Contractor as to materials and methods of construction and other Project requirements. Contractor shall notify District in writing of any perceived or alleged error, inconsistency, conflict, ambiguity, or lack of detail or explanation in the Drawings and Specifications in the manner provided herein. If the Contractor or its Subcontractors, material or equipment suppliers, or any of their officers, agents, and employees performs, permits, or causes the performance of any Work under the Contract Documents, which it knows or should have known to be in error, inconsistent, or ambiguous, or not sufficiently detailed or explained, Contractor shall bear any and all costs arising therefrom including, without limitation, the cost of correction thereof without increase or adjustment to the Contract Price or the time for performance. If Contractor performs, permits, or causes the performance of any Work under the Contract Documents prepared by or on behalf of Contractor which is in error, inconsistent or ambiguous, or not sufficiently detailed or explained, Contractor shall bear any and all resulting costs, including, without limitation,
the cost of correction, without increase to or adjustment in the Contract Price or the time for performance.

1.2.2 Addenda and Deferred Approvals

1.2.2.1 Addenda are the changes in specifications, drawings, and contract documents, which have been authorized in writing by the District or Architect prior to receipt of bids, and which alter, explain, or clarify the contract documents. Addenda shall govern over all other Contract Documents. Subsequent addenda issued shall govern over prior addenda unless otherwise specified in the addenda.

1.2.2.2 Deferred Approvals. Contract Documents which require deferred approval items are meant to be for illustration purposes only. Contractor is responsible for all deferred approval requirements set forth in the Contract Documents. Contractor is responsible to comply with all laws, building codes, and regulations necessary to obtain all necessary approvals, including those required from the Division of the State Architect (“DSA”) and the State Fire Marshall. Contractor shall not be granted an extension of time for failure to obtain necessary approvals due to failure to comply with laws, building codes, and other regulations (including Title 24 of the California Code of Regulations). Contractor shall schedule all deferred approval items in its progress schedule pursuant to Specification Section 01310, Construction Scheduling. If Contractor fails to include deferred-approval items in its schedule which results in a critical path delay, then Contractor shall be subject to the assessment of liquidated damages.

1.2.2.3 Deferred Approval Requirements. Deferred approvals shall be submitted and processed pursuant to the requirements of Division 1 of the Specifications. All deferred approvals shall be prepared by Contractor or Contractor’s agent early enough so as to not delay the Project. Contractor is aware that Title 21 California Code of Regulations Section 17(g) and Title 24 California Code of Regulations Section 4-317 have specific requirements for deferred approval as to governing agencies and as to the Architect and Engineer for the Project. As a result, any delay associated with the time for approval by applicable agencies or by the Architect or Architect’s consultants shall be Contractor’s.

1.2.3 Specification Interpretation

1.2.3.1 Titles. The Specifications are separated into titled sections for convenience only and not to dictate or determine the trade or craft involved.

1.2.3.2 As Shown, Etc. Where “as shown,” “as indicated,” “as detailed,” or words of similar import are used, reference is made to the Drawings accompanying the Specifications unless otherwise stated. Where “as directed,” “as required,” “as permitted,” “as authorized,” “as accepted,” “as selected,” or words of similar import are used, the direction, requirement, permission, authorization, approval, acceptance, or selection by Architect is intended unless otherwise stated.
1.2.3.3 *General Conditions.* The General Conditions and Supplementary General Conditions are a part of each and every section of the Specifications.

1.2.3.4 *Abbreviations.* In the interest of brevity, the Specifications are written in an abbreviated form and may not include complete sentences. Omission of words or phrases such as “Contractor shall,” “shall be,” etc., are intentional. Nevertheless, the requirements of the Specifications are mandatory. Omitted words or phrases shall be supplied by inference in the same manner as they are when a “note” occurs on the Drawings. In the interest of brevity, the Contract Documents frequently omit modifying words such as “all” and “any” and articles such as “the” and “an,” but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

1.2.3.5 *Plural.* Words in the singular shall include the plural whenever applicable or the context so indicates.

1.2.3.6 *Metric.* The Specifications may indicate metric units of measurement as a supplement to U.S. customary units. When indicated thus: 1”的 (25 mm), the U.S. customary unit is specific, and the metric unit is nonspecific. When not shown with parentheses, the unit is specific. The metric units correspond to the “International System of Units” (SI) and generally follow ASTM E 380, “Standard for Metric Practice.”

1.2.3.7 *Standard Specifications.* Any reference to standard specifications of any society, institute, association, or governmental authority is a reference to the organization’s standard specifications, which are in effect at the date of the Contractor’s proposal unless directed otherwise. If applicable specifications are revised prior to completion of any part of the Work, the Contractor may, if acceptable to Architect, perform such Work in accordance with the revised specifications. The standard specifications, except as modified in the Specifications for the Project, shall have full force and effect as though printed in the Specifications. Architect will furnish, upon request, information as to how copies of the standard specifications referred to may be obtained.

1.2.4 *Rules of Document Interpretation*

1.2.4.1 In the event of conflict within the drawings, the following rules shall apply:

(a) General Notes, when identified as such, shall be incorporated into other portions of Drawings.

(b) Schedules, when identified as such, are complementary with other notes and other portions of Drawings including those identified as General Notes.

(c) Larger scale drawings shall take precedence over smaller scale drawings.

(d) At no time shall the Contractor base construction on scaling of drawings.
1.2.4.2 Specifications shall govern as to materials, workmanship, and installation procedures.

1.2.4.3 If Contractor observes that drawings and specifications are in conflict, Contractor shall, within five (5) days, notify the Architect in writing for the purposes of obtaining an interpretation of the Contact Documents.

1.2.4.4 In the case of conflict or inconsistencies, the order of precedence shall be as follows:

(a) General Conditions take precedence over Drawings and Specifications.

(b) Special Conditions take precedence over General Conditions.

(c) The Agreement shall take precedent over the Special Conditions.

(d) In the case of disagreement or conflict between or within standards, specifications, and drawings, the more stringent, higher quality, and greater quantity of Work shall apply.

1.3 OWNERSHIP AND USE OF ARCHITECT’S DRAWINGS, SPECIFICATIONS AND OTHER DOCUMENTS

The Drawings, Specifications, and other contract documents for the Project are the property of the District and/or Architect pursuant to Education Code § 17316. The Contractor may retain one contract record set. Neither the Contractor nor any Subcontractor, or material or equipment supplier shall own or claim a copyright in the Drawings, Specifications, and other documents prepared by the Architect. All copies except the Contractor’s record set, shall be returned or properly accounted for upon completion of the Work. The Drawings, Specifications, and other documents prepared by the Architect, and copies thereof furnished to the Contractor are not to be used by the Contractor or any Subcontractor, Sub-subcontractor, or material or equipment supplier on other projects or for additions to this Project outside the scope of the Work. The District and/or Architect hereby grants the Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers a limited license to use applicable portions of the Drawings, Specifications, and other documents prepared for the Project in the execution of their Work under the Contract Documents. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the District’s property interest or other reserved right.

ARTICLE 2

DISTRICT

Contra Costa Community College District
Los Medanos College
L-636 Physical Education & Student Union Complex
2.1 INFORMATION AND SERVICES REQUIRED OF THE DISTRICT

2.1.1 Site Survey.

If applicable, the District will furnish, at its expense, a legal description of the Site and a land survey showing the boundaries of the Site. Contractor shall be responsible for all surveys regarding location of construction, grading and site work.

2.1.2 Soils.

When required by the scope of the Project, the District will furnish, at its expense, the services of geotechnical engineers or consultants when reasonably required and deemed necessary by the Architect or as required by local or state codes. Such services, with written reports and appropriate written professional recommendations, may include test boring, test pits, soil bearing values, percolation tests, air and water pollution tests, and ground corrosion and resistivity tests, including necessary operations for determining subsoil, air, and water conditions.

2.1.3 Contractor Reliance.

A soils investigation report has been obtained from test holes at the Site, and such report is available for the Contractor’s use in preparing its bid and Work under this Contract. The soils report is provided for review. Any information obtained from such report or any other information given on drawings as to subsurface soil condition or to elevations of existing grades or elevations of underlying rock is approximate only. If, during the course of Work under this Contract, Contractor encounters subsurface conditions which differ materially from those indicated in the soils investigation report, then Contractor shall notify the District within five (5) calendar days of discovery of the condition, and changes to the contract price may be made in accordance with Specification Section 01250 entitled “Contract Modification Procedures.” Contractor agrees that no claim against District will be made by Contractor for damages and hereby waives any rights to damages in the event the Contractor fails to notify District within the five-day period mentioned above.

WARNING: DISTRICT DOES NOT WARRANT THE SOILS AT THE PROJECT SITE. SOILS INVESTIGATION REPORT IS PROVIDED FOR CONTRACTORS INFORMATION ONLY. CONTRACTOR HAS CONDUCTED AN INDEPENDENT INVESTIGATION OF THE PROJECT SITE AND THE SOILS CONDITIONS OF THE SITE. DISTRICT DOES NOT WARRANT THE SOILS CONDITIONS OF THE SITE AND CONTRACTOR IS FULLY RESPONSIBLE TO ASCERTAIN SITE CONDITIONS FOR THE PURPOSES OF DETERMINING CONSTRUCTION MEANS AND METHODS PRIOR TO COMMENCING CONSTRUCTION. THE SOILS INVESTIGATION REPORT IS NOT A CONTRACT DOCUMENT.

2.1.4 Utilities.

2.1.4.1 Regional Notification Center. Contractor, except in an emergency, shall contact the appropriate regional notification center at least two working days prior to commencing any
excavation if the excavation will be conducted in an area or in a private easement which is known, or reasonably should be known, to contain subsurface installations other than the underground facilities owned or operated by the District, and obtain an inquiry identification number from that notification center. No excavation shall be commenced and carried out by the Contractor unless such an inquiry identification number has been assigned to the Contractor or any subcontractor of the Contractor and the District has been given the identification number by the Contractor. Any damages arising from failure to make appropriate regional notification shall be at the sole risk of Contractor. Any delays caused by failure to make appropriate regional notification shall be at the sole risk of Contractor and shall not be considered for extension of time pursuant to Paragraph 8.4.

2.1.4.2 Utilities – Removal and Restoration

The District has endeavored to determine the existence of utilities at the Site of the Work from the records of the District of known utilities in the vicinity of the Work. The positions of these utilities as derived from such records are shown in the Contract Documents.

No excavations were made to verify the locations shown for underground utilities. The service connections to these utilities may not be shown on the drawings. It shall be the responsibility of the Contractor to determine the exact location of all service connections. The Contractor shall make its own investigations, including exploratory excavations, to determine the locations and type of service connections, prior to commencing work which could result in damage to such utilities. The Contractor shall immediately notify the District’s representative as to any utility discovered by Contractor in a different position than shown in the Contract Documents or which is not shown on the Contract Documents.

Contractor shall coordinate its Work with all utilities, including, but not limited to electricity, water, gas and telephone and meet with said utilities prior to the start of any work.

2.1.4.3 Other Utilities

In case it should be necessary to remove, relocate, or temporarily maintain a utility because of interference with the Work, the work on the utility shall be performed and paid for as follows:

When it is necessary to remove, relocate or temporarily maintain a service connection, the cost of which is not required to be borne by the owner thereof, the Contractor shall bear all expenses incidental to the work on the service connection. The work on the service connection shall be done in a manner satisfactory to the owner thereof; it being understood that the owner of the service connection has the option of doing such work with his own forces or permitting the work to be done by the Contractor.

When it is necessary to remove, relocate, or temporarily maintain a utility which is in the position shown on the drawings, the cost of which is not required to be borne by the owner thereof, the Contractor shall bear all expenses incidental to the work on the utility.
work on the utility shall be done in a manner satisfactory to the owner thereof; it being understood that the owner of the utility has the option of doing such work with his own forces or permitting the work to be done by the Contractor.

When it is necessary to remove, relocate, or temporarily maintain a utility which is not shown on the drawings or is in a position different from that shown on the drawings and were it in the position shown on the drawings would not need to be removed, relocated, or temporarily maintained, and the cost of which is not required to be borne by the owner thereof, the District will make arrangements with the owner of the utility for such work to be done at no cost to the Contractor, or will require the Contractor to do such work in accordance with Specification Section 01250 or will make changes in the alignment and grade of the Work to obviate the necessity to remove, relocate, or temporarily maintain the utility. Changes in alignment and grade will be ordered in accordance with Specification Section 01250.

No representations are made that the obligations to move or temporarily maintain any utility and to pay the cost thereof is or is not required to be borne by the owner of such utility, and it shall be the responsibility of the Contractor to investigate to find out whether said cost is required to be borne by the owner of the utility.

The right is reserved to governmental agencies and to owners of utilities to enter at any time upon any street, alley, right-of-way, or easement for the purpose of making changes in their property made necessary by the Work and for the purpose of maintaining and making repairs to their property.

2.1.5 Existing Utility Lines; Removal, Relocation.

2.1.5.1 Main or Trunkline Facilities

If the Contractor while performing the contract discovers utility facilities not identified by the District in the Contract Documents, Contractor shall, within five (5) days, notify the District and utility in writing.

The District has the responsibility to identify, with reasonable accuracy, main or trunkline facilities on the drawings and specifications. In the event that main or trunkline utility facilities are not identified with reasonable accuracy in the drawings and specifications, District shall assume the responsibility for their timely removal, relocation, or protection.

The owner of the public utility shall have the sole discretion to perform repairs or relocation work or permit the Contractor to do such repairs or relocation work at a reasonable price.

The Contractor shall exercise reasonable care and shall be compensated by the District for the actual verified field costs of locating, and removing, relocating, protecting or temporarily maintaining such main or trunkline utility facilities not indicated with reasonable accuracy in the drawings and specifications, and for equipment in use on the project necessarily idled during such work. This work shall be performed in accordance with Specification Section 01250 of these Contract Documents.
Alternatively, District may make changes in the alignment and grade of the work to obviate the need to remove, relocate, or temporarily maintain the utility, in accordance with Specification Section 01250 or District may make arrangements with the owner of the utility for such work to be done at no cost to the Contractor.

The Contractor shall not be assessed a forfeiture for delay in completion of the Project when such delay is caused by the failure of the District or the owner of the utility to provide for the removal, relocation, protection or temporary maintenance of all such main or trunkline facilities not indicated with reasonable accuracy.

Nothing herein shall preclude the District from pursuing any appropriate remedy against the utility for delays which are the responsibility of the utility.

Nothing herein shall be construed to relieve the utility from any obligation as required either by law or by contract to pay the cost of removal or relocation of existing utility facilities.

2.1.5.2 **Assessment.** These subparagraphs shall not be construed to preclude assessment against the Contractor for any other delays in completion of the Work. Nothing in these subparagraphs shall be deemed to require the District to indicate the presence of existing service laterals or appurtenances whenever the presence of such utilities on the Site can be inferred from the presence of other visible facilities, such as buildings, or meter junction boxes on or adjacent to the Site.

2.1.5.3 **Notification.** If the Contractor, while performing Work under this Contract, discovers utility facilities not identified by the District in the Contract Documents, Contractor shall, within five (5) days, notify the District and the utility in writing. If Contractor fails to notify the District within five (5) days after discovery of any utility facilities not identified by District in the Contract Documents, Contractor waives all rights to be compensated for any extra Work or damages resulting from such discovered utilities.

2.1.6 **Easements.**

District shall secure and pay for easements for permanent structures or permanent changes in existing facilities, if any, unless otherwise specified in the Contract Documents.

### 2.2 **DISTRICT’S RIGHT TO CARRY OUT THE WORK**

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents, including, but not limited to:

1. Failure to supply adequate workers on the entire Project or any part thereof;
2. Failure to supply a sufficient quantity of materials;
3. Failure to perform any provision of this Contract;
4. Failure to comply with safety requirements, or due to Contractor is creation of an unsafe condition;
5. In the case of bona fide emergency;
6. Failure to order materials in a timely manner;
7. Failure to prepare deferred-approval items or shop drawings in a timely manner;
8. Failure to comply with Contractor’s schedule which would result in a delay to the critical path;

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents, and fails (within a five-day period after receipt of written notice or a shorter time period expressly stated in the written notice from the District in an emergency situation) to commence and continue correction of such default with diligence and promptness, the District may correct such deficiencies without prejudice to other remedies the District may have, including those set forth in Article 14 after providing five-day written notice to Contractor and Surety. If during this five (5) day period, Surety personally delivers notice to District that it intends to perform such work, District shall allow Surety seven (7) days to perform. In an emergency situation, the District may correct such deficiencies without prejudice to other remedies the District may have, including those set forth in Article 14 after providing 48 hours’ notice to the Contractor. In either case, the Contractor will be invoiced the cost of correcting such deficiencies, including compensation for additional services and expenses made necessary by such default, or neglect. The invoice amount shall be deducted from the next payment due the Contractor. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the District.

ARTICLE 3

THE CONTRACTOR

3.1 SUPERVISION AND CONSTRUCTION PROCEDURES

3.1.1 Contractor.

The Contractor shall continually supervise and direct the Work using the Contractor’s best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences, procedures; and shall coordinate all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. The Contractor shall not perform the Work without utilizing the Contract Documents or, where required, approved shop drawings, product data, or samples for any such portion of the work. If any of the Work is performed by contractors retained directly by the District, Contractor shall be responsible for the coordination and sequencing of the work of those other contractors so as to avoid any impact on the project schedule pursuant to the requirements of Article 6 and Article 8. Specific duties of the Contractor...
shall include those set out in Section 43 of Title 21 of the California Code of Regulations and Section 4-343 of Title 24 of the California Code of Regulations. These duties include, but are not limited to the following:

(a) Responsibilities. It is the duty of the Contractor to complete the Work covered by his or her contract in accordance with the approved drawings and specifications. The Contractor in no way is relieved of any responsibility by the activities of the Architect, Engineer, Inspector or DSA in the performance of their duties.

(b) Performance of the work. The Contractor shall carefully study the approved drawings and specifications and shall plan its schedule of operations well ahead of time. If at any time it is discovered that work is being done which is not in accordance with the approved drawings and specifications, the contractor shall correct the work immediately.

All inconsistencies or times which appear to be in error in the drawings and specifications shall promptly be called to the attention of the Architect or, Engineer, for interpretation or correction. Local conditions which may affect the structure shall be brought to the Architect’s attention at once. In no case, shall the instruction of the Architect be construed to cause work to be done which is not in conformity with the approved drawings, specifications, change orders, construction change directives, and as required by law.

The Contractor shall not carry on Work except with the knowledge of the Inspector of Record.

(c) Verified Reports. The Contractor shall make and submit to the District from time to time, verified reports as required in Section 36 of Title 21 and Section 4-366 of Title 24.

Contractor shall fully comply with any and all reporting requirements of Education Code Sections 81147.

3.1.2 Contractor Responsibility.

The Contractor shall be responsible to the District for acts and omissions of the Contractor’s employees, Subcontractors, material and equipment suppliers, and their agents, employees, invitees, and other persons performing portions of the Work under direct or indirect contract with the Contractor or any of its Subcontractors.

3.1.3 Obligations not Changed by Architect’s Actions.

The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect’s
administration of the Contract or by tests, inspections, or approvals required or performed by persons other than the Contractor.

3.1.4 Acceptance/Approval of Work.

The Contractor shall be responsible to determine when any completed portions of the Work already performed under this Contract or provided pursuant to Article 6 are suitable to receive subsequent Work thereon.

3.1.5 Performance of Work With Own Force.

Contractor shall perform at least 10% of the Work, exclusive of supervisory and clerical work without the services of any subcontractor. Contractor shall supervise and direct the work competently and efficiently, devoting such attention thereto and applying such skills as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall submit scope of specific work to be self-performed at same time as submission of subcontractor percent of work list required by Section 00300.

3.2 SUPERVISION

3.2.1 Full Time Supervision.

Unless personally present on the Project site where the Work is being performed, the Contractor shall keep on the Work at all times during its progress a competent construction Superintendent satisfactory to the District. The Superintendent shall be present on a full-time basis, shall be dedicated exclusively to the Project and shall not share superintendency duties with another project or job. The Superintendent shall not be replaced except with written consent of the District. The Superintendent shall represent the Contractor in its absence and shall be fully authorized to receive and fulfill any instruction from the Architect, the Inspector, the District or any other District representative. All Requests for Information shall be originated by the Superintendent and responses thereto shall be given to the Superintendent. No Work shall begin on any day by any Subcontractor or other person on the Project site until the Superintendent has arrived, or shall any Work continue during the day after the Superintendent has departed from the Project site. The Superintendent shall have authority to bind Contractor through the Superintendent’s acts. The Superintendent shall represent the Contractor, and communications given to the Superintendent shall be binding on the Contractor. Before commencing the Work, Contractor shall give written notice to District and Architect of the name and a Statement of Qualifications of such superintendent for District approval. Superintendent shall not be changed except with written consent of District, unless a superintendent proves to be unsatisfactory to Contractor and ceases to be in its employ, in which case, Contractor shall notify District and Architect in writing. Contractor shall provide a replacement superintendent approved by the District prior to performing additional work.

3.2.2 Staff.
Notwithstanding other requirements of the contract documents, the Contractor and each Subcontractor shall: (1) furnish a competent and adequate staff as necessary for the proper administration, coordination, supervision, and superintendence of its portion of the Work; (2) organize the procurement of all materials and equipment so that the materials and equipment will be available at the time they are needed for the Work; and (3) keep an adequate force of skilled and fit workers on the job to complete the Work in accordance with all requirements of the Contract Documents.

3.2.3 Right to Remove.

District shall have the right, but not the obligation, to require the removal from the Project of any superintendent, staff member, agent, or employee of any Contractor, Subcontractor, material or equipment supplier.

3.3 LABOR AND MATERIALS

3.3.1 Contractor to Provide.

Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, material, equipment, tools, construction equipment and machinery, water, heat, air conditioning, utilities, transportation, and other facilities, services and permits necessary for proper execution and completion of the Work whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

3.3.2 Quality.

Unless otherwise specified, all materials and equipment to be permanently installed in the Project shall be new and shall be of the highest quality or as specifically stated in the Contract Documents. The Contractor shall, if requested, furnish satisfactory evidence as to kind and quality of all materials and equipment within ten (10) days of a written request by the District, including furnishing the District with bona fide copies of invoices for materials or services provided on the Project. All labor shall be performed by workers skilled in their respective trades, and shall be of the same or higher quality as with the standards of other school construction.

3.3.3 Replacement.

Any work, materials, or equipment, which do not conform to these requirements or the standards set forth in the Contract Documents, may be disapproved by the District, in which case, they shall be removed and replaced by the Contractor at no additional cost or extension of time to the District.

3.3.4 Discipline.

The Contractor shall enforce strict discipline and good order among the Contractor’s and Subcontractor’s employees, and other persons carrying out the Contract. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them.
used in this subsection, “unfit” includes any person who the District concludes is improperly skilled for the task assigned to that person, who fails to comply with the requirements of this article, or who creates safety hazards which jeopardize other persons and/or property.

3.3.5 Not used.

3.3.6 Noise, Drugs, Tobacco, and Alcohol.

Contractor shall take all steps necessary to insure that employees of Contractor or any of its subcontractors’ employees do not use, consume, or work under the influence of any alcohol, tobacco or illegal drugs while on the project. Contractor shall further prevent any of its employees or its subcontractor employees from playing any recorded music devices or radios or wearing any radio headphone devices for entertainment while working on the project. Likewise, Contractor shall prevent its employees or subcontractor’s employees from bringing any animal onto the project. Contractors shall not violate any written school policies.

3.3.7 Delivery of Material.

Contractor shall place orders for materials or equipment so that the Work may be completed in accordance with the Construction schedule for the Work as set forth in Article 8 of this Agreement. Contractor shall, upon demand from the Architect, furnish to the Architect documentary evidence including, but not limited to purchase orders, invoices, bills of materials, work orders and bills of lading, showing that orders have been placed.

3.3.8 Liens and Other Security Interests of Subcontractors and Material Suppliers.

No material, supplies, or equipment for the Work shall be purchased subject to any chattel mortgage or under a conditional sale or other agreement by which an interest therein or in any part thereof is retained by seller or supplier. Contractor warrants good title to all material, supplies, and equipment installed or incorporated in Work and agrees upon completion of all Work to deliver premises, together with all improvements and appurtenances constructed or placed thereon by it, to District free from any claims, security interests, liens, or charges. Contractor further agrees that neither it nor any person, firm, or corporation furnishing any materials or labor for any Work covered by this Contract shall have any right to place a lien upon the premises or any improvement or appurtenance thereof, except that Contractor may install metering devices or other equipment of a utility company or political subdivision, title to which is commonly retained by the utility company or political subdivision. In event of installation of any such metering device or equipment, Contractor shall advise District as to its owner within five (5) days of such installation in writing, prior to making the installation.

3.3.9 Title to Materials.

The title to new materials or equipment for the Work of this Contract, and attendant liability for its protection and safety, shall remain with Contractor until incorporated in the Work of this Contract.
and accepted by the District and Architect; no part of said materials shall be removed from its place of storage, and Contractor shall keep an accurate inventory of all said materials and equipment in a manner satisfactory to the District or its authorized representative.

3.3.10 Assemblies.

For all material and equipment specified or indicated in the Drawings, the Contractor shall provide all labor, materials, equipment, and services necessary for complete assemblies and complete working systems. Incidental items not indicated on the Drawings, nor mentioned in the Specifications, that can legitimately and reasonably be inferred to belong to the Work described, or be necessary in good practice to provide a complete assembly or system, shall be furnished as though itemized in the Contract Documents in every detail. In all instances, material and equipment shall be installed in strict accordance with each manufacturer’s most recent published recommendations and specifications.

3.4 NOISE CONTROL

The Contractor shall be responsible for the installation and maintenance of noise reducing devices on construction equipment. Contractor shall comply with the requirements of the city and county having jurisdiction with regard to noise ordinances governing construction sites and activities. Construction equipment noise is subject to the control of the Environmental Protection Agency’s Noise Control Program (Part 204 of Title 40, Code of Federal Regulations).

3.5 WARRANTY

The Contractor warrants to the District and Architect that material and equipment furnished under the Contract will be of the highest quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform with the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. Contractor’s warranty and guaranty to District includes, but is not limited to the following representations:

(a) In addition to any other warranties and guaranties provided elsewhere, Contractor shall, and hereby does, warrant all Work after the date of Notice of Completion of Work by District and shall repair or replace any or all such work, together with any other work, which may be displaced in so doing that may prove defective in workmanship or materials within a one (1) year period from date of completion as defined in Public Contract Code Section 7107(c) without expense whatsoever to District, ordinary wear and tear, unusual abuse or neglect excepted. District will give notice of observed defects with reasonable promptness. Contractor shall notify District upon completion of repairs.

(b) In the event of failure of Contractor to comply with above mentioned conditions within one week after being notified in writing, District is hereby
authorized to proceed to have defects repaired and made good at expense of Contractor who hereby agrees to pay costs and charges therefore immediately on demand.

(c) If, in the opinion of the District, defective Work creates a dangerous condition or requires immediate correction or attention to prevent further loss to the District, the District will attempt to give the notice required by this Article. If the Contractor cannot be contacted or does not comply with the District’s requirements for correction within a reasonable time as determined by the District, the District may, notwithstanding the provisions of this article, proceed to make such correction or attention which shall be charged against Contractor. Such action by the District will not relieve the Contractor of the guarantee provided in this Article or elsewhere in this Contract.

(d) This Article does not in any way limit the guarantee on any items for which a longer warranty or guaranty is specified or on any items for which a manufacturer gives a guarantee for a longer period. Contractor shall furnish District all appropriate guaranty or warranty certificates upon completion of the project.

3.6 TAXES

Contractor will pay all applicable Federal, State, and local taxes on all materials, labor, or services furnished by it, and all taxes arising out of its operations under the Contract Documents. District is exempt from Federal Excise Tax, and a Certificate of Exemption shall be provided upon request.

3.7 PERMITS, FEES AND NOTICES

3.7.1 Payment.

The Contractor shall secure and pay for all permits and governmental fees, licenses, and inspections necessary for proper execution and completion of the Work which are necessary after execution of the Contract and are legally required by any authority having jurisdiction over the Project, except those required by the Division of the State Architect (DSA). District shall be responsible for all testing and inspection as required by the DSA on-site or within the distance limitations set forth in Paragraph 13.5.2, unless a different mileage range is specified in the Special Conditions.

3.7.2 Compliance.

The Contractor shall comply with and give notices required by any law, ordinance, rule, regulation, and lawful order of public authorities bearing on performance of the Work.

3.7.3 Responsibility.
The Contractor shall perform all Work in conformance with every applicable law, statute, ordinance, building code, rule or regulation. The Contractor shall assume full responsibility for such Work and shall bear the attributable cost of correction or project delay.

3.8 **DSA VERIFIED REPORTS AND CERTIFICATE OF COMPLIANCE**

3.8.1 Contractor Actions.

The Contractor acknowledges and agrees that a material obligation of the Contractor under the Contract Documents is the completion by the Contractor of all actions and activities which by the Contract Documents or by operation of applicable law, code, rule or regulation are the responsibility of the Contractor relating to DSA reporting requirements pursuant to Education Code §81141 (including amendments thereto) and issuance of DSA's Certificate of Compliance for the Project pursuant to Education Code §81147 (including amendments thereto) upon completion of Project construction. The foregoing shall include without limitation, the timely preparation, completion and filing of Verified Reports during Project construction and the filing of the Final Verified Report with DSA within ten (10) days of the determination of Project Final Completion. The Contractor shall provide the Project Inspector, Architect, Construction Manager retained by the District for the Project and the District with copies of all Verified Reports completed by the Contractor and submitted to DSA; such copies shall be provided to the Project Inspector, Architect, the Construction Manager and the District concurrently with the Contractor’s submission thereof to DSA.

3.8.2 Final Verified Report.

Notwithstanding any provision of the Contract Documents to the contrary, the completion and filing of the Final Verified Report with DSA by the Contractor is an express condition precedent to the District’s disbursement of Twelve Thousand Dollars ($12,000) of the Contract Price due the Contractor under this Agreement (“the Final Verified Report”). The Final Verified Report is in addition to, and not in lieu of, retention withheld and retained by the District from Progress Payments disbursed to the Contractor during construction. The District’s disbursement of the Final Verified Report to the Contractor shall be made by the District within thirty (30) days of the presentation by the Contractor to the District, Project Inspector, and Architect, of reasonably satisfactory written evidence that the Contractor has filed the Contractor’s Final Verified Report with DSA in accordance with the preceding and the submission of a billing statement by the Contractor to the District for payment of the Final Verified Report. If the Contractor fails to file the Final Verified Report with DSA within ten (10) days of the determination of the Contract Final Completion, notwithstanding the preparation or filing of such Final Verified Report by the Contractor thereafter, the District may in the sole and exclusive discretion of the District withhold from disbursement to the Contractor all or any part of the Final Verified Report as damages for the failure of the Contractor to have timely discharged its obligations hereunder.
3.9  (Not used.)

3.10  DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the Site for the District one current copy of the International Building Code, Titles 19, 21 and 24 of the California Code of Regulations and one record copy of the Drawings, Specifications, Addenda, Change Orders, and other Modifications, in good order and marked currently to record changes and selections made during construction. In addition, the Contractor shall maintain at the Site approved Shop Drawings, Product Data, Samples, and similar required submittals. These documents shall be available to the Architect and shall be delivered to the Architect for delivery to the District upon completion of the Work.

3.11  SUBSTITUTIONS

3.11.1  NOT USED

3.11.2  NOT USED

3.11.3  NOT USED

3.11.4  PRODUCT SUBSTITUTIONS

3.11.4.1  One Product Specified. Unless the Specifications state that no substitution is permitted, whenever the Contract Documents indicate any specific article, device, equipment, product, material, fixture, patented process, form, method, or type of construction or any specific name, make, trade name, or catalog number, with or without the words “or equal,” such specification shall be deemed to be used for the purpose of facilitating description of the material, process, or article desired and shall be deemed to be followed by the words “or equal” unless the Contract Documents specify “no substitution allowed”, “no equal”, “no equivalent”, “to match campus standard”, or other language with similar meaning, in which case no substitutions will be allowed. Pursuant to Paragraph 3.11.4.3, the Contractor may, unless otherwise stated, at time of bid offer any material, process, article, etc., which shall be materially equal or better in every respect to that so indicated or specified (“Specified Item”) and will completely accomplish the purpose of the Contract Documents.

3.11.4.2  Products Specified Which are Commercially Unavailable. If the Contractor fails to make a request for substitutions for products, with its bid, and such products subsequently become commercially unavailable, the Contractor may request a substitution for such commercially unavailable item. The decision to grant this request is solely at the District’s discretion. The written approval of the District, consistent with the procedure for Change Orders, shall be required for the use of a proposed substitute material. The District may condition its approval of the substitution upon the delivery to District of an extended warranty or guaranty or other assurances of adequate
performance of the substitution as well as an equitable deduction in the contract price should the substituted item cost less than the Specified Item. All risks of delay due the approval of a requested substitution by the DSA, or any other governmental agency having jurisdiction, shall be on the requesting party. All additional costs, all procurement and construction delays, and all costs for review by the Architect or its consultants shall be the responsibility of the Contractor and will be deducted from Contractor’s pay request.

3.11.4.3 Substitution Request Form. Requests for substitutions of products, materials, or processes in place of a Specified Item must be submitted in writing on the District’s Substitution Request Form (“Request Form”) within three (3) work days after bid opening, except as provided for in Paragraph 3.11.4.2.

The Request Form must be accompanied by evidence as to whether the proposed substitution:

1. Is equal in quality/service/ability to the Specified Item;
2. Will entail no changes in detail, construction, and scheduling of related work;
3. Will be acceptable in consideration of the required design and artistic effect;
4. Will provide no cost disadvantage to the District;
5. Will require no excessive or more expensive maintenance, including adequacy and availability of replacement parts; and
6. Will required no change of the construction schedule.

3.11.4.4 In completing the Request Form, the bidder must state, with respect to each requested substitution, whether the bidder will agree to provide the Specified Item in the event that the District denies the bidder’s request for such requested substitution. In the event that the bidder has agreed in the Request Form to provide the Specified Item and the District denies the bidder’s requested substitution for a Specified Item, the bidder shall provide the Specified Item without any additional cost or charge to the District.

3.11.4.5 After bids are opened, the apparent lowest bidder shall provide, within ten (10) days of opening such bids, any and all Drawing, Specifications, samples, performance data, calculations, and other information, as may be required to assist the Architect and the District in determining whether the proposed substitution is acceptable. The burden of establishing these facts shall be upon the bidder.

3.11.4.6 After the District’s receipt of such evidence by the bidder, the District will make its final decision as to whether the bidder’s request for substitution for any Specified Items will be granted. The decision as to whether a proposed request for substitution is equal to a Specified Item shall be at the sole discretion of the District. Any request for substitution that is granted by the District shall be documented and processed though a Change Order. The District may condition its approval of any substitution upon delivery to the District of an extended warranty or guaranty or other assurances of adequate performance of the substitution. Any and all risks of delay
due to approval by the DSA or any other governmental agency having jurisdiction shall be on the bidder.

3.11.4.7 If the Architect and District accept a proposed substitution, the Contractor agrees to pay for all engineering and design services, including, without limitation, compensation to the Architect and affected engineers for their required time to process such substitution through the Division of the State Architect, if required, and to make all changes and adjustments in materials or the work of all trades directly or indirectly affected by the substituted item or items at no cost to the District.

3.12 **INTEGRATION OF WORK**

3.12.1 Scope.

The Contractor shall be responsible for cutting, fitting, or patching to complete the Work and to make all parts fit together properly. Contractor shall be responsible for ensuring that all trades are coordinated and scheduled so as to ensure the timely and proper execution of the work. When modifying existing work or installing new Work adjacent to existing work, Contractor shall match, as closely as conditions of Site and materials will allow, the finishes, textures, and colors of the original work, refinishing existing work at no additional cost to District. All cost caused by defective or ill-timed work shall be borne by Contractor. Contractor shall be solely responsible for protecting existing work on adjacent properties and shall obtain all required permits for shoring and excavations near property lines.

3.12.2 Structural Members.

New or existing structural members and elements, including reinforcing bars and seismic bracing, shall not be cut, bored, or drilled except by written authority of the Architect. Work done contrary to such authority is at the Contractor’s risk and subject to replacement at its own expense without reimbursement under the Contract. Schedule delays resulting from Agency approvals for unauthorized work shall be the Contractor’s responsibility.

3.12.3 Subsequent Removal.

Permission to patch any areas or items of the Work shall not constitute a waiver of the District’s or the Architect’s right to require complete removal and replacement of the areas of items of the Work if, in the opinion of the Architect or the District, the patching does not satisfactorily restore quality and appearance of the Work or does not otherwise conform to the Contract Documents.

3.13 **CLEANING UP**

3.13.1 Contractor’s Responsibility.

Contractor at all times shall keep premises free from debris such as waste, dust, excess water, storm water runoffs, rubbish, and excess materials and equipment. Contractor shall not leave debris under, in, or about the premises, but shall promptly remove same from the
premises and dispose of it in a lawful manner. Disposal receipts or dump tickets shall be furnished to the Architect within five (5) days of request. Upon completion of Work, Contractor shall clean interior and exterior of buildings, including fixtures, equipment, walls, floors, ceilings, roofs, window sills and ledges, horizontal projections, and any areas where debris has collected, so surfaces are free from foreign material or discoloration; Contractor shall clean and polish all glass, plumbing fixtures, equipment, finish hardware and similar finish surfaces. Upon completion of the Work, Contractor shall also remove temporary utilities, fencing, barricades, planking, sanitary facilities and similar temporary facilities from Site.

Contractor shall remove rubbish and debris resulting from the Work on a daily basis. Contractor shall maintain the structures and Site in a clean and orderly condition at all times until acceptance of the project by the District. Contractor shall keep its access driveways and adjacent streets, sidewalks, gutters and drains free of rubbish, debris and excess water by cleaning and removal each day.

3.13.1.1 In addition to the general cleaning, the following special cleaning shall be done at the completion of the work in accordance with the specifications including, but not limited to:

(a) Remove putty stains from glazing, then wash and polish glazing.
(b) Remove marks, stains, fingerprints and other soil or dirt from painted, stained or decorated work.
(c) Remove temporary protection and clean and polish floors and waxed surfaces.
(d) Clean and polish hardware and plumbing trim; remove stains, dust, dirt, plaster and paint.
(e) Remove spots, soil, plaster and paint from tile work, and wash tile.
(f) Clean all fixtures and equipment, remove excess lubrication, clean light fixtures and lamps, polish metal surfaces.
(g) Vacuum-clean carpeted surfaces.
(h) Remove debris from roofs, down spout and drainage system.

3.13.2 Failure to Cleanup.

If the Contractor fails to clean up as provided in the Contract Documents, the District may do so, and the cost thereof shall be the responsibility of the Contractor and deducted from the next progress payment.

3.14 ACCESS TO WORK
The Contractor shall provide the District, the Architect, Engineers and the Inspector of Record, access to the Work in preparation and progress wherever located. Contractor shall provide safe and proper facilities for such access so that District’s representatives may perform their functions.

3.15 **ROYALTIES AND PATENTS**

3.15.1 Payment and indemnity for Infringement.

Contractor shall hold and save the District and its officers, agents, and employees, the Architect, and the Architect’s consultants harmless from liability of any nature or kind, including cost and expense, for or on account of any patented or unpatented invention, process, article, or appliance manufactured or used in the performance of the contract, including its use by the District, unless otherwise specifically provided in the contract documents, and unless such liability arises from the sole negligence, or active negligence, or willful misconduct of the District, the Architect, or the Architect’s consultants.

3.15.2 Review.

The review by the Architect of any method of construction, invention, appliance, process, article, device, or material of any kind shall be for its adequacy for the Work and shall not be an approval for the use by the Contractor in violation of any patent or other rights of any person or entity.

3.16 **INDEMNIFICATION**

3.16.1 Contractor.

Contractor shall defend, indemnify and hold harmless District, Architect, Inspector, the State of California and their officers, employees, agents and independent contractors from all liabilities, claims, actions, liens, judgments, demands, damages, losses, costs or expenses of any kind arising from death, personal injury, property damage or other cause based or asserted upon any act, omission, or breach connected with or arising from the progress of Work or performance of service under this Agreement or the Contract Documents. As part of this indemnity, Contractor shall protect and defend, at its own expense, District, Architect, Inspector, the State of California and their officers, employees, agents and independent contractors from any legal action including attorneys fees or other proceeding based upon such act, omission, or breach.

Furthermore, Contractor agrees to and does hereby defend, indemnify and hold harmless District, Architect, Inspector, the State of California and their officers, employees, agents and independent contractors from every claim or demand made, and every liability, loss, damage, expense or attorneys fees of any nature whatsoever, which may be incurred by reason of:
(a) Liability for (1) death or bodily injury to persons; (2) damage or injury to, loss (including theft), or loss of use of, any property; (3) any failure or alleged failure to comply with any provision of law or the Contract Documents; or (4) any other loss, damage or expense, sustained by any person, firm or corporation or in connection with the Work called for in this Agreement or the Contract Documents, except for liability resulting from the sole or active negligence, or the willful misconduct of the District.

(b) Any bodily injury to or death of persons or damage to property caused by any act, omission or breach of Contractor or any person, firm or corporation employed by Contractor, either directly or by independent contract, including all damages or injury to, loss (including theft), or loss of use of, any property, sustained by any person, firm or corporation, including District, arising out of or in any way connected with Work covered by this Agreement or the Contract Documents, whether said injury or damage occurs either on or off District property, but not for any loss, injury, death or damages caused by the sole or active negligence or willful misconduct of the District.

(c) Any dispute between Contractor and Contractor's subcontractors/supplies/sureties, including, but not limited to, any failure or alleged failure of the Contractor (or any person hired or employed directly or indirectly by the Contractor) to pay any Subcontractor or Materialman of any tier or any other person employed in connection with the Work and/or filing of any stop notice or mechanic's lien claims.

Contractor, at Contractor’s own expense, cost, and risk, shall defend any and all claims, actions, suits, or other proceedings that may be brought or instituted against the District, its officers, agents or employees, on any such claim or liability, and shall pay or satisfy any judgment that may be rendered against the District, its officers, agents or employees in any action, suit or other proceedings as a result thereof.

Contractor shall ensure that its contract with each of its subcontractors contains provisions requiring the subcontractors to defend, indemnify and hold harmless the District, Architect, Inspector, the State of California to a minimum level as set forth in this Article and consistent with the language of 3.15.1.

The Contractor’s and Subcontractors’ obligation to defend, indemnify and hold harmless the District, Architect, Inspector, the State of California and their officers, employees, agents and independent contractors hereunder shall include, without limitation, any and all claims, damages, and costs for the following: (1) any damages or injury to or death of any person, and damage or injury to, loss (including theft), or loss of use of, any property; (2) breach of any warranty or guaranty, express or implied; (3) failure of the Contractor or Subcontractors to comply with any applicable governmental law, rule, regulation, or other requirement; and (4) products installed in or used in connection with the Work.

3.17 SUBMISSION OF DAILY REPORTS
3.17.1 General.

At the close of each working day, the Contractor shall submit a daily report to the District and the Inspector, on forms approved by the District, together with applicable delivery tickets, listing all labor, materials, and equipment involved for that day. An attempt shall be made to reconcile the report daily, and it shall be signed by a District representative and the Contractor. In the event of disagreement, pertinent notes shall be entered by each party to explain points which cannot be resolved that day. Each party shall retain a signed copy of the report. Reports by subcontractors or others shall be submitted through the Contractor.

3.17.2 Labor.

The report required by Paragraph 3.17.1 shall show names of workers, classifications, hours worked and hourly rate. Project superintendent expenses are not allowed.

3.17.3 Materials.

The report required by Paragraph 3.17.1 shall describe and list quantities of materials used and unit costs.

3.17.4 Equipment.

The report required by Paragraph 3.17.1 shall show type of equipment, size, identification number, and hours of operation, including loading and transportation, if applicable, and hourly/daily cost. Move-on and move-off fees, if allowable, shall be noted.

3.17.5 Other Services and Expenditures.

Other services and expenditures shall be described in detail as the District requires.

ARTICLE 4

ADMINISTRATION OF THE CONTRACT

4.1 ARCHITECT

4.1.1 Replacement of Architect.

In the case of the termination of the Architect, the District may appoint an architect or another construction professional or may perform such functions with its own licensed professional personnel. The status of the replacement Architect under the Contract Documents shall be the same as that of the former architect.

4.2 ARCHITECT’S ADMINISTRATION OF THE CONTRACT

4.2.1 Status.
Pursuant to Titles 24 and 21 of the California Code of Regulations and as required pursuant to the Field Act, Education Code 17280 et. Seq. the Architect will provide administration of the Contract Documents and the Work, and will be a District representative during construction, as well as during the one (1) year period following the commencement of any warranties or guaranties. The Architect will have authority to act on behalf of the District only to the extent provided in the Contract Documents.

4.2.2 Site Visits.

The Architect will visit the Site at intervals necessary in the judgment of the Architect to become generally familiar with the progress and quality of the Work and to determine in general if the Work is being performed in accordance with the Contract Documents.

4.2.3 Limitations of Construction Responsibility.

The Architect shall not have control over, charge of, or be responsible for construction means, methods, techniques, schedules, sequences or procedures, fabrication, procurement, shipment, delivery, receipt, installation, or for safety precautions and programs in connection with the Work, since these are solely the Contractor’s responsibility under the Contract Documents. The Architect shall not be responsible for the Contractor’s, Subcontractors’, material or equipment suppliers’, or any other person’s schedules or failure to carry out the Work in accordance with the Contract Documents. The Architect shall not have control over or charge of acts or omissions of the Contractor, Subcontractors, their agents or employees, or any other persons or entities performing or supplying portions of the Work. The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect’s administration of the Contract Documents, or by tests, inspections, or approvals required or performed by persons other than the Contractor.

4.2.4 Communications Facilitating Contract Administration.

Except as otherwise provided in the Contract Documents the Contractor shall communicate through the District representative. The District representative shall be promptly informed, and shall receive copies of all written communications. Contractor shall not rely upon any communications from the District that is not from the District’s representative. Communications by and with the Architect’s consultants shall be through the Architect. Communications by and with Subcontractors and material or equipment suppliers shall be through the Contractor.

4.2.5 Payment Applications.

The Architect will review and make recommendations to the District regarding the amounts due the Contractor on the Certificates for Payment pursuant to Specification Section 01290 and subject to the Inspector’s approval and Architect’s observation.

4.2.6 Rejection of Work.
In addition to the rights, duties, and obligations of the Inspector under this Article, the Architect may recommend to the District that the District reject Work which does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable to achieve the intent of the Contract Documents, the Architect may recommend to the District that the District require additional inspection or testing of the Work in accordance with Paragraph 13.5, whether or not such Work is fabricated, installed, or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons performing portions of the Work.

4.2.7 Warranties and Guarantees Upon Completion.

The Architect, in conjunction with the District and Inspector will conduct field reviews of the Work to determine the date of completion, shall receive and forward to the District for the District’s review and records written warranties, guaranties, and related documents required by the Contract and assembled by the Contractor, and will issue a final Certificate for Payment when the Architect believes the Work has been completed in compliance with the requirements of the Contract Documents. The handling by the Architect of such warranties, guaranties, maintenance manuals, or similar documents shall not diminish or transfer to the Architect any responsibilities or liabilities required by the Contract Documents of the Contractor or other entities, parties, or persons performing or supplying the Work.

The Architect will conduct a field review of the Contractor’s comprehensive list of items to be completed or corrected (final punch list) and one (1) follow-up field review if required. The cost incurred by the District for further field reviews or the preparation of further punch lists by the Architect shall be invoiced to the Contractor and deducted from the final payment.

4.2.8 Interpretation.

The Architect will interpret and decide matters concerning performance and requirements of the Contract Documents.

4.2.9 Additional Instructions.

4.2.9.1 Typical Parts and Sections. Whenever typical parts or sections of the Work are completely detailed on the Drawings, and other parts or sections which are essentially of the same construction are shown in outline only, the complete details shall apply to the Work which is shown in outline.

4.2.9.2 Dimensions. Dimensions of Work shall not be determined by scale or rule. Figured dimensions shall be followed at all times. If figured dimensions are lacking on Drawings, Architect shall supply them on request. The Architect’s decisions on matters relating to aesthetic effect will be final.
4.3 INSPECTOR OF RECORD

4.3.1 General.

One or more project inspectors employed by the District and approved by the Division of the State Architect will be assigned to the Work in accordance with the requirements of Title 24 of the California Code of Regulations. The Inspector(s) duties are as specifically defined in Title 24.

4.3.2 Inspector’s Duties.

All Work shall be under the observation of the Inspector. The Inspector shall have free access to any or all parts of the Work at any time. The Contractor shall furnish the Inspector such information as may be necessary to keep the Inspector fully informed regarding progress and manner of Work and character of materials. Such observations shall not, in any way, relieve the Contractor from responsibility for full compliance with all terms and conditions of the Contract, or be construed to lessen to any degree the Contractor’s responsibility for providing efficient and capable superintendence. The Inspector is not authorized to make changes in the drawings or specifications nor shall the Inspector’s approval of the Work and methods relieve the Contractor of responsibility for the correction of subsequently discovered defects, or from its obligation to comply with the Contract Documents.

4.3.3 Inspector’s Authority to Reject or Stop Work.

The Inspector shall have the authority to reject Work whenever provisions of the Contract Documents are not being complied with, and Contractor shall instruct its Subcontractors and employees accordingly. In addition, the Inspector may stop any Work that poses a probable risk of harm to persons or property. The Contractor shall instruct its employees, Subcontractors, material and equipment suppliers, etc., accordingly. The absence of any Stop Work order or rejection of any portion of the Work shall not relieve the Contractor from any of its obligations pursuant to the Contract Documents.

4.3.4 Not used.

4.3.5 Testing Times.

The District will provide inspection and testing at its cost during the normal eight (8) hour day Monday through Friday (except holidays). Work by the Contractor outside of the normal eight (8) hour day shall constitute an authorization from the Contractor to the District to provide inspection and testing as required outside of the normal eight (8) hour day. Contractor shall reimburse District for any additional costs associated with inspection and testing (including re-inspection and re-testing) outside the normal eight-hour day and for any retests caused by the Contractor.

4.4 RESPONSIBILITY FOR ADDITIONAL CHARGES INCURRED BY THE DISTRICT FOR PROFESSIONAL SERVICES
If at any time prior to the completion of the requirements under the Contract Documents, the District is required to provide or secure additional professional services for any reason by any act of the Contractor, the Contractor shall be invoiced by the District for any costs incurred for any such additional services, which costs shall be deducted from the next progress payment. Such invoicing shall be independent from any other District remedies and shall not be considered a waiver of any District rights or remedies. If payments then or thereafter due to the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the District. Additional services shall include, but shall not be limited to, the following:

(a) Services made necessary by the default of the Contractor.

(b) Services made necessary due to the defects or deficiencies in the Work of the Contractor.

(c) Services required by failure of the Contractor to perform according to any provision of the Contract Documents.

(d) Services in connection with evaluating substitutions of products, materials, equipment, Subcontractors’ proposed by the Contractor, and making subsequent revisions to drawings, specifications, and providing other documentation required (except for the situation where the specified item is no longer manufactured or available).

(e) Services for evaluating and processing claims submitted by the Contractor in connection with the Work outside the established Change Order process.

(f) Services required by the failure of the Contractor to prosecute the Work in a timely manner in compliance within the specified time of completion.

(g) Services in conjunction with the testing, adjusting, balancing and start-up of equipment other than the normal amount customarily associated for the type of Work involved.

(h) Services in conjunction with more than one (1) re-review of submittals of shop drawings, product data, samples, etc.

4.5 DISPUTES

4.5.1 Decision of Architect.

Disputes between District and Contractor involving money or time, including those alleging an error or omission by the Architect, shall be referred initially to the Architect for action as provided in Paragraph 4.5.2. A decision by the Architect, as provided in Paragraph 4.5.5, shall be required as a
condition precedent to proceeding with remedies set forth in Paragraph 4.5.6 as to all such matters arising prior to the date final payment is due, regardless of whether such matters relate to execution and progress of the Work, or the extent to which the Work has been completed. The decision by the Architect in response to a Claim shall not be a condition precedent to the remedies under Paragraph 4.5.2 through 4.5.5 in the event: (1) the position of Architect is vacant; (2) the Architect has not received evidence or has failed to render a decision within agreed time limit; (3) the Architect has failed to take action required under Paragraph 4.6.4 within thirty (30) days after the Claim is made, forty-five (45) days have passed after the Claim has been referred to the Architect; or (4) the Claim relates to a Stop Notice Claim not arising from any extra change order or Construction Change Directive for which approval has not been provided.

4.5.2 Architect’s Review.

The Architect will review Claims and take one or more of the following preliminary actions within ten (10) days of receipt of a Claim: (1) request additional supporting data from the Claimant; (2) submit a schedule to the parties indicating when the Architect expects to take action; (3) reject the Claim in whole or in part, stating reasons for rejection; (4) recommend approval of the Claim; or (5) suggest a compromise. The Architect may also, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim.

4.5.3 Documentation if Resolved.

If a Claim has been resolved, the Architect will prepare or obtain appropriate documentation.

4.5.4 Actions if Not Resolved.

If a Claim has not been resolved and all documentation requested pursuant to Paragraph 4.5.2 has been provided, the party making the Claim shall, within ten (10) days after the Architect’s preliminary response, take one or more of the following actions: (1) modify the initial Claim; (2) notify the Architect that the initial Claim stands; or (3) supplement with additional supporting data.

4.5.5 Architect’s Written Decision.

If a Claim has not been resolved after consideration of the foregoing and of other evidence presented by the parties or requested by the Architect, the Architect will notify the parties in writing that the Architect’s decision will be made within twenty (20) days. Upon expiration of such time period, the Architect will render to the parties its written decision relative to the Claim, including any change in the Contract Sum or Contract Time or both. The Architect may, but is not obligated to, notify the surety and request the surety’s assistance in resolving the controversy.

4.5.6 Continuing Contract Performance.
Pending final resolution of a Claim, including, negotiation, mediation, arbitration, or litigation, the Contractor shall proceed diligently with performance of the Contract, and the District shall continue to make any undisputed payments in accordance with the Contract. If the dispute is not resolved, Contractor agrees it will neither rescind the contract nor stop the progress of the work, but Contractor’s sole remedy shall be to submit such controversy to determination by a court of competent jurisdiction in the county where the project is located, after the project has been completed, and not before. At the District’s sole option, the District may submit individual disputes for binding arbitration and Contractor agrees to the resolution determined for each individual dispute by Arbitrator, including resolution of time and delays. If binding arbitration is utilized for individual disputes, such resolution is full and final as to that particular Claim.

4.5.7 Claims for Concealed Trenches or Excavations Greater Than Four Feet Below the Surface.

When any excavation or trenching extends greater than four feet below the surface or if any condition involving hazardous substances are encountered:

(a) Immediately upon discovery, The Contractor shall promptly, and before the following conditions are disturbed, notify the District, by telephone and in writing, of the condition except:

1. If such condition is a hazardous waste condition, and Contractor’s bid includes removal or disposal of hazardous substances. Material that the Contractor believes may be a material that is hazardous waste, as defined in Section 25117 of the Health and Safety Code, that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with the provisions of existing law. In such case, the notice bulletin procedures of Specification Section 01250 apply.

2. Subsurface or latent physical conditions at the Site differing from those indicated.

3. Unknown physical conditions at the Site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in Work of the character provided for in the Contract.

(b) The District shall investigate the conditions, and if District finds that the conditions materially so differ, do involve hazardous waste, and cause a decrease or increase in the Contractor’s cost of, or the time required for, performance of any part of the Work shall issue a change order or construction change directive under the procedures described in the Contract.

(c) In the event that a dispute arises between the District and the Contractor whether the conditions materially differ, involve hazardous waste, or cause a decrease
or increase in the Contractor’s cost of, or time required for, performance of any part of the work, the Contractor shall not be excused from any scheduled completion date provided for by the Contract, but shall proceed with all Work to be performed under the Contract. The Contractor shall retain any and all rights provided either by Contract or by law which pertain to the resolution of disputes and protests between the contracting parties.

4.5.8 Claims for Extension of Time.

If Contractor and District cannot agree upon an extension of time, whether compensable or not, then Contractor must have first completed the procedures set forth in Paragraph 8.4. Upon completion of the procedures set forth under Paragraph 8.4, Contractor must then comply with the requirements in this Article including those set forth under Paragraph 4.5.9.

4.5.9 Claims Procedures.

4.5.9.1 Procedure applicable to all Claims:

(a) Definition of Claim: A “Claim” means a separate demand by the Contractor for (1) time extension, (2) payment of money or damages arising from Work done by or on behalf of the Contractor pursuant to the CONTRACT and payment of which is not otherwise expressly provided for or the Claimant is not otherwise entitled to, or (3) and amount the payment of which is disputed by the District.

(b) Filing Claim is Not Basis To Discontinue Work: The Contractor shall promptly comply with Work under the Contract or Work requested by the District even though a written Claim has been filed. The Contractor and the District shall make good faith efforts to resolve any and all Claims that may arise during the performance of the Work covered by this contract.

(c) Claim Notification: The Contractor shall within seven (7) calendar days after the Claim arises, submit a notification, in writing, with the District stating clearly the basis for the Claim. If the notification is not submitted within seven (7) days after the Claim arises, the Contractor shall be deemed to have waived all right to assert the Claim, and the Claim shall be denied. Claims submitted after the final payment date shall also be considered null and void by the District. All Claims shall be reviewed pursuant to Paragraph 4.5.1, 4.5.2, and 4.5.5. In order to qualify as a Claim, the written notice must state that it is a Claim submitted under this paragraph of these General Conditions.

(d) Formal Claim Appeal Submission: If the Contractor does not concur with the District’s decision regarding the Claim Notification, the Contractor will issue a formal Claim Appeal within fourteen (14) days of receipt of the District’s decision and all detailed information in support of the Claim Appeal within thirty (30) days. All appeals shall be submitted before final payment. If the Claim Appeal is not submitted within
fourteen (14) calendar days and detailed information within thirty (30) days, the Contractor shall be deemed to have waived its right to assert the Claim and the Claim shall be denied. Contractor’s failure to submit any detailed information which is in the possession of Contractor shall render such information inadmissible by Contractor at trial or arbitration.

(e) Appeal Claim Format: The Contractor shall provide all written detailed documentation which supports the Claim, including but not limited to: arguments, justifications, cost, estimates, schedule analysis and detailed documentation. The format of the Claim Appeal shall be as follows:

(1) Cover letter.

(2) Summary of factual basis of Claim and amount of Claim.

(3) Summary of the basis of the Claim, including the specific clause and section under the Contract under which the Claim is made.

(4) Documents relating to the Claim, including:
   a. Specifications
   b. Drawings
   c. Clarifications (RFI’s)
   d. Other relevant information
   e. Analysis of claim merit.
   f. Analysis of claim cost.
   g. For Claims relating to time extensions, an analysis and supporting documentation evidencing any effect upon the critical path.
   h. Certification.
   i. Chronology of events and related correspondence.
   j. Daily reports and logs.

(f) Certification: The Contractor (and subcontractors, if applicable) shall submit with the Claim a certification under penalty of perjury:

1. That the Contractor has reviewed the Claim and that such Claim is made in good faith;

2. Supporting data are accurate and complete to the best of the Contractor’s knowledge and belief;

3. The amount requested accurately reflects the amount of compensation for which the Contractor believes the District is liable.
4. That the Contractor is familiar with Government Code Sections 12650 et seq. and Penal Code Section 72 and that false Claims can lead to substantial fines and/or imprisonment.

(g) Signature of Certification: If the Contractor is not an individual, the certification shall be executed by an officer or general partner of the Contractor having overall responsibility for the conduct of the Contractor’s affairs.

(h) Mandatory Claim Appeal Procedure: The Contractor’s Claim Appeal shall be denied if it fails to provide the written basis of the Claim and certification as set forth herein.

(i) District May Request Additional Information: Within thirty (30) days of receipt of the Claim Appeal and the information under this Article, the District may request in writing any additional documentation supporting the Claim or documentation relating to defenses to the Claim which the District may assert.

4.5.9.2 Binding Arbitration of Individual Claim Issues. At the District’s sole option, the District may submit individual disputes, or Claims, to binding arbitration and Contractor agrees to the resolution determined for each individual dispute by Arbitrator, including resolution of time and delays. If binding arbitration is utilized, such resolution is a full and final resolution of the particular Claim or dispute. Under no circumstances may the Contractor stop work, rescind its contract or otherwise slow the progress of Work during resolution of individual Claims in binding Arbitration.

4.5.9.3 Resolution of Disputes in Court of Competent Jurisdiction. If Claims are not resolved under the procedure set forth and pursuant to Article 4.5.9.2, such Claim or controversy shall be submitted to a court in the county of competent jurisdiction after the Project has been completed, and not before.

4.5.9.4 Warranties, Guaranties and Obligations. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto, and, in particular but without limitation, the warranties, guaranties and obligations imposed upon Contractor by the General Conditions and amendments thereto; and all of the rights and remedies available to District and Architect thereunder, are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by laws or regulations by special warranty or guaranty or by other provisions of the Contract Documents, and the provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right and remedy to which they apply.
ARTICLE 5

SUBCONTRACTORS

5.1 DEFINITIONS

5.1.1 Subcontractual Relations

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the same obligations and responsibilities, assumed by Contractor pursuant to the Contract Documents. Each subcontract agreement shall preserve and protect the rights of the District and the Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound. Upon written request of the Subcontractor, the Contractor shall identify to the Subcontractor the terms and conditions of the proposed subcontract agreement, which may be at variance with the Contract Documents. Subcontractors shall similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

5.1.2 Subcontractor Licenses.

All subcontractors shall be properly licensed by the California State Licensing Board.

5.1.3 Substitution of Subcontractor

Substitution of Subcontractors shall be permitted only as authorized under Public Contract Code §§ 4107 et. Seq. Any substitutions of Subcontractors shall not result in any increase in the Contract Price or result in the granting of any extension of time for the completion of the Project.

5.1.4 Contingent Assignment of Subcontracts and Other Contracts

Each subcontract and other contract or agreement for any portion of the Work is hereby assigned by the Contractor to the District provided that:

(a) Such assignment is effective only after termination of this contract with the Contractor by the District as provided herein and only for those subcontracts and other contracts and agreements that the District accepts by notifying the Subcontractor or Materialman (as may be applicable) in writing; and
(b) Such assignment is subject to the prior rights of the Surety(ies) obligated under the Payment Bond and Performance Bond.

The Contractor shall include adequate provisions for this contingent assignment of subcontracts and other contracts and agreements in each such document.

ARTICLE 6

CONSTRUCTION BY DISTRICT OR BY SEPARATE CONTRACTORS

6.1 DISTRICT’S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

6.1.1 Separate Contracts.

(a) District reserves the right to let other contracts in connection with this Work. Contractor shall afford other contractors reasonable opportunity for (1) introduction and storage of their materials; (2) access to the Work; and (3) execution of their work. Contractor shall properly connect and coordinate its work with that of other Contractors.

(b) If any part of Contractor’s Work depends on proper execution or results of any other contractor, the Contractor shall inspect and within seven (7) days or less, report to Architect, in writing, any defects in such work that render it unsuitable for proper execution of Contractor’s work. Contractor will be held accountable for damages to District for that work which it failed to inspect or should have inspected. Contractor’s failure to inspect and report shall constitute its acceptance of other contractors’ work as fit and proper for reception of its work, except as to defects which may develop in other contractors’ work after execution of Contractor’s work.

(c) To ensure proper execution of its subsequent Work, Contractor shall measure and inspect Work already in place and shall at once report to the Architect in writing any discrepancy between executed Work as built and the Contract Documents.

(d) Contractor shall ascertain to its own satisfaction the scope of the Project and nature of any other contracts that have been or may be awarded by District in prosecution of the Project and the potential impact of such work on Contractor’s schedule.

(e) Nothing herein contained shall be interpreted as granting to Contractor the exclusive occupancy at the site of Project. Contractor shall not cause any unnecessary
hindrance or delay to any other contractor working on the Project Site. If execution of any contract by the District is likely to cause interference with Contractor’s performance of its contract, District shall decide which contractor shall cease work temporarily and which contractor shall continue, or whether work can be coordinated so that contractors may proceed simultaneously.

(f) District shall not be responsible for any damages suffered or extra costs incurred by Contractor resulting directly or indirectly from award or performance or attempted performance of any other contract or contracts at the Project, or caused by any decision or omission of District respecting the order of precedence in performance of contracts.

CONTRACTOR IS AWARE THAT THIS CONTRACT MAY BE SPLIT INTO SEVERAL PHASES. IF THE CONTRACT IS SPLIT INTO PHASES THEN CONTRACTOR HAS MADE ALLOWANCE FOR ANY DELAYS OR DAMAGES WHICH MAY ARISE FROM COORDINATION WITH CONTRACTORS FOR OTHER PHASES. IF ANY DELAYS SHOULD ARISE FROM ANOTHER CONTRACTOR WORKING ON A DIFFERENT PHASE, CONTRACTOR’S SOLE REMEDY FOR DAMAGES, INCLUDING DELAY DAMAGES, SHALL BE AGAINST THE CONTRACTOR WHO CAUSED SUCH DAMAGE AND NOT THE DISTRICT. CONTRACTOR SHALL PROVIDE ACCESS TO OTHER CONTRACTORS FOR OTHER PHASES AS NECESSARY TO PREVENT DELAYS AND DAMAGES TO OTHER CONTRACTORS WORKING ON OTHER PHASES OF CONSTRUCTION.

6.1.2 District’s Right to Carry Out the Work. See Paragraph 2.2.

6.1.3 Designation as Contractor.

When separate contracts are awarded to contractors on the Project Site, the term “Contractor” in the Contract Documents in each case shall mean the Contractor who executes each separate District/Contractor Agreement.

6.1.4 Contractor Duties.

The Contractor shall have overall responsibility to reasonably coordinate and schedule Contractor’s activities with the activities of the District’s own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the District in reviewing their construction schedules when directed to do so. The Contractor shall make any revisions to the construction schedule and Contract Sum deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors, and the District until subsequently revised. Additionally, Contractor shall coordinate with Architect and District inspector to ensure timely and proper progress of work.

6.2 CONSTRUCTIVE OWNERSHIP OF PROJECT SITE AND MATERIAL
Upon commencement of Work, the Contractor becomes the constructive owner of the entire site, improvements, material and equipment on Project site. Contractor must ensure proper safety and storage of all materials and assumes responsibility as if Contractor was the owner of the Project site. All risk of loss or damage shall be borne by Contractor during the Work until the date of Completion. As construction owner, Contractor must carry adequate insurance in case of calamity and is not entitled to rely on the insurance requirements as set forth in this agreement as being adequate coverage in case of calamity.

6.3 **DISTRICT’S RIGHT TO CLEAN UP**

If a dispute arises among the Contractor, separate contractors, and the District as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish as described in Paragraph 3.12, the District may clean up and allocate the cost among those it deems responsible.

**ARTICLE 7**

**NOT USED**

**ARTICLE 8**

**TIME**

8.1 **DEFINITIONS**

8.1.1 **Contract Time.**

Contractor shall perform and complete all Work under this Contract within the time specified in the Agreement Form. Moreover, Contractor shall perform its Work in strict accordance with any completion schedule, construction schedule or Project milestones developed pursuant to the provisions of the Contract including, but not limited to the Project Schedule set forth in the Specifications.

8.1.2 **Notice to Proceed.**

District may give a notice to proceed within three (3) months of the award of the bid by District. Once Contractor has received the notice to proceed, Contractor shall complete the Work in the period of time referenced in the Contract Documents.

In the event that District desires to postpone the giving of the notice to proceed beyond this three-month period, it is expressly understood that with reasonable notice to the Contractor, the giving of the date to proceed may be postponed by District. It is further expressly understood by Contractor, that Contractor shall not be entitled to any Claim of additional compensation as a result of the postponement of the giving of the notice to proceed.
If the Contractor believes that a postponement will cause a hardship to Contractor, Contractor may terminate the contract with written notice to District within 10 days after receipt by Contractor of District’s notice of postponement. It is further understood by Contractor that in the event that Contractor terminates the Contract as a result of postponement by the District, the District shall only be obligated to pay Contractor for the Work that Contractor had performed at the time of notification of postponement. Should Contractor terminate the contract as a result of a notice of postponement, District shall have the authority to award the contract to the next lowest responsible bidder.

8.1.3 Computation of Time.

The term “day” as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

The Contractor will only be allowed a time extension for unusually severe weather if it results in precipitation or other conditions which in the amount, frequency, or duration is in excess of the norm at the location and time of year in question as established by National Oceanic and Atmospheric Administration (NOAA) weather data. No less than the amount of work days allocated in Section 01305, Delay and Extensions to the Work, shall be allocated equally across the Contract Time, unless otherwise approved by the District, and will be identified as non-working weather days in the Contractor’s Baseline CPM Schedule for the entire Contract period of performance. The weather days shall be shown on the Baseline CPM Schedule and if not used will become float for the Project’s use. A day-for-day extension will only be allowed for those days in excess of the norm. The Contractor is expected to work seven (7) days per week (if necessary, irrespective of inclement weather), to maintain access, and to protect the Work under construction from the effects of inclement weather. If the weather is unusually severe and is in excess of the NOAA data norm and prevents the Contractor from beginning work at the usual daily starting time, or prevents the Contractor from proceeding with seventy-five (75%) of the normal labor and equipment force towards completion of the day’s current controlling item on the accepted schedule for a period of at least five hours, and the crew is dismissed as a result thereof, the Architect will designate such time as unavoidable delay and grant one (1) work-day extension.

8.2 HOURS OF WORK.

8.2.1 Sufficient Forces.

Contractors and Subcontractors shall continuously furnish sufficient forces to ensure the prosecution of the Work in accordance with the Construction Schedule.

8.2.2 Performance During Working Hours.

Work shall be performed during regular working hours as permitted by the appropriate governmental agency except that in the event of an emergency, or when required to complete the Work in accordance with job progress, Work may be performed outside of regular working
hours with the advance written consent of the District and approval of any required governmental agencies.

8.2.3 Costs for After Hours Inspections.

If the Contract Documents require Work to be done outside the Inspector’s regular working hours, the costs of any after hour inspections, shall be borne by the District.

If the District allows the Contractor to do Work outside regular working hours for the Contractor’s convenience, or if required to maintain schedule, the costs of any inspections required outside regular working hours shall be invoiced to the Contractor by the District and deducted from the next Progress Payment.

If the Contractor elects to perform Work outside the Inspector’s regular working hours, costs of any inspections required outside regular working hours shall be invoiced to the Contractor by the District and deducted from the next Progress Payment.

8.3 PROGRESS AND COMPLETION.

8.3.1 Time of the Essence.

Time limits stated in the Contract Documents are of the essence to the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

8.4 EXTENSIONS OF TIME – LIQUIDATED DAMAGES

8.4.1 Liquidated Damages.

Contractor and District hereby agree that the exact amount of damages for failure to complete the Work within the time specified is extremely difficult or impossible to determine. If the Work is not completed within the time specified in the Contract Documents, it is understood that the District will suffer damage. It being impractical and unfeasible to determine the amount of actual damage, it is agreed the Contractor shall pay to District as fixed and liquidated damages, and not as a penalty, the amount specified in the Construction Agreement for each calendar day of delay in completion. Any liquidated damages recovered by the District shall not, however, limit the District’s right to separately recover any actual out-of-pocket damages it suffers due to Contractor’s delay. Contractor and his surety shall be liable for the amount thereof pursuant to Government Code section 53069.85.

8.4.2 Excusable Delay.

Contractor shall not be charged for liquidated damages because of any delays in completion of Work which are not the fault or negligence of Contractor or its subcontractors, including acts of God, as defined in Public Contract Code Section 7107, acts of enemy, epidemics and quarantine restrictions.
Contractor shall within five (5) calendar days of beginning of any such delay notify District in writing of causes of delay; thereupon District shall ascertain the facts and extent of delay and grant extension of time for completing Work when, in its judgment, the findings of fact justify such an extension. Extensions of time shall apply only to that portion of Work affected by delay, and shall not apply to other portions of Work not so affected. An extension of time may only be granted after proper compliance with the Specification Sections requiring preparation and submission of a properly prepared CPM schedule.

No extended overhead, general conditions costs, impact costs, out-of-sequence costs or any other type of compensation, by any name or characterization, shall be paid to the Contractor for any delay to any activity not designated as a critical path item on the latest approved Project schedule.

The Contractor shall notify the District in writing of any anticipated delay and its cause, in order that the District may take immediate steps to prevent, if possible, the occurrence or continuance of delay, and may determine whether the delay is to be considered avoidable or unavoidable, how long it continues, and to what extent the prosecution and completion of the Work might be delayed thereby.

In the event the Contractor requests an extension of Contract time for unavoidable delay, such request shall be submitted in accordance with the provisions in the Contract Documents governing changes in work. When requesting time, i.e., extensions, for proposed Change Orders, they must be submitted with the proposed Change Order with full justification and documentation. If the Contractor fails to submit justification with the proposed Change Order it waives its right to a time extension at a later date. Such justification must be based on the official Contract schedule as updated at the time of occurrence of the delay or execution of Work related to any changes to the scope of work. The justification must include, but is not limited to, the following information:

(a) The duration of the activity relating to the changes in the Work and the resources (manpower, equipment, material, etc.) required to perform these activities within the stated duration.

(b) Logical ties to the official Contract schedule for the proposed changes and/or delay showing the activity/activities in the schedule whose start or completion dates are affected by the change and/or delay. (A fragment of any delay of over ten (10) days must be provided.)

The Contractor and District understand and expressly agree that insofar as Public Contract Code Section 7102 may apply to changes in the Work or delays under this contract, the actual delays and damages, if any, and time extensions are intended to, and shall provide, the exclusive and full method of compensation for changes in the Work and construction delays.

8.4.3 Notice by Contractor Required.
The Contractor shall within five (5) calendar days of beginning of any such delay notify the District in writing of causes of delay with justification and supporting documentation. District will then ascertain the facts and extent of the delay and grant an extension of time for completing the Work when, in its judgment, the findings of fact justify such an extension. Extensions of time shall apply only to that portion of the Work affected by the delay and shall not apply to other portions of the Work not so affected. The sole remedy of Contractor for extensions of time under Paragraph 8.4.2 shall be an extension of the Contract Time at no cost to the District.

Claims relating to time extensions shall be made in accordance with applicable provisions of Specification Section 01250.

8.4.4 No Additional Compensation for Delays within Contractor's Control

CONTRACTOR IS AWARE THAT GOVERNMENTAL AGENCIES, SUCH AS THE DEPARTMENT OF GENERAL SERVICES, GAS COMPANIES, ELECTRICAL UTILITY COMPANIES, WATER DISTRICTS AND OTHER AGENCIES MAY HAVE TO APPROVE CONTRACTOR PREPARED DRAWINGS OR APPROVE A PROPOSED INSTALLATION. CONTRACTOR HAS INCLUDED DELAYS AND DAMAGES WHICH MAY BE CAUSED BY SUCH AGENCIES IN CONTRACTOR'S BID. THUS, CONTRACTOR IS NOT ENTITLED TO MAKE CLAIM UPON THE DISTRICT FOR DAMAGES OR DELAYS ARISING FROM THE DELAYS CAUSED BY SUCH AGENCIES. FURTHERMORE, THE CONTRACTOR HAS SCHEDULED FOR SUCH DELAYS AND IS NOT ENTITLED TO AN EXTENSION OF TIME FOR DELAYS CAUSED BY GOVERNMENTAL AGENCIES WHICH CONTRACTOR MUST OBTAIN APPROVALS FROM AND, THUS, CONTRACTOR IS NOT ENTITLED TO AN EXTENSION OF TIME.

CONTRACTOR SHALL ONLY BE ENTITLED TO COMPENSATION FOR DELAY WHEN THE FOLLOWING CONDITIONS ARE MET: (1) THE DISTRICT IS RESPONSIBLE FOR THE DELAY; (2) THE DELAY IS UNREASONABLE UNDER THE CIRCUMSTANCES INVOLVED; AND (3) THE DELAY WAS NOT WITHIN THE CONTEMPLATION OF DISTRICT AND CONTRACTOR.

ARTICLE 9
NOT USED

ARTICLE 10
NOT USED

ARTICLE 11

INSURANCE AND BONDS

11.1 CONTRACTOR’S LIABILITY INSURANCE

11.1.1 Insurance Requirements.
Before the commencement of the Work, the Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in California as admitted carriers with a financial rating of at least an A status as rated in the most recent edition of Best's Insurance Reports or as amended by the Supplementary General Conditions, such insurance as will protect the District from claims set forth below, which may arise out of or result from the Contractor’s operations under the Contract and for which the Contractor may be legally liable, whether such operations are by the Contractor, by a Subcontractor, by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

(a) Claims for damages because of bodily injury, sickness, disease, or death of any person District would require indemnification and coverage for employee claim;

(b) Claims for damages insured by usual personal injury liability coverage, which are sustained by a person as a result of an offense directly or indirectly related to employment of such person by the Contractor or by another person;

(c) Claims for damages because of injury or destruction of tangible property, including loss of use resulting therefrom, arising from operations under the Contract Documents;

(d) Claims for damages because of bodily injury, death of a person, or property damage arising out of the ownership, maintenance, or use of a motor vehicle, all mobile equipment, and vehicles moving under their own power and engaged in the Work;

(e) Claims involving contractual liability applicable to the Contractor’s obligations under the Contract Documents, including liability assumed by and the indemnity and defense obligations of the Contractor and the Subcontractors; and

(f) Claims involving Completed Operations, Independent Contractors’ coverage, and Broad Form property damage, without any exclusions for collapse, explosion, demolition, underground coverage, and excavating. (XCU)

(g) Claims involving sudden or accidental discharge of contaminants or pollutants.

11.1.2 Subcontractor Insurance Requirements.

Unless specifically stated elsewhere to provide larger limits of insurance for subcontractors in these Contract Documents, or as required by the State of California, the minimum amount of insurance for Comprehensive General Liability Insurance, including automobile insurance, shall be $2,000,000 per occurrence with a $10 million project specific aggregate; and $2,000,000 for Products and Completed Operations. The limit for the required Worker’s Compensation insurance described in Article 11.2 below is $1,000,000.
11.1.3  Additional Insured Endorsement Requirements.

The Contractor shall name, on any policy of insurance required under Paragraph 11.1, the District, Construction Manager, Architect, Inspector, the State of California, their officers, employees, agents and independent contractors as additional insureds. Subcontractors shall name the Contractor, the District, Architect, Inspector, the State of California, their officers, employees, agents and independent contractors as additional insureds. The Additional Insured Endorsement included on all such insurance policies shall be a CG 20 10 (07/04) and CG 20 37 (07/04) form and state that coverage is afforded the additional insured with respect to claims arising out of operations performed by or on behalf of the insured. If the additional insureds have other insurance which is applicable to the loss, such other insurance shall be on an excess or contingent basis. The insurance provided by the Contractor pursuant to 11.1.1 must be designated in the policy as primary and non-contributory to any insurance obtained by the District. The amount of the insurer’s liability shall not be reduced by the existence of such other insurance.

11.1.4  Specific Insurance Requirements.

Contractor shall procure the following insurance:

1.  Comprehensive General Liability Insurance with a combined single limit per occurrence of not less than $5,000,000.00 and $10,000,000 project specific aggregate, or Commercial General Liability Insurance (including automobile insurance) which provides limits of not less than:

   (a)  Per occurrence (combined single limit).............................. $5,000,000.00
   (b)  Project Specific Aggregate (for this project only).............. $10,000,000.00
   (c)  Products and Completed Operations .............................. $5,000,000.00

2.  Insurance Covering Special Hazards

   The following Special hazards shall be covered by riders or riders to above mentioned public liability insurance or property damage insurance policy or policies of insurance, in amounts as follows:

   (a)  Automotive and truck where operated in amounts............. $1,000,000.00
   (b)  Material Hoist where used in amounts.......................... $1,000,000.00
   (c)  Explosion, Collapse and Underground (XCU coverage).... $1,000,000.00

3.  In addition, provide Excess Liability Insurance coverage in the amount of Two Million Dollars ($2,000,000.00).

11.2  WORKERS’ COMPENSATION INSURANCE
During the term of this Contract, the Contractor shall provide workers' compensation insurance for all of the Contractor’s employees engaged in Work under this Contract on or at the Site of the Project and, in case any of the Contractor’s Work is subcontracted, the Contractor shall require the Subcontractor to provide workers’ compensation insurance for all the Subcontractor’s employees engaged in Work under the subcontract. Any class of employee or employees not covered by a Subcontractor’s insurance shall be covered by the Contractor’s insurance. In case any class of employees engaged in Work under this Contract on or at the Site of the Project is not protected under the Workers’ Compensation laws, the Contractor shall provide or cause a Subcontractor to provide adequate insurance coverage for the protection of those employees not otherwise protected. The Contractor shall file with the District certificates of insurance as required under Paragraph 11.6 and in compliance with Labor Code § 3700.

11.3 **BUILDER’S RISK/ “ALL RISK” INSURANCE**

11.3.1 Course-of-Construction Insurance Requirements.

The Contractor, during the progress of the Work and until Substantial Completion of the Work by District, shall maintain Builder’s Risk, Course of Construction or similar first party property coverage issued on a replacement cost value basis consistent with the total replacement cost of all insurable Work and the Project included within the Contract Documents. Coverage is to insure against all risks of accidental direct physical loss, and must include, by the basic grant of coverage or by endorsement, the perils of vandalism, malicious mischief (both without any limitation regarding vacancy or occupancy), fire, sprinkler leakage, civil authority, sonic boom, flood, collapse, wind, lightning, smoke and riot. The coverage must include debris removal, demolition, increased costs due to enforcement of building ordinance and law in the repair and replacement of damage and undamaged portions of the property, and reasonable costs for the Architect’s and engineering services and expenses required as a result of any insured loss upon the Work and Project which is the subject of the Contract Documents, including completed Work and Work in progress, to the full insurable value thereof. Such insurance shall include the District, Construction Manager, and the Architect as additional named insureds, and any other person with an insurable interest as designated by the District.

The Contractor shall submit to the District for its approval all items deemed to be uninsurable. The risk of the damage to the Work due to the perils covered by the “Builder’s Risk/All Risk” Insurance, as well as any other hazard which might result in damage to the Work, is that of the Contractor and the surety, and no claims for such loss or damage shall be recognized by the District nor will such loss or damage excuse the complete and satisfactory performance of the Contract by the Contractor.

11.4 **FIRE INSURANCE**

See Article 11.3, which includes insurance from fire damage.
11.5 OTHER INSURANCE

The Contractor shall provide all other insurance required to be maintained under applicable laws, ordinances, rules, and regulations.

11.6 PROOF OF INSURANCE

The Contractor shall not commence Work nor shall it allow any Subcontractor to commence Work under this Contract until all required insurance and certificates have been obtained and delivered in duplicate to the District for approval subject to the following requirements:

(a) Certificates and insurance policies shall include the following clause:

“This policy shall not be non-renewed, canceled, or reduced in required limits of liability or amounts of insurance until notice has been mailed to the District. Date of cancellation or reduction may not be less than thirty (30) days after the date of mailing notice.”

(c) Certificates of insurance shall state in particular those insured, the extent of insurance, location and operation to which the insurance applies, the expiration date, and cancellation and reduction notices.

(d) Certificates of insurance shall clearly state that the District and the Architect are named as additional insureds under the policy described and that such insurance policy shall be primary to any insurance or self-insurance maintained by District.

(e) The Contractor and its Subcontractors shall produce a certified copy of any insurance policy required under this Section upon written request of the District.

11.7 COMPLIANCE

In the event of the failure of any contractor to furnish and maintain any insurance required by this Article 11, the Contractor shall be in default under the Contract. Compliance by Contractor with the requirement to carry insurance and furnish certificates or policies evidencing the same shall not relieve the Contractor from liability assumed under any provision of the Contract Documents, including, without limitation, the obligation to defend and indemnify the District and the Architect.

11.8 WAIVER OF SUBROGATION

Contractor waives (to the extent permitted by law) any right to recover against the District for damages to the Work, any part thereof, or any and all claims arising by reason of any of the foregoing, but only to the extent that such damages and/or claims are covered by property insurance and only to the extent of such coverage (which shall exclude deductible amounts) by insurance actually carried by the District.
The provisions of this section are intended to restrict each party to recovery against insurance carriers only to the extent of such coverage and waive fully and for the benefit of each, any rights and/or claims which might give rise to a right of subrogation in any insurance carrier. The District and the Contractor shall each obtain in all policies of insurance carried by either of them, a waiver by the insurance companies thereunder of all rights of recovery by way of subrogation for any damages or claims covered by the insurance.

11.9 PERFORMANCE AND PAYMENT BONDS

11.9.1 Bond Requirements.

Unless otherwise specified in the Special Conditions, prior to commencing any portion of the Work, the Contractor shall furnish separate payment and performance bonds for its portion of the Work which shall cover 100% faithful performance of and payment of all obligations arising under the Contract Documents and/or guaranteeing the payment in full of all claims for labor performed and materials supplied for the Work. All bonds shall be provided by a corporate surety authorized and admitted to transact business in California as sureties.

To the extent, if any, that the Contract Price is increased in accordance with the Contract Documents, the Contractor shall, upon request of the District, cause the amount of the bonds to be increased accordingly and shall promptly deliver satisfactory evidence of such increase to the District. To the extent available, the bonds shall further provide that no change or alteration of the Contract Documents (including, without limitation, an increase in the Contract Price, as referred to above), extensions of time, or modifications of the time, terms, or conditions of payment to the Contractor will release the surety. If the Contractor fails to furnish the required bonds, the District may terminate the Contract for cause.

11.9.2 Surety Qualification.

Only bonds executed by admitted Surety insurers as defined in Code of Civil Procedure § 995.120 shall be accepted. Surety must be a California-admitted surety and listed by the U.S. Treasury with a bonding capacity in excess of the Project cost.

11.9.3 Alternate Surety Qualifications.

If a California-admitted surety insurer issuing bonds does not meet these requirements, the insurer will be considered qualified if it is in conformance with § 995.660 of the California Code of Civil Procedure and proof of such is provided to the District.

ARTICLE 12
12.1 **UNCOVERING OF WORK**

12.1.1 Uncovering Work for Required Inspections.

If a portion of the Work is covered without Inspector or Architect approval or not in compliance with the Contract Documents, it must, if required in writing by the Inspector or the Architect, be uncovered for the Inspector’s or the Architect’s observation and be replaced at the Contractor’s expense without change in the Contract Sum or Time.

12.1.2 Costs for Inspections not Required.

If a portion of the Work has been covered which the Inspector or the Architect has not specifically requested to observe prior to its being covered, the Inspector or the Architect may request to see such Work, and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncover and replacement shall, by appropriate Change Order, be charged to the District. If such Work is not in accordance with Contract Documents, the Contractor shall pay such costs unless the condition was caused by the District or a separate contractor, in which event the District shall be responsible for payment of such costs to the Contractor.

12.2 **CORRECTION OF WORK**

12.2.1 Correction of Rejected Work.

The Contractor shall promptly correct the Work rejected by the Inspector or the District upon recommendation of the Architect as failing to conform to the requirements of the Contract Documents, whether observed before or after Completion and whether or not fabricated, installed, or completed. The Contractor shall bear costs of correcting the rejected Work, including additional testing, inspections, and compensation for the Inspector’s or the Architect’s services and expenses made necessary thereby.

12.2.2 One-Year Warranty or Guaranty Corrections.

If, within one (1) years after the date of Completion of the Work or a designated portion thereof, or after the date for commencement of warranties and guaranties established under this Contract, or by the terms of an applicable special warranty or guaranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the District to do so unless the District has previously given the Contractor a written acceptance of such condition. This period of one (1) years shall be extended with respect to portions of the Work first performed after Completion by the period
of time between Completion and the actual performance of the Work. This obligation under this Paragraph 12.2.2 shall survive acceptance of the Work under the Contract and termination of the Contract. The District shall give such notice promptly after discovery of the condition.

12.2.3 District’s Rights if Contractor Fails to Correct.

If the Contractor fails to correct nonconforming Work within a reasonable time, the District may correct it, pursuant to Specification Section 01290.

ARTICLE 13

MISCELLANEOUS PROVISIONS

13.1 GOVERNING LAW

The Contract shall be governed by the law of the place where the Project is located.

13.2 SUCCESSORS AND ASSIGNS

The District and the Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to the other party hereto and to partners, successors, assigns, and legal representatives of such other party in respect to covenants, agreements, and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

13.3 WRITTEN NOTICE

In the absence of specific notice requirements in the Contract Documents, written notice shall be deemed to have been duly served if delivered in person to the individual, member of the firm or entity, or to an officer of the corporation for which it was intended, or if delivered at or sent by registered or certified mail to the last business address known to the party giving notice.

13.4 RIGHTS AND REMEDIES

3.4.1 Duties and Obligations Cumulative.
Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

3.4.2 No Waiver.

No action or failure to act by the Inspector, the District, or the Architect shall constitute a waiver of a right or duty afforded them under the Contract Documents, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

13.5 TESTS AND INSPECTIONS

13.5.1 Compliance.

Tests, inspections, and approvals of portions of the Work required by the Contract Documents will comply with Title 24, and with all other laws, ordinances, rules, regulations, or orders of public authorities having jurisdiction.

13.5.2 Independent Testing Laboratory.

The District will select and pay an independent testing laboratory to conduct all tests and inspections required by regulatory agencies. Selection of the materials required to be tested shall be made by the laboratory or the District’s representative and not by the Contractor. All costs for all other tests shall be included in the Bid Price and shall be paid for by the Contractor. Any costs or expenses of inspection or testing required by regulatory agencies, incurred outside of a fifty (50) mile radius from the Project Site or not located in a contiguous county to the Site, whichever distance is greater, shall be paid for by the District, invoiced by the District to the Contractor, and deducted from the next Progress Payment.

13.5.3 Advance Notice to Inspector.

The Contractor shall notify the Inspector a sufficient time in advance of its readiness for required observation or inspection so that the Inspector may arrange for same. The Contractor shall notify the Inspector a sufficient time in advance of the manufacture of material to be supplied under the Contract Documents which must, by terms of the Contract Documents, be tested in order that the Inspector may arrange for the testing of the material at the source of supply.

13.5.4 Testing Off-Site.

Any material shipped by the Contractor from the source of supply, prior to having satisfactorily passed such testing and inspection or prior to the receipt of notice from said Inspector that such testing and inspection will not be required, shall not be incorporated in the Work.

13.5.5 Additional Testing or Inspection.
If the Inspector, the Architect, the District, or public authority having jurisdiction determines that portions of the Work require additional testing, inspection, or approval not included under Paragraph 13.5.1, the Inspector will, upon written authorization from the District, make arrangements for such additional testing, inspection, or approval. The District shall bear such costs except as provided in Paragraph 13.5.7.

13.5.6 Costs for Retesting.

If such procedures for testing, inspection, or approval under Paragraphs 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, the Contractor shall bear all costs arising from such failure, including those of re-testing, re-inspection, or re-approval, including, but not limited to, compensation for the Architect’s services and expenses. Any such costs shall be paid by the District, invoiced to the Contractor, and deducted from the next Progress Payment.

13.5.7 Costs for Premature Test.

In the event the Contractor requests any test or inspection for the Project and is not completely ready for the inspection, the Contractor shall be invoiced by the District for all costs and expenses resulting from that testing or inspection, including, but not limited to, the Inspector’s and Architect’s fees and expenses, and the amount of the invoice of shall be deducted from the next Progress Payment.

13.6 TRENCH EXCAVATION

13.6.1 Trenches Greater Than Five Feet.

Pursuant to Labor Code § 6705, if the Contract Price exceeds $25,000 and involves the excavation of any trench or trenches five (5) feet or more in depth, the Contractor shall, in advance of excavation, submit to the District or a registered civil or structural engineer employed by the District or Architect, a detailed plan showing the design of shoring for protection from the hazard of caving ground during the excavation of such trench or trenches.

13.6.2 Excavation Safety.

If such plan varies from the Shoring System Standards established by the Construction Safety Orders, the plan shall be prepared by a registered civil or structural engineer, but in no case shall such plan be less effective than that required by the Construction Safety Orders. No excavation of such trench or trenches shall be commenced until said plan has been accepted in writing by the District or by the person to whom authority to accept has been delegated by the District.

13.6.3 No Tort Liability of District.
Pursuant to Labor Code § 6705, nothing in this Article shall impose tort liability upon the District or any of its employees.

13.6.4 No Excavation Without Permits.

The Contractor shall not commence any excavation Work until it has secured all necessary permits including the required CAL OSHA excavation/shoring permit. Any permits shall be prominently displayed on the Site prior to the commencement of any excavation.

13.7 **WAGE RATES, TRAVEL, AND SUBSISTENCE**

13.7.1 Wage Rates.

Pursuant to the provisions of Article 2 (commencing at § 1720), Chapter 1, Part 7, Division 2, of the Labor Code, the District has obtained the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work in the locality in which this public works project is to be performed for each craft, classification, or type of worker needed for this Project from the Director of the Department of Industrial Relations ("Director"). These rates are on file at the administrative office of the DISTRICT and are also available from the Director of the Department of Industrial Relations. Copies will be made available to any interested party on request. The Contractor shall post a copy of such wage rates at appropriate, conspicuous, weatherproof points at the Site.

Any worker employed to perform work on the Project, but such work is not covered by any classification listed in the published general prevailing wage rate determinations or per diem wages determined by the Director of the Department of Industrial Relations, shall be paid not less than the minimum rate of wages specified therein for the classification which most nearly corresponds to the employment of such person in such classification.

13.7.2 Holiday and Overtime Pay.

Holiday and overtime work, when permitted by law, shall be paid for at the rate set forth in the prevailing wage rate determinations issued by the Director of the Department of Industrial Relations or at least one and one-half (1½) times the specified basic rate of per diem wages, plus employer payments, unless otherwise specified in the contract documents or authorized by law.

13.7.3 Wage Rates Not Affected by Subcontracts.

The Contractor shall pay and shall cause to be paid each worker engaged in the execution of the Work on the Project not less than the general prevailing rate of per diem wages determined by the Director, regardless of any contractual relationship which may be alleged to exist between the Contractor or any Subcontractor and such workers.

13.7.4 Per Diem Wages.
The Contractor shall pay and shall cause to be paid to each worker needed to execute the Work on the Project per diem wages including, but not limited to, employer payments for health and welfare, pensions, vacation, travel time and subsistence pay as provided for in Labor Code §1773.1.

13.7.5 Forfeiture and Payments.

Pursuant to Labor Code §1775 and the District’s Labor Compliance Program, the Contractor shall forfeit to the District, not more than Fifty Dollars ($50.00) for each calendar day, or portion thereof, for each worker paid less than the prevailing wages rates as determined by the Director of the Department of Industrial Relations, for the work or craft in which the worker is employed for any Work done under the Agreement by the Contractor or by any Subcontractor under it. The amount of the penalty shall be determined by the Labor Commissioner and shall be based on consideration of: (1) whether the Contractor or Subcontractor’s failure to pay the correct rate of per diem wages was a good faith mistake and, if so, the error was promptly and voluntarily correct upon being brought to the attention of the Contractor or Subcontractor; and (2) whether the Contractor or Subcontractor has a prior record of failing to meet its prevailing wage obligations. Further details regarding the enforcement of paying prevailing wage rates, reporting violations, withholding contract payments, forfeitures and hearing to review withholding of contract payments are set forth in the District’s Labor Compliance Program.

13.9 APPRENTICES

13.9.1 Apprentice Wages and Definitions.

All apprentices employed by the Contractor to perform services under the Contract shall be paid the standard wage paid to apprentices under the regulations of the craft or trade for which he or she is employed, and as determined by the Director of the Department of Industrial Relations, and shall be employed only at the craft or trade to which he or she is registered. Only apprentices, as defined in §3077 of the Labor Code, who are in training under apprenticeship standards that have been approved by the Chief of the Division of Apprenticeship Standards and who are parties to written apprenticeship agreements under Chapter 4 (commencing with §3070) of Division 3, are eligible to be employed under this Contract. The employment and training of each apprentice shall be in accordance with the apprenticeship standards and apprentice agreements under which he or she is training, or in accordance with the rules and regulations of the California Apprenticeship Council.

13.9.2 Employment of Apprentices.

Contractor agrees to comply with the requirements of Labor Code §1777.5. The Contractor awarded the Project, or any Subcontractor under him or her, when performing any of the Work under the Contract or subcontract, employs workers in any apprenticeable craft
or trade, the Contractor and Subcontractor shall employ apprentices in the ratio set forth in Labor Code §1777.5. The Contractor or any Subcontractor must apply to any apprenticeship program in the craft or trade that can provide apprentices to the Project site for a certificate approving the contractor or subcontractor under the apprenticeship standards for the employment and training of apprentices in the area or industry affected. However, the decision of the apprenticeship program to approve or deny a certificate shall be subject to review by the Administrator of Apprenticeship. The apprenticeship program or programs, upon approving the Contractor or Subcontractor, shall arrange for the dispatch of apprentices to the Contractor or Subcontractor upon the Contractor’s or Subcontractor’s request. “Apprenticeable craft or trade” as used in this Article means a craft or trade determined as an apprenticeable occupation in accordance with the rules and regulations prescribed by the California Apprenticeship Council. The ratio of work performed by apprentices to journeyman employed in a particular craft or trade on the Project shall be in accordance with Labor Code §1777.5.

13.9.3 Submission of Contract Information.

Prior to commencing work on the Project, the Contractor and Subcontractors shall submit contract award information to the applicable apprenticeship program(s) that can supply apprentices to the Project and make the request for the dispatch of apprentices in accordance with the Labor Code. The information submitted shall include an estimate of journeyman hours to be performed under the Contract, the number of apprentices proposed to be employed, and the approximate dates the apprentices would be employed. A copy of this information shall also be submitted to the District. Within 60 days after concluding work on the Project, the Contractor and Subcontractors shall submit to the District, if requested, and to the apprenticeship program a verified statement of the journeyman and apprentice hours performed on the Project.

13.9.4 Apprentice Fund.

The Contractor or any Subcontractor under him or her, who, in performing any of the Work under the Contract, employs journeymen or apprentices in any apprenticeable craft or trade shall contribute to the California Apprenticeship Council the same amount that the Director determines is the prevailing amount of apprenticeship training contributions in the area of the Project. The Contractor and Subcontractors may take as a credit for payments to the California Apprenticeship Council any amounts paid by the Contractor or Subcontractor to an approved apprenticeship program that can supply apprentices to the Project. The Contractor and Subcontractors may add the amount of the contributions in computing his or her bid for the Contract.

13.9.5 Prime Contractor Compliance.

The responsibility of compliance with Article 13 and §1777.5 of the Labor Code for all apprenticeable occupations is with the Prime Contractor. Any Contractor or Subcontractor that knowingly violates the provisions of this Article or Labor Code §1777.5 shall be subject to the penalties set forth in Labor Code §1777.7 and the District’s Labor Compliance Program.
13.10 ASSIGNMENT OF ANTITRUST CLAIMS

13.10.1 Application.

Pursuant to Government Code § 4551, in entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to a public works contract, the Contractor or Subcontractor offers and agrees to assign to the District all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act, (15 U.S.C. § 15) or under the Cartwright Act (Chapter 2 [commencing with § 16700] of Part 2 of Division 7 of the Business and Professions Code), arising from the purchase of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the awarding body tenders final payment to the Contractor, without further acknowledgment by the parties. If the District receives, either through judgment or settlement, a monetary recovery for a cause of action assigned under Chapter 11 (commencing with § 4550) of Division 5 of Title 1 of the Government Code, the assignor shall be entitled to receive reimbursement for actual legal costs incurred and may, upon demand, recover from the District any portion of the recovery, including treble damages, attributable to overcharges that were paid by the assignor but were not paid by the District as part of the bid price, less the expenses incurred in obtaining that portion of the recovery.

13.10.2 Assignment of Claim.

Upon demand in writing by the assignor, the District shall, within one (1) year from such demand, reassign the cause of action assigned pursuant to this Article if the assignor has been or may have been injured by the violation of law for which the cause of action arose and the District has not been injured thereby or the District declines to file a court action for the cause of action.

13.11 STATE AUDIT

Pursuant to and in accordance with the provisions of Government Code § 10532, or any amendments thereto, all books, records, and files of the District, the Contractor, or any Subcontractor connected with the performance of this Contract involving the expenditure of state funds in excess of Ten Thousand Dollars ($10,000.00), including, but not limited to, the administration thereof, shall be subject to the examination and audit of the Office of the Auditor General of the State of California for a period of three (3) years after final payment is made under this Contract. Contractor shall preserve and cause to be preserved such books, records, and files for the audit period.

13.12 STORM WATER POLLUTION PREVENTION PLAN

13.12.1 Application

This Section, and including other Contract Specifications related to Storm Water Pollution Prevention, addresses the preparation, implementation and monitoring of a Storm Water
Pollution Prevention Plan (SWPPP) for the purpose of preventing the discharge of pollutants from the construction site. This includes the elimination of pollution discharges such as improper dumping, spills or leakage from storage tanks or transfer areas. When required or specified, the District will not issue a Notice to Proceed until Contractor has prepared and obtained approval of SWPPP from the District and the State Water Resources Control Board. The Contractor shall also secure a certification that the construction project has met all of the conditions of the State Construction General Permit (Order No. 2009-0009-DWQ) and comply with all applicable local, state and federal regulations governing storm water pollution prevention. See Section 01572, Storm Water Pollution Prevention Plan-Sites that Disturbs One or More Acres for additional requirements for District projects over one or more acres. See below for projects under one acre.

13.12.2 References and Materials

- “Erosion and Sediment Control Field Manual” California Regional Water Quality Control Board (RWQCB)—San Francisco Bay Region.

Use materials of a class, grade and type needed to meet the performance described in the Field Manual and/or the BMP Handbook.

13.12.3 Preparation and Approval

The Contractor shall prepare the Storm Water Pollution Prevention Plan (SWPPP), when required or specified, to comply with storm water pollution regulations for project sites with storm water discharges associated with construction activity such as clearing or demolition, grading, excavation and other land disturbances. The SWPPP shall apply to all areas that are directly related to construction activity, including but not limited to staging areas, storage yards, material borrow areas, and access roads.

13.12.3.1 For project sites, new or existing, with land disturbance of 1 or more acres (or less than 1 acres if part of a common plan of development), the Contractor shall prepare and submit to the District the SWPPP for review and approval. Submittal shall be made by fulfilling all data and attachment requirements required by the California Storm Water Multiple Application and Report Tracking System – SMARTS web-based program.

13.12.3.2 Data required by the SMARTS program shall be entered into the SMARTS program and submitted in time for the District to file a Notice of Intent at least two weeks prior to the commencement of construction activities. Failure by the Contractor to fully schedule and comply with these requirements shall not entitle a claim for delay.

13.12.3.3 Where land disturbance is less than 1 acres, a SWPPP is not required. However, BMPs indicated in the BMP Handbook needed to prevent or minimize storm water pollution shall be submitted to the District and implemented at no extra cost to the District.
13.12.3.4 Within twenty days after Award of Contract by the District, the Contractor shall submit to the District one copy of the SWPPP for review. After the District's approval, the Contractor shall provide approved copies of the SWPPP as follows: one copy each to the District’s Construction Inspector, District’s Construction Manager, District Architect, and District’s Civil Engineer.

13.12.4 Implementation

The Contractor shall implement the Storm Water Pollution Prevention Plan by doing the following:

(a) Install perimeter controls prior to starting other construction work at the site.

(b) Contain on-site storm water at the jobsite. Do not drain on-site water directly into the storm drain.

(c) Provide SWPPP and BMP implementation training for those responsible for implementing the SWPPP.

(d) Designate trained personnel for the proper implementation of the SWPPP.

(e) Revise the SWPPP to suit changing site conditions and instances when properly installed systems are ineffective.

(f) Maintain data required by the state permit and SMARTS program to ensure that all data is up to date, and that any change in conditions or personnel responsible for the SWPPP is current and compliant.

(g) At the end of Construction Contract.

i. Leave in place storm water pollution prevention controls needed for post-construction storm water management and remove those that are not needed as determined by the District. Thereafter, left-in-place controls will be maintained by the District.

ii. Provide Site Monitoring Reports, SWPPP revisions, Compliance Certifications and related documents to the District. Post-construction storm water operation and management plan as mentioned in the compliance certifications are considered to be in place at the end of the Construction Contract.

iii. Provide and upload all required data and documents required in the SMARTS web-based program to receive an approved Notice of Termination from the State.
13.12.5 Monitoring

The Contractor shall comply with all requirements of the State Construction General Permit (Order No. 2009-0009-DWQ). The Contractor shall conduct examination of storm water pollution prevention controls monthly, as well as before and after each storm event and once each 24-hour period during extended storm events to identify BMP effectiveness and implement repairs or BMP changes as soon as feasible. All maintenance related to a storm event should be completed within 48 hours of the storm event. The Contractor shall also prepare and maintain, at the jobsite, a log of each inspection using Site Monitoring Report forms.

13.12.6 Liabilities and Penalties

(a) Review of the SWPPP and inspection logs by the District shall not relieve the Contractor from liabilities arising from non-compliance with storm water pollution regulations.

(b) Payment of penalties for non-compliance by the Contractor shall be the sole responsibility of the Contractor and will not be reimbursed by the District.

(c) Compliance with the Clean Water Act and storm water pollution regulations pertaining to construction activity is the sole responsibility of the Contractor. For any fine(s) levied against the District due to non-compliance by the Contractor, the District will deduct from the final payment due the Contractor the total amount of the fine(s) levied on the District, plus legal and associated costs.

ARTICLE 14
TERMINATION OR SUSPENSION OF THE CONTRACT

14.1 TERMINATION BY THE CONTRACTOR FOR CAUSE

14.1.1 Grounds for Termination.

The Contractor may terminate the Contract if the Work is stopped for a period of thirty (30) consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons performing portions of the Work for whom the Contractor is contractually responsible, for only the following reasons:

(a) Issuance of an order of a court or other public authority having jurisdiction; or

(b) An act of government, such as a declaration of national emergency.

14.1.2 Notice of Termination.
If one of the above reasons exists, the Contractor may, upon written notice of seven (7) additional days to the District, terminate the Contract and recover from the District payment for Work executed and for reasonable costs verified by the Architect with respect to materials, equipment, tools, construction equipment, and machinery, including reasonable overhead, profit, and damages.

**14.2 TERMINATION BY THE DISTRICT FOR CAUSE**

**14.2.1 Grounds for Termination.**

The District may terminate the Contractor and/or this Contract for the following reasons:

(a) Persistently or repeatedly refuses or fails to supply enough properly skilled workers or proper materials;

(b) Persistently or repeatedly is absent, without excuse, from the job site;

(c) Fails to make payment to Subcontractors, suppliers, materialmen, etc.;

(d) Persistently disregards laws, ordinances, rules, regulations, or orders of a public authority having jurisdiction; or

(e) Otherwise is in substantial breach of a provision of the Contract Documents.

**14.2.2 Notification of Termination.**

When any of the above reasons exist, the District may, without prejudice to any other rights or remedies of the District and after giving the Contractor and the Contractor’s surety, if any, written notice of seven (7) days, terminate the Contractor and/or this Contract and may, subject to any prior rights of the surety:

(a) Take possession of the Project and of all material, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

(b) Accept assignment of Subcontracts. Contractor acknowledges and agrees that if the District (in its sole and absolute discretion) decides to takeover completion of the Project, the Contractor agrees to immediately assign all subcontracts to the District which the District has chosen to accept; and

(c) Complete the Work by any reasonable method the District may deem expedient, including contracting with a replacement contractor or contractors.

**14.2.3 Payments Withheld.**

If the District terminates the Contract for one of the reasons stated in Paragraph 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is
complete. All costs associated with the termination and completion of the Project shall be the responsibility of the Contractor and/or its surety.

14.2.4 Payments Upon Completion.

If the unpaid balance of the Contract Sum exceeds costs of completing the Work, including compensation for professional services and expenses made necessary thereby, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the District. The amount to be paid to the Contractor, or District, as the case may be, shall be certified by the Architect upon application. This payment obligation shall survive completion of the Contract.

14.3 TERMINATION OF CONTRACT BY DISTRICT (CONTRACTOR NOT AT FAULT)

14.3.1 Termination for Convenience.

District may terminate the Contract upon fifteen (15) calendar days of written notice to the Contractor and use any reasonable method the District deems expedient to complete the project, including contracting with replacement contractor or contractors, if it is found that reasons beyond the control of either the District or Contractor make it impossible or against the District’s interest to complete the work. In such a case, the Contractor shall have no claims against the District except: (1) the actual cost for labor, materials, and services performed which may be documented through timesheets, invoices, receipts, or otherwise, and (2) ten percent (10%) profit and overhead, and (3) five percent (5%) termination cost of the total of items (1) and (2). Contractor acknowledges and agrees that if the District (in its sole and absolute discretion) decides to takeover completion of the Project, the Contractor agrees to immediately assign all subcontracts to the District which the District has chosen to accept.

14.3.2 Non-Appropriation of Funds/ Insufficient Funds.

In the event that sufficient funds are not appropriated to complete the Project or the DISTRICT determines that sufficient funds are not available to complete the Project, DISTRICT may terminate or suspend the completion of the Project at any time by giving written notice to the Contractor. In the event that the DISTRICT exercises this option, the DISTRICT shall pay for any and all work and materials completed or delivered onto the site for which value is received, and the value of any and all work in progress and orders actually placed which cannot be canceled up to the date of notice of termination. The value of work and materials paid for shall include a factor of fifteen percent (15%) for the Contractor’s overhead and profit and there shall be no other costs or expenses paid to Contractor. All work, materials and orders paid for pursuant to this provision shall become the property of the DISTRICT. DISTRICT may, without cause, order Contractor in writing to suspend, delay or interrupt the Project in whole or in part for such period of time as DISTRICT may determine. Adjustment shall be made for increases in the cost of performance of the Agreement caused by suspend, delay or interruption.

14.4 REMEDIES OTHER THAN TERMINATION
If a default occurs, the District may, without prejudice to any other right or remedy, including, without limitation, its right to terminate the Contract pursuant to Article 14.2, do any of the following:

(a) Permit the Contractor to continue under this Contract, but make good such deficiencies or complete the Contract by whatever method the District may deem expedient, and the cost and expense thereof shall be deducted from the Contract Price or paid by the Contractor to the District on demand;

(b) If the workmanship performed by the Contractor is faulty or defective materials are provided, erected or installed, then the District may order the Contractor to remove the faulty workmanship or defective materials and to replace the same with work or materials that conform to the Contract Documents, in which event the Contractor, at its sole costs and expense, shall proceed in accordance with the District’s order and complete the same within the time period given by the District in its notice to the Contractor; or

(c) Initiate procedures to declare the Contractor a non-responsible bidder for a period of two to five years thereafter.

All amounts expended by the District in connection with the exercise of its rights hereunder shall accrue interest from the date expended until paid to the District at the maximum legal rate. The District may retain or withhold any such amounts from the Contract Price. If the Contractor is ordered to replace any faulty workmanship or defective materials pursuant to Paragraph (b) above, the Contractor shall replace the same with new work or materials approved by the Architect and the District, and, at its own cost, shall repair or replace, in a manner and to the extent the Architect and the District shall direct, all work or material that is damaged, injured or destroyed by the removal of said faulty workmanship or defective material, or by the replacement of the same with acceptable work or materials. In no event shall anything in this Paragraph be deemed to constitute a waiver by the District of any other rights or remedies that it may have at law or in equity, it being acknowledged and agreed by the Contractor that the remedies set forth in this Paragraph are in addition to, and not in lieu of, any other rights or remedies that the District may have at law or in equity.

END OF SECTION 00700
SECTION 01030
ALTERNATES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS
A. All Contract Documents shall be reviewed for applicable provisions related to the provisions in this document, and provisions in the General Conditions and other Division 1 Specification Sections shall apply to this Section without limitation.

1.2 RELATED REQUIREMENTS SPECIFIED IN OTHER SECTIONS
1. Section 00200 – “Instructions to Bidders”
2. Section 00300 – “Bid Proposal Form”
3. Section 01010 – “Summary of Work”
4. Section 01290 – “Payment Procedures”
5. Section 01310 – “Construction Scheduling”
6. Section 01311 – “Project Management and Coordination”
7. Section 01330 – “Submittal Procedures”
8. Section 01740 – “Warranties and Guarantees”
10. Divisions 2 through 33 Sections for Alternates requirements for the work in those Sections.

1.3 SUMMARY
1. This Section includes administrative and procedural requirements governing Alternates. Each Alternate is identified by number and describes the basic changes to be made in the Work.

1.4 REQUIREMENTS
1. Alternate pricing quoted on the Bid Proposal Form will be reviewed by the District, and accepted or rejected at District’s sole option. Any accepted Alternate(s) will be identified in the District-Contractor Agreement.
2. See the Bid Proposal Form, Section 00300. Item 1.G, for District Bid evaluation procedure.
3. All Alternates are either “additive” or “deductive” or “no change” to the Lump Sum Base Bid. The Contractor shall quote the amount for each Alternate in the space provided on the Bid Proposal Form.
4. Failure to either quote an Alternate amount or the insertion of the words “no bid,” “none” or words of similar import, may be considered as not completing the Bid Proposal Form and may constitute disqualification of the entire bid at District’s sole discretion. Bidders may insert a zero dollar amount ($0.00) in the Alternate price line of the Bid Proposal Form if the Bidder proposes to perform the Work of the Alternate with no additional change to the Contract Sum.
5. The Base Bid and the Alternates are exclusive in their scope of Work. There is no overlap between or among the Base Bid and the Alternates.

6. The cost of any item of work shall be included only once, in the Base Bid or in the Alternates.

7. Each Alternate is intended to cover all of the Work required for a complete, finished job.
   1. Alternate Work includes all miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of the Alternate, but necessary to complete the Alternate Work according to the Contract Documents.

1.5 PROCEDURES

1. Modify or adjust affected adjacent Work as necessary to completely integrate Work of each accepted Alternate into the Project.

2. Notification: Immediately following award of the Contract, Contractor shall notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.

3. The District reserves the right to reinstate Alternates at any time within 90 calendar days after the Notice to Proceed without any increase or decrease in Contract Price (beyond the amount of the Alternates(s) listed in Section 00300, Part 2), or any increase in Contract Time.

4. Execute accepted Alternate(s) under the same conditions as other Work of this Contract.

PART 2 - PRODUCTS

2.1 DESCRIPTION OF ALTERNATES [edit as appropriate]

1. Alternates are listed in Part 2 of the Bid Proposal Form, and hence are identified below as 2.B.1, 2.B.2 and 2.B.3.
   1. ADDITIVE ALTERNATE NO. 2.B.1: Provide Stain for polished floor surfacing at SU-134 Bookstore as specified in Section 033100 instead of medium gloss finish specified as base bid as specified in Section 033536. (Add. # 3)
   2. ADDITIVE ALTERNATE NO. 2.B.2: Install ultra-high performance concrete (UHPC) panels specified in Section 074273 with concealed fasteners instead of exposed fasteners as indicated in Drawing Detail 4/A8.11, except at the Loading Yard.
   3. ADDITIVE ALTERNATE NO. 2.B.3: Install ultra-high performance concrete (UHPC) panels specified in Section 074273 on the south side of the Student Union Loading Dock Enclosure with concealed fasteners instead of exposed fasteners as indicated in Drawing Detail 4/A8.11.

PART 3 - EXECUTION

3.1 GENERAL

1. Execute accepted alternates under the same conditions as other Work of this Contract.

2. Coordination: Modify or adjust affected Work as required to completely and fully integrate that Work into the Project.

END OF SECTION 01030
SECTION 01250
CONTRACT MODIFICATION PROCEDURES
ADDENDUM # 3

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. All Contract Documents shall be reviewed for applicable provisions related to the provisions in this document, and provisions in the General Conditions and other Division 1 Specification Sections shall apply to this Section without limitation.

1.2 RELATED REQUIREMENTS SPECIFIED IN OTHER SECTIONS

A. Section 01010 – “Summary of Work”
B. Section 01310 – “Construction Scheduling”
C. Section 01311 – “Project Management and Coordination”
D. Section 01330 – “Submittal Procedures”
E. Section 01770 – “Contract Closeout Procedures”
F. Divisions 2 through 33 Sections for Contract Modification Procedures requirements for the work in those Sections

1.3 SUMMARY

A. Any change in scope of Work or deviation from Contract Documents including, without limitation, extra work, or alterations or additions to or deductions from the original Work, shall not invalidate the original Contract, and shall be performed under the terms and conditions of the Contract Documents.

B. Changes in the work generally will begin with Requests for Information (RFI), followed by a response from the District and/or Architect, and possibly a Request for Proposal (RFP), a Contractor Proposed Change Order (PCO), a negotiated Proposed Change Order, followed by a formal Change Order (CO) authorizing the Change in the Work. A Construction Directive (CD) may be used in the absence of agreement on the terms of the Change in the Work.

1.4 CHANGES - No Changes Without Authorization

A. There shall be no change whatsoever in the drawings, specifications, or in the Work without a District executed Change Order, District executed Construction Change Directive, or District approved no cost order by the Architect for a minor change in the Work as herein provided.

B. District shall not be liable for the cost of any extra work or any substitutions, changes, additions, omissions, or deviations from the Drawings and Specifications unless the District’s Governing
Board has authorized the same and the cost thereof approved in writing by Change Order or executed Construction Change Directive.

C. No extension of time for performance of the Work shall be allowed hereunder unless claim for such extension is made at the time changes in the Work are ordered, and such time duly adjusted in writing in the Change Order.

D. The provisions of the Contract Documents shall apply to all such changes, additions, and omissions with the same effect as if originally embodied in the Drawings and Specifications. Notwithstanding anything to the contrary in this Section, all Change Orders shall be prepared and issued by the Architect and shall become effective when executed by the District’s Governing Board, the Architect, and the Contractor.

E. Should any Change Order result in an increase in the Contract price, the cost of such Change Order shall be agreed to, in writing, in advance by Contractor and District and be subject to the monetary limitations set forth in Public Contract Code. In the event that Contractor proceeds with any change in Work without first notifying District and obtaining the Architect’s and District’s consent to a Change Order, Contractor waives any claim of additional compensation for such additional work.

CONTRACTOR UNDERSTANDS, ACKNOWLEDGES, AND AGREES THAT THE REASON FOR THIS NOTICE REQUIREMENT IS SO THAT DISTRICT MAY HAVE AN OPPORTUNITY TO ANALYZE THE WORK AND DECIDE WHETHER THE DISTRICT SHALL PROCEED WITH THE CHANGE ORDER OR ALTER THE PROJECT SO THAT SUCH CHANGE IN WORK BECOMES UNNECESSARY.

1.5 REQUEST FOR INFORMATION (“RFI”)

A. Definition: An RFI is a written request prepared by the Contractor requesting the Architect to provide additional information necessary to clarify or amplify an item which the Contractor believes is not clearly shown or called for in the drawings or specifications, or to address problems which have arisen under field conditions. The Contractor shall not submit an RFI to the District or the Architect if it pertains to a Subcontractor’s request for clarification of the Contractor’s Subcontract or contractor’s construction documents, or any other Contract Documents prepared by the Contractor.

B. Scope: The RFI shall reference all the applicable Contract Documents including specification section, detail, page numbers, drawing numbers, and sheet numbers, etc. The Contractor shall make suggestions and interpretations of the issue raised by the RFI. An RFI cannot modify the Contract Cost, Contract Time, or the Contract Documents. The Contractor shall use RFI format provided by the District.

1. The Contractor shall be responsible for Contractor and Subcontractor costs to implement and administer RFIs throughout the duration of the Project. The Contractor shall maintain an RFI log with all RFIs, including revisions, listed with a short description of the request, the date, the status, and the disposition of the RFI. Regardless of the number of RFIs submitted, the Contractor shall not be entitled to additional compensation.

2. The Contractor shall be responsible for both the District and District consultants costs, including the Architect, for answering RFIs if an RFI requests an interpretation or decision of a matter where the information sought is equally available to the party making such request, as determined by the District; at the District’s discretion, such costs may be deducted from progress payments or the final payment.
3. The Architect or the District may issue a Request for Proposal which includes a detailed description of a proposed change with supplementary or revised Drawings and specifications. The Contractor shall then prepare and submit an estimate within seven (7) Calendar Days. If the Contractor fails or refuses to submit a Proposal within said seven (7) day period, the District’s Representative or the District shall determine the fair and reasonable cost of the Work indicated in a Request for Proposal which shall be binding on the Contractor.

4. Supplemental Instruction or Bulletin: The Architect or the District may issue an Architect’s Supplemental Instruction (ASI) or Bulletin to the Contractor.
   a. If the Contractor is satisfied with the Supplemental Instruction or Bulletin and does not request change in Contract Sum or Contract Time, then the direction of the Work shall be executed without a Change Order.
   b. If the Contractor believes that the Supplemental Instruction or Bulletin results in a change in Contract Sum or Contract Time, then the Contractor shall notify the District in writing within five Calendar Days after receiving the response. If the District disagrees with the Contractor, then the Contractor may give notice of intent to submit a Claim as described in the General Conditions, and submit its Claim within five Calendar Days of the District’s response. If the District agrees with the Contractor, then the Contractor must submit a cost or time extension proposal within seven (7) Calendar Days of the District’s response to the RFI. The Contractor’s failure to deliver either the foregoing notice of Claim or proposal by the respective deadlines stated above shall result in waiver of the right to file a proposal or Claim.

C. The Contractor shall reference each RFI to an activity of the Construction Schedule and shall note time criticality of the RFI, indicating time within which a response is required. The Contractor’s failure to reference RFI to an activity on the Construction Schedule and note time criticality on the RFI shall constitute the Contractor’s waiver of any claim for time delay or interruption to the Work resulting from any delay in responding to the RFI. The Contractor must submit time critical RFIs at least seven (7) Days prior to the scheduled start date of the affected Work activity.

D. Response Time: The Architect must respond to a RFI in writing within a reasonable time, normally seven (7) days for routine RFIs, after receiving such request. If the Architect’s response results in a change in the Work, then such change shall be effected by a written CO or Construction Change Directive, if appropriate. If the Architect cannot respond to the RFI within a reasonable time, the Architect shall notify the Contractor, with a copy to the Inspector and the District, of the amount of time that will be required to respond. District or the Architect will endeavor to respond within five (5) working Days from receipt of RFI with a written response to the Contractor, provided that the RFI complies with the paragraph above and is determined by the Architect or District to be time critical. Failure of the Contractor to plan ahead or mitigate problems shall not be cause for a determination that an RFI is time critical. The District or the Architect may return an RFI requesting additional information should the original RFI be incomplete or inadequately describe the information requested or conditions encountered. The Contractor shall distribute responses to all appropriate Subcontractors.
E. If the Contractor is satisfied with the response and does not request a change in Contract Sum or Contract Time, then the response shall be executed without a change.

F. Only the Contractor and/or the District may initiate changes in the scope of Work or deviation from Contract Documents.
   1. Contractor may initiate changes by submitting an RFI or a letter providing Notice of Concealed or Unknown Conditions, or Notice of Hazardous Waste Conditions.
      a. RFIs shall be submitted to seek clarification of or request changes in the Contract Documents. RFIs shall not be submitted to the District seeking clarification of any errors or omissions on behalf of the Contractor’s preparation of the construction documents or any other Contract Documents prepared by the Contractor.
      b. Differing Site Conditions: The Contractor shall submit a Notice of Differing Site Conditions by RFI to resolve problems regarding differing conditions encountered in the execution of the Work pursuant to General Conditions, which shall govern. If the District and the Architect determine that a change in Contract Sum or Contract Time is justified, the District and the Architect will issue RFP or CCD.
      c. Hazardous Waste Conditions: The Contractor shall submit Notices of Hazardous Waste Conditions by RFI to resolve problems regarding undocumented hazardous materials encountered in the execution of the Work pursuant in General Conditions, which shall govern. If the District and the Architect determine that a change in Contract Sum or Contract Time is justified, the District and the Architect will issue RFP or CCD.
   2. The Contractor may submit to the Architect a written Request for Information (RFI) if one of the following conditions occurs:
      a. Contractor discovers what appears to be an unforeseen condition or circumstance that is not described in the Contract Documents.
      b. The Contractor discovers what appears to be a conflict or inconsistency within the Contract Documents and the intent of the Contract Documents cannot be reasonably inferred.
      c. The Contractors discovers what appears to be an error or omission in the Contract Documents and the intent of the Contract Documents cannot be reasonably inferred.
      d. The Contractor considers a portion of the Contract Documents is not sufficiently explained or detailed for the Contractor to proceed with that portion of the Work.
      e. The Contractor who, after a full search of the Contract Documents and upon exercising required due diligence, fails to locate the required information.

G. If the Contractor believes that the RFI response results in Change in the Contract Sum or the Contract Time, the Contractor shall notify the District in writing within five calendar Days after receiving the response. If the District disagrees with the Contractor, then the Contractor may give notice of intent to submit a Claim as described in General Conditions, and submit its Claim within 30 Calendar Days of the District’s response. If the District agrees with the Contractor, then the Contractor must submit a cost or time extension proposal within fourteen (14) Calendar Days of the District’s response to the RFI. The Contractor’s failure to
deliver either the foregoing notice of Claim or proposal by the respective deadlines stated above shall result in waiver of the right to file a proposal or Claim.

H. Contractor shall identify RFIs with sequential numbering (i.e. 001, 002, 003 etc.) with a separate number assigned to each RFI. Resubmittal of apparent unresolved RFI issues shall be on a new RFI form with the initial RFI number amended with a sequential Revision suffix (.R1, .R2, .R3 etc.) until the issue is resolved.

I. Unless otherwise directed by the Project Manager, the Contractor shall submit each RFI on the form required by the District.

1. The Contractor shall fill in all required information. Include additional information, data, sketches and the like on separate sheets as necessary; limit sheet size to 8-1/2 by 11 inches if possible. RFIs without all required information may be returned without action to the Contractor for resubmittal. Resubmittal in accordance with the specified requirements shall be the Contractors’ responsibility.

2. The Contractors own proposed form may be used, if in the Project Manager’s judgment, it is equal to the form required by the District and it contains all pertinent information.

J. In each request, include the following information, type or printed legibly in block letters with black ink:

1. Project name as it appears on the Contract Documents

2. Contractor’s RFI identification number.

3. Title of issue.


5. Description of issue.

6. Contractor’s proposed written and graphic solution, Architect will determine if the proposal is in compliance with the Contract Documents and design intent of Project. Contractor’s failure to make reasonable effort to propose realistic solutions may result in the Request for Information being returned with no action.

7. Date of submission to Architect.

8. Date that response is needed to avoid impact to Construction schedule and cost. Time for response shall be reasonable to allow for processing and review, research, and written response by the appropriate party.

9. Urgency (normal or high).

10. Justification for high urgency.

11. Contractors’ name and the printed name and signature of Contractors’ representative responsible for issuance of request.

12. Name (individual and company) of responsible for originating RFI and his or her relationship to the Contractor.

13. Photographic image of condition. Furnish digital image if possible.

14. Photocopy of Contract Documents or sketch of condition (with dimensions) that pertains to this issue.
K. Limit each RFI to a single subject or issue. RFIs with multiple subject or issues may be returned to the Contractor without response. Resubmittal in accordance with the specified requirements shall be the Contractor’s responsibility.

L. Transmit each RFI to the District Project Manager as necessary to expedite the Project and to allow adequate time for review without delay to the Work. Do not transmit RFIs directly to the Architect, Architect’s Consultants, or others.

M. RFIs that do not meet the requirements of this Section will be returned to the Contractor with an explanation for its return.

N. Inappropriate RFIs, as described hereinafter, will be returned to the Contractor with an explanation for its return but without further action:
   1. RFIs that are received by the Architect from an entity other than the Contractor (such as a Subcontractor, Sub-subcontractor, supplier or others.)
   2. RFIs that transmit or contain a request for a substitution.
   3. RFIs that transmit or constitute a submittal.
   4. RFIs that are submitted without the Contractors’ thorough review of the Contract Documents or in a manner that suggests that specific portions of the Contract Documents are assumed to be excluded or taken as an isolated portion of the Contract Documents in part rather than whole.
   5. RFIs that are submitted in an untimely manner without adequate coordination or scheduling of the Work or related trades.
   6. RFIs that are submitted as a proposed or requested Change Order or other Contract Modification.
   7. RFIs that do not constitute a good faith request for required information.

O. Contractor shall be responsible for resubmittal of information contained in inappropriate RFIs in accordance with the requirements of the appropriate portion of the Contract Documents.

P. If information requested by the Contractor in an RFI is apparent from field observations, is contained in the Contract Documents, or can be reasonably inferred from them, the Contractor shall be responsible to the District for all reasonable fees charged by the Architect for additional services required to furnish such information. The amount of such additional services will be deducted from the Contractor’s next payment application by the District and those funds will be forwarded to the Architect as compensation.

Q. The quantity of RFIs submittal by the Contractor shall not be the basis for any claim by the Contractor.

R. Should the Contractor proceed with Work affected by an RFI issue before receipt of a written response from the Architect within the time described hereinbefore, that portion of the Work not performed in accordance with the requirements of the response shall be subject to the removal and replacement by the Contractor at no increase in Contract Sum or Contract Time.

S. Maintain a current and accurate Request for Information Log as follows:
   1. For each RFI, include the RFI number, subject matter, date submitted, date returned. Maintain current status of each RFI at all times.
   2. Submit log weekly and as requested by Project Manager or Architect.
3. Accurately maintain log for the duration of the Contract.

1.6 REQUEST FOR PROPOSAL (“RFP”)  
A. Definition: An RFP is a written request prepared by the Architect requesting the Contractor to submit to the District and the Architect an estimate of the effect of a proposed change on the Contract Price and the Contract Time.

B. Scope: An RFP shall contain adequate information, including any necessary drawings and specifications, to enable Contractor to provide the cost breakdowns required by this Specification Section. The Contractor shall not be entitled to any Additional Compensation for preparing a response to an RFP, whether ultimately accepted or not.

C. District Requested RFP: the Contractor shall furnish a proposal within fourteen (14) Calendar Days of the District’s RFP. Upon approval of RFP, the District will issue a PCO directing the Contractor to proceed with the extra Work. If the parties do not agree on the price for an RFP, the District may issue a CCD. Upon receipt of CCD, the Contractor shall promptly proceed with the change of Work involved and concurrently respond to the District’s CCD within seven (7) Calendar Days. The Contractor shall perform the changed Work notwithstanding any claims or disagreements of any nature.

1.7 PROPOSED CHANGE ORDER (PCO) REQUEST  
A. Definition: A PCO is a written request prepared by the Contractor requesting that the District and the Architect issue a CO based upon a proposed change called for in an RFP or a claim pursuant to the General Conditions.

B. Changes in Price: A PCO shall include breakdowns per this specification section to validate any change in Contract Price due to proposed change or claim.

C. Changes in Time: A PCO shall also include any additional time required to complete the Project. Any additional time requested shall not be the number of days to make the proposed change, but must be based upon the impact to the Project Schedule as defined in the Construction Scheduling Specifications of these Contract Documents. Any changes in time will be granted only if there is an impact to the critical path. If contractor fails to request a time extension in a PCO, then the Contractor is thereafter precluded from requesting or claiming a delay.

D. The Contractor may propose changes by submitting a Proposed Change Order (PCO form, see section 01340) to the District’s Representative, describing the proposed change and its full effect on the Work. The Contractor shall include a statement describing the reason for the change and the effect on the Contract Sum and Contract Time with full documentation including detailed cost and schedule breakout, and a statement describing the effect on Work by separate or other the Contractors. Document any requested substitutions in accordance with the Contract Documents. Cost for Work in approved PCOs shall not be applied for by the Contractor or paid by the District until the PCOs are included in a Change Order (CO form, see section 01340)

E. Cost Proposal and Procedures: Whenever the Contractor is required in this Section to prepare a Proposed Change Order form (PCO), and whenever the Contractor is entitled to submit a cost proposal and elects to do so, the Contractor shall prepare and submit to the District and the Architect for consideration a proposal using the PCO form found in the Contract Documents, or other similarly prepared form previously approved by the District. All cost proposals must
contain detailed line-item backup with a complete breakdown of costs for credits, deducts and extras, which itemizes materials, labor, equipment, taxes, overhead and profit. All Subcontractor Work shall be so indicated. Subcontractor quotes for any subcontractor tier submitted as lump sum or without the required line-item breakdown will be rejected. After receipt of a proposal with a detailed breakdown, the District and the Architect will act promptly thereon.

1. If the District and the Architect approves a proposal, the PCO will be routed for Contractor signatures, the District Representative signatures, and the District signature.

2. If a proposal is not acceptable to the District or the Architect because it does not agree with costs and/or time included in the proposal, the District or the Architect will submit in a response what it believes to be a reasonable cost and/or adjustment, if any. Except, as otherwise provided in this Section, the Contractor shall have five Calendar Days in which to respond to the District with a revised proposal.

3. When necessity to proceed with a change does not allow the District sufficient time to conduct a proper cost and schedule analysis of a proposal (or revised proposal), the District may direct the Contractor to proceed on a basis to be determined at earliest practical date. In this event, the value of the Change, with corresponding equitable adjustment to Contract, shall not be more than the increase or less than the decrease initially proposed.

1.8 CHANGE ORDERS (“CO”)

A Change Order is a written instrument prepared by the Architect and signed by the District (as authorized by the District’s Governing Board), the Contractor, the Architect, and the DSA (if necessary), stating their agreement upon all of the following:

A. A description of a change in the Work;

B. The amount of the adjustment in the Contract Sum, if any; and

C. The extent of the adjustment in the Contract Time, if any.

D. Change Order Forms: Whether or not noted on the executed form of Change Order, all Change Orders approved by the District are deemed to include and incorporate the following provision: “The adjustment of the Contract Price and the Contract Time for the changes noted in a Change Order (the “Changes”) represents the full and complete adjustment of the Contract Price and the Contract Time due the Contractor for providing and completing such Changes, including without limitation: (i) all costs (whether direct or indirect) for labor, equipment, materials, tools, supplies and/or services; (ii) all general and administrative costs (including without limitation, home office, field office and Site General Conditions costs) and profit; and (iii) all impacts, delays, disruptions, interferences or hindrances in providing and completing the Changes. The Contractor waives all rights, including without limitation, those arising under Civil Code Section 1542, for any other adjustment of the Contract Price or the Contract Time on account of a Change Order or the performance and completion of the Changes.”
E. Correlation of Other Items

1. Contractor shall promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum as shown on the Change Order prior to the last day of the next monthly pay period.

2. Within seven (7) days, Contractor shall promptly revise Progress schedules, look ahead schedules, and the Contractors Master Schedule to reflect any Change in Contract Time, revise sub schedules to adjust times for other items of work affected by the change and resubmit to the District for review and approval. The Contractors shall not make changes to tasks in any schedule not impacted by the Change.

3. Contractor is responsible to promptly enter Changes in Project Record Documents.

F. All Changes:

1. Documentation of Change in Contract Sum and Contract Time:
   a. Contractor shall maintain detailed records of all Work performed on a time-and-material basis.
   b. Contractor shall document each proposal for a change in cost or time with sufficient data to allow detailed line item evaluation and analysis of the proposal.
   c. Contractor shall, on request, provide additional data to support computations for:
      i) Quantities of products, materials, labor and equipment.
      ii) Taxes, insurance, and bonds.
      iii) Overhead and profit.
      iv) Justification for any change in Contract Time and new Progress Schedule showing revision due, if any. Justification for change shall comply with Construction Scheduling Section 01310.
      v) Credit for deletions from Contract, similarly documented.
   d. Contractor shall support each claim for additional costs and for Work performed under Force Account with additional information including:
      i) Credit for deletions from Contract, similarly documented.
      ii) Origin and date of claim.
      iii) Dates and times Work was performed and by whom.
      iv) Time records and wage rates paid.
      v) Invoices and receipts for products, materials, equipment and subcontracts, similarly documented.

G. COST OF CHANGE ORDERS

1. It is the responsibility of the Contractor to notify the District within five Calendar Days if there is a cost change related to a change in the Work. Notification beyond this time limit may result in future claims being time barred.

2. Within seven (7) Calendar days after a request is made for a change that impacts the Contract Sum, the critical path, or the Contract Time, the Contractor shall provide the District and the Architect, with a written estimate of the effect of the proposed CO upon the Contract Sum and the actual cost of construction, which shall include a complete itemized cost breakdown of all labor and material showing actual quantities, hours, unit
prices, and wage rates required for the change, and the effect upon the Contract Time of such CO. Changes may be made by District by an appropriate written CO, or, at the District’s option, such changes shall be implemented immediately upon the Contractor’s receipt of an appropriate written Construction Change Directive.

3. District may, as provided by law and without affecting the validity of this Agreement, order changes, modification, deletions and extra work by issuance of written CO or Construction Change Directives from time to time during the progress of the Project, contract sum being adjusted accordingly. All such work shall be executed under conditions of the original Agreement except that any extension of time caused thereby shall be adjusted at time of ordering such change. District has discretion to order changes on a “time and material” basis with adjustments to time made after Contractor has justified through documentation the impact on the critical path of the Project.

4. The amount of the increase or decrease in the Contract Price from a CO, if any, shall be determined in one or more of the following ways as applicable to a specific situation:
   a. Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation. If an agreement cannot be reached within fifteen (15) days after submission and negotiation of Contractor’s proposal, Contractor may submit a properly formatted claim per the General Conditions and this Specification Section. Submission of sums which have no basis in fact are at the sole risk of Contractor and may be a violation of the False Claims Act set forth under Government Code Section 12650 et. seq.);
   b. By unit prices contained in Contractor’s original bid and incorporated in the Project documents or fixed by subsequent agreement between District and Contractor;
   c. Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee. However, in the case of disagreement, Contractor must utilize the procedure under this Specification Section; or
   d. By cost of material and labor and percentage of overhead and profit. (Force Account)

H. COST DETERMINATION

1. Total cost of extra Work or of Work omitted shall be the sum of construction labor costs, material costs, equipment rental costs, as defined herein plus overhead and profit as allowed herein and by the General Conditions. This limit applies in all cases of claims for extra Work, whether calculating cost proposals, Change Orders or CCDs, or calculating claims of all types, and applies even in the event of fault, negligence, strict liability, or tort claims of all kinds, including strict liability or negligence. The Contractor may recover no other costs arising out of or connected with the performance of extra Work, of any nature. No special, incidental or consequential damages may be claimed or recovered against the District, its representatives or agents, whether arising from breach of contract, negligence or strict liability, unless specifically authorized in the Contract Documents.

2. Application of Overhead and Profit: (Overhead shall be as defined in this Specification Section.)
   a. Total overhead and profit on labor for extra Work shall not exceed 15 percent.
   b. Total overhead and profit on materials for extra Work shall not exceed 15 percent.
   c. Total overhead and profit on equipment for extra Work shall not exceed 10 percent.
d. When extra Work is performed by a first tier Subcontractor the Contractor shall receive a 5 percent markup on Subcontractors’ total costs of extra Work. First tier Subcontractor’s markup on its Work shall not exceed 15 percent.

e. When extra Work is performed by a lower tier Subcontractor, the Contractor shall receive a total of 5 percent markup on the lower tier Subcontractors’ total costs of extra Work. First tier Subcontractors and lower tier Subcontractors shall divide the 15 percent markup as mutually agreed.

f. Notwithstanding the foregoing, in no case shall the total markup on any extra Work exceed 20 percent of the direct cost, notwithstanding the actual number of contract tiers.

g. On proposals covering both increases and decreases in Contract Sum, overhead and profit shall be allowed on the net increase only as determined in paragraph 1.5 above. When the net difference is a deduction, no percentage for overhead and profit shall be allowed, but rather the deduction shall apply.

h. No markup will be allowed on permits, fees, insurance, and bonds.

I. Taxes: All State sales and use taxes, Contra Costa County and applicable City sales taxes, shall be included. Federal and Excise tax shall not be included.

J. Accord and Satisfaction: Every Change Order and accepted CCD shall constitute a full accord and satisfaction, and release, of all the Contractor (and if applicable, Subcontractor) claims for additional time, money or other relief arising from or relating to the subject matter of the change including, without limitation, impacts of all types, cumulative impacts, inefficiency, overtime, delay and any other type of claim. The Contractor may elect to reserve its rights to disputed claims arising from or relating to the changed Work at the time it signs a Change Order or approves a CCD, but must do so expressly in a writing delivered concurrently with the executed Change Order or approved CCD, and must also submit a Claim for the reserved disputed items pursuant to the General Conditions no later than 30 Calendar Days of the Contractor’s first written notice of its intent to reserve rights.

K. COST BREAKDOWN

1. Labor: the Contractor will be paid cost of labor for workers (not including the project superintendent, or forepersons unless forepersons work greater than 50% of the time and then only when authorized by the District), used in actual and direct performance of extra Work. Labor rate, whether employer is the Contractor, Subcontractor or other forces, will be sum of following:

   a. Actual Wages: Actual wages paid shall include any employer payments to or on behalf of workers for health and welfare, pension, vacation, and similar purposes.

   b. Labor surcharge: Payments imposed by local, county, state, and federal laws and ordinances, and other payments made to, or on behalf of, workers, other than actual wages such as taxes and worker’s compensation insurance. Such labor surcharge shall not exceed that set forth in the Prevailing Wage schedule which is in effect on date upon which extra Work is accomplished and which schedule is incorporated herein by reference as though fully set forth herein.

   c. If agreement cannot be reached between the District and Contractor, or its subcontractors regarding labor productivity rates then Saylor Publications Current Construction Costs, which is in effect on date upon which extra work is
2. **Material**: Only materials furnished and installed in the Work by the Contractor and necessarily used in performance of extra Work will be paid for. The Contractor and any and all subcontractors will submit proof of material cost satisfactory to the District when requested. Cost of such materials will be cost, including sales tax, to purchaser (Contractor, Subcontractor or other forces) from supplier thereof, except as the following are applicable:

   a. If cash or trade discount by actual supplier is offered or available to purchaser, it shall be credited to the District notwithstanding fact that such discount may not have been taken.

   b. For materials salvaged upon completion of extra Work, salvage value of materials shall be deducted from cost, less discounts, of materials.

   c. If cost of a material is, in opinion of the District, excessive, then cost of material shall be deemed to be lowest current wholesale price at which material is available in quantities concerned delivered to Site, less any discounts as provided in this Specification Section.

   d. **Unless accepted in writing by the District’s Representative, NECA (National Electrical Contractors Association) manual shall NOT be used as a basis to determine any material costs. (ADD. #3)**

3. **Equipment Rental**: For the Contractor- or Subcontractor-owned equipment, payment will be made at rental rates listed for equipment in California Department of Transportation official equipment rental rate schedule which is in effect on date upon which extra Work is accomplished and which schedule is incorporated herein by reference as though fully set forth herein.

   a. If there is no applicable rate for an item of equipment, then payment shall be made for the Contractor- or Subcontractor-owned equipment at rental rate listed in the most recent edition of the Association of Equipment Distributors (AED) book.

   b. For rented equipment, payment will be made based on actual rental invoices. Equipment used on extra Work shall be of proper size and type. If, however, equipment of unwarranted size or type and cost is used, cost of use of equipment shall be calculated at rental rate for equipment of proper size and type, as determined by the District.

   c. Rental rates paid shall be deemed to cover cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance, and all incidentals. Unless otherwise specified, manufacturer’s ratings, and manufacturer-approved modifications, shall be used to classify equipment for determination of applicable rental rates.
d. Individual pieces of equipment or tools not listed in said publication and having a replacement value of $250 or less, whether or not consumed by use, shall be considered to be small tools and no payment will be made therefore as payment is included in payment for labor.

e. Rental time will not be allowed while equipment is inoperative due to breakdowns.

f. For equipment on Site, rental time to be paid for equipment shall be time equipment is in operation on extra Work being performed or on standby as approved by the District. The following shall be used in computing rental time of equipment:
   i) When hourly rates are listed, less than 30 minutes of operation shall be considered to be ½ hour of operation.
   ii) When daily rates are listed, less than four hours of operation shall be considered to be ½ Day of operation.

g. For equipment that must be brought to Site to be used exclusively on extra Work, cost of transporting equipment to Site and its return to its original location shall be determined as follows:
   i) District will pay for costs of loading and unloading equipment.
   ii) Cost of transporting equipment in low bed trailers shall not exceed hourly rates charged by established haulers.
   iii) Cost of transporting equipment shall not exceed applicable minimum established rates of California Public Utilities Commission.
   iv) District will not make any payment for transporting and loading and unloading equipment if equipment is used on Work in any other way than upon extra Work.

h. Rental period may begin at time equipment is unloaded at Site of extra Work and terminate at end of the performance of the extra Work or Day on which the District directs the Contractor to discontinue use of equipment, whichever first occurs. Excluding Saturdays, Sundays, and the District’s legal holidays, unless equipment is used to perform extra Work on such Days, rental time to be paid per Day shall be four hours for zero hours of operation, six hours for four hours of operation and eight hours for eight hours of operation, time being prorated between these parameters. Hours to be paid for equipment that is operated less than eight hours due to breakdowns, shall not exceed eight less number of hours equipment is inoperative due to breakdowns.

4. Work Performed by Special Forces or Other Special Services: When the District, the Architect and the Contractor by agreement, determine that special service or item of extra Work cannot be performed by forces of the Contractor or those of any Subcontractors, service or extra Work item may be performed by specialists. Invoices for service or item of extra Work on basis of current market price thereof may be accepted without complete itemization of labor, material, and equipment rental costs when it is impracticable and not in accordance with established practice of the special service industry to provide complete itemization. In those instances wherein the Contractor is required to perform extra Work necessitating a fabrication or machining process in a fabrication or machine shop facility away from Site, charges for that portion of extra Work
performed in such facility may, by agreement, be accepted as a specialist billing. The District must be notified in advance of all off-Site Work. In lieu of overhead and profit provided in this Section, 15 percent will be added to specialist invoice price, after deduction of any cash or trade discount offered or available, whether or not such discount may have been taken.

L. FORCE-ACCOUNT WORK

1. If it is impracticable because of nature of Work, or for any other reason, to fix an increase or decrease in price definitely in advance, the Contractor may be directed to proceed at a not-to-exceed (NTE) maximum price which shall not under any circumstances be exceeded. Subject to such limitation, such extra Work shall be paid for at actual necessary cost for Force-Account Work or at the negotiated cost, as determined by the District. The cost for Force-Account Work shall be determined pursuant to this Specification Section.

2. Force-Account Work shall be used when it is not either possible or practical to price the changed Work prior to the start of that Work. In these cases, Force-Account Work will be utilized during the pricing and negotiation phase of the change. Once negotiations have been concluded and a bilateral agreement has been reached, the tracking of the Work under Force-Account is no longer necessary. Force-Account Work shall also be used when negotiations between the District and the Contractor have broken apart and a bilateral agreement on the value of the changed Work cannot be reached. The District may approve other uses of Force-Account Work.

3. Whenever any Force-Account Work is in progress, definite price for which has not been agreed on in advance, the Contractor shall report to the District each Business Day in writing in detail amount and cost of labor, equipment, and material used, and any other expense incurred in Force-Account Work on the preceding day, by using a preapproved cost proposal form. No claim for compensation for Force-Account Work will be allowed unless report shall have been made and acknowledged by the District.

4. Whenever Force-Account Work is in progress, definite price for which has not been agreed on in advance, the Contractor shall report to the District when 75 percent of the NTE amount has been expended.

5. RECORDS AND CERTIFICATION
   a. Force-Account (cost reimbursement) charges shall be recorded daily and summarized in preapproved cost proposal form. The Contractor or authorized representative shall complete and sign form each Day and submit to the District Representative for review and approval. The Contractor shall also provide with the form: the names and classifications of workers and hours worked by each; an itemization of all materials used; a list by size type and identification number of equipment and hours operated; and an indication of all Work performed by specialists.
   b. No payment for Force-Account Work shall be made until the Contractor submits original invoices substantiating materials and equipment charges.
   c. District shall have the right to audit all records in possession of the Contractor relating to activities covered by the Contractor’s claims for modification of Contract, including Force-Account Work and CCD Work.
d. Further, the District will have right to audit, inspect, or copy all records maintained in connection with this Contract, including financial records, in possession of the Contractor relating to any transaction or activity occurring or arising out of, or by virtue of, the Contract. If the Contractor is a joint venture, right of the District shall apply collaterally to same extent to records of joint venture sponsor, and of each individual joint venture member. This right shall be specifically enforceable, and any failure of the Contractor to voluntarily comply shall be deemed an irrevocable waiver and release of all claims then pending that were or could have been subject to the General Condition of Contract.

6. Force-Account Work shall be paid as extra Work under this Section. Methods of determining payment for Work and materials provided in this paragraph shall not apply to performance of Work or furnishings of material that, in judgment of the District, may properly be classified under items for which prices are otherwise established in Contract Documents.

a. Basis for Establishing Costs.
   i) Labor will be the actual cost for wages prevailing locally for each craft or type of workers at the time the extra Work is done, plus employer payments of payroll taxes and insurance, health and welfare, pension, vacation, apprenticeship funds, and other direct costs resulting from Federal, State, or local laws, as well as assessments or benefits required by lawful collective bargaining agreements. The use of a labor classification which would increase the extra Work cost will not be permitted unless the Contractor establishes the necessity for such additional costs. Labor costs for equipment operators and helpers shall be reported only when such costs are not included in the invoice for equipment rental.
   
   ii) Materials shall be at invoice or lowest current price at which such materials are locally available and delivered to the Site in the quantities involved, plus sales tax, freight, and delivery. The District reserves the right to approve materials and sources of supply or to supply materials to the Contractor if necessary for the progress of the Work. No markup shall be applied to any material provided by the District.
   
   iii) Tool and Equipment Rental. No payment will be made for the use of tools which have a replacement value of $250 or less.

b. Other Items. The District may authorize other items which may be required on the extra work. Such items include labor, services, material, and equipment which are different in their nature from those required by the Work, and which are of a type not ordinarily available from the Contractor or any of the Subcontractors. Invoices covering all such items in detail shall be submitted with the request for payment.

c. Invoices. Vendors’ invoices for material, equipment rental, and other expenditures shall be submitted with the PCO. If the request for payment is not substantiated by invoices or other documentation, the District may establish the cost of the item involved at the lowest price which was current at the time of the Daily Report.

d. Overhead and Profit. Overhead and profit is defined and shall be applied as in this Specification Section.
M. DISTRICT-FURNISHED MATERIALS

1. District reserves right to furnish materials, as it deems advisable, and the Contractor shall have no claims for costs and overhead and profit on such materials.

N. OVERHEAD DEFINED

1. The following includes, but is not limited to, costs that are deemed included in overhead for all Contract Modifications, including COs, Force-Account Work or CCD Work, whether incurred by the Contractor, Subcontractors, or suppliers, and the Contractor shall not invoice or receive payment for these costs separately:
   a. Drawings: field drawings, Shop Drawings, etc., including submissions of drawings.
   b. Routine field inspection of Work proposed.
   c. General Superintendence, including Site Superintendent, Project Engineers, Project Management or Construction Management services provided by the Contractor.
   d. General administration and preparation of cost proposals, schedule analysis, change orders and other supporting documentation as necessary.
   e. Computer services.
   f. Reproduction services.
   g. Salaries of, superintendent, foremen, timekeeper, storekeeper and secretaries
   h. Janitorial services
   i. Temporary on Site facilities, including for any extended periods of Contract Time:
      i) Offices
      ii) Telephones
      iii) Plumbing
      iv) Electrical: Power, lighting, etc.
      v) Platforms
      vi) Fencing, barricades, signage, etc.
      vii) Water

2. Home office expenses

3. Insurance and Bond premiums - Add. # 1

4. Procurement and use of vehicles and fuel used coincidentally in Work otherwise included in the Contract Documents

5. Surveying

6. Estimating

7. Protection of Work

8. Handling and disposal fees

9. Final cleanup

10. Small tools

11. Warranty

12. All Contract General Conditions
13. Other incidental Work

O. Deductive Change Orders: All deductive Change Order(s) shall be prepared in the same manner as additive change orders using the same forms and formulas, with negative numbers. **Overhead and profit will be neither added nor deducted when calculating deductive changes. (ADD. # 3)**

P. Discounts, Rebates, and Refunds: For purposes of determining the cost, if any, of any change, addition, or omission to the Work hereunder, all trade discounts, rebates, refunds, and all returns from the sale of surplus materials and equipment shall accrue and be credited to the Contractor, and the Contractor shall make provisions so that such discounts, rebates, refunds, and returns may be secured, and the amount thereof shall be allowed as a reduction of the Contractor’s cost in determining the actual cost of construction for purposes of any change, addition, or omissions in the Work as provided herein.

Q. Accounting Records: With respect to portions of the Work performed by COs and Construction Change Directives on a time-and-materials, unit-cost, or similar basis, the Contractor shall keep and maintain cost-accounting records satisfactory to the District, which shall be available to the District on the same terms as any other books and records the Contractor is required to maintain under the Contract Documents.

R. Notice Required: If the Contractor desires to make a claim for an increase in the Contract Price, or any extension in the Contract Time for completion, it shall notify the District pursuant to the General Conditions of these Contract Documents. Contractor shall proceed to execute the Work even though the adjustment may not have been agreed upon. Any change in the Contract Price or extension of the Contract Time resulting from such claim shall be authorized by a CO.

S. Applicability to Subcontractors: Any requirements under this Section shall be equally applicable to COs or Construction Change Directives issued to Subcontractors by the Contractor to the same extent required by the Contractor.

T. Alteration to Change Order Language: Contractor shall not alter or reserve time in Change Orders or Construction Change Directives. Contractor shall execute finalized Change Orders and proceed with the Work. If Contractor intends to reserve time, without an approved CPM schedule prepared pursuant to the Construction Scheduling Specification, the Contractor may be prosecuted pursuant to the False Claim Act.

1.9 CONSTRUCTION CHANGE DIRECTIVE

A. Definition: A Construction Change Directive is a written order prepared by the Architect and signed by the District and the Architect, directing a change in the Work and stating a proposed basis for adjustment, if any, in the Contract Sum or Contract Time, or both. The District may, by Construction Change Directive and without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions within. If applicable, the Contract Sum and Contract Time will be adjusted accordingly. In the case of a Construction Change Directive being issued, Contractor must commence Work immediately or delays from failure to perform Construction Change Directive shall be the responsibility of Contractor. Any dispute as to the sum of Construction Change Directive or timing of payment, shall be resolved pursuant to the Disputes paragraphs of these Contract...
Documents. A Construction Change Directive shall be used in the absence of agreement on the terms of a CO.

B. Construction Change Directives: If at any time the Architect or the District believes in good faith that a timely Change Order will not be agreed upon using the foregoing procedures, the Architect or the District may issue a CCD with a recommended cost and/or time adjustment.

1. Upon receipt of CCD, the Contractor shall promptly proceed with the change of Work involved and concurrently respond to the District’s CCD within 10 Calendar Days.
   a. Contractor’s response must be any one of following:
      i) Return CCD signed, thereby accepting the District’s response, time, and cost.
      ii) Submit a (revised if applicable) proposal with supporting documentation (if applicable, reference original proposal number followed by letter R1, R2, etc. for each revision.
      iii) Give notice of intent to submit a Claim as described in the General Conditions, and submit its Claim with 30 Calendar Days.
   b. If the CCD provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:
      i) Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation.
      ii) Unit prices stated in the Contract Documents or subsequently agreed upon.
      iii) Force account.
      iv) Cost to be determined in a manner agreed.

C. A CCD signed by the Contractor indicates the agreement of the Contractor therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a PCO.

D. If the Contractor does not respond promptly, or disagrees with the method for adjustment in the Contract Sum, the method and the adjustment shall be determined by the District on the basis of published estimating guides, District or Architect estimating consultant analysis, or reasonable and historical expenditures and savings of those performing similar Work including, in case of an increase in the Contract Sum, a reasonable allowance for overhead and profit. If the parties still do not agree on the price for a CCD, the Contractor may file a Claim per General Conditions. The Contractor shall keep and present, in such form as the District may prescribe, an itemized accounting together with appropriate supporting data.

E. The amount of credit to be allowed by the Contractor for a deletion or change which results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect and the District. When both additions and credits covering related Work or substitutions are
involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

1.10 Responses: For all responses for which the Contract Documents, including without limitation this Section, do not provide a specific time period, recipients shall respond within a reasonable time.

1.11 Disputes: For all disputes arising from the procedures herein, the Contractor shall follow this Section and the Contract General Conditions.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION 01250
SECTION 01300
LABOR COMPLIANCE PROGRAM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. All Contract Documents shall be reviewed for applicable provisions related to the provisions in this document, and provisions in the General Conditions and other Division 0 and Division 1 Specification Sections shall apply to this Section without limitation.

1.2 RELATED REQUIREMENTS SPECIFIED IN OTHER SECTIONS
A. Section 01010 – “Summary of Work”
B. Section 01290 – “Payment Procedures”
B. Section 01770 – “Contract Closeout Procedures”
C. Divisions 2 through 33 Sections for Labor Compliance Program requirements for the work in those Sections.

1.3 SUMMARY
A. Labor Code Section 1725.5 regarding Department of Industrial Relations (DIR) contractor registration process including registration criteria and implementation of DIR registration requirements. Labor Code Section 1771.7 establishes contractor’s obligation to submit Certified Pay Roll (CPR) to the Department of Labor and Standards Enforcement (DLSE) and public works monitoring and enforcement. Labor Code Section 1773.3 requires the District to submit a PWC-100 to DIR for all public works contract awarded effective January 1, 2015. (ADD. # 3)
B. Contractors and subcontractors performing work on District projects will be expected to adhere to the labor compliance provisions outlined in Division 2, Part 7, Chapter 1 of the California Labor Code §1720- 1861 including, but not limited to, the reporting of certified payroll, payment of prevailing wages and the employment of apprentices.

1.4 LABOR COMPLIANCE PROGRAM REQUIREMENTS
A. California Labor Code Section 1770, et seq., and Education Code Section 17424 require that contractors on Public works projects pay their workers based on the prevailing wage rates which are established and issued by the Department of Industrial Relations, Division of Labor Statistics and Research.
1. Pursuant to the provisions of Division 2, Part 7, Chapter 1, Article 2 of the California Labor Code §1770, et seq., the District has obtained from the Director of the California Department of Industrial Relations the general prevailing rate of per diem wages and the prevailing rate for straight time, holiday time and overtime work in the locality in which
the work is to be performed for each craft, classification or type of worker needed to execute the contract. The prevailing wage determination can be accessed online at http://www.dir.ca.gov/dlslr/DPreWageDetermination.htm. Copies of the prevailing rate of per diem wages are also on file at the District office, which shall be made available to any interested party on request. Per diem wages shall be deemed to include employer payments for health and welfare, pensions, vacation, travel time and subsistence pay as provided in California Labor Code §1773.1 and as shown in the Director’s determination. For apprenticeship or other training programs authorized by California Labor Code §3093, and similar purposes, when the term “per diem wages” is used herein it shall have the meaning as defined in the prevailing wage determination as published by the Director of the California Department of Industrial Relations and California Labor Code.

2. The contractor shall post at an appropriate conspicuous weatherproof point on the site of the project a copy of the prevailing wage determination published by the Director of the California Department of Industrial Relations which is applicable to the project and the Notice of Approval of the Labor Compliance Program.

3. There shall be paid to each worker of the contractor or any subcontractor, of any tier, engaged in the work, not less than the general prevailing wage rate regardless of any contractual relationship which may be alleged to exist between the contractor or any subcontractor, of any tier, and such worker. The contractor and subcontractors will be required to pay all workers on a weekly basis. Each worker needed to execute the work on the project shall also be paid travel and subsistence payments, as such travel and subsistence payments are defined in the prevailing wage determination published by the Director of the California Department of Industrial Relations.

4. Holiday and overtime work, when permitted by law, shall be paid for at the rate identified in the prevailing wage determination issued by the Director of the California Department of Industrial Relations. In accordance with Labor Code §1815, work performed by employees of contractors in excess of 8 hours per day, and 40 hours during any one week, shall be permitted upon public work upon compensation for all hours worked in excess of 8 hours per day at not less than 1 1/2 times the basic rate of pay.

5. The Contractor shall forfeit fifty dollars ($50.00) for each calendar day or portion thereof, for each worker paid less than the prevailing rates as determined by the Director of the California Department of Industrial Relations for such work or craft in which such worker is employed by the contractor or by any subcontractor, of any tier, in connection with the work. Pursuant to California Labor Code §1775, the difference between such prevailing wage rates and the amount paid to each worker for each calendar day, or portion thereof, for which each worker was paid less than the prevailing wage rate, shall be paid to each worker in addition to the penalties. The amount of forfeiture shall be determined by the Labor Commissioner and shall be based on consideration of the contractor’s mistake, inadvertence, or neglect in failing to pay the correct rate of prevailing wages. The contractor’s previous record in meeting the prevailing wage obligations or the contractor’s willful failure to pay the correct rates of prevailing wages may influence the amount of penalty.

6. In accordance with Labor Code §1813, the contractor or subcontractor shall, as a penalty to the state or political subdivision on whose behalf the contract is made or awarded, forfeit twenty-five dollars ($25) for each worker employed in the execution of the contract by the respective contractor or subcontractor for each calendar day during which the
worker is required or permitted to work more than 8 hours in any one calendar day and 40 hours in any one calendar week in violation of the provisions of this article. In awarding any contract for public work, the awarding body shall cause to be inserted in the contract a stipulation to this effect. The awarding body shall take cognizance of all violations of this article committed in the course of the execution of the contract, and shall report them to the Division of Labor Standards Enforcement.

B. California Labor Code Section 1776 requires contractors to keep accurate payroll records of trade workers on all public works projects and to submit copies of certified payroll records upon request.

1. Pursuant to California Labor Code §1776, the contractor and every subcontractor, of any tier, shall keep accurate payroll records, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per them wages paid to each journeyman, apprentice, worker or other employee employed by them in connection with the public works project. The payroll records shall be certified and submitted bi-weekly to the Labor Compliance Representative and shall be available for inspection at all reasonable hours at the principal office of the Contractor on the following basis:

1. A certified copy of an employee’s payroll record shall be made available for inspection or furnished to such employee or his/her authorized representative on request;

2. A certified copy of all payroll records shall be made available for inspection or furnished upon request to the District, the Division of Labor Standards Enforcement and the Division of Apprenticeship Standards of the Department of Industrial Relations;

3. A certified copy of payroll records shall be made available upon request to the public for inspection or copies thereof made; provided, however, that a request by the public shall be made through the District, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement. The contractor shall have ten (10) days in which to completely comply, subsequent to receipt of written notice specifying in what respects the contractor must comply herewith. Should noncompliance be evident after such 10-day period, the contractor shall, as a penalty to the District, forfeit Twenty-Five Dollars ($25.00) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated.

C. California Labor Code Section 1777.5 requires contractors to employ registered apprentices on Public works projects.

1. Per California Labor Code §1777.5(e), the contractor and all subcontractors shall notify an approved training program that can supply apprentices to the area of the public works project. The contractor and subcontractors shall submit contract award information to the applicable joint apprenticeship committee which shall include an estimate of journeyman hours to be performed under the contract, the number of apprentices to be employed, and the approximate dates the apprentices will be employed. Additionally, the contractor and subcontractors shall request, from the joint apprenticeship committee, dispatch of apprentices on the public works project using the state form DAS-142.

2. All apprentices employed by the contractor to perform any of the work shall be paid the prevailing wages identified by the Director of the California Department of Industrial Relations. Only apprentices, as defined in California Labor Code §3077 who are in training
under apprenticeship standards and written apprenticeship agreements under California Code §§3070, et seq., are eligible to be employed for the work. The employment and training of each apprentice shall be in accordance with the provisions of the apprenticeship standards and apprentice agreements under which such apprentice is training or the standards established by the Division of Apprenticeship Standards.

3. The ratio of work performed by apprentices to journeymen, who shall be employed in the work, may be the ratio stipulated in the apprenticeship standards under which the joint apprenticeship committee operates, but in no case shall the ratio be less than one hour (1) of apprentice work for each five (5) hours of labor performed by a journeyman, except as otherwise provided in California Labor Code §1777.5. Any ratio shall apply during any day or portion of a day when any journeyman, or the higher standard stipulated by the joint apprenticeship committee, is employed at the site of the Work and shall be computed on the basis of the hours worked during the day by journeymen so employed, except for the surveyor classification. The Contractor shall employ apprentices for the number of hours computed as above before the completion of the work. The contractor shall, however, endeavor, to the greatest extent possible, to employ apprentices during the same time period that the journeymen in the same craft or trade are employed at the site of the Work. Where an hourly apprenticeship ratio is not feasible for a particular craft or trade, the Division of Apprenticeship Standards, upon application of a joint apprenticeship committee, may order a minimum ratio of not less than one apprentice for each five journeymen in a craft or trade classification. This article shall not apply to contracts of general contractors, or to contracts of specialty contractors not bidding for work through a general or prime contractor, involving less than thirty thousand dollars ($30,000).

4. The contractor or any subcontractor, of any tier, who performs any of the work by employment of journeymen or apprentices in any apprenticeable craft or trade and who is not contributing to a fund or funds to administer and conduct the apprenticeship program in any such craft or trade in the area of the site of the work, to which fund or funds other contractors in the area of the site of the work are contributing, shall contribute to the fund or funds in each craft or trade in which it employs journeymen or apprentices in the same amount or upon the same basis and in the same manner as the other contractors do, but where the trust fund administrators are unable to accept such funds, contractors not signatory to the trust agreement shall pay a like amount to the California Apprenticeship Council. The contractors shall provide proof of such contributions when requested, including checks, check stubs, receipts, or other records required to prove that all required payments were made.

5. In the event the contractor willfully fails to comply with the provisions of California Labor Code §1777.5, and pursuant to California Labor Code §1777.7, the contractor shall: (i) be denied the right to bid on any public works contract for a period of one (1) year from the date the determination of non-compliance is made by the administrator of apprenticeship; and (ii) forfeit, as a civil penalty, one hundred dollars ($100.00) and up to three hundred dollars ($300.00) for each calendar day of noncompliance. The District shall withhold such amount from the contract price then due or to become due upon request of the Division of Apprenticeship Standards.

END OF SECTION 01300
SECTIO N 01552

GEOTECHNICAL REQUIREMENTS
ADDENDUM # 3

1. General

1.1. These Geotechnical Requirements have been prepared for the purpose of bid and have been derived from the District’s soils report and updates prepared by RMA Group, dated October 21, 2016 and revised on December 8, 2016. Such reports have been submitted to the DSA as part of the Permit Set documents, and is available for inspection by the Contractor, but is not part of the Contract Documents and is made available solely for the convenience of the Contractor. The site plan showing the locations of borings, cone penetration tests (CPTS), and trenches and the logs of test borings, CPT profiles and trench logs showing a record of the data obtained by the District’s investigation of subsurface conditions is included in the above referenced report. These soils borings and logs are made available for the convenience of the Contractor, but are not part of the Contract Documents, but represent only the opinion of the District as to the character of the materials and ground water levels encountered on the date drilled/performed. The Contractor can only rely on the “technical data” as described in Section 00210, Paragraph 1.5.

1.2. This Specification Section includes the following:

   1.2.1 Clearing, stripping, grubbing, and preparing areas to be filled

   1.2.2 Selecting materials for fill

   1.2.3 Placing, spreading, and compacting fill

   1.2.4 Completing subsidiary work necessary to conform to lines, grades, and slopes shown on Contract Drawings

   1.2.5 Protecting the soil in slab and foundation areas from drying out between grading and construction

1.3 Tests and observations shall be made by a representative from the Geotechnical Engineer (hereafter Geotechnical Engineer Representative) during grading so that the Geotechnical Engineer Representative can perform observations and tests to confirm that grading was performed according to the Drawings and Specifications of this Contract.

1.4 The Geotechnical Engineer Representative shall be notified at least two working days prior to placement of fill; so arrangements for testing and observation can be made.

1.5 No grading operations and/or placement of fill performed by Contractor without inspection by the Geotechnical Engineer Representative will be accepted.

(ADDENDUM # 3) 1.6 The Contractor shall be responsible to protect open excavations and open trenches during or following seasonal rainfall. Contractor shall be responsible to
mitigate excessively over-optimum (wet) soil moisture conditions caused by the Contractor’s failure to protect open excavations and open trenches by any of the following as part of their original Contract Price:

1.6.1 Frequent spreading and mixing during warm dry weather;

1.6.2 Mixing with lime, lime-fly ash, or cement product, approved by the Geotechnical Engineer. However, none of these products are allowed to be used in any tree protection zones, or within twice the diameter of any tree protection zones shown on the drawings.

1.6.3 Mixing with lime, lime-fly ash, or cement product, approved by Geotechnical Engineer and the District’s Arborist;

1.6.4 Stabilizing with aggregate, geotextile stabilization fabric and/or geo-grid; shall be evaluated and approved by Geotechnical Engineer Representative.

1.7 When unfavorable weather conditions necessitate interrupting filling and grading operations, areas shall be prepared by compaction of surface and grading to avoid collection of water. Adequate temporary drainage shall be provided to prevent erosion. After interruption, compaction specified in last layer shall be verified or reestablished before resuming work.

2. Testing

2.1 The American Society for Testing and Materials (ASTM) Test Procedure D 1557 - (latest revision) shall be the standard test to define maximum densities for all compaction of fill. All densities shall be expressed as relative compaction in terms of the maximum dry density obtained in the laboratory by the foregoing standard procedure.

2.2 Field density tests shall be performed according to ASTM Test Procedures D 6938-08A. The locations and number of field density tests shall be selected by the Geotechnical Engineer Representative.

3. Clearing, Stripping, Grubbing, and Subexcavation to Prepare Areas to be Filled

3.1 Trees, roots, vegetation, and organic surficial soil shall be removed from structural areas unless specified otherwise by the Geotechnical Engineer. The depth of organic surficial soil to be removed will be recommended by the Geotechnical Engineer Representative, but for purposes of the original Contract Price, should be estimated as 3 inches. Stripping shall extend a minimum of 5 feet laterally beyond building lines (defined as the outside perimeter of the building walls or footing outer limits, whichever results in the greatest building envelope, and 2 feet beyond flatwork and pavement, where feasible.

3.2 Strippings are defined as surface vegetation and organic surficial soil. Strippings may not be used in engineered fill unless specifically authorized and observed by the Geotechnical Engineer Representative. Stripping may be stockpiled for landscaping use, with the approval of the District and Architect.
3.3 Soil deemed soft or unsuitable by the Geotechnical Engineer Representative shall be removed. Loose fills and surface soil sloughs shall also be excavated.

3.4 Underground structures such as old foundations, abandoned pipelines, septic tanks, and leach fields shall be legally removed from the Site.

3.5 The final stripping and excavation shall be approved by the Geotechnical Engineer Representative before further grading is started.

3.6 Demolition and removal of the former foundations may result in disturbance to the subsoil to a depth of twelve (12) inches below previously existing slab or footings/grade beams (see recommendation in Geotechnical Report, Section 3.04). This disturbed zone must be properly recompacted in order to prepare a uniform compacted fill pad prior to placing new fill to establish the new building subgrade. The actual depth and lateral extent of the subexcavation required shall be determined in the field by the Geotechnical Engineer Representative.

3.7 The subexcavated subgrade soil to receive fill shall be moisture-conditioned and compacted to the following requirements:

- Minimum relative compaction: 90 percent
- Minimum moisture content: 2 percent over optimum

Scarification and moisture conditioning of intact rock areas may be waived by the Geotechnical Engineer Representative.

4. Selecting Fill

4.1 The Geotechnical Engineer shall evaluate suitability of materials for compacted fills. The material shall be a soil or soil-rock mixture, free of organic matter or other deleterious substances. Within 3 feet of finished grade, the compacted fill shall contain no rocks or lumps over 3 inches in diameter and none that are more than 15 percent larger than 2-1/2 inches. Rocks greater than 3 inches in diameter shall be placed in deep fills as approved by the Geotechnical Engineer Representative; so that they are not nested and so compaction may be achieved around them.

4.2 If imported materials are needed or desired by the Contractor, or when “non-expansive” file is specified, they must be approved by the Geotechnical Engineer Representative prior to transporting the fill to the project. The proposed import fill shall be submitted to the Geotechnical Engineer for approval and appropriate testing no less than 5 working days before the expected delivery to the Site. Unless otherwise exempted by the Geotechnical Engineer, they shall meet the requirements per Section 3.04 of the Geotechnical Report.

5. Placing, Spreading, and Compacting Fill

5.1 The fill shall be placed in uniform lifts of not more than 8 inches in uncompacted thickness. Each layer shall be spread evenly and shall be thoroughly blade mixed during spreading to
obtain uniformity of material. Before compaction begins, the fill shall be brought to a water content (as directed by the Geotechnical Engineer Representative) that will permit required compaction by either (1) aerating the material if it is too wet, or (2) spraying the material with water if it is too dry.

5.2 After each layer has been placed, mixed, and spread evenly, it shall be compacted, except as noted for pavement subgrade (see Paragraph 10 in this specification section) as follows:

Minimum relative compaction: 90 percent

Minimum moisture content: 2 percent over optimum for clay soils and at near optimum moisture content for “Non-expansive” fill and granular soils.

5.3 The Contractor shall use appropriate equipment to compact the fill to the specified density. Compacting shall be performed while the fill is within the specified range of moisture content. Each layer shall be compacted over its entire area, and the compacting equipment shall make enough passes to achieve the required density.

5.4 Fill placed on slopes shall be compacted by means of suitable equipment. Benching of the slopes shall be done in increments of 3 to 5 feet in height until the fill is brought to its specified height, or as determined by the Geotechnical Engineer Representative. To permit proper compaction of the outer limits of fill slopes, the slopes should be over built about 1 foot horizontally and then cut back to grade.

5.5 When sheepsfoot rollers are used for compaction, the density tests shall be taken in the compacted material below the surface disturbed by the roller. When these tests indicate that the density of any layer of fill, or portion thereof, is below the required density, it shall be reworked until the required compaction has been obtained.

5.6 Soil shall not be placed or compacted during periods of rain or on ground which is not drained of water. Soil which has been moistened by rain or other cause shall not be compacted until the moisture content is within the limits specified in Paragraph 5.2 above, or as approved by the Geotechnical Engineer Representative.

5.7 Proof-roll finish subgrade below the building slabs and pavements and where requested by the Geotechnical Engineer Representative, with a heavy pneumatic-tire (e.g. loaded water truck) to identify soft pockets and areas of excessive yielding. Do not proof-roll wet or saturated subgrade.

5.8 Building pad subgrade and foundation excavations require periodic moistening to prevent drying of the subgrade soil. The Geotechnical Engineer Representative must check moisture conditions in the subgrade soil and foundation excavations 48 hours prior to the placement of rock base or concrete.
6. **Backfilling Trenches**

6.1 Geologic exploratory trenches (or other depressions), if any, within the proposed building or pavement areas, shall be re-excavated and backfilled to meet the requirements for compacted fill, as specified above.

6.2 The utility trenches extending under the perimeter foundation and concrete slabs-on-grade require backfilling or plugging with impermeable soils at the building line and extending two feet into and beyond the building line. Trench backfill will be compacted to a minimum 90 percent relative compaction at a minimum of 2 percent over-optimum moisture content, except the upper 8-inches of backfill beneath pavement areas shall be compacted to a minimum of 93 percent relative compaction. Ponding (flooding) or jetting of trench backfill is not permitted.

6.2 Utility trenches that parallel the sides of the buildings shall be placed so that they do not extend below a line sloped down and away at a slope of 2H:1V (horizontal to vertical) from the bottom outside edge of the perimeter foundations (i.e., the base of the grade beam systems or the base of the exterior footings for the reinforced slab on grade floors).

6.3 Trench Excavation and Shoring: The Contractor shall provide the District and the Geotechnical Engineer with a letter identifying the company’s “Competent Person” overseeing excavation activities, and a copy of the company’s current OSHA permit. The Contractor shall also submit for approval a trench excavation safety plan conforming to Sections 5-1.02A and 7-1.01E of the California State Standard Specifications.

7. **Removing Subsurface Pipes**

7.1 The Geotechnical Engineer Representative shall designate the methods of removal of subsurface pipes. Depending upon depth and location, one of the following methods shall be specified:

7.1.1 Pipes larger than 6 inches in inside diameter or as shown on the Drawings shall be removed, and the trench shall be filled and compacted according to applicable requirements for compacting native soil (Paragraph 3 of this specification section) or fill (Paragraph 5 of this specification section).

7.1.2 Pipes less than 6 inches in diameter may be left in place unless they interfere with new construction provided they are filled with a sand cement slurry or cement grout.

7.2 If discovered as a differing site condition, any existing wells on the Site shall be filled, buried and capped according to the requirements of the local regulatory agency. The final elevation of the top of the well casing shall be a minimum of 36 inches below any adjacent grade at the completion of grading or filling. Under no circumstances should structural foundations be placed over the capped wells unless otherwise permitted by the Geotechnical Engineer Representative.
8. **Grading Slopes**

8.1 Slopes shall be graded at gradients no steeper than 2:1 (horizontal to vertical) for fill and cut, unless approved by the Geotechnical Engineer Representative.

8.2 After the slopes have been graded, they shall be track-rolled, and provisions shall be made for planting the slopes for erosion control. Drainage facilities shall be constructed to prevent water from flowing over slopes. No slope shall be left to stand through a winter season without erosion control.

9. **Installing Subdrains**

9.1 For subdrains, the contractor shall provide and install perforated pipe Standard Designation Ratio (SDR) 23.5 or equivalent approved by the Geotechnical Engineer and filter material for subdrains as shown on the Drawings or as directed by the Geotechnical Engineer. The following restrictions apply:

9.1.1 Clay drain tile, concrete drain tile and perforated clay pipe shall not be permitted. Use no wyes, tees, or other joints of these materials.

9.1.2 Porous concrete pipe, perforated asbestos-cement pipe, bituminous fiber or pipe of other materials shall be permitted only on written authorization of the Geotechnical Engineer.

9.1.3 The Contractor shall use Caltrans Class 2 permeable material, or as otherwise approved by the Geotechnical Engineer. Where the use of 1/2 by 3/4 inch drain rock is allowed, it must be wrapped within a filter fabric approved by the Geotechnical Engineer, unless otherwise permitted by written authorization from the Geotechnical Engineer. Filter fabric is not needed if Caltrans Class 2 permeable material is used.

9.1.4 Unless recommended otherwise by the Geotechnical Engineer Representative, the Contractor shall use pipes not less than 4 inches in diameter for lateral drains up to 50 feet in length. Use pipes of not less than 6 inches in diameter for lateral drains greater than 50 feet in length. Larger minimum pipe diameters may be specified by the Geotechnical Engineer during construction.

9.1.5 All retaining walls must be drained by providing a perforated horizontal pipe (SDR 35, or equivalent) behind the wall or other method deemed acceptable by the Geotechnical Engineer. The subdrain pipe must be placed no greater than 2 inches off the bottom of a gravel drain placed at the top of the heel of the wall footing and drained to an acceptable outlet. The subdrain pipe must be a minimum of 4-inches in diameter and lie at a minimum 1 percent slope gradient. The minimum 12-inch gravel drain composed of Caltrans Class 2 permeable material shall extend to within 18-inches of the surface, with the remainder of backfill consisting of compacted, relatively impervious, native soil material.
10. **Pavement**

10.1 The original ground on which the fill and pavement section are to be placed shall be plowed or scarified at least 12 inches and until the surface is free from ruts, hummocks or uneven features, which would tend to prevent compaction. The pavement sections presented in the Drawings and Specifications are preliminary and are subject to modification based on the results of R-value tests performed on the subgrade soils after grading is completed. The pavement section requires the following construction criteria:

10.1.1 Remove organic and deleterious materials from all pavement subgrade. Areas of existing asphaltic concrete section that are disturbed from existing tree roots may require additional subexcavation and recompaction, and even the placement of subgrade stabilization geotextile fabric in order to provide a stable subgrade.

10.1.2 Moisture condition the upper 12 inches of subgrade soil and compact it to a minimum relative compaction of 95 percent and to a moisture content of at least 2 percent over the optimum moisture content. All pavement subgrade should be stable with no “pumping’ at the time the base rock is placed, and will be “proof-rolled under as requested and under the review of the Geotechnical Engineer.

10.1.3 Use only good quality materials of the type and minimum thickness specified. All baserock shall meet the Caltrans Standard Specifications for Class 2 baserock and should be angular in shape.

10.1.4 Compact the baserock uniformly to a minimum relative compaction of 95 percent.

10.1.5 Place the asphaltic concrete only during periods of fair weather and not raining when the free air temperature is within the prescribed limits as set forth by the Asphalt Concrete Institute.

10.1.6 Compact all trench backfill under the pavement to reduce fill settlement and minimize pavement damage that may result from such settlement. Mechanical compaction is required. Compaction by jetting or ponding is not permitted.

10.1.6 Provide adequate drainage or V-ditch systems to prevent surface water from migrating into the subgrade pavement soil from behind curb-and-gutter sections. For areas where pavement abuts landscaping, the concrete curb shall be extended a minimum of 2 inches below the base of the baserock to form a cut-off wall to prevent water from migrating into the baserock.

11. **Dewatering**

11.1 The Contractor shall anticipate the need to dewater the Site and therefore, dewatering equipment necessary to drain and keep excavations free of water under all circumstances shall be provided, operated, and removed by the Contractor when work is completed.
11.2 Contractor shall obtain the Geotechnical Engineer’s approval of the proposed method of
dewatering, and comply with all requirements, including the payment of any fees or charges by
the City of San Pablo or agency having jurisdiction, and to legally dispose of surface and
groundwater.

11.3 Surface water shall be prevented from flowing into the excavations. Accumulated water
shall be promptly removed.

11.4 Dewatering systems shall be maintained in-place until construction work below
groundwater level is completed.

12. Foundations

12.1 Foundation excavations shall be per the lines and grades shown on the Drawings.

12.2 The Geotechnical Engineer Representative must review the foundation excavation for
acceptance prior to the placement of reinforcement steel. Where the bearing soils are
determined to be too soft, overexcavation and replacement with lean concrete or compacted
engineered fill will be required.

12.3 The Geotechnical Engineer Representative must determine if bearing soils are at an
acceptable moisture condition. Moisture condition includes drying soils that are too wet and
adding water to soils that are too dry.

13. Unusual Conditions

13.1 If unusual conditions occur during grading, the Geotechnical Engineer shall be immediately
notified for recommendations.

END OF SECTION 01552
PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Cast-in-place concrete, including reinforcement, concrete materials, mix design, placement procedures, and finishes.

1. Include concrete retaining walls.
2. Include special proportioning procedures and admixtures to reduce moisture vapor emissions through interior concrete slabs on grade.
3. Include responsibility for providing floor slabs that meet manufacturers' moisture and alkalinity limitations for finish floor coverings.
4. Include special materials and procedures for concrete exposed to weather.
5. Include integral hydrophobic and anti-corrosive concrete admixture system in concrete locations described in Part 2.

B. Referenced Sections:

1. Section 012500 - Substitution Procedures.
2. Section 012613 - Requests for Interpretation.
3. Section 013119 - Project Meetings.
4. Section 013300 - Submittal Procedures.
5. Section 014500 - Quality Control: General requirements for testing and special inspection.
6. Section 017123 - Field Engineering.
7. Section 017419 - Construction Waste Management and Disposal.
8. Section 018113 - Sustainable Design Requirements.
9. Section 031000 - Concrete Forming and Accessories: Preparation for placement.
10. Section 032000 - Concrete Reinforcing.
11. Section 033536 - Polished Concrete Surface Finishing.
12. Section 033542 - Concrete Sealing.
13. Section 079200 - Joint Sealants.
15. Section 096513 - Resilient Base and Accessories.
16. Section 099100 - Painting.
17. Section 312323 - Fill.
18. Section 321313 - Concrete Paving.
19. Section 323310 - Architectural Site Concrete.

C. Refer to Section 031000 for waterstops and related joint requirements.
1.02 REFERENCED STANDARDS

A. ASTM International (ASTM):
   2. C 31-12 - Practice for Making and Curing Concrete Test Specimens in the Field.
   5. C 42-13 - Methods of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
   6. C 78-10 - Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading).
   7. C 88-13 - Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
  17. C 173-12 - Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
  18. C 192-12a - Method of Making and Curing Concrete Test Specimens in the Laboratory.
  19. C 231-10 - Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
  27. C 617-11 - Practice of Capping Cylindrical Specimens.
30. C 979-10 - Specification for Pigments for Integrally Colored Concrete.
34. D 638-10 - Test Method for Tensile Properties of Plastics.
38. D 2047-11 - Test Method Static Coefficient of Friction of Polished-Coated Floor Surfaces as Measured by the James Machine.
42. E 154-08a(2013) - Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover in Crawl Spaces.
43. E 514-11 - Test Method for Water Penetration and Leakage Through Masonry.
44. F 710 - Practice for Preparing Concrete Floors to Receive Resilient Flooring.
46. E 1643-11 - Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
47. E 1745-11 - Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

B. California Code of Regulations (CCR):

1. Title 24, Part 2- California Building Code (CBC), 2013 edition:
   a. Chapter 11b - accessibility to public buildings, public Accommodations, Commercial Buildings, and Public Housing:
      1) Division 3 - Building Blocks.
         a) Section 11B-302 - Floor or Ground Surfaces.
      2) Division 4 - Accessible Routes.
         a) Section 11B-403 - Walking Surfaces.
   b. Chapter 17A - Structural Tests and Inspections.
   c. Chapter 19A - Concrete.
      1) Section 1905A - Modifications to ACI 318.

C. American Concrete Institute (ACI):
      a. 117 - Standard Tolerances for Concrete Construction and Materials.
      b. 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
      c. 211.2 - Standard Practice for Selecting Proportions for Structural Lightweight Concrete.
      d. 301-10 - Specifications for Structural Concrete for Buildings.
         1) Section 6: Architectural Concrete.
            a) 6.3.9: Repair of Tie Holes and Surface Defects.
            b) 6.3.10: Finishing.
      e. 308 - Standard Practice for Curing Concrete.
      f. 318 - Building Code Requirements for Reinforced Concrete.
      g. 503.4 - Specification for Repairing Concrete with Epoxy Mortars.

D. American Society of Concrete Contractors (ASCC):
   1. Position Statement № 24 - Tolerances for Suspended Concrete Slabs.

E. IAPMO Evaluation Service (IAPMO ES), a division of International Association of Plumbing and Mechanical Officials:
   1. IAPMO Uniform Evaluation Reports, (UER-), designated by applicable report number.

F. ICC Evaluation Service, Inc. (ICC ES), a subsidiary corporation of the International Code Council:
   1. ICC ES Evaluation Reports, Materials, Products, Methods and Types of Construction (ESR-), designated by applicable report number.

G. Public Works Standards, Inc. (PWS):

H. British Standards Institution (BS):

I. United States Green Building Council (USGBC):
   1. Leadership in Energy and Environmental Design (LEED):

1.03 DEFINITIONS

A. Water Vapor Transmission: In accordance with ASTM C 168, the steady water vapor flow in unit time through a unit area (of the actual membrane thickness).
   1. Note: Water vapor transmission is a property of the material.
B. Water Vapor Permeance: In accordance with ASTM C 168, the time rate of water vapor transmission through unit area (of the actual membrane thickness) induced by unit vapor pressure difference.
   1. Note: Permeance is a performance evaluation and not a property of a material.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Refer to Section 012613 for RFI drawing requirements.
   2. Refer to Section 017419 regarding procedures for implementing construction waste management requirements.
   3. Refer to Section 018113 regarding procedures for implementing sustainable design requirements.
   4. Refer to Section 033536 for special polished concrete requirements.
   5. Identify finish flooring manufacturers’ concrete slab vapor emission and alkalinity requirements, and coordinate concrete slab mixing and installation procedures to achieve desired results. Concrete slab requirements for finish flooring may be more restrictive than general requirements of the Contract Documents, and may require additional materials, means, or methods. Such additional materials, means, or methods shall be included as part of the work.
   6. Coordinate method of securing reinforcing and other embedded items in concrete slabs on grade without penetrating vapor barriers.
   7. Verify depth of slab depressions for waterproofing and toppings at walking decks.
   8. Verify depth of slab depressions for wood athletic floors and finish materials installed over mortar beds.

B. Preinstallation Conference: Review hydrophobic waterproofing procedures for conducting work of this Section, including:
   1. Review of mix design and mix test results.
   2. Mixing procedure.
   3. Conditions for acceptance of concrete at project site.
   4. Placement procedures.
   5. Finishing options and procedures.
   6. Curing and crack control procedures.
   7. Testing for acceptable moisture emissions, alkalinity pH levels, and relative humidity of concrete slab prior to installation of finish flooring.
   8. Effect of the above on the project schedule.
   9. Refer to requirements of Section 013119 - Project Meetings.

1.05 SUBMITTALS

A. General: Make submittals in accordance with provisions of Section 013300.

B. Product Data: For proprietary products, submit complete manufacturer's descriptive literature and specifications.
C. Shop Drawings: Submit layout drawings showing location of slab-on-grade joints.
   1. Submit large scale dimensioned plans for horizontal work having slab openings, penetrations, depressions, and steps.

D. Samples: Submit the following:
   1. Aggregate proposed for exposed finish, indicating color, texture, and size, for acceptance-review. Submit not less than 5 pounds of aggregate.

E. Quality Control Submittals: Submit the following items to Architect and Structural Engineer for information only:
   1. Design Data: Submit design mix data for each type of concrete and each compressive strength required on the Structural Contract Drawings. Submittal of mix designs shall not relieve Contractor of its responsibility to furnish concrete of proper consistency and specified strengths. Where used for concrete subject to special inspections, submit mix designs to testing laboratory for review and written acceptance.
      a. Design mix submittal shall be wet stamped and signed by a professional engineer licensed in the State of California.
      b. For each material, including admixtures and water, state water-cement ratio and maximum allowable water content.
      c. For each material, state manufacturer’s name, designation, and source.
      d. Submit shrinkage and creep factors for each type of aggregate, and each source proposed for use, for acceptance-review.
      e. For each mix design:
         1) Pay costs associated with mix design preparation.
         2) Consider concrete cover and clear distances between reinforcing bars as indicated on the Structural Contract Drawings in determining the aggregate size for mix designs. This may result in an aggregate size smaller than specified elsewhere in this Specification.
         3) Submit a schedule which identifies the locations within the structure where each mix design is proposed for use.
         4) Submit project specific 28-day shrinkage test results in accordance with Paragraph 2.14-C.
   2. Test Reports: Submit certified laboratory test reports to Structural Engineer and Building Department confirming physical characteristics of materials used in the performance of the work of this Section.
      a. Include shrinkage tests and petrographic tests on concrete with aggregate proposed for use.
   3. Placement Schedule: Prepare a placement schedule and submit to Architect and Structural Engineer for review and acceptance prior to start of concrete placement operations.
4. Field Reports: Maintain an accurate record of the items listed below. Keep records available for review at the site. Upon completion of work of this Section, deliver two copies of each record to Structural Engineer in form acceptable to Architect and Structural Engineer.
   a. Concrete Placement: Date and time of placement in each portion of schedule. Include starting and ending temperatures, humidities, and wind velocities.
5. Certificates: Provide certificate of composition of blended hydraulic cements in accordance with ASTM C 595.
7. Refer to Section 012613 for RFI drawing requirements.

1.06 SUSTAINABLE DESIGN SUBMITTALS

A. Materials & Resources Submittals: Refer to Section 018113 for additional information on LEED submittals.
   1. Letter Template for MR Credit 2: Letter template, signed by Contractor, tabulating total waste material, quantities diverted and means by which it is diverted, and statement that requirements for the credit have been met.
      a. Comply with Section 017419 Construction Waste Management and Disposal.
   2. Product Data and Certification Letter for MR Credit 4: Indicate percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.
   3. Product Data for MR Credit 5: For regional materials indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include statement indicating cost for each regional material and the fraction by weight that is considered regional.

B. Indoor Environmental Quality Submittals: Refer to Section 018113 for additional information on LEED submittals.
   1. Product Data for IEQ Credit 4.2: For paints and coatings used inside the weatherproofing system, documentation indicating chemical composition and highlighting VOC content of each product used. Indicate VOC content in grams per liter (g/L) calculated according to CFR59, Subpart D (EPA Method 24).

1.07 CLOSEOUT SUBMITTALS

A. Warranty Documentation:
   1. Submit required warranties, including waterproof floor sealer warranty.
   2. Submit manufacturer’s standard hydrophobic concrete admixture warranty document executed by an authorized company official. Manufacturer’s warranty is in addition to, and not a limitation of, other rights owner may have under the contract documents.
1.08 QUALITY ASSURANCE

A. Qualifications:
   1. Testing Laboratory Qualifications for Mix Designs: Regularly engaged and specializing, for the preceding 10 years, in the preparation of mix formulae for structural concrete.
      a. Testing laboratory shall be acceptable to the enforcement agency and the Owner.
   2. Concrete Supplier: Provide ready-mixed concrete from a concrete supplier approved by the hydrophobic concrete admixture manufacturer having a minimum of 5 years’ experience providing hydrophobic and anti-corrosive concrete admixtures on projects of similar scope and authorized to dispense the hydrophobic concrete admixture manufacturer’s waterproofing materials.

B. Field Samples: Prepare a sample of exposed concrete finish in a semi-concealed location for Architect’s acceptance-review.
   1. Vertical Concrete Sealer and Water Repellent: Test a minimum 4 foot by 4 foot area on concrete wall to be sealed. Use the manufacturer’s application instructions. Let test area protective treatment cure before inspection. Keep test panels available for comparison throughout the cleaning project.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Comply with the requirements of ASTM C 595 regarding packaging and package marking for cement delivered in package or bulk.

1.10 FIELD CONDITIONS

A. Environmental Requirements:
   1. Fly ash shall meet the recycled content requirements specified in Section 018113.
   2. Product substitutions shall be approved in writing, prior to use, by the Owner or Architect and Structural Engineer as specified in Section 017419.
   3. The actual dollar cost of the amount of this product used on the project must be tracked. The actual dollar cost shall be separated into the amount that meets the requirements of Section 017419 and amount that does not meet the requirements (for the amount of product allowed for use as a substitution as described above and in Section 017419).

1.11 WARRANTY

A. Warrant concrete floor sealer to be free from manufacturing defects for a period of 15 years. Applications completed by an approved installer in accordance with published technical data will be warranted for the suppression and control of water vapor emission, alkalinity, and relative humidity from concrete during the warranty period.

B. Provide manufacturer’s standard 10-year hydrophobic and anti-corrosive concrete admixture warranty executed by an authorized company official.
covering cost of repair of any leak in protected areas through industry-accepted and approved means.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers of Floor Leveling Compounds:
   1. Ardex, Inc., Coraopolis, PA (412)264-4240.
   2. Euclid Chemical Company, Cleveland, OH (800)321-7628.
   3. Mapei Corporation, Garland, TX (972)271-9500, with offices in Fredericksburg, VA (540)310-0111, with offices in Anaheim, CA (714)385-0155.

B. Acceptable Manufacturers of Floor Sealer Products:
   2. Euclid Chemical Company, Cleveland, OH (800)321-7628.
   5. Sonneborn Building Products, Hayward, CA (415)889-9899.

C. Acceptable Manufacturers of Vapor Retarder Products:
   1. Fortifiber Corporation, Fernley, NV (800)773-4777, with offices in Los Angeles, CA (213)266-6783, (800)443-4079.
   3. Reef Industries, Inc., Houston, TX (713)943-0070, (800)231-6074.

D. Acceptable Manufacturers of Fiber Reinforcing Products:

E. Acceptable Manufacturers of Accessory and Admixture Products:
   1. BASF Admixture Systems (formerly Master Builders Technologies), Cleveland, OH with regional resource center at (800)627-2929, (800)233-1232.

3. Custom Building Products, Bell, CA (213)582-0846.

4. Euclid Chemical Company, Cleveland, OH (800)321-7628.


9. Larsen Products Corporation, Rockville, MD (800)633-6668, represented by Frontier Building Supply, Los Angeles, CA (818)765-3865.


15. Nox-Crete, Inc., Omaha, NE (402)341-2080, (800)369-9800, and Upland, CA (714)982-3049.


17. Prosoco, Inc., Lawrence, KS (800)255-4255, www.prosoco.com, with manufacturer’s representative in Danville, CA (925)570-8884, and Santa Fe Springs, CA (310)941-0231.


19. Sonneborn Building Products, Minneapolis, MN (612)835-3434 and Hayward, CA (415)889-9899.


F. Like materials shall be the products of one manufacturer and shall be either the ones upon which the design is based or equal products of other manufacturers accepted in advance in accordance with Section 012500.

2.02 REGULATORY REQUIREMENTS

A. Regulations: Refer to Section 014500 with regard to compliance with applicable codes and regulations.

1. Comply with ACI 301 and ACI 318 for interpreting design requirements of reinforced concrete.

   a. Section 1.6.1 of ACI 301 requires that Contractor keep a copy of ACI SP-15 in the field office of any project where ACI 301 requirements are referenced.
2. Concrete floor surfaces shall have a minimum slip resistance coefficient of friction of 0.6 as tested in accordance with ASTM C 1028 or ASTM D 2047.
   a. Comply with Section 11B-403 requirements for slip resistance.

B. Waste Management: Comply with CALGreen Section 5.408 Construction Waste Reduction, Disposal and Recycling. Establish a construction waste management plan for the diverted material.
   1. Recycle or salvage for reuse a minimum of 50 percent of the non-hazardous construction and demolition waste in accordance with CALGreen 5.408.1.3.

C. Comply with CALGreen 5.504.4.3 Paints and Coatings:
   1. Architectural paints and coatings shall comply with VOC limits in Table 5.504.4.3.
   2. Aerosol paints and coatings shall comply with CALGreen 5.504.3.1

2.03 SUSTAINABILITY REQUIREMENTS

A. LEED Goals for Materials & Resources: For additional information on LEED goal requirements, refer to Section 018113.
   1. MR Credit 2 - Construction Waste Management: Recycle and/or salvage at least 75 percent of non-hazardous construction and demolition debris.
   2. MR Credit 4 - Recycled Content: Use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer content constitutes 10 percent of the total value of the materials in the project.
   3. MR Credit 5 - Regional Materials: Use building materials or products that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of the project site for a minimum of 10 percent of the total materials value.

B. LEED Goals for Indoor Environmental Quality: For additional information on LEED requirements, refer to Section 018113.
   1. IEQ Credit 4.2 Low-Emitting Materials, Paints and Coatings: Paints and coatings used on the interior of the building shall comply with the following requirements.
      a. Concrete Sealers: Do not exceed VOC content limits established in South Coast Air Quality Management District (SCAQMD) Rule No. 1113 Architectural Coatings.

2.04 CEMENT MATERIALS

A. Refer to Structural Contract Drawings.
2.05 AGGREGATE MATERIALS

A. Normal Weight Aggregate: Conform to ASTM C 33 and CBC 1903A with proven concrete shrinkage characteristics of less than 0.04 percent when tested in accordance with ASTM C 157, and proven, by past service records, not to cause alkali-aggregate reactivity (AAR). Do not change source of aggregate during course of work without prior written acceptance of the Architect and Structural Engineer.

1. Fine Aggregate: Washed natural sand consisting of hard, particles, containing not more than the maximum limits of deleterious material allowed by Table 1 of ASTM C 33.
   a. Fineness modulus shall be in the range of 2.90 to 3.10.

2. Coarse Aggregate, Structural Concrete:
   a. Clean washed gravel or sound crushed rock, containing not more than 5 percent flat, thin, elongated, or laminated material, and containing not more than the maximum limits of deleterious material allowed by Table 3 of ASTM C 33 for moderate weathering regions.
      1) Grade 1-inch aggregate from No. 100 sieve to 1 inch.
      2) Grade 1-1/2-inch aggregate from No. 100 sieve to 1-1/2 inches.
   b. Maximum Size: No larger than three-fourths of the clear space between reinforcing bars or between reinforcing bars and forms, nor larger than one-fifth of the narrowest dimension between sides of forms, nor larger than one-third of the depth of slab.
      1) Use largest size coarse aggregate available in other than mass concrete where reinforcement clearance will permit.
      2) Use largest size coarse aggregate available in mass concrete where reinforcement clearance will permit.

3. Coarse Aggregate, Site Work: Refer to Section 323310 for formed concrete used in site work.

B. Lightweight Aggregate: Coated, calcined expanded clay or shale produced by rotary kiln process, and complying with ASTM C 330.

1. Provide aggregates having a loss of not more than 8 percent if tested by sodium sulfate solution and 10 percent if tested by magnesium sulfate solution, all in accordance with ASTM C 88.

2. Maximum Size: No larger than 3/4th of the clear space between reinforcing bars or between reinforcing bars and forms, 1/5th of the narrowest dimension between sides of forms, 1/3rd of the depth of slab, with a maximum size of 3/4-inch.

3. Acceptable types include Hydralite, Ridgeline, Rocklite, or equal.

2.06 OTHER CONCRETE MATERIALS

A. Steel Reinforcement: Refer to Section 032000.

B. Water: Clean and free from deleterious amount of acids, alkalis, salts, or organic materials.

C. Fibrous Reinforcement: Micro-fiber type.

1. Comply with ASTM C 1116, Type III, Section 4.1.3 and ASTM C 1116 Performance Level 11 as outlined in Section 21 Note 17. Fibers must be 1-1/2 inches in length. Provide one of the following, or equal:
2.07 ADМИXTURES AND ADDITIVES

A. General: Provide admixtures and additives produced by established manufacturers.
1. Do not use admixtures and additives which have not been incorporated and tested in accepted combinations and mixes.
2. Do not use admixtures without written acceptance of the Architect and Structural Engineer.
3. Admixtures containing chlorides will not be permitted.

B. For compatibility, admixtures and additives shall be produced by the same manufacturer. The following admixtures may be used only with the written acceptance of the Architect and Structural Engineer.
2. Water Reducing: Design is based on the use of Kel-Crete Admixture, manufactured by Kel-Crete Industries, Eucon Series manufactured by Euclid Chemical Company, or equal. Conform to ASTM C 494, Type A. Provide a polymer-based admixture which enhances the characteristics of concrete to extent no less beneficial than the following:
   a. Water Reduction: Not less than 5 percent.
   b. Increase in Compressive Strength: Not less than 10 percent at age 28 days.
   c. Dry Shrinkage: At age 21 days, less than concrete without admixture.
3. High-Range Water Reducing Type: Design is based on the use of MasterRheobuild 1000 (formerly Rheobuild 1000), manufactured by Master Builders Solutions (BASF), Eucon or Plastol Series by Euclid Chemical Company, or equal. Conform to ASTM C 494 Type F.
4. Air Entraining: Conform to ASTM C 260. Design is based on one of the following:
   a. Kel-Crete Admixture, manufactured by Kel-Crete Industries.
   b. Nox-Aire, manufactured by Nox-Crete.
   c. Eucon AEA or Eucon Air Series manufactured by Euclid Chemical Company.
5. Water Repelling: Design is based on the use of Sika Corporation Sikamix W-10 Water Repelling and Efflorescence Controlling Admixture, or equal conforming to ASTM E 514.

6. Plasticizer: Conform to ASTM C 494, Type F. Design is based on the use of Kel-Crete Admixture, manufactured by Kel-Crete Industries.

C. Superplasticizers: Refer to Paragraph 2.07-B.3 High-Range Water Reducers.

D. Integral Waterproofing Admixtures: ASTM C 494, Type S; complex catalyzed hydrous silicate, crack-reducing, water and vapor proofing liquid admixture.

1. Basis-of-Design Product: Subject to compliance with requirements, provide MOXIE International, Moxie Shield 1800 Admixture, or comparable product by one of the following:
   a. System W1000, manufactured by Hycrete, Inc.
   b. MasterPel, manufactured by BASF Admixture Systems.
   c. Xypex Admix C-500, manufactured by Xypex Chemical Corporation.
   d. Eucon Vandex AM-10, manufactured by Euclid Chemical Company.

2. Properties:
   a. Water/Cement Ratio: Maximum 0.52.
   b. Water Vapor Transmission: Less than 0.1 perms .
   c. Water Seepage or Permeability: Not to exceed 7.00 x 10-9 cm/s at 50 psi.

E. ASR Control Admixture:
   1. Euclid Eucon Integral ARC, or equal, manufactured by Euclid Chemical Company.

2.08 VAPOR RETARDERS

A. Vapor Retarder, Class A: Conform to ASTM C 755.

1. Reinforced high density polyethylene or mylar geomembrane, minimum 15 mils thickness, having the following properties:
   a. Water Vapor Permeance: 0.02 Perms maximum, in accordance with ASTM E 154 Section 7.
   b. Underslab Vapor Retarder Classification: Class A, in accordance with ASTM E 1745.
   c. Puncture Resistance: 2200 grams minimum, in accordance with ASTM D 1709 Method B.
   d. Tensile Strength: 45 lbf/in minimum, in accordance with ASTM E 154 Section 9, Method ASTM D 882.

2. Products: One of the following, in accordance with ASTM E 1745:
   b. Viper VaporCheck II 15-mil Class A, manufactured by Insulation Solutions.
   c. Vapor Block 15, manufactured by Raven Industries.
   d. Griffolyn Type 105, manufactured by Reef Industries.
   e. Stego Wrap 15-mil Class A Vapor Barrier manufactured by Stego Industries.
   g. Florprufe 120, manufactured by Grace Construction Products.

B. Subslab Waterproofing (At Floor Slabs Subject to Minor Hydraulic Moisture Pressures Including All Gymnasium Floors): Vapor barrier under slab on grade with low hydraulic moisture pressures or wet soils. Conform to ASTM C 755.

1. Reinforced high density polyethylene (HDPE), mylar geomembrane, or 1/8-inch thick pre-molded membrane having the following minimum properties:
   a. Water Vapor Permeance: 0.005 Perms maximum, in accordance with ASTM E 96.
   b. Water Vapor Barrier Classification: Class A, in accordance with ASTM E 1745.
   c. Puncture Resistance: 2400 grams minimum, in accordance with ASTM D 1709 Method B.
   d. Tensile Strength: 70 lbf/in minimum, in accordance with ASTM E 154 Section 9, Method ASTM D 882.

2. Products: One of the following, or equal:
   a. Alumiseal Zero Perm Vapor Barrier manufactured by Alumiseal Corporation.
   b. Griffolyn VAPORguard manufactured by Reef Industries.
   c. Stego Wrap 15-Mil Class A Vapor Barrier manufactured by Stego Industries.
   d. Pre-Molded Membrane vapor seal with plasmatic core manufactured by W.R. Meadows. Refer to special installation requirements in Part 3.

3. Accessory Products: Provide vapor proofing mastic, pipe boots, and related accessory products recommended by manufacturer of vapor retarder.

C. Subslab Waterproofing (At Floor Slabs Subject to Ground Water Intrusion Identified in the Geotechnical Report): Refer to horizontal blind-side waterproofing specified in Section 071353.

D. Seam Tape:
   1. High density reinforced polyethylene vapor retarding seam tape with pressure sensitive adhesive as recommended by manufacturer of vapor/radon barrier for product accepted for use. Minimum 4 inches in width and of a contrasting color.
2.09 LIQUID CURE/ SEAL SYSTEMS

A. Floor Liquid Curing Compound Type FCC: For use on concrete slabs that will be exposed with separately applied floor sealer finish, or on slabs that will be covered by breathable floor coverings or mortar beds.
      a. Compound shall be a water-based non-staining dissipating translucent resin, conforming to ASTM C 309, Type 1, Class B.
      1) Sodium silicate compounds will not be permitted.
      b. Product shall be compatible with subsequently applied toppings (sealers, hardeners, finishes, or coverings).

B. Floor Remedial Vapor Emission and Alkalinity Control Sealer Type FCS: For remedial use on concrete slabs on grade that do not meet manufacturer's specific moisture emission and alkalinity limits for non-breathable floor finishes, refer to Section 033542.

C. Evaporation Retardant: Use in conjunction with hot weather concreting:
   1. E-Con, manufactured by L&M Construction Chemicals.
   2. Confilm, manufactured by BASF Admixture Systems.
   3. Sika Film, manufactured by Sika Corporation.
   4. Eucobar, manufactured by Euclid Chemical Company.

D. Reactive Chemical Concrete Stain (for use with Alternate No. 1): Lithochrome Chemstain Classic Reactive, as manufactured by L.M. Scofield, water-based solution of metallic salts which react with calcium hydroxide in cured concrete substrates to produce permanent variegated or translucent color effects. Zero VOC content.
   1. Sealing Compound: Curesel-VOC,
   2. Color: As selected by Architect for color compatible with interior application.

2.10 GROUT MATERIALS

A. Patching Mortar:
   1. Horizontal: Polymer modified portland cement mortar for horizontal patching, equal to:
      a. Durapatch Industrial, manufactured by L&M Construction Chemicals.
      b. Embeco R310, manufactured by BASF Admixture Systems.
      c. ProSpec Vinyl Concrete Patch, as manufactured by Bonsal American.
      d. Euco-Speed or Express Repair, manufactured by Euclid Chemical Company.
   2. Vertical: Polymer modified portland cement mortar for vertical and overhead patching, equal to:
      a. Durapatch VOH, manufactured by L&M Construction Chemicals.
      c. ProSpec Vertical Leveling Mortar, as manufactured by Bonsal American.
d. EucoRepair V100 or Verticoat Supreme, manufactured by Euclid Chemical Company.

B. Non-Shrink Cementitious Grout: Special purpose precision mineral aggregate grouts, selected and utilized for each special application as recommended by manufacturer. Grout shall be prepackaged, non-metallic, non-gaseous. It shall be non-shrink when tested in accordance with ASTM C 1107 at a fluid (flow cone) consistency of 20-30 seconds. Grout shall attain 8000 psi compressive strength in 28 days at above flow and shall not bleed. Provide one of the following products:
1. DuragROUT, manufactured by L&M Construction Chemicals.
2. Five Star Grout, manufactured by Five Star Products.
4. Masterflow 928 (with extended working time), manufactured by BASF Admixture Systems.
5. ProSpec High Strength Precision Grout, or ProSpec C-1107 Construction Grout, as applicable, manufactured by Bonsal American.
6. NS Grout, manufactured by Euclid Chemical Company.

C. Non-Shrink Epoxy Grout: One of the following, or equal:
1. Five Star Epoxy Grout, manufactured by Five Star Products.
2. Epogrout, manufactured by L&M Construction Chemicals.
3. E3 Series Epoxy Grout, manufactured by Euclid Chemical Company.

2.11 ACCESSORY MATERIALS

A. Granular Fill: For use under concrete slabs on grade, refer to Geotechnical Investigation and Section 312323.

B. Curing Barriers:

C. Chemical Bonding Agent: Film-forming, freeze-thaw resistant, acrylic latex emulsion compound suitable for brush or spray application, complying with ASTM C 1059, Type II. Provide one of the following products:
1. Weldcrete, manufactured by Larsen Products Corporation.
3. Everbond, manufactured by L&M Construction Chemicals.
4. ProSpec Acrylic Additive, manufactured by Bonsal American.
5. LevelTop SP, manufactured by Euclid Chemical Company.
6. At Contractor’s option, provide the following product instead of the above products:
a. Long Open Time Bonding Agent Containing a Corrosion Inhibitor: Duralprep A.C. three-component, pre-proportioned, VOC compliant, water-based epoxy modified portland cement, manufactured by Euclid Chemical Company.

D. Floor Leveling Compound: Two-part acrylic polymer latex concrete equal to one of the following:
2. Levelex, manufactured by L&M Construction Chemicals.
3. Level-Right Plus, manufactured by Maxxon Corporation.
4. ProSpec, Level Set 300 Series, type appropriate to specific application, manufactured by Bonsal American.

E. Floor Patching Materials:
   1. Tamms Thin Patch or Tammspatch II, manufactured by Euclid Chemical Company.
   2. Sakrete Fast Setting Cement Patcher.
   3. ProSpec Floor Patch Pro, manufactured by Bonsal American.

F. Skim Coat: Blended compound of portland cement, graded silica aggregates, and special chemical additives formulated for bonding, smoothing, rubbing, and thin coating concrete surfaces, equal to Pavecrete manufactured by Lyons Manufacturing or Rapid Set WunderFixx manufactured by CTC Cement or Tamms Cement Wash, manufactured by Euclid Chemical Company.
   1. Bonding Agent: Manufacturer's Type II acrylic bonding agent, when applicable. Do not use PVA Type I bonding agents.
   2. Integral Color: Color shall be selected by Architect.
      a. Pigment: SGS ColorFlo Liquid iron oxide color pigments, as manufactured by Solomon Colors, Color-Crete, manufactured by Euclid Chemical Company, or equal, in accordance with ASTM C 979.
      b. Admixture: Chromix-L manufactured by L.M. Scofield Products, or equal product manufactured by Davis Colors.

G. Aggregate for Non-Slip Finish (at Steps): Aluminum oxide grits or crushed emery, factory-graded, packaged, rust-proof and non-glazing:
   1. Grip It, manufactured by L&M Construction Chemicals.
   2. Frictex, manufactured by Sonneborn Building Products.

H. Geotextile Fabric: Mirafi 500X, or equal.

I. Fasteners: Sizes, types, and embedment as indicated on Contract Drawings. Post-installed fasteners as manufactured by Hilti Inc., Sika Chemical, or equal.
   1. Anchors: Equal to Hilti HIT-RE 500-SD conforming to ICC ESR 2322.
   3. Shot Pins: Shot pins shall be low velocity with minimum 3/4-inch embedment.
   4. Through Dowels: Equal to Sika Sikadur 35 High Mode LV.

J. Isolation Joint Sealant: In accordance with Section 079200. Provide polyurethane type compatible with fiber joint filler.

K. Metal Dividers: Standard white metal (zinc) dividers with integral anchors, 1/8-inch by 1-1/4-inches minimum depth, one piece at each opening, unless otherwise indicated on Structural Contract Drawings.

2.12 PROPORTIONING

A. Mix Designs:
   1. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
2. Proportioning Structural Lightweight Concrete: Comply with ACI 211.2 recommendations.

3. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
   a. For trial mixtures method, employ independent testing agency acceptable to Architect and Structural Engineer for preparing and reporting proposed mix designs.

4. Accurately control the proportions, water content, and air content. Use weighing equipment accurate to within 1 percent for cement and 2 percent for aggregates, and adjustable for varying aggregate moisture content. A beam auxiliary shall register any part of the last 100 pounds of each aggregate. The aggregate hopper shall have a volume adjustment.
   a. Proportion concrete by weight of loose, dry material.
   b. Fine aggregate volume shall be at least 35 percent (approximate proportion of 1 part to 2 parts) of the sum of the separate fine and coarse aggregate volumes.

5. Design mix to produce shrinkage test results in accordance with 2.14-C.

B. Vapor Emission and Alkalinity Control Procedures: At interior slabs, implement the following provisions to reduce vapor emissions to levels recommended by manufacturers of floor finish materials used on this Project:

1. Comply with requirements of this Section for installation, curing, sealing, and protection of subslab moisture barrier.

2. Do not cover subslab vapor retarder with sand cushion. Concrete slabs-on-grade must come in contact with vapor retarder.

3. Concrete Mix:
   a. Concrete compressive strength shall be as indicated on the Structural Contract Drawings.
   b. Slabs-on-Grade: Water to cement content shall not exceed a ratio of 0.42 upon delivery at site, nor 0.45 when placed.
   c. Other Concrete Not in Contact with Soils: Water to cement content shall not exceed a ratio of 0.45 upon delivery to site, or 0.48 when placed.
   d. Additional admixtures may be used in the same concrete batch, provided such admixtures are added separately and the combination has been determined by independent laboratory testing to have no deleterious effect on the concrete. Do not use calcium chloride admixtures.

4. Provide "continuous moisture" curing for slabs-on-grade as specified in Article 3.07-A - Curing Slab Areas.

C. Fibrous Reinforcing: Add fibers in the amount of 1.0 pound per cubic yard of concrete in accordance with fibrous reinforcing manufacturer's instructions and recommendations for uniform and complete distribution.

D. Admixture: If admixture is proposed for use by concrete supplier, conform to types accepted by Architect and Structural Engineer in writing. Quantity per sack of cement and method of using admixture shall be in
accordance with recommendations of manufacturer and laboratory furnish-ning mix design.

1. Integral Waterproofing Admixture: Refer to manufacturer’s recom-mendations for dosage.

E. Patching Mortar: Combine dry mix with liquid and add water in propor-tions recommended by patching mortar manufacturer.

2.13 MIXING CONCRETE

A. General: The minimum ultimate 28-day compressive strength of concrete shall be controlled in accordance with requirements on Contract Structural Drawings. Mixes may be established by a qualified person based upon previously proven mixes and material tests made by a recognized testing agency.

1. Slump: As indicated on the Structural Contract Drawings, and deter-mined in accordance with ASTM C 143 and ACI 301.

2. Integral Waterproofing Admixture: Refer to manufacturer’s recom-mendations for mixing.

B. Weather Requirements:

1. Hot Weather Usage: Adjust mix as required to counteract effects of anticipated or probable hot weather on strength of concrete. Conform to ACI recommendations of regarding admixtures, temperature of mixing water, and delivery times.

a. During hot weather, proper attention shall be given to ingredi-ents, production methods, handling, placing, protection and cur-ing to prevent excessive concrete temperatures or water evaporation that may impair required strength or serviceability of the member or structure.

b. When air temperature is between 85 degrees F. and 90 degrees F, limit mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 degrees F, limit mixing and delivery time to 60 minutes.

C. Transit-mixed Concrete: Mix in accordance with provisions of ASTM C 94.

1. With each load, provide ticket certifying the materials and quantities as well as compliance with the accepted mix design.

2. On the transit mix ticket, state the time water was first added to the mix.

3. At the batch plant, withhold 2-1/2 gallons of water per cubic yard of concrete.

4. Upon arrival at the job site, as directed by the Testing Laboratory Inspector, add all or part of the withheld water before the concrete is discharged from the mixer.

5. Mix concrete for not less than 5 minutes after the withheld water has been added, and not less than 1 minute of that time immediately prior to discharge of the batch.

a. Drum shall rotate approximately 70 to 100 revolutions at a mixing speed of approximately 6 to 18 rpm.

b. After mixing, drum shall rotate at an agitating speed of approxi-mately 2 to 6 rpm.
c. Unless otherwise directed, provide 15 minutes total mixing per batch after first addition of water.

6. Discharge of the concrete shall be completed within 90 minutes after water is introduced into the mix, or before the drum has completed 300 revolutions.

2.14 SOURCE QUALITY CONTROL

A. Tests for Concrete Materials at Batch Plant: Utilizing batch plant test records, perform the following tests in accordance with provisions of the building code:

1. Cement: Sample and test cement, or provide mill test reports, as accepted, certifying that the cement conforms to the requirements of this Specification.

2. Aggregate:
   a. Sample and test concrete aggregate for grading and soundness before concrete mix designs are established.
   b. Test aggregate for shrinkage characteristics in accordance with ASTM C 157.
   c. Conduct petrographic examinations of aggregate proposed for use in accordance with ASTM C 295.

3. Air Content: ASTM C 173, volumetric method or ASTM C 231, pressure method. One test for each set of compressive strength test specimens.

4. Refer to Article 3.14 - Field Quality Control for testing of actual concrete mix and placement.

B. Inspection: Accompany each load of materials or concrete with a signed copy of batch plant’s certificate stating quantity of each material, design strength, amount of water added at plant, admixtures, departure time and date, and maximum amount of water allowed to be added at site.

C. Shrinkage Test:

1. Before placing any concrete, prepare a trial batch of the mix design, using the same aggregates, cement, and admixtures (if any) proposed for use on the project. Prepare at least three specimens for determining the drying shrinkage of the mix design.

2. The drying shrinkage specimens shall be 4" x 4" x 11" prisms, made, cured, dried, and measured as specified in ASTM C 157. Measure and report separately for 7, 14, 21, and 28 days of drying. After 7 days of moist curing. The effective gauge length of the specimens shall be 10 inches.

3. The average drying shrinkage of the test specimens after 28 days of drying shall not exceed 0.045 percent for footing and grade beams, and 0.025 to 0.030 percent for all other locations. Use adequate amount of shrinkage reducing admixture as required.
PART 3 - EXECUTION

3.01 EXAMINATION

A. Verification of Conditions:
   1. Verify elevations and depressions of floor finishes, and be responsible for final excavation required for foundations and footings prior to placing concrete.
      a. Conform to the administrative requirements of Section 017123.
   2. Notify Architect and Structural Engineer 48 hours before scheduled start of placing concrete to permit Architect's and Structural Engineer's observation of excavations, forms, reinforcement, and embedded items before concrete is placed.
   3. Verify locations of proposed and future breathable and non-breathable floor finishes in advance of placing concrete to determine type of floor sealers to be applied in finishing operations.
   4. Verify that formwork is properly located such that the unshored concrete will maintain specified tolerances after forms are removed.

B. Verification for Commissioning:
   1. CxA will perform site observation of the initial under slab vapor retarder as part of BECx.

3.02 PREPARATION

A. Forms: Immediately before start of pour, remove foreign matter accumulated in forms. Close ports and openings left in formwork.
   1. Clean rough surfaces to be bonded in accordance with CBC 1905A.7, and as follows:
      a. The surface of horizontal construction joints shall be cleaned and roughened by removing the entire surface and exposing clean aggregate solidly embedded in mortar matrix.
      b. In the event that the contact surface becomes coated with earth, sawdust, or other contaminants after being cleaned, the entire surface so coated shall be re-cleaned.

B. Vapor Retarder: Install vapor retarder over subbase in accordance with ASTM E 1643 as required by slab floor finish requirements. Where integral waterproofing admixture is used in concrete mix at slabs on grade, vapor retarder may be omitted at the discretion of the Architect.
   1. Roll subgrade smooth before placing vapor retarder.
   2. Lap joints minimum 6 inches. Tape and seal all penetrations and laps with high density polyethylene pressure sensitive tape and mastic. Turn up edges of vapor retarder 2 inches at vertical surfaces. Attach pipe boots accordance with manufacturer's recommendations.
   3. Do not cover with additional subbase material. Place concrete directly on vapor retarder.
   4. Avoid grade staking through vapor retarder.
   5. Repair damaged areas of vapor barrier with overlapping patches of vapor barrier secured with pressure sensitive tape.

C. Subslab Waterproofing: Install premolded waterproof membrane directly over tamped grade under areas to receive wood flooring. The polyfilm
(logo) side of the board is placed down to the grade with the felt side up to the concrete.

1. Material is placed in position in either the "Dutch lap" method with laps sealed with manufacturer's catalytic bonding asphalt, or by the "butt-joint" method with joints sealed with manufacturer's detail strips.
2. Extend waterproofing to down face of adjacent footings 12 inches, or horizontally 5 feet from edge of wood flooring above.
3. Use under all moisture-sensitive floor finishes and floors in rooms adjacent to below grade walls.

D. Equipment: Thoroughly clean tools and equipment used in transporting, placing, and consolidating concrete immediately before and after each pour.

### 3.03 PLACING AND COMPACTING

A. Pouring Schedule: Pour concrete in accordance with accepted pouring schedule and construction joint layout.

B. Conveying: Acceptable methods include bucket, cart, wheelbarrow, and buggies. Pumps or belts shall be used only for mixes specifically designed for conveying by such methods.

C. Placing: Place concrete continuously between predetermined construction and control joints. Keep surface of concrete level throughout, without flow from one position to another. Deposit at such a rate that mix is plastic and flows readily into space between bars.
   1. Sloped slabs shall be placed uniformly from established points and lines.
   2. Comply with the requirements of CBC 1905A.10.

D. Compacting:
   1. General: Spade, rod, vibrate, and consolidate concrete in forms. Vibrators shall not be left in any one spot longer than 30 seconds and shall be kept constantly in motion. Insert and remove vibrators vertically. One vibrator shall be assigned to each location where concrete is being placed and a standby vibrator shall be kept ready at all times. Avoid creating rock pockets, air bubbles, honeycomb, or separation of ingredients.
   2. Work concrete thoroughly around reinforcement and embedded items and into corners and angles of forms by spading, rodding, and tamping.
   3. Consolidation: Vibrate to consolidate each layer with previously placed layers, completely embedding reinforcing and fixtures, and bringing fine material to surface of slab to produce proper finish.

E. Compression Test Specimens: Prepare in accordance with Article 3.14 - Field Quality Control.
F. Slab-on-Grade: Install control joints and construction joints in accordance with Article 3.10 - Control Joints. Set screeds. Rod, tamp, and float to indicated levels and slopes. Maintain reinforcing at proper levels. Slabs depressed to receive finishes specified in other Sections shall be screed-ed and tamped.
   1. Over vapor retarder use screed pads to hold screed posts.
   2. Comply with ACI recommendations at concrete slabs to reduce plastic and drying shrinkage cracks.

G. Reinforcement: Clean bars extending through construction joints while concrete encrustation is soft.

H. Hot Weather Placing: Comply with ACI recommendations regarding placing of concrete during hot weather.
   1. Take accepted measures to reduce evaporation and temperature of concrete during hot, dry weather.
   2. Be prepared to use fog spray or evaporation retarder when required by the Architect and Structural Engineer, or when rate of evaporation exceeds 0.2 pounds per square foot per hour.

3.04 TOLERANCES

A. Tolerances for Concrete Construction and Materials shall conform to all requirements of ACI 117, Standard Specifications for Tolerances for Concrete Construction and Materials, published by the American Concrete Institute, except as modified by the requirements of these Specifications.
   1. Formed Surfaces: Maintain bowing, warping, and dimensional tolerances within the maximum tolerances stated in ACI 117 for Class A surfaces.
   2. Concrete Slabs: Floor finish tolerances shall be measured in accordance with ASTM E 1155 Standard Test Method for Determining Floor Flatness and Levelness Using the F-Number System (Inch-Pound Units) for the following conditions:
      a. Typical Slabs-on-Grade:
         1) Floor profile quality classification of Flat with a minimum $F_T 30$ and $F_L 20$.
      b. Typical Supported Slabs:
         1) Flatness shall not vary more than 5/16-inch in any direction along a freestanding 10-foot unleveled straightedge.
         2) Levelness: Floors must be level, and the elevation of the top surface shall fall within a 3/4-inch envelope in accordance with ASCC Tolerances for Suspended Concrete Slabs, unless part of a sloping floor or as otherwise noted.
      c. Fitness, Training, and Similar Rooms:
         1) Depressed floors shall be level to a tolerance of 1/8-inch in 10 feet.
         2) Verify that Fitness Room floors are recessed as specified in Section 096466 and as indicated on Contract Drawings.
      d. Exposed Floors in Utility Areas:
         1) Floor profile quality classification of Flat with a minimum $F_T 15$ and $F_L 13$. 


3. Concrete Door Sills:
   a. Slabs Under Operable Partitions or Sound-Rated Accordion Doors: 1/8-inch from level along line under partition or door.

B. Levelness tolerances shall be measured within 72 hours after slab concrete placement.

C. Owner reserves the right to test floors and concrete members for conformance to ACI 117 - Tolerance Specifications by Use of the Dipstick Floor Profiler. Should tolerances not be within the limits specified, the Contractor shall be required to pay the cost of the tests, as well as the repairs required to bring work into compliance.

D. Correction Procedures:
   1. High spots on slabs which receive floor covering shall be ground down to meet specified tolerances.
   2. Low spots on slabs which are to receive floor covering shall be filled to meet specified tolerances.

3.05 FINISHING FLATWORK

   A. Screeding: Work out irregularities and bring surfaces to true finish grade or elevation. Remove excess water and debris worked to the surface during compaction and screeding.
      1. Refer to Section 321313 for finishing of site paving.

   B. Initial Troweling:
      1. Do not commence troweling until surface water sheen has disappeared.
      2. Use wood bullfloats to open top of slab to allow bleed water out.
         a. Do not use metal floats.
      3. Do not apply dry cement, sand, or water to surface.
      4. Slabs to Receive Mortar-bed with Topping or Bonded Finish: Upon completion of pour, and before concrete has hardened, texture surface of slab with stiff broom, or roughen surface.
      5. Slabs to Receive Crack Isolation Membrane or Mortar-bed with Cleavage Membrane: Finish slabs with typical smooth troweled surface.

   C. Final Troweling:
      1. Interior Slabs: Steel trowel and burnish.
         a. Do not finish slab until bleed water has evaporated.
         b. Do not apply water to the concrete during finishing.
         c. Do not allow rain water to stand on slab.
      3. Liquid Curing Compound: Where specified, apply in accordance with the requirements of this Section. If sprayed on with a low pressure sparyer, backroll with a short nap roller for uniform coverage.
      4. Sealer: Where specified, apply in accordance with the requirements of Article 3.08.

   D. Finish for Interior Stairs and Ramps:
      1. Sprinkle abrasive aggregate uniformly on unhardened surface immediately prior to finishing, at the rate of 2 pounds per square yard.
Work into surface during finishing. Rub lightly to expose abrasive aggregate while concrete is green.

2. Concrete walking surfaces shall have a minimum slip resistance coefficient of friction of 0.6 as tested in accordance with ASTM D 2047.

3. Stairs: Apply grooves and tooled edges to tread nosings in accordance with the Contract Drawings.

4. Warning stripes: Apply 2-inch wide warning stripe of 70 percent contrasting color at top and bottom nosings of each run at interior stairs, 1 inch maximum from edge of nosing.
   a. Refer to Section 321313 and Section 321316 for exterior stairs.

5. Pedestrian ramps, general:
   a. Provide medium broom finish. For concrete containing fiber reinforcing, broom once in one direction only, perpendicular to direction of traffic.

E. Scratch finish:

1. Consolidate, strike off, and level concrete, eliminating high spots and low spots.
2. Finish to 1/2-inch tolerance.
3. Roughen surface with stiff coarse broom before final set.
4. Locations:
   a. Surfaces scheduled to receive thick-set mortar beds or similar cementitious materials, except for thick-set mortar beds on cleavage membranes or on waterproofing membranes.

F. Float finish:

1. After screeding, consolidating, and straightening concrete slabs, do not work surface until ready for floating.
2. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats. The application of portland cement to slab during floating or troweling is prohibited.
3. Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and frill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.
4. Finish to straightedge tolerance.
5. Cut down high areas and fill in low areas.
6. After restraightening, refloat surface to uniform, smooth, granular texture.
7. Locations:
   a. Surfaces scheduled for trowel and broom finishes.
   b. Surfaces scheduled to receive adhered roofing or waterproofing membrane.
   c. Surfaces scheduled to receive thick-set mortar beds on cleavage membrane.

G. Trowel Finish:

1. After applying float finish, apply first trowel finish and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in
3.06 FINISHING FORMED CONCRETE

A. Surface Repairs: Repair surface defects, including defective areas and tie holes as recommended in ACI 301 Chapter 9.

B. Rough-Formed Finish: Cast concrete texture imparted by form-facing material, not arranged in any specific visual manner. Repair and patch tie holes and defective areas. Rub down or chip off fins and other projections exceeding 1/4-inch in height.
1. Apply to concrete surfaces not exposed to public view.

C. Smooth-Formed Finish: Cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Completely remove fins and other projections.
1. Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, or painting.
2. Apply the following rubbed finish, defined in ACI 301 Chapter 10 Section 10.3, to smooth-formed finished concrete.
   a. Grout-cleaned finish.

D. Painted Finish: Entire surface area exposed to view shall be free of voids, cracks, spills, protrusions, and non-uniform textures.
1. Prior to sacking, prepare surfaces in accordance with Section 099100.
2. Entire surface area of concrete exposed to view shall be repaired, resurfaced, and made ready to receive paint finish specified under Section 099100.
   a. Resurfacing of concrete panel surfaces shall be accomplished with specified resurfacing materials in accordance with manufacturer's written instructions and the preparation and application procedures of ACI 503.4.
3. Interior surfaces at window openings shall be ground smooth, resurfaced, and prepared to receive sealants.
   a. Resurface concrete sills, jambs, and heads with specified resurfacing, patching, and finishing materials in accordance with manufacturer's written instructions.
      1) Interior surfaces at openings shall be ground smooth, resurfaced, and prepared to receive sealants.
4. Finish repaired surfaces with primer and two coats of paint finish as specified under Section 099100.

E. Related Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and
finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

F. Patching and Skim Coating: Refer to Article 3.16-B.

G. Staining: Comply with chemical stain manufacturer’s printed instructions and current recommendations.

H. Sealing: Where indicated on Contract Drawings, treat vertical surfaces of exterior exposed formed concrete with sealer specified in this Section.
   1. Refer to Division 32 for sealing of concrete paving.

3.07 CURING FLATWORK

A. Slab Areas, General: Commence curing operations as soon as practicable after finishing operations without marring surfaces, and in any case, within 2 hours. Keep forms containing concrete in a wet condition until removed. Freestanding water is not acceptable before concrete set has occurred. Curing method shall be consistent with recommendations of ACI 308 at concrete slabs. Cure concrete with one of the following methods:
   1. Curing Compound, Slabs Over Metal Deck: Cure by completely and uniformly applying liquid curing compound in accordance with manufacturer’s printed instructions. Apply at least two coats at right angles to each other. If sprayed with low pressure sprayer, backroll with short nap roller.
      a. Reapply curing membrane at saw cut joints and at exposed edges of slab after removal of forms.
      b. Omit curing compound and use moisture curing where required to provide floor sealer.
      c. Omit curing compound where curing/sealing compound specified provides a concurrent curing function and is applied at the time of concrete placement appropriate to such function.
   2. Continuous Moisture: Cure by keeping concrete continuously wet for a period of at least 7 days after pouring in accordance with established ACI Guidelines for curing interior slabs to receive flooring finishes. During periods of high temperature, low humidity, or wind, wet concrete as often as required to keep concrete continuously moist for a period of at least 10 days. Cover with waterproof curing paper or reinforced vapor retarder, maintaining a film of water.

B. Ambient Conditions:
   1. Hot Weather Curing:
      a. Conform to ACI recommendations regarding curing of concrete flatwork in hot weather.

3.08 SEALING FLATWORK

A. Sealed Concrete: Grind and clean floors prior to sealing.

B. Sealer/Dustproofer:
   1. Prepare substrates and spray apply curing sealer in accordance with manufacturer’s written directions.
2. Locations:
   a. Mechanical rooms, main trash room, electrical rooms, and telephone rooms.
   b. Other locations where indicated or scheduled on Contract Drawings.

3.09 SEALING FORMED SURFACES

A. Formed Surfaces: Where indicated on Contract Drawings, treat vertical surfaces of exterior exposed formed concrete with sealer in accordance with specified sealer finish **Type FSF**.

3.10 CONTROL JOINTS

A. General: Locate form joints true to line and profile.

B. General: Locate form joints true to line and profile. Coordinate with location of slip dowel sleeves installed in Section 032000. Comply with the requirements of CBC 1906A.4.
   1. Tool edges with 1/4-inch radius tool to minimize possibility of spalling at exposed concrete.

C. Location: As indicated on the Structural Contract Drawings, but not more than 20 feet on centers in both directions at exterior slabs. Limit interior slabs on grade to 400 square foot bays with length to width ratios of 1 to 1.5 maximum.
   1. Locate on column center lines and at re-entrant corners wherever practical.
      a. Avoid areas receiving tile or paver floor finish.
   2. Coordinate locations with proposed floor finish joint layout.
   3. Limit length to width ratios to 1 to 1.5.

D. Saw Cutting: Saw cut 1/8-inch wide by one-quarter depth of slab immediately after slab has attained its initial set.
   1. Avoid saw cuts occurring in aisle ways where possible.

3.11 GROUTING

A. Grout: Provide required grouting with cement grout. Thoroughly fill space under plates to provide complete bond.
   1. Compressive strength of grout shall be tested in accordance with ASTM C 109.

B. Non-Shrink Grout: Install non-shrink grout properly beneath bearings of plates, columns, and other structural members using product recommended by manufacturer for specific application and in accordance with printed instructions.

3.12 FLOOR LEVELING

A. Apply floor leveling compound where required by work of other Sections.

B. At floor mat recesses, secure frame, and apply floor leveling compound to maintain proper depth for installation of walk-off mats.

C. Comply with manufacturer's printed installation recommendations.
3.13 EQUIPMENT BASES, PADS, CURBS, PITS, AND TRENCHES

A. Pour pits for valves and trenches. Pour bases, pads, and curbs for miscellaneous concrete items. Steel trowel surfaces hard, dense, and smooth with corners, intersections, and terminations rounded. Where structural details for minor structures listed above do not specify otherwise, walls, floors, and covers shall be 5 inches thick, reinforced with No. 3 bars at 12 inches on centers both ways at center of members.

3.14 FIELD QUALITY CONTROL

A. Tests: In accordance with Section 014500, perform tests and submit test reports. Sample fresh concrete in accordance with ASTM C 172, except modified for slump to comply with ASTM C 94.
   1. Slump: Test will be performed in accordance with ASTM C 143. One test will be made for each concrete load at point of discharge and one test for each set of compressive strength test specimens.
   2. Concrete Temperature: Test will be taken hourly when air temperature is 40 degrees F or below, and when 80 degrees F or above, and each time a set of compression test specimens is made.
   3. Curing: Cure specimens in accordance with ASTM C 31.
   4. Frequency of Compressive Strength Testing: Test will be made in accordance with ASTM C 39, ACI 318, and CBC 1913A.10 and Table 1704A.4.

B. Special Inspection: Where slab concrete is based on a compressive design strength in excess of 2500 psi (CBC Section 1704A), provide the services of a Special Inspector in accordance with Section 014500 to observe the taking of test specimens and the placing of concrete. A complete and accurate record of these tests shall be kept by the Inspector.
   1. Require that each load of concrete or materials be accompanied by a signed copy of batch plant's certificate stating the quantity of each material, amount of water, admixtures, departure time and date.

C. Moisture Vapor Emission Testing: After concrete slabs have cured and prior to installation of finish flooring materials, verify that moisture content and alkali content of concrete slabs do not exceed limits acceptable to manufacturer of flooring materials.
   1. Refer to Section 033542 for testing requirements.

D. Vapor Emission and Alkalinity Testing:
   1. Perform vapor emission and alkalinity testing and take appropriate action based on results in relation to finish floor manufacturer's moisture and alkalinity requirements.
      a. Refer to Section 033542 for remedial procedures.

3.15 DEFECTIVE CONCRETE

A. Mix Proportions: If ultimate compressive strength of test cylinders fall below minimum assumed in design, evaluate current operations and adjust proportions of concrete mixes for remaining portion of structure to produce concrete of desired design strength.
B. Test Cores: Should required test cylinders fail to show minimum design compressive strength, take test cores at locations designated by Structural Engineer.
   1. If results show compressive strength to be less than design stress, concrete shall be deemed defective and shall be replaced in a manner acceptable to the Structural Engineer and the Building Department. Contractor shall pay costs of patching.
   2. If results show compressive strength to conform to design stress, drypack coring holes and finish to match adjacent surface.

C. Concrete work not formed as indicated, not true to intended alignment, not plumb, level, or true to intended grades, cracked, with embedded sawdust or debris, and not fully conforming to the provisions of these Specifications, shall be deemed defective. Remove defective concrete from the job site and replace with concrete complying with specified requirements.

D. Concrete substrates for non-breathable floor finishes that indicate by testing excess quantities of moisture and alkalinity shall require remedial measures, as specified in this Section.

3.16 PATCHING FORMED CONCRETE

A. Patching Exposed Concrete: After flushing with water, pack tie wire, nail, bolt, and core sample holes which will be exposed as soon as possible after form removal. Grout and repair rough pockets, cracks, or honeycomb. If patches are required, chip defective areas to a uniform depth of at least 1 inch with sides at right angles to surface. Match surrounding concrete surfaces in color and texture. Make trial patch to determine color match. Before applying, moisten surrounding concrete and apply specified bonding compound.
   1. Smooth Formed Concrete: Grind off ridges, offsets, and other prominent marks of smooth formed concrete while concrete is green, and grind smooth. Sack exposed concrete surfaces.
      a. Painted concrete shall be considered as being exposed.
   2. Patch defects deeper than 1/2-inch in panels with specified patching material and methods deemed by the Architect as the appropriate method to correct such defects.

B. Skim Coating: Apply to architectural formed cast-in-place concrete walls in accordance with manufacturer's instructions.
   1. New concrete must be cured 28 days.
   2. pH must be verified prior to skim coating application to determine if primer needs to be applied, as required by manufacturer.
   3. Clean concrete in accordance with ASTM D 4258.
   4. Mixing Skim Coat:
      a. Add to water, adding only enough to make a stiff trowelable consistency like soft putty.
      b. Add color additive.
      c. Working Time: Approximately 15 minutes.
   5. Apply to walls with trowel in smooth uniform coat in continuous operations to maintain a uniform shade.
6. Patching: Broad deep areas in concrete surface shall be filled with skim coat material in accordance with manufacturer's directions prior to application of skim coat. Where surfaces are shiny smooth, apply manufacturer's Type II bonding agent.

C. Patching Unexposed Concrete: Ridges, offsets, and other prominent marks need not be ground off, cleaned, or sacked. This requirement applies to concrete areas that will be concealed by other construction.
   1. Finish below-grade concrete indicated to receive waterproofing in the same manner as exposed, smooth-formed concrete, except that surfaces need not be sacked.
   2. Patch and repair concrete slabs ready to receive future finish materials installed by Owner.

D. Patching Formed Concrete Used in Landscape Work: Site concrete with imperfections shall be removed and replaced with acceptable concrete. Patching is not acceptable.

3.17 CLEANING

A. Wash and clean flatwork surfaces. Leave free from oil, paint, plaster, form coating, and other foreign substances, ready to receive scheduled finishes.

END OF SECTION
- SECTION 051200 -

STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Structural steel, related anchors, bolts, fastenings, and erection.

B. Referenced Sections:
   1. Section 012100 - Allowances.
   2. Section 012500 - Substitution Procedures.
   3. Section 013300 - Submittal Procedures.
   4. Section 014500 - Quality Control.
   5. Section 017419 - Construction Waste Management and Disposal.
   7. Section 031000 - Concrete Forming and Accessories.
   8. Section 033100 - Structural Concrete.
   10. Section 050595 - Welded Stud Connectors.
   11. Section 051213 - Architecturally-Exposed Structural Steel: Requirements for welding and finishing where AESS is indicated.
   12. Section 053100 - Steel Decking.
   13. Section 099100 - Painting.

1.02 PRICE AND PAYMENT PROCEDURES

A. Extra Stock Material Allowance: Provide and install an additional 2 tons of structural steel for the project in addition to the quantities shown on drawings. This additional steel shall be installed during construction, in sizes and locations as directed by Structural Engineer.
   1. The allowed steel may be of any shape or size, and the number of pieces and locations of application may vary.
   2. Provide unit price for purpose of adjusting contract price to reflect quantity of extra material actually used.
   3. Refer to Section 012100 for allowance procedures.

1.03 REFERENCES

A. ASTM International (ASTM):
   1. A 6-14 - Specification for General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use.
3. A 53-12 - Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
10. A 490-14a - Specification for Heat-Treated, Steel Structural Bolts, 150 ksi (1035 MPa) Tensile Strength.
17. F 3125-15 - Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions.

B. California Code of Regulations (CCR):
1. Title 24, Part 2 - California Building Code (CBC), 2013 edition:
   a. Chapter 17A - Structural Tests and Special Inspections.
   b. Chapter 22A - Steel.

C. IAPMO Evaluation Service (IAPMO ES), a division of International Association of Plumbing and Mechanical Officials:
1. IAPMO Uniform Evaluation Reports, (UER-), designated by applicable report number.

D. ICC Evaluation Service, Inc. (ICC ES), a subsidiary corporation of the International Code Council:
1. ICC ES Evaluation Reports, Materials, Products, Methods and Types of Construction (ESR-), designated by applicable report number.

E. American Galvanizers Association (AGA):
1. Inspection of Products Hot-Dip Galvanizing After Fabrication.
F. American Institute of Steel Construction (AISC):
   1. 325-11 - ASD Steel Construction Manual, including:
   2. 341-10 - Seismic Provisions for Structural Steel Buildings
   3. 360-10 - Specification for Structural Steel Buildings.

G. American Institute of Steel Construction (AISC):

H. American Iron and Steel Institute (AISI):
   1. 9002 - Welding of Stainless Steels and Other Joining Methods.

I. American Welding Society (AWS):
   1. A2.4 - Symbols for Welding and Nondestructive Testing, Including Brazing.

J. The Society for Protective Coatings (SSPC):
      b. Volume 2 - Systems and Specifications, 7th Edition, including Specifications, Guides, Procedures, and Supplements:
         1) SP-3 - Power Tool Cleaning.
         2) SP-6 - Commercial Blast Cleaning (NACE 3).

K. Federal Specifications (FS):
   1. FF-S-325 - Shield, Expansion; Nail, Expansion; and Nail, Drive Screw (Devices, Anchoring Masonry).

L. Military Specifications (MIL):
   1. MIL-P-21035 - Paint, High Zinc Dust Content Galvanizing Repair.

M. Research Council on Structural Connections:

N. United States Green Building Council (USGBC):
   1. Leadership in Energy and Environmental Design (LEED):

1.04 ADMINISTRATIVE REQUIREMENTS

A. Allowances: This Section may be affected by allowances described in Section 012100.

B. Coordination: Refer to Section 017419 regarding procedures for implementing construction waste management requirements.

C. Coordination: Refer to Section 018113 regarding procedures for implementing sustainable design requirements.

D. Coordination: Comply with AESS requirements of Section 051213.
E. Preinstallation Meeting: Conduct a preinstallation meeting with the engineer of record, fabricator, erector, Contractor, and inspectors to discuss the Welding Procedure Specifications as indicated on Structural Contract Drawings.

F. Scheduling: Deliver anchor bolts, base plates, and other anchorage devices that are embedded in cast-in-place concrete or masonry construction to the Project site in time to be installed before the start of cast-in-place concrete operations or masonry work.

1.05 SUBMITTALS

A. General: Make submittals in accordance with provisions of Section 013300.

B. Product Data: Submit complete manufacturer’s descriptive literature and specifications.

C. Shop Drawings: Submit complete Shop Drawings comprehensively describing fabrication and installation of structural steel. Shop Drawings shall include not less than the following:
   1. Dimensioned profiles of structural members cross-referenced to plans for purposes of location.
      a. Individual items of structural steel shall be cross-referenced by grid location.
   2. Fabrication and installation details, including details of anchorage to supporting structure.
   3. Designated shop and field welds in accordance with AWS A2.4.
   4. Indicate type of primer and finish, if applicable, to be applied to each member.
   5. Project welding requirements as indicated on Structural Contract Drawings.
   6. Identify members which will receive sprayed fireproofing specified in Section 078100.

D. Quality Control Submittals: Submit the following to Architect and Engineer of Record:
   1. Design Data: Submit structural calculations signed and sealed by a qualified structural engineer licensed in the State of California confirming design of connections not specifically detailed on the Contract Drawings.
   2. Test Reports:
      a. Submit certified laboratory test reports confirming physical characteristics of materials used in the performance of the work of this Section.
      b. Submit Charpy-V-Notch (CVN) Impact Test by results the manufacturer for applicable steel members and components.
   3. Certificates:
      a. Furnish mill test reports of identified stock.
      b. Submit manufacturer’s certificates certifying welders employed on Project.
      c. Certificate of Compliance for Offsite Fabrication: Submit in accordance with CBC 1704A.2 for structural steel. Furnish copies to Owner, Testing Laboratory, and Structural Engineer.
4. Welding Procedures:
   a. Submit welding procedures, indicating joint details and tolerances, preheat and interpass temperature, postheat treatment, single or multiple pass, electrode type and size, welding current, polarity, and amperes and roof treatment.
   b. Welding procedures shall comply with the requirements of AWS D1.1 and D1.8. Include welding parameters recommended by the welding electrode manufacturer.
   c. Refer to Structural Contract Drawings for weld testing and inspection.

1.06 SUSTAINABLE DESIGN SUBMITTALS

A. Materials & Resources Submittals: Refer to Section 018113 for additional information on LEED submittals.
   1. Letter Template for MR Credit 2: Letter template, signed by Contractor, tabulating total waste material, quantities diverted and means by which it is diverted, and statement that requirements for the credit have been met.
      a. Comply with Section 017419 Construction Waste Management and Disposal.
   2. Product Data and Certification Letter for MR Credit 4: Indicate percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.
   3. Product Data for MR Credit 5: For regional materials indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include statement indicating cost for each regional material and the fraction by weight that is considered regional.

1.07 CLOSEOUT SUBMITTALS

A. Warranty: Submit copies of written warranty, as supplied by the applicator, agreeing to repair or replace defective coating work during the warranty period.

1.08 QUALITY ASSURANCE

A. Qualifications:
   1. Fabricator's Qualifications: Regularly engaged and specializing, for the preceding 5 years, in the fabrication of structural steel for building construction.
      a. When required, licensed, bonded, or otherwise approved by governmental agencies having jurisdiction.
   2. Erector's Qualifications: Regularly engaged and specializing, for the preceding 5 years, in the erection of structural steel for building construction.
      a. Licensed or certified.
   3. Welder's Qualifications: Currently certified in accordance with AWS D1.1.
B. Reference Modifications: Comply with Code of Standard Practice for Steel Buildings and Bridges, except as follows:
   1. Modify Paragraph 4.2.1 by deletion of the following sentence: "This approval constitutes the Owner's acceptance of all responsibility for the design adequacy of any connections designed by the fabricator as part of his preparation of these shop drawings."
   2. Delete Paragraph 4.2.2 in its entirety.
   3. Modify paragraph 7.9.3 by deletion of the following sentence: "The contract documents specify the sequence and schedule of placement of such elements."
   4. Provide special inspection for expansion anchors.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Storage: Protect steel members that will be stored on site for a prolonged period to protect from adverse effects of exposure to weather.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers:
   1. American Solder and Flux.
   2. Bethlehem Steel Corporation.
   4. Euclid Chemical Company, Cleveland, OH (800)321-7628.
   5. Hilti, Inc., Tulsa, OK (918)627-9711, (800)979-8000.
   7. Master Builders Inc., Cleveland, OH (216)831-5500, (800)228-3318, (714)476-0500 [Admixtures], (800)824-8441 [Construction Products].
   8. Metalloy Products
   10. Rust-Oleum Corporation, Vernon Hills, IL (312)367-7700, (800)323-0851, and represented by Vista Paint, Fullerton, CA (714)380-6800.

B. Like materials shall be the products of one manufacturer and shall be either the ones upon which the design is based or equal products of other manufacturers accepted in advance in accordance with Section 012500.

2.02 REGULATORY REQUIREMENTS

A. Regulations:
   1. Where required by the building code of jurisdiction, and as specified in Section 014500, provide inspections by a special inspector.
   2. Comply with air quality management regulations in force at the time of the performance of the work of this Section with regard to low VOC primers.
   3. Welding for buildings shall conform to City of Los Angeles Interdepartmental Correspondence dated August 11, 1997 titled Repair of
2.03 SUSTAINABILITY REQUIREMENTS

A. LEED Goals for Materials & Resources: For additional information on LEED goal requirements, refer to Section 018113.
   1. MR Credit 2 - Construction Waste Management: Recycle and/or salvage at least 75 percent of non-hazardous construction and demolition debris.
   2. MR Credit 4 - Recycled Content: Use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer content constitutes 10 percent of the total value of the materials in the project.
   3. MR Credit 5 - Regional Materials: Use building materials or products that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of the project site for a minimum of 10 percent of the total materials value.

2.04 DESIGN CRITERIA

A. Design Requirements: Where designated as AESS on Contract Drawings, comply with requirements of Section 051213 for Architecturally Exposed Structural Steel (AESS).
   1. Galvanized steel members shall comply with the requirements of Section 051213 Architecturally Exposed Structural Steel (AESS) where steel is designated as AESS in the Contract Drawings.

2.05 MATERIALS, FERROUS STEEL

A. General: Tensile requirements for steel members shall conform to applicable ASTM standards referenced.
   B. Wide Flange Shapes: Refer to Structural Contract Drawings.
   C. Channels, Angles, Tees, Bars, and Plates: Refer to Structural Contract Drawings.
   D. Structural Steel Tubing and Pipe: Refer to Structural Contract Drawings.

2.06 CONNECTIONS

A. Anchor Bolts: Conform to ASTM F 1554 Grade 55, weldable, hot-dipped galvanized, and Supplement S1. Provide headed type, with ASTM A 563 Grade A hexagonal nuts, unless otherwise indicated on Contract Drawings.
B. Threaded Anchor Rods: As indicated on Structural Contract Drawings.
C. Standard Threaded Fasteners: Refer to Structural Contract Drawings.
D. High-Strength Threaded Fasteners: Refer to Structural Contract Drawings.

2.07 OTHER MATERIALS

A. Filler Metals for Welding: Weld material shall comply with AISC Section J2.6, AWS A5.18, or AAWS A5.20, E70 series, and AISC 341.
   1. Shielded Metal Arc Welding: AWS D1.1 and D.8, with specified electrodes:
      a. Steel Member Connections: AWS A5.1 or A5.5, E80XX low hydrogen with a minimum toughness of 20 foot-pounds at 20°F.
      b. Steel Reinforcing Bar Connections: E90XX low hydrogen.
   2. Charpy V-Notch Toughness: Electrodes for welding moment frames, braced frames, and drag members (designated CVN) shall have a minimum CVN toughness of 20 foot-pounds at minus 20 degrees F.
      a. When they are used as members in the seismic Force Resisting System, ASTM A 6 Group 3 shapes with flanges 1-1/2 inches thick and thicker, ASTM A 6 Groups 4 and 5 shapes, and plates that are 1-1/2 inches thick or thicker in built-up cross-sections shall have a minimum V-Notch toughness of 20 foot-pounds at 0 degrees F.

B. Shop Paint Primer: Apply one of the following, or equal:
   1. Exterior Use: Prime galvanized steel and finish in accordance with Section 099600.
      a. Refer to Section 099600 for epoxy primers required with urethane finish coatings.
      b. Refer to Section 051213 for steel designated as AESS.
   2. Interior Use:
      b. Tnemec Series 115 Uni-Bond DF Primer, manufactured by Tnemec Company.
      c. Refer to Section 051213 for steel designated as AESS.

C. Field Repair Galvanize Coating: Dry-Galv manufactured by American Solder and Flux, or Galvalloy manufactured by Metalloy Products.

D. Non-Shrink Grout: Refer to Section 033100.

E. Headed Welded Studs: Granular flux-filled shear connector or anchor studs, equal to Nelson Stud Welding Division of TRW ICC ER 2614, or equal, manufactured of Grade C-1015, cold-rolled steel conforming to ASTM A 108.

F. Adhesive Anchoring System: As indicated on Structural Contract Drawings.

G. Expansion Bolts: As indicated on the Structural Contract Drawings.
2.08 WELDING

A. Welded Construction: Strictly comply with AWS Code for procedures, appearance and quality of welds, and methods used in correcting welding work. Assemble and weld built-up sections by methods which will produce true alignment of axes without warp.
   1. Welding shall comply with AWS D1.1.

B. Connections: Weld or bolt shop connections, as indicated.

C. Holes for Other Work: Provide holes required for securing other work to structural steel framing and for passage of other work through steel framing members as indicated on Structural Contract Drawings. Provide threaded nuts welded to framing, and other specialty items as indicated to receive other work. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning.

D. Anchor Bolts: Furnish anchor bolts and other connectors required for securing structural steel to foundations and other in-place work. Furnish templates and other devices as necessary for presetting bolts and other anchors to accurate locations.

2.09 FABRICATION

A. Shop Fabrication and Assembly: Fabricate structural steel in accordance with the AISC Specification and CBC Chapter 22A. Do not start fabrication until mill test reports have been accepted by Structural Engineer.
   1. Fabricate and assemble structural assemblies in the shop to greatest extent possible. Provide camber in structural members where indicated, or required.
   2. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.
   3. Furnish column bases shop-attached to columns.
   4. Shop connections shall be welded, except where bolted connections are indicated.
   5. Field connections shall be bolted, except where welded connections are indicated on the Contract Drawings.
   6. Holes shall be standard hole diameter, except holes for anchor bolts, which may be oversize holes as indicated on Structural Contract Drawings.
   7. Cleaning: Clean contact surfaces immediately prior to assembly and leave unpainted.
   8. Special Requirements For Members Belonging To Lateral Force Resisting Frames:
      a. Thermal cutting of members shall comply with AISC Section M2.2.
      b. Splices in heavy sections shall comply with AISC Section J1.7.
      c. Beam holes and weld access holes shall comply with AISC Section J1.8.

B. AESS: Where applicable, comply with requirements of Section 051213 for architecturally-exposed structural steel (AESS).
C. Welded Connections: Refer to Structural Contract Drawings for welding requirements.
   1. General: Make welded connections by shielded-arc method in accordance with AWS D1.1 and City of Los Angeles Interdepartmental Correspondence.
      a. Welding shall be done in the shop unless otherwise shown or specified.
      b. Prior to welding, preheat members in accordance with AWS D1.1 and Structural Contract Drawings.
      c. Welds not otherwise identified shall be continuous fillet welds, with size based on AISC standards for thicker part being joined.
      d. Welds exposed in the finished work shall be ground and dressed smooth to preserve the shape and profile of the welded item.
   2. Inspection: Welding shall be continuously inspected under supervision of a Special Inspector in accordance with Section 014500.
   3. Headed Welded Studs: Prepare steel surfaces as recommended by the manufacturer of shear connectors. Shop- or field-weld headed welded studs, spaced as indicated, to beams and columns. Use automatic end welding of headed stud shear connectors in accordance with the manufacturer’s printed instructions. Provide complete fusion between end of the stud and the members without porosity or evidence of lack of fusion.

D. Galvanizing: Hot dip galvanize all ferrous metal in accordance with ASTM A 123. Hot dip galvanize all exterior and interior ferrous steel. Perform galvanizing after fabrication (shearing, punching, bending, forming, assembling, and welding) in the largest units practicable. Remove projections, barbs, and icicles after galvanizing.
   1. Comply with requirements of Section 051213 for AESS with special attention to surface blemishes. Grind all pits, runs, and rough spots to provide a smooth, clean surface for paint finish.

E. Shop Painting:
   1. Preparation:
      a. General: Clean surfaces of mill scale, grease, dirt, and foreign matter in accordance with SSPC SP-3.
         1) Where members will be exposed to long term exterior exposure, comply with SSPC SP-6.
      b. Architecturally-Exposed Structural Steel (AESS): Refer to Section 051213 where exposed to view or indicated as AESS.
   2. Regular Primers: Shop paint surfaces of structural steel members (including galvanized members) with specified primer, except as follows:
      a. Structural steel members, or portions of members, to be welded or embedded in concrete specified in Section 033100.
      b. Surfaces in contact with high strength bolts, bearing surfaces, and surfaces supporting concrete-filled metal deck specified in Section 053100.
      c. Members to be galvanized or to receive other coatings as indicated on Contract Drawings and Specifications.
      d. Members that will be concealed by interior finishes.
3. Epoxy Primers: Surfaces to receive urethane coating systems shall be primed with epoxy primer specified in Section 099600.
   a. Architecturally-exposed Structural Steel (AESS): Refer to Section 051213 where exposed to view or indicated as AESS.

4. Inaccessible Surfaces: Shop paint exterior and interior steel surfaces not in contact, but inaccessible for painting after erection, with two coats of specified primer. Thoroughly work primer into joints and angles.

F. Finish:
   1. Exterior: Structural steel exposed to view shall be finish painted in accordance with Section 099600.
   2. Interior: Structural steel exposed to view in public places shall be finish painted in accordance with Section 099600.
   3. Architecturally-exposed Structural Steel (AESS): Refer to Section 051213 where exposed to view or indicated as AESS.

2.10 SOURCE QUALITY CONTROL

A. No structural steel materials may be used, fabricated, or furnished until written acceptance of quality control submittals is issued by the code enforcement agency.
   1. Conduct a thorough material ID and mill certification review for steel products.

B. Conform to the inspection requirements of CBC Chapter 17A and the testing requirements of CBC 2212A as specified in Section 014500:
   1. Inspection of Structural Welding: CBC 1704A.3.1.4.
      a. Inspection of all shop and field welding operations shall be made by a qualified welding inspector approved by the enforcement agency. The minimum requirements for a qualified welding inspector shall be as those for an AWS certified welding inspector (CWI), as defined in the provisions of the AWS QC1. All welding inspectors shall be as approved by the enforcement agency.
      a. Review manufacturer’s Material Test Report (MTR). Verify that material properties are as specified by DSA-approved documents, and that materials are readily identifiable and traceable to a MTR.
      b. Sample unidentifiable material for testing. Testing of materials must be performed by a laboratory accepted in the DSA Laboratory Evaluation and Acceptance Program (LEA).
      c. Conduct a thorough visual examination of the seam weld area in hollow structural sections (HSS) for visible discontinuities. Visual examination shall include a minimum of 10% of the exterior of the seam weld and the interior at each end.
      d. Conduct a thorough visual examination of surfaces of structural plate for visible lamination discontinuities.
C. Determine mechanical properties in conformance with ASTM A 370 of the following materials:
   1. Structural steel shapes and tubing.
   2. Anchor bolts.
   3. Filler metals for welding.
   4. High-strength threaded fasteners.
   5. Headed stud type shear connectors.

D. Inspect shop-assembled high-strength bolted connections and shop welds as described in Article 3.02 - Field Quality Control.

E. Refer to Section 014500 for responsibility and cost of testing services.

F. Charpy-V-Notch tests shall be performed by the manufacturer employing Test Frequency (P) in accordance with latest edition of AISC seismic provisions, utilizing standard specimen sizes indicated in Figure 6 of ASTM E 23. The absorbed energy in a CVN impact test shall not be less than that indicated by the following formula where CVN minimum average value shall be 20 ft. lb.:
   \[
   \text{CVN} = \frac{F_y (t + 0.25)}{5.45} \text{ ft. lb.}
   \]
   Where: \(F_y\) = Specified Yield Stress (ksi), \(t\) = Material Thickness (in.), \(CVN\) = ft. lb. of absorbed energy when tested at a temperature of 70 degrees F.
   1. Components requiring mandatory toughness requirements shall be designated on the steel shop drawings.
   2. Refer to Structural Contract Drawings for additional Charpy-V-Notch test requirements.

G. Prior to welding, base metal thicker than 1-1/2 inches when subjected to through thickness weld shrinkage strains shall be ultrasonically inspected for discontinuities.

**PART 3 - EXECUTION**

### 3.01 ERECTION

A. General: Erect structural steel in accordance with the AISC Specification referenced.
   1. Accurately assemble structural steel components to the lines and elevations indicated, within the specified erection tolerances.
   2. Accurately align and adjust the various members forming parts of a frame or structure after being assembled and before being fastened.
   3. Fasten splices of compression members after the abutting surfaces have been brought completely into contact.
   4. Clean bearing surfaces and surfaces that will be in permanent contact before the members are assembled.
   5. Coordinate setting of anchor bolts and anchors using templates with work of Section 031000.
   6. Make splices and field connections with bolts except where welding is indicated on Contract Drawings.
   7. Cranes will not be allowed on building slab areas.
B. Temporary Supports: Provide temporary bracing and supports for all dead loads of structure and the imposed loads of erecting and construction activities. Maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing. Provide erection bracing plans designed and stamped by State of California licensed Civil or Structural Engineer.
   1. Do not tighten building framing connections for temporary bracing purposes.

C. Connections:
   1. Field connections shall be bolted, except where welded connections are indicated on the Contract Drawings.
   3. Simple Shear Connections: High strength bolts, or as indicated on the Structural Contract Drawings.
      a. Simple shear connections shall be removable by handwrench without power tool and not fully tightened.

D. High-Strength Steel Bolting: Perform in accordance with the AISC Code of Standard Practice referenced, and in accordance with the CBC Chapter 22A.

E. Cutting of Holes: Field cutting of holes shall be made by drilling only. Burning of holes will not be permitted.

F. Field Assembly: Set structural frames accurately to lines and elevations. Align and adjust various members forming a part of a complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces which will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
   1. Level and plumb individual members of structure within specified AISC tolerances.
   2. Splice members only where indicated and accepted on final shop drawings.
   3. Do not enlarge holes in members by burning or by use of drift pins except in secondary bracing members. Ream holes that must be enlarged to admit bolts.
   4. Back-up bars, dams, and runoff tabs shall be removed: the weld, base metal shall be ground flush and smooth per AWS.

G. Gas Cutting: Do not use gas cutting torches in field for correcting fabrication errors in structural framing. Cutting will be permitted only on secondary members which are not under stress. Finish gas-cuts sections equal to a sheared appearance when permitted.

H. Follow applicable fabrication sections.

I. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.
J. Tolerances: Individual pieces shall be erected in conformance with the AISC Specification referenced. Deviation from plumb, level, and alignment shall not exceed 1 to 500.

3.02 FIELD QUALITY CONTROL

A. Inspection of Erection: Special Inspector will inspect erection, field welding, and high-strength bolting.

B. Certification: Special Inspector will:
   1. Certify in writing, after completion of the work, that structure has been erected in accordance with the Contract Documents and the building code.
   2. Certify in writing, after completion of the work, that welding has been performed in accordance with the Contract Documents and the building code.
   3. Certify in writing, after completion of the work, that high-strength bolting has been performed in accordance with the Contract Documents and the building code.

C. Inspection of Welding:
   1. Inspection of structural welding shall conform to the requirements of AWS D1.1.
   2. Special Inspector will visually inspect welds and be present to inspect and accept groove, single-pass, multi-pass, and penetration welding.
   3. Non-Destructive Testing: Comply with CBC Chapter 17A.
   4. Complete penetration groove welds contained in the beam to column joints of the moment frames shall be tested 100 percent either by ultrasonic testing or by radiography.
      a. At other than moment frame beam to column connections, base metal thicker than 1-1/2-inches, when subjected to through-thickness weld shrinkage strains, shall be ultrasonically inspected for discontinuities directly behind such welds. Test shall be performed not less than 24 hours after joint completion.

D. Inspection of High-Strength Bolts, Nuts, and Washers:
   1. Testing Laboratory will inspect high-strength bolting performed in fabricator's shop or at the site.
      a. Bolt tightness shall be checked on a minimum 10 percent of bolts, selected at random, for each high-strength bolted joint.

E. Inspection and Testing of Headed Welded Studs:
   1. Special Inspector shall continuously inspect field welding of headed studs.
      a. Inspection of all shop and field welding operations, including the installation of automatic end-welded stud shear connectors, shall be made in accordance with CBC 2213A.2 by a qualified welding inspector approved by the enforcement agency.
2. At the beginning of work each day make minimum of two test welds with same equipment and materials as actual work piece. Test studs shall be subjected to 90 degree bend test by striking them with a heavy hammer. After test, weld section shall not exhibit any tearing out or cracking.

### 3.03 ADJUSTING AND CLEANING

A. Field Touch-up Painting: After the erection of structural steel, touch-up field connections, exposed bolts, and abrasions in the prime coat with the same paint used for the shop painting.

1. Rusting: Structural members showing evidence of rusting over 25 percent of any surface after erection shall be removed and replaced.
2. Mark Numbers: Remove or apply prime coat over mark numbers as part of work of this Section.

B. After erection and field welding, wire brush scarred galvanized surfaces and apply field repair galvanize coating according to manufacturer’s specifications.

1. Surfaces covered with structural concrete or lightweight insulating concrete fill need not be touched-up.

**END OF SECTION**
- SECTION 072216 -

ROOF BOARD INSULATION

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Rigid board roof insulation, flat and tapered types, installed with roofing membrane as an integrated system.

B. Referenced Sections:
   1. Section 012500 - Substitution Procedures.
   2. Section 013300 - Submittal Procedures.
   4. Section 018113 - Sustainable Design Requirements.
   5. Section 072221 - Roof Board Underlayment: Cover board.
   6. Section 075423 - Thermoplastic Polyolefin Roofing.

C. Related Sections:
   1. Section 072100 - Thermal Insulation.
   2. Section 092900 - Gypsum Board.

1.02 REFERENCES

A. ASTM International (ASTM):
   2. C 1289-14a - Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.

B. California Code of Regulations (CCR):
   1. Title 24, Part 2 - California Building Code (CBC), 2013 edition:
         1) Section 1508 - Roof Insulation.
C. FM Global (FM):
      a. 4450 - Class 1 Insulated Steel Roof Decks.
      b. 4470 - Class 1 Roof Covering.
   2. Loss Prevention Data Sheets:
      a. 1-28 - Design Wind Loads.

D. National Roofing Contractors Association (NRCA):

E. Polyisocyanurate Insulation Manufacturers Association (PIMA):

F. Roof Insulation Contractors/Thermal Insulation Manufacturers Association (RIC/TIMA):

G. Underwriters Laboratories (UL):
   1. 1256 - Fire Test of Roof Deck Constructions.

H. United States Green Building Council (USGBC):
   1. Leadership in Energy and Environmental Design (LEED):

1.03 DEFINITIONS

A. R-Value is the thermal resistance of insulation only, and does not take into account alleged air spaces or other factors assumed to result in higher values.
   2. Design Stabilized R-Value: Thermal resistance of polyisocyanurate foam insulation based on 5-year stabilization period after manufacture.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Refer to Section 017419 regarding procedures for implementing construction waste management requirements.

B. Coordination: Refer to Section 018113 regarding procedures for implementing sustainable design requirements.

C. Coordination: Conform to requirements for roofing system guaranty and coordinate work with Section 075423.

1.05 SUBMITTALS

A. General: Make submittals in accordance with provisions of Section 013300.

B. Product Data: Submit complete manufacturer's descriptive literature and specifications.

C. Shop Drawings: Submit shop drawings indicating fastener patterns for FMRC wind uplift resistance specified.
   1. Coordinate with shop drawing submittals for Section 075423.
D. Samples: Submit 6-inch square by 1.5-inch thick samples of each insulation material clearly identified with manufacturer's name, brand name, R-value, fire-resistive classification, and composition.

E. Quality Control Submittals: Submit the following:
   1. Test Reports: Certified laboratory test reports confirming physical characteristics of materials used in the performance of the work of this Section.
   2. Certificates:
      a. Certificates confirming that roofing membranes proposed for use are mutually acceptable for application to both the manufacturer of the roofing membrane and the manufacturer of the insulation system, and that no warranty, guaranty or bond issued by either party is modified or rendered void by virtue of such application.
      b. Upon completion of installation of building envelope insulation, and in conjunction with roofing system work, one card certifying compliance with requirements of Title 24 for installation of insulation shall be completed, executed, and delivered to local building officials, and one card shall be conspicuously posted at a location on site acceptable to the building official.
   3. Manufacturer's Instructions: The manufacturer's current recommended methods of installation, including relevant limitations, safety and environmental cautions, and application rates.

1.06 SUSTAINABLE DESIGN SUBMITTALS

A. Material & Resources Submittals:
   1. Letter Template for MR Credit 2: Letter template, signed by Contractor, tabulating total waste material, quantities diverted and means by which it is diverted, and statement that requirements for the credit have been met.
      a. Comply with Section 017419 Construction Waste Management and Disposal.
   2. Product Data and Certification Letter for MR Credit 4: Indicate percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.
   3. Product Data for MR Credit 5: For regional materials indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include statement indicating cost for each regional material and the fraction by weight that is considered regional.

1.07 QUALITY ASSURANCE

A. Manufacturer's Qualifications:
   1. Obtain primary sheet roofing material from a single manufacturer.
   2. Manufacturer shall have directly produced the specified roof insulation components for a period equal to or greater than that of the specified warranty term prior to beginning the work of this Section.
3. Provide secondary materials as recommended by manufacturer of primary materials, unless written approval from primary manufacturer is provided, listing recommendations on secondary materials.

4. Manufacturer's qualified technical representative will be required to visit project site to advise Installer of procedures and precautions for installation of roofing materials and to verify warranty requirements.

B. Applicator Qualifications: Five years successful documented experience in installation of roof insulation similar to those required for this project and approved by membrane manufacturer.
1. Owner's Representative reserves the right to request a list of completed jobs and references to verify work and performance.

C. Certifications:
1. Provide insulation manufacturer's certification that proposed system meets minimum requirements for warranties. Details and specifications that do not comply with manufacturer's standards shall be revised to comply with warranty requirements at no additional cost.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Storage: Store insulation indoors, dry, off-floor, and under cover.

1.09 FIELD CONDITIONS

A. Ambient Conditions:
1. Proceed with roofing work when existing and forecasted weather and wind conditions permit performance in accordance with manufacturer's recommendations and warranty requirements.
2. Do not apply adhesive when ambient temperature is below 40 degrees F.

B. Protection:
1. Protect building contents and grounds during the process of the work.
2. Remove debris daily from the roof.

C. Cleaning During Construction:
1. Prior to and during application, all dirt, debris and dust shall be removed from surfaces either by vacuuming, sweeping, blowing with compressed air and/or similar methods.
2. New roof insulation waste material, including scrap roof insulation and empty cans of adhesive, shall be immediately removed from the site by the applicator and properly transported to a legal dumping area authorized to receive such material.
3. Arrange work sequence to avoid use of newly installed roof insulation as a walking surface or for equipment movement and storage. Where such access is absolutely required, provide necessary protection and barriers to segregate the work area and to prevent damage to adjacent areas. A substantial protection layer consisting of plywood over NWP felt or plywood over insulation board shall be pro-
provided for new and existing roof areas that receive rooftop traffic during construction.

1.10 WARRANTY

A. Guaranty: The work of this Section, including warranty, is related to roofing system specified in Section 075423.
   1. Roof insulation shall be a component of the PVC roofing system and will be included in the 20-year warranty.

B. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

C. Provide single source, single responsibility guaranty which covers insulation, membrane, insulation, bituminous flashing, walkways, roofing manufacturer-supplied roof drains, expansion joint covers, copings systems and fascia systems.

D. Provide manufacturer's Guaranty equal to Johns Manville's Fifteen-Year Gold Shield No Dollar Limit (NDL) Roofing System Guaranty, running from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS


B. Acceptable Manufacturers, listed alphabetically:
   1. Carlisle SynTec, Carlisle, PA (800) 434-2279.

C. Acceptable Manufacturers of Insulation Products: Materials shall be products of, or specifically recommended by, one manufacturer and shall be provided by, or acceptable to, roofing membrane manufacturer issuing roofing system guaranties.

D. Like materials shall be the products of one manufacturer and shall be either the ones upon which the design is based or equal products of other manufacturers accepted in advance in accordance with Section 012500.
2.02 REGULATORY REQUIREMENTS

A. Regulations:
1. Provide insulation and insulation fasteners listed in the FM Guide referenced that are tested and approved by Factory Mutual in accordance with their Standard 4470.
2. Provide Class I Wind Rating, IA-90 Approval, as determined in accordance with FMRC Standard 4470.

B. Waste Management: Comply with CALGreen Section 5.408 Construction Waste Reduction, Disposal and Recycling. Establish a construction waste management plan for the diverted material.
1. Recycle or salvage for reuse a minimum of 50 percent of the non-hazardous construction and demolition waste in accordance with CALGreen 5.408.1.3.
   a. Include carpet, wood, aggregate, paint, shingles, wallboard, and other materials that have recyclable value.

2.03 SUSTAINABILITY REQUIREMENTS

A. LEED Goals for Materials & Resources: For additional information on LEED goal requirements, refer to Section 018113.
1. MR Credit 2 - Construction Waste Management: Recycle and/or salvage at least 75 percent of non-hazardous construction and demolition debris.
2. MR Credit 4 - Recycled Content: Use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer content constitutes 10 percent of the total value of the materials in the project.
3. MR Credit 5 - Regional Materials: Use building materials or products that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of the project site for a minimum of 10 percent of the total materials value.

2.04 PERFORMANCE CRITERIA

A. Performance Characteristics: Performance characteristics of roof insulation board proposed for use shall have been confirmed by tests in accordance with the following:
1. Thermal Resistivity (R-Value): ASTM C 518 and, in the case of foamed-plastic insulations, comply with the conditioning requirements of RIC/TIMA 281-1 and PIMA 101.
2. Permeability of Insulation Facing: ASTM E 96, less than 1 perm.
6. Dimensional Stability: ASTM D 2126 or ASTM D 696, less than 2 percent linear change.

B. Design Requirements: Provide product compatible with warranty related requirements of specified roofing system.
2.05 MATERIALS

A. Rigid insulation shall be of type and manufacture acceptable to roofing system manufacturer for inclusion in roofing system warranty.
   1. Thickness of insulation is indicated on Contract Drawings.
   2. Insulation board shall be installed in two layers where recommended by manufacturer.

B. Core: HCFC-free, closed cell faced rigid cellular polyisocyanurate core thermal roof insulation board bonded in the foaming process to universal non-asphaltic fiberglass reinforced faced roof insulation board and tapered panels.
   1. FS HH-I-1972/Gen, or HH-I-1972/2, Class I, as applicable.
   2. Comply with ASTM C 1289, Type II, Class 1, Grade 2.
   3. UL listed for Class A rated assemblies.
   4. FM rated as Class 1A-60 and 1A-90 for fire and wind resistant systems for built-up roofing.
   6. Design-stabilized value of R-5.56 per inch thickness of foam board shall be maintained over expected life of roof system.
      a. Provide a minimum value of R-30 over entire roof surface of each building as indicated on Contract Drawings.
   7. Tapered Insulation: Provide tapered shapes with pre-cut miters and pre-cut crickets of same insulation material proposed for use. Provide slope as indicated in Part 3 of this Section.

C. Roof Board Underlayment: Refer to Section 072221.

D. Accessories:
   1. Mechanical Fasteners for Insulation: Manufacturers standard, FM listed, corrosion resistant, Drill-Tec Insulation Fastener and Plates threaded roofing fasteners and pressure plates of appropriate width as approved for guaranteed systems.
   2. Low Rise Foam Adhesive: Manufacturer's standard FM-approved low rise foam adhesive for two-layer installation.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verification of Conditions: Refer to roofing system specifications for examination and verification procedures.
   1. Verify that roof openings, curbs, pipes, sleeves, ducts, vents, or other penetrations through the roof are solidly set, and that flashings, tapered edges, and reglets are secure and tight to the building.

B. Metal Roof Deck:
   1. Verify that metal deck is securely fastened with no projecting fasteners or severe weld "burn-throughs."
   2. Verify that roof openings, curbs, pipes, sleeves, ducts, vents, or other penetrations through the roof are solidly set, and that flashings, tapered edges, and reglets are secure and tight to the building.
3. Verify that flatness and fastening of roof deck to structure complies with the following:
   a. Top Flanges: No concavity or convexity in excess of 1/16-inch across any three adjacent flanges.
   b. Side Laps: Properly nested and mechanically fastened at maximum 36 inches on centers.
   c. End Laps: Minimum 2-inch laps located over fastened supports.

C Verify that roof is sloped as indicated on the Contract Drawings.
   1. Tapered insulation shall be used in areas where adequate slope does not exist to build proper slope.

D. Vapor Retarder: When required by manufacturer for proper installation or for warranty requirements, install vapor retarder prior to installation of rigid insulation in accordance with insulation manufacturer's recommendations.

3.02 INSTALLATION

A. Install insulation in accordance with the manufacturer's instructions, and in accordance with the requirements of FM 1-28 for an 1-90 installation.
   1. For single-layer construction, apply insulation board with, and fasten with specified fasteners in accordance with manufacturer's recommendations.
      a. Install rigid roof insulation board with specified attachments in accordance with FM Property Loss Preventions Data Sheet 1-28.
   2. For bottom layer of two-layer construction, fasten rigid insulation board with specified fasteners in accordance with manufacturer's recommendations.
      a. Stagger end and side joints of insulation in successive rows.
   3. For top layer of two-layer construction, embed insulation board with low-rise foam adhesive in accordance with manufacturer's requirements and recommendations.
   4. Other requirements for roof insulation:
      a. Do not leave insulation exposed to the weather. Apply no more in one day than can be covered with roofing membrane on the same day.
      b. Insulation shall not bridge expansion joints where they occur.
      c. Insulation shall be laid in 24-inch widths wherever possible.

B. Tapered Insulation: Install over non-drainable deck areas in the form of crickets to direct the flow of water around objects to roof drains.
   1. Lay insulation with edges parallel to perimeter of roof. Lay in ashlar pattern with joints between the long dimension of the board parallel.
   2. Arrange tapered sections to maintain a minimum 1/4-inch per foot slope over entire roof area. Horizontal fill areas shall be same material as tapered insulation.
   3. Keep roof insulation 1/4-inch from vertical flashing.
   4. Secure to deck with low rise foam adhesive or mechanical fasteners, as applicable.
   5. Stagger end joints of insulation in successive rows.
C. Cover Board: Refer to Section 072221.

3.03 CLEANING

A. Promptly remove trash and clean areas of debris caused by work of this Section.

END OF SECTION
PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Underlayment cover board for protection of roof insulation.
      a. Include underlayment on uninsulated parapets.
      b. Include as a roof cover board where insulation is installed under the steel decking when applicable.

B. Referenced Sections:
   1. Section 012500 - Substitution Procedures.
   2. Section 013300 - Submittal Procedures.
   4. Section 018113 - Sustainable Design Requirements.
   5. Section 072216 - Roof Board Insulation.
   6. Section 075423 - Thermoplastic Polyolefin Roofing.

1.02 REFERENCES

A. California Code of Regulations (CCR):
   1. Title 24, Part 2- California Building Code (CBC), 2013 edition:

B. ASTM International (ASTM):
   5. E 136-12 - Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C.

C. FM Global, Factory Mutual Research (FM):
   2. Property Loss Prevention Data Sheets:
      b. 4450 - Approval Standard for Class 1 Insulated Steel Deck Roofs (with supplements).
         1) Report J.I. IN2A6.AM.
D. United States Green Building Council (USGBC):
  1. Leadership in Energy and Environmental Design (LEED):

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate with construction waste management requirements specified in Section 017419.

B. Coordination: Coordinate with applicable Credit descriptions for more specific procedural requirements of Section 018113.

1.04 SUBMITTALS

A. Product Data: In accordance with the provisions of Section 013300, submit complete manufacturer's descriptive literature and specifications indicating material composition, thickness, sizes, and fire resistance.

B. Shop Drawings: Submit Shop Drawings indicating fastener and adhesive patterns for FMRC wind uplift resistance specified.

C. Quality Control Submittals:
   1. Certification: Submit manufacturer's written certification that product meets specified fire resistance requirements.

1.05 SUSTAINABLE DESIGN SUBMITTALS

A. Material & Resources Submittals:
   1. Letter Template for MR Credit 2: Letter template, signed by Contractor, tabulating total waste material, quantities diverted and means by which it is diverted, and statement that requirements for the credit have been met.
      a. Comply with Section 017419 Construction Waste Management and Disposal.
   2. Product Data and Certification Letter for MR Credit 4: Indicate percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.
   3. Product Data for MR Credit 5: For regional materials indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include statement indicating cost for each regional material and the fraction by weight that is considered regional.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to the job site in manufacturer's original packaging, containers and bundles with manufacturer's brand name and identification intact and legible.

B. Storage and Handling: Roof board shall be kept dry before, during and after application. Outside storage shall be off ground and protected by a breathable waterproof covering. Dry wet roof board before installation. Install no more roof board than can be roofed the same day.
1.07 FIELD CONDITIONS

A. Environmental Requirements:
1. Avoid accumulation of water due to leaks or condensation in or on roof boards during and after construction.
2. Avoid application of roof board during rain, heavy fogs, and other weather conditions that may deposit moisture on the surface.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers:

B. Acceptable Manufacturers of Accessory Products: Provide a system by a manufacturer that complies with the specified requirements.
1. CertainTeed Corporation, Valley Forge, PA (215)341-7000.
2. Dow Chemical Company, Construction Materials Group, Midland, MI (800)232-2436.

C. Like materials shall be the products of one manufacturer and shall be either the ones upon which the design is based or equal products of other manufacturers accepted in advance in accordance with Section 012500.

2.02 REGULATORY REQUIREMENTS

A. Regulations: Refer to Article 2.04 for thickness of underlayment products applicable to this Project.
1. Comply with UL 790 Class A listing when minimum 1/4-inch thick roof board is used as a barrier overlayment.
2. Comply with UL 1256 when minimum 1/2-inch thick roof board is used as a thermal barrier underlayment over steel decks.
3. Comply with Underwriters Laboratories classification when minimum 5/8-inch thick roof board is used in UL P assemblies.
5. Comply with Factory Mutual 4450 criteria for Class 1 insulated steel roof decks.
   a. Capable of adhering a minimum 1/2-inch thick roof board to steel deck to withstand a wind uplift resistance in excess of 90 psf according to FMRC Standard 4450, report J.I. 1N2A6.AM.
6. Test installation for uplift in accordance with FMRC for 60 psf and 90 psf.
7. Comply with FMRC for mechanical attachment to metal decks for wind uplift. For additional FMRC 1-60 and 1-90 windstorm resistance compliance, refer to membrane manufacturer's FMRC listing:
   a. 1/2-Inch Thickness: Install in accordance with J.I. 1N2A6.AM of FMRC Standard 4450.
B. Waste Management: Comply with CALGreen Section 5.408 Construction Waste Reduction, Disposal and Recycling. Establish a construction waste management plan for the diverted material.
   1. Recycle or salvage for reuse a minimum of 50 percent of the non-hazardous construction and demolition waste in accordance with CALGreen 5.408.1.3.
      a. Include carpet, wood, aggregate, paint, shingles, wallboard, and other materials that have recyclable value.

C. Comply with CALGreen 5.504.4.1 Adhesives, Sealants, and Caulks: Adhesives, sealants, primers, and caulks in amounts greater than 16 ounces shall comply with SCAQMD Rule 1168 VOC limits, as indicated in Table 5.504.4.1 and Table 5.504.4.2.
   1. Aerosol adhesives and smaller sizes of adhesives and sealant or caulking shall comply with CCR Title 17, commencing with Section 94507.

2.03 SUSTAINABILITY REQUIREMENTS

A. LEED Goals for Materials & Resources: For additional information on LEED goal requirements, refer to Section 018113.
   1. MR Credit 2 - Construction Waste Management: Recycle and/or salvage at least 75 percent of non-hazardous construction and demolition debris.
   2. MR Credit 4 - Recycled Content: Use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer content constitutes 10 percent of the total value of the materials in the project.
   3. MR Credit 5 - Regional Materials: Use building materials or products that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of the project site for a minimum of 10 percent of the total materials value.

2.04 MATERIALS

A. Exterior Gypsum Roof Deck (Glass Mat-Faced) Roof Underlayment Board: Design is based on the use DensDeck nonstructural, glass mat-embedded, water-resistant gypsum core panel, manufactured by G-P Gypsum Corporation, or equal.
   1. Composition: ASTM C 1177 and ASTM D 3273, maximum permissible lengths, ends square cut, water resistant, silicone-treated core penetrated by fiberglass mats front and back.
      a. Type: DensDeck Prime Roof Board, as manufactured by Georgia-Pacific Gypsum, or equal. Provide thickness, as indicated in the Contract Drawings.
         1) Location: Use as exterior gypsum glass mat underlayment roof board over metal roof deck or rigid insulation fully-adhered single ply roofing membranes applied with adhesives.
            a) Use also at fluid-applied waterproofing under ACM panels at parapet.
b. Type: DensDeck Roof Board, as manufactured by Georgia-Pacific Gypsum, or equal. Provide thickness as indicated on Contract Drawings.
   1) Location: Use as exterior gypsum glass mat underlayment roof board over metal roof deck or rigid insulation for mechanically-attached single-ply roofing system.
   2. Edge Profile: Square.
   3. Size: Nominal 4 feet by 8 feet.

B. Fire Resistance:
   1. All Thicknesses: Flame spread 0, smoke developed 0, when tested in accordance with ASTM E 84; noncombustible when tested in accordance with ASTM E 136.
   2. 5/8-inch Thick Type X Roof Board: UL-classified Type DGG when tested in accordance with ASTM E 119.

C. Mechanical Fasteners: Manufacturers No. 15 steel screws or equivalent, with 3-inch square No. 26 formed galvanized steel plates, FMRC-listed as approved for use in the wind uplift mode specified.

D. Adhered Systems: Insta-Foam Products Insta-Stik Adhesive used with specified roof insulation board shall achieve a FMRC Class-180 according to test report 1Y7A5.AM in selected Class 1 insulated steel and concrete deck roof construction.

2.05 TAPERED FILLER STRIPS

A. Physical Characteristics: Provide tapered filler strips having physical characteristics no less beneficial than the following:
   1. Surface-burning Characteristics:
      b. Smoke Developed: 5.
   2. Compression Resistance: At 5 percent consolidation, 35 psi.
   3. Water Absorption: 1.20 percent by volume.
   4. Weight: For a 1-inch thickness, 0.90-pound per square foot.
   5. Tensile Strength: 4 psi, laminar.
   6. Thickness: Not less than that specified by the manufacturer for the flute span of the metal decking provided.

B. Acceptable Products:
   1. Fesco Board, as manufactured by Johns Manville Roofing Systems Division.
   2. Celot-Therm, as manufactured by Celotex Corporation.
   3. Permalite, Sealskin, as manufactured by International Permalite.
   4. Gaftemp, as manufactured by GAF Building Materials Corporation.
   6. DensDeck, as manufactured by G-P Gypsum Corporation.

C. Mechanical Fasteners: Manufacturers standard, FMRC-listed as approved for use in the wind uplift mode specified.
D. Cants: Pre-formed or pre-cut insulation material cut to configuration shown on the Contract Drawings.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that maximum flute span of metal deck complies with manufacturer's recommendations.

B. Verify the need for a separator sheet or sheet between the roof board and the roofing membrane with the roof membrane manufacturer or roofing systems designer.

3.02 INSTALLATION

A. Use maximum lengths possible to minimize number of joints. Locate edge joints parallel to and on deck ribs. Stagger end joints of adjacent lengths of roof board. Butt ends and edges.

B. Fasten roof board directly over metal deck where indicated on drawings using specified fasteners system in accordance with requirements of Article 2.02.

1. Maximum Flute Spans:
   a. 2-5/8 inches for 1/4-inch thick roof panels.
   b. 5 inches for 1/2-inch thick roof panels.
   c. 8 inches for 5/8-inch thick roof panels.

2. Install roof boards lengths perpendicular to direction of flutes.

C. Adhere roof board directly over rigid insulation where indicated on Contract Drawings using specified adhesives.

D. When applying solvent-based adhesives or primers, allow sufficient time for the solvent to flash off to avoid damage to roofing components.

E. Parapets: Do not use 1/4-inch thick roof boards for vertical parapet applications.

1. Spacing: Maximum framing space shall be as follows:
   a. 16 inches on centers for 1/2-inch thick roof boards.
   b. 24 inches on centers for 5/8-inch thick roof boards.

2. Metal Framing: Fasten a maximum 8 inches on centers around the perimeter and 8 inches on centers in the field.

END OF SECTION
PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Aluminum-faced, composite core, building panel rain-screen system (ACM), including perimeter extrusions and stiffeners, gaskets, sealants, fasteners, and related flashings and accessories.
   1. Include provision of exterior ceiling panels for Building B.

B. Related Sections:
   1. Section 011100 - Summary of Work.
   2. Section 012500 - Substitution Procedures.
   3. Section 013300 - Submittal Procedures.
   4. Section 014339 - Mockups.
   5. Section 017419 - Construction Waste Management and Disposal.
   7. Section 072710 - Air and Vapor Barriers.
   8. Section 079200 - Joint Sealants: General requirements for installation of joint sealants.
   9. Section 092216 - Non-Structural Metal Framing.

1.02 REFERENCES

A. ASTM International (ASTM):

B. American Architectural Manufacturers Association (AAMA):

C. ICC Evaluation Service, Inc. (ICC ES), a subsidiary corporation of the International Code Council:
   1. ICC ES Evaluation Reports, Materials, Products, Methods and Types of Construction published after February 1, 2003 (ESR-).

D. National Fire Protection Association (NFPA):
   1. 285 - Intermediate Scale, Multi-Story Fire Test Apparatus.

E. Society for Protective Coatings (SSPC):
   1. SSPC Paint 32-2006 - Coal Tar Emulsion.

F. United States Green Building Council (USGBC):
   1. Leadership in Energy and Environmental Design (LEED):

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination: The work of this Section is affected by mock-up requirements described in Section 014339.

B. Coordination: Refer to Section 017419 regarding procedures for implementing construction waste management requirements.

C. Coordination: Refer to Section 018113 regarding procedures for implementing sustainable design requirements.

D. Coordinate with the suspension system work of Section 095300 for installation of exterior ceiling panels.

E. Preinstallation Meetings: Conduct preinstallation meetings to verify project requirements, substrate condition, installation instructions and warranty requirements.

1.04 SUBMITTALS

A. Product Data: In accordance with the provisions of Section 013300, submit complete manufacturer's descriptive literature and specifications.

B. Shop Drawings: In accordance with the provisions of Section 013300, submit complete Shop Drawings comprehensively describing fabrication and installation of metal panels.
   1. Indicate thickness and dimension of parts, fastening and anchoring methods, detail and location of joints, including joints necessary to accommodate thermal movement.
C. Samples: In accordance with the provisions of Section 013300, submit two 12-inch by 12-inch samples of specified finish complete with factory-applied edge treatment for acceptance-review.
   1. Upon acceptance of samples by Architect, proceed with fabrication of full size mock-up.

D. Test Reports: Furnish independent laboratory test data of composite aluminum panel system indicating that products meet or exceed performance requirements.

E. Quality Control Submittals:
   1. Design Data: In accordance with the provisions of Section 013300, submit deferred approval data for work of this Section.

F. Substrate Condition Field Report: Furnish report from installer confirming that surfaces, alignments, and tolerances to which materials of this Section will be applied are in a suitable and acceptable condition to receive finish materials specified in this Section.

1.05 SUSTAINABLE DESIGN SUBMITTALS

A. Material & Resources Submittals:
   1. Letter Template for MR Credit 2: Letter template, signed by Contractor, tabulating total waste material, quantities diverted and means by which it is diverted, and statement that requirements for the credit have been met.
      a. Comply with Section 017419 Construction Waste Management and Disposal.
   2. Product Data and Certification Letter for MR Credit 4: Indicate percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.
   3. Product Data for MR Credit 5: For regional materials indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include statement indicating cost for each regional material and the fraction by weight that is considered regional.

1.06 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Stock Materials: Provide five additional face panels, and one of each type of corner, sill or soffit panel for Owner's stock. Include sufficient stiffeners, edge trim, and gaskets to mount spare panels. Panels shall be manufactured and finished identical to installed panels.

1.07 QUALITY ASSURANCE

A. Qualifications: Manufacturer, fabricator, and installer shall have demonstrated no less than 10 years successful experience of metal panel work similar in scope and size to this project.

B. Field Samples: When and as directed by the Architect, install a formed glazing panel in aluminum framing on a portion of the project. Field
sample installations shall be representative of the work proposed in every respect. When accepted by Architect, the field sample will become the standard by which the work of this Section will be judged.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver fabricated panels and component parts identified in accordance with accepted Shop Drawings.

B. Protect panel finishes and edges from damage during shipping and erection. Inspect work for damage upon delivery.

C. Storage: Stack materials on platforms or pallets, covered with suitable ventilated covering. Do not store panels to accumulate water or be in contact with other materials that might cause staining, denting or other surface damage.

1.09 FIELD CONDITIONS

A. Field Measurements: Prepare required Shop Drawings based on field measurements taken specifically for the work of this Section.

1.10 WARRANTY

A. Panels: Provide manufacturer's standard 5-year panel lamination warranty.

B. Installation shall be free of water leakage in accordance with performance requirements.

C. Finish: Provide manufacturer's standard 20-year finish warranty, to run concurrently with the framing system specified in Section 084313.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Design Basis Manufacturer:
   1. 3A Composites USA, Inc. (Alucobond), Benton, KY (270)527-4200, (800)626-3365, www.alucobondusa.com, with representation in Northern California (916)427-8811 (Jim Vann).

B. Acceptable Manufacturers:
   2. 3A Composites USA, Inc. (Alucobond), Benton, KY (270)527-4200, (800)626-3365, www.alucobondusa.com, with representation in Northern California (916)427-8811 (Jim Vann).
   3. Mitsubishi Chemical America, Inc. (Alpolic), Composite Materials Division, Chesapeake, VA (800)422-7270, with representation in California (949)586-9418.

C. Acceptable Fabricators:
D. Like materials shall be the products of one manufacturer and shall be either the ones upon which the design is based or equal products of other manufacturers accepted in advance in accordance with Section 012500.

2.02 REGULATORY REQUIREMENTS

A. Regulations:
   1. Comply with ICC ES Evaluation Reports applicable to product proposed for use:
      a. ICC ES Report 3435, issued to Alcoa Architectural Products.
   2. Comply with code regulations relating to fire resistance of core materials.

2.03 SUSTAINABILITY REQUIREMENTS

A. LEED Goals for Materials & Resources: For additional information on LEED goal requirements, refer to Section 018113.
   1. MR Credit 2 - Construction Waste Management: Recycle and/or salvage at least 75 percent of non-hazardous construction and demolition debris.
   2. MR Credit 4 - Recycled Content: Use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer content constitutes 10 percent of the total value of the materials in the project.
   3. MR Credit 5 - Regional Materials: Use building materials or products that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of the project site for a minimum of 10 percent of the total materials value.

2.04 PERFORMANCE/DESIGN CRITERIA

A. Design Requirements:
   1. Thermal Movement: Allow free and noiseless vertical and horizontal movement for an ambient temperature range from 20 degrees F to 180 degrees F.
   2. Wind Loads: Based on wind design criteria indicated on the Structural Contract Drawings applied to panels and corners in positive and negative modes.
   3. Seismic Forces: Design to accommodate floor structure displacement of 0.006-inch per foot of floor height.
   4. Deflection:
      a. Panel: With load applied normal to plane of panel, deflection of horizontal perimeter framing shall not exceed 1/175 of span length, or 3/4-inch, whichever is less.
      b. Anchor: Maximum anchor deflection shall not exceed 1/16-inch in any direction.
      c. Permanent deflection of framing members shall not exceed 1/1000 of span length, and components shall not experience failure or gross permanent distortion.
B. Performance Requirements:
   1. Air Infiltration: Air leakage of not more than 0.160 cfm/ft² (complete chamber) when tested according to ASTM E 283 at the following test pressure difference.
      a. Test Pressure Difference: 1.57 psf positive air pressure difference.
   2. Water Infiltration:
      a. Water Penetration under Static Pressure: No water penetration under static pressure at 15.0 psf when tested according to ASTM E 331 at a test pressure difference 6.24 lb/sq ft.
      b. Water Pressure under Dynamic Pressure: Less than 5% water on surface of chambers water moisture barrier when tested no less than 12.0 psf in accordance to AAMA 501.1.
   3. Structural Performance: Provide metal composite material panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 330.
      a. Wind Loads: As indicated on drawings.
      b. Other design loads: As indicated on drawings.
      c. Deflection limits: For wind loads no greater than l/175 for frame elements and L/60 for panel materials.
   4. Fire-Resistance Ratings: Comply with ASTM E84 if a rated wall is required; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
      a. Indicate design designations from UL's Fire Resistance Directory or from the listings of another qualified testing agency.
   5. Fire Propagation Characteristics: Where required by code, metal composite material wall panel systems with 4mm FR Alucobond shall pass NFPA 285 testing. 4mm PE is certified to Class A usage under ASTM-E-84.

2.05 SYSTEM DESCRIPTION

A. Rain Screen System:
   1. Barrier system in which panels are fabricated and formed into pans and hung on substrate using aluminum extrusions with concealed fasteners. Panel joints are finished using elastomeric strips that float at the extrusions and sealant between panels.
      a. System may allow incidental water to enter the cladding cavity, as long as it can be drained through the system via weep holes.

2.06 COMPONENTS

A. Aluminum Metal-Composite Metal (ACM) Panel System Type MP-2: Design is based on Alucobond PE Rear Ventilated Rainscreen II dry seal panel system, manufactured by 3A Composites, or equal, and fabricated by Elward Systems Corporation, or equal.

B. Metal Composite Material Wall Panel Systems: Provide factory-formed and -assembled, metal composite material wall panels fabricated from two metal facings that are bonded to a solid, extruded thermoplastic core; formed into profile for installation method indicated. Include attachment assembly components, panel stiffeners, and accessories required for weathertight system.
C. Aluminum-Faced Composite Wall Panels (ACM) Formed with 0.020-inch-thick, coil coated aluminum sheet facings.
   1. Panel Thickness: 4mm (0.157 inch).
   2. Core: Thermoplastic Core Material PE.

D. Attachment Assembly Components: Formed from extruded aluminum.

2.07 OTHER COMPONENTS

A. Miscellaneous Metal Subframing and Furring: ASTM C 645, cold-formed, metallic-coated steel sheet ASTM A 653, G90 (2275 hot-dip galvanized) coating designation or ASTM A 792, Class AZ50 (Class AZM150) aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal composite material panel system.

B. Panel Accessories: Provide components required for a complete “rain screen” panel system including trim, copings, sills, flashings, sealants and similar items. Match material and finish of metal composite material panels unless otherwise indicated.

C. Flashing and Trim: Provide flashing and trim formed to match finish of metal composite material panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, end walls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal composite material panels.

D. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal composite material panels.

E. Panel Sealants: ASTM C 920; elastomeric polyurethane or silicone seal-ant; of type, grade, class, and use classifications required to seal joints in metal composite material panels and remain weathertight; and as recommended in writing by metal composite material panel manufacturer.

2.08 FABRICATION

A. General: Fabricate and finish metal composite material panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. Fabricate metal composite material panel joints with factory-installed captive or separator splines that provide a water controlled seal and prevent metal-to-metal contact, and that minimize noise from movements.
C. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's *Architectural Sheet Metal Manual* that apply to design, dimensions, metal, and other characteristics of item indicated.
   1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
   2. Sealed Joints: Form non-expansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
   3. Conceal fasteners and expansion provisions where possible. Exposed fasteners are to be finished to match panels when exposed to view.
   4. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
      a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

D. Finish:
   1. Panels: Manufacturer's Alucobond PE Anodized Clear finish AAMA 611, AA-M12C22A41, Class I, 0.018 mm, or thicker.
   2. Apply a removable plastic film to the finish side of panels prior to fabrication that shall remain on the panel during fabrication, shipping, and erection to protect the surface from damage.

**PART 3 - EXECUTION**

**3.01 EXAMINATION**

A. Examine supporting structure and conditions under which the work is to be erected. Notify Contractor in writing of conditions detrimental to proper and timely completion of the work. Do not proceed with erection until unsatisfactory conditions have been corrected.
   1. Surfaces to receive panels shall be even, smooth, sound, clean, and free from defects detrimental to panel installation.

**3.02 PREPARATION**

A. Align structural support system to receive panels. Support system shall be installed to the same tolerances as required for the panel system.
   1. Maximum deviation from vertical and horizontal alignment of substrate shall be no more than 1/4-inch in 20'-0".

B. Install elastomeric membrane over exterior sheathing as specified in Section 072710.

C. Install furring channels in accordance with requirements of Section 092216.

**3.03 INSTALLATION**

A. General: Install metal composite material panels according to manufacturer's written instructions in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to supports unless otherwise indicated. Anchor metal composite material panels and other compo-
ments of the work securely in place, with provisions for thermal and structural movement.

1. Shim or otherwise plumb substrates receiving metal composite material panels.

2. Flash and seal metal composite material panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal composite material panels are installed.

3. Install screw fasteners in predrilled holes unless self-drilling fasteners are used.

4. Locate and space fastenings in uniform vertical and horizontal alignment.

5. Install flashing and trim as metal composite material panel work proceeds.

6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.

7. Align bottoms of metal composite material panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.

8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.

B. Fasteners:

1. Aluminum Panels: Use approved drill flex coated or stainless-steel fasteners for surfaces exposed to the exterior and for surfaces exposed to the interior.

C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal composite material panel manufacturer.

D. Attachment Assembly, General: Install attachment assembly required to support metal composite material wall panels and to provide a complete rain screen wall system, including subgirts, perimeter extrusions, and anchor channels.

1. Include attachment to supports, panel-to-panel joinery, panel-to-dissimilar-material joinery, and panel-system joint seals.

E. Installation: Attach metal composite material wall panels to supports at locations, spacings, and with fasteners recommended by manufacturer to achieve performance requirements specified.

1. Alucobond PE Series Rainscreen System: Install using systems standard assembly with vertical and horizontal continuous channels and flashings that provides support and secondary drainage at each panel and the base of the wall. Install all starter tracks and flashings prior to installing panels. Install panels plumb and level in accordance with approved panel system shop drawings. Do not apply sealants to joints unless otherwise indicated.
F. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
   1. Install components required for a complete metal composite material panel assembly including trim, copings, flashings, sealants and similar items. Provide types indicated by metal composite material panel manufacturer; or, if not indicated, provide types recommended in writing by metal composite material panel manufacturer.

G. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated.
   1. Install exposed flashing and trim that is without buckling and tool marks and that is true to line and levels indicated. Install sheet metal flashing and trim to fit substrates and to result in waterproof performance.
   2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

3.04 ERECTION TOLERANCES
   A. Installation Tolerances: Shim and align metal composite material wall panel units within installed tolerance of 1/4 inch in 20 feet non-accumulative, on level, plumb, and location lines as indicated, and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.05 FIELD QUALITY CONTROL
   A. Testing Agency: a qualified independent testing agency to perform field tests and inspections.
   B. Water-Spray Test: After installation, test area of assembly [shown on Drawings] [as directed by Architect] for water penetration according to AAMA 501.2.
   C. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.
   D. Prepare test and inspection reports.

3.06 CLEANING AND PROTECTION
   A. Remove temporary protective coverings and strippable films, if any, as metal composite material panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal composite material panel installation, clean finished surfaces as recommended by metal composite material panel manufacturer. Maintain in a clean condition during construction.
B. After metal composite material panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

C. Replace metal composite material panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

D. Verify weep holes and drainage channels are unobstructed and free of dirt and sealants.

E. Clean all portions of the work, including surfaces of adjacent work soiled as a consequence of the work of this Section.

END OF SECTION
- SECTION 074273 -

ULTRA-HIGH PERFORMANCE CONCRETE PANELS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Through-color ultra-high performance mesh reinforced concrete panels (UHPC) wall for exterior cladding and soffits.

B. Alternatives: This Section may be affected by alternatives described in Section 012300.

1.02 REFERENCES

A. Referenced Sections:
   1. Section 012300 - Alternatives.
   2. Section 012500 - Substitution Procedures.
   3. Section 013300 - Submittal Procedures.
   4. Section 054100 - Structural Metal Stud Framing.
   5. Section 072100 - Thermal Insulation.
   6. Section 072710 - Air and Vapor Barriers.

B. Refer to Section 072100 for thermal insulation.

C. Refer to Section 072710 for air and vapor barriers for rainscreen applications.

1.03 REFERENCED STANDARDS

A. ASTM International (ASTM):
   4. E 136-12 - Test Method for Behavior of Materials in a Vertical Tube Furnace at 750° C.

B. European Committee For Standardization (CEN):

B. Coding Center Heidelberg (CCHD):

1.04 SUBMITTALS

A. General: Make submittals in accordance with provisions of Section 013300.
B. Product Data: Manufacturer's data sheets on each product to be used, including, but not limited to:
1. Preparation instructions and recommendations for fibre cement panels.
2. Storage and handling requirements and recommendations.
3. Installation methods for the supporting framework and fibre cement wall panels, and cut sheets for all hardware.
6. MSDS Sheets.
7. Field Cutting & Drilling Instructions
8. Field Chip Repair Instructions
9. Field [Re]application of Sealer & Stain Instructions

C. Selection Samples: For each finish product being specified, two complete sets of 5 1/4" x 2 1/2" color chips representing manufacturer's full range of colors and patterns available in the United States, one 12x12 inch sample & four 6x6 inch samples per color/texture pattern for approval.

D. Verification Samples: For each finish product specified, two samples, minimum size 12 inches square, representing actual product, color, and patterns

E. Shop Drawings: Provide detailed drawings of non-standard applications of panel materials which are outside the scope of the standard details and specifications provided by the manufacturer.

F. Code Compliance: Prior to the bid, submit documents showing product compliance with local building code. Include appropriate Evaluation Reports and/or test reports supporting the use of the product.

G. Engineering Calculations: Submit engineering calculations as required by the local building code, showing that the installed panels and attachment system meets the wind load requirements for the project.

H. Operation and Maintenance Data: Submit operation, maintenance, and cleaning information for products covered under this section.

1.05 SUSTAINABLE DESIGN SUBMITTALS

A. Materials & Resources Submittals: Refer to Section 018113 for additional information on LEED submittals.
1. Letter Template for MR Credit 2: Letter template, signed by Contractor, tabulating total waste material, quantities diverted and means by which it is diverted, and statement that requirements for the credit have been met.
   a. Comply with Section 017419 Construction Waste Management and Disposal.
2. Credit MR 4: Manufacturer's Product Data indicating the following:
   a. Percentages by weight of post-consumer and pre-consumer recycled content.
   b. Indicate total weight of products provided.
   c. Include statement indicating costs for each product having recycled content.
3. Product Data for MR Credit 5: For regional materials indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include statement indicating cost for each regional material and the fraction by weight that is considered regional.

1.06 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Stock Materials: Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Furnish not less than 10 square feet for every 500 square feet or fraction thereof, for each color, pattern, and type and color provided.

1.07 QUALITY ASSURANCE

A. Installer Qualifications: All products listed in this Section shall be installed by a single installer trained and approved by the manufacturer or representative.

B. Mockups: Provide a full size mock-up for evaluation of surface preparation techniques and application workmanship. Mock-up shall include a corner, window sill, jamb and head condition, wall base, and wall-roof intersection.
   1. Finish areas as designated by Architect.
   2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Ship, unload, store, protect, uncrate, and handle panels in accordance with manufacturer's instructions. Crates shall be returned to manufacturer after use.

B. Ship panels in crates labeled with installation sequence. Material shall be crated according to area (not in specific sequence) and manifest will have list of parts per Shop Drawing elevations.

C. Storage and Handling Requirements:
   1. Store crated panel materials in dry conditions, protected from weather and other trades.

D. Moving panels that are stacked in crates should be done with a forklift or a crane. Ensure the panels are secured to the pallet in a way that will not cause damage. Stacks should be transported under a waterproof cover.

E. Always lift panels off of each other; never slide them over one another to avoid scratching finished surfaces. Panels shall be shipped vertical, not flat stacked. Lifting and handling shall always be vertical.

1.09 FIELD CONDITIONS

A. Ambient Conditions: Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits or which could involve life safety situations.
B. Field Measurements Verify actual measurements/openings by field measurements performed by the installer prior to release for fabrication. The General Contractor or Installer shall be responsible for existing site dimensions. Recorded measurements shall be indicated on shop drawings based on field measurements provided by the installer. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

1. Lead time and manufacturing process does not include separate releases from field dimensions. Identify with purchaser of field processed panels to alleviate the time constraints on waiting for field dimensions.

1.10 WARRANTY

A. Special Warranty: At project closeout, provide manufacturer's limited 10-year warranty covering defects in materials. Warranty is only available when material is installed by an installation contractor trained and approved by the manufacturer's representative.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers of Concrete Panels: Design is based on products manufactured by TAKTL, LLC, Glenshaw, PA (412)486-1600, www.taktl-llc.com.


C. Like components shall be the products of one manufacturer and shall be either the ones upon which the design is based or equal products of another manufacturer accepted in advance in accordance with Section 012500.

2.02 REGULATORY REQUIREMENTS

A. Waste Management: Comply with CALGreen Section 5.408 Construction Waste Reduction, Disposal and Recycling. Establish a construction waste management plan for the diverted material.

1. Recycle or salvage for reuse a minimum of 50 percent of the non-hazardous construction and demolition waste in accordance with CALGreen 5.408.1.3.

   a. Include carpet, wood, aggregate, paint, shingles, wallboard, and other materials that have recyclable value.
2.03 SUSTAINABILITY REQUIREMENTS

A. LEED Goals for Materials & Resources: For additional information on LEED goal requirements, refer to Section 018113.

1. MR Credit 2 - Construction Waste Management: Divert 75 percent of construction waste from landfill in accordance with County requirements and to achieve LEED certification point as defined by the U.S. Green Building Council.
   a. Note that excavated soils and land-clearing debris (organic material) does not count toward construction waste credits, but all material shall be disposed of responsibly.

2. MR Credit 4 - Recycled Content: Use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer content constitutes 20 percent of the total value of the materials in the project.

3. MR Credit 5 - Regional Materials: Use building materials or products that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of the project site for a minimum of 20 percent of the total materials value.

2.04 PERFORMANCE CRITERIA

A. Color Evaluation: No change, 2000 hours of accelerated weathering with color evaluation, in accordance with CCHD Performance Test Report.

2.05 SYSTEM DESCRIPTION

A. Summary: Ultra-high performance concrete solid exterior wall panels and pre-engineered support system.

B. Basis of Design Product/Manufacturer: TAKTL Standard + Exterior Patterned Wall and Façade Panels.

1. Fasten to substrate with base bid exposed fasteners unless Alternative 2 specified in Section 012300 for concealed fasteners has been accepted and included in Contract.

2.06 WALL PANELS

A. Panels Types UHPC-1 and UHPC-2: Factory-formulated with ultra-high performance concrete and reinforced with alkali-resistant glass mesh, factory-mixed and manufactured. Comply with ASTM C 1186. Type A, Grade IV.

1. Panel Sizes: Varies Not to exceed 48" x 120" nominal.

2. Panel Thickness: 5/8-inch nominally, thickness variation +/-1/16.

3. Panel Edges: Mitered and fully adhered at all outside panel corners, mitered (open joint) at all inside corners.


B. Support Structure:
1. Support Structure: Eco cladding VCI 40 vertical and HCI horizontal girts over continuous insulation.
   a. Complete sub-frame assembly to support and anchor solid exterior solid UHPC wall panels, consisting of cold-formed steel with zinc-aluminum-magnesium ZM40 coating. Extruded aluminum support structure shall be anchored to building structure. Attachment system shall consist of the following components:
      1) 16 gage structural steel studs.
      2) DensGlass sheathing.
      3) HCI horizontal girts spaced at 39 inches on centers at exposed fasteners.
      4) CI vertical girts spaced at 32 inches on centers at concealed fasteners.
      5) PanelRails in opposite direction supporting concrete panels.
      6) Ultra-high performance concrete panels.
   b. Fasteners: Corrosion-resistant stainless steel concealed fasteners and undercut anchors of type, size, and spacing required for type of substrate and project conditions.
2. Components for Exposed Fasteners (Base Bid):
   a. Horizontal HCI girt hat channel support bracket anchored directly to building structure.
   b. Vertical hat channel PanelRail that fastens into horizontal support brackets to support UHPC wall concrete panels. Include vertical RevealRail where required.
3. Components for Concealed Fasteners (Alternative Bid):
   a. Vertical CI Girt channels anchored directly to building structure, as manufactured by KnightWall Systems.
   b. Horizontal PanelRail hat channel support rails attached to girt profile which provides means to suspend UHPC wall panels extruded aluminum 'C' Rail & Clips with concealed undercut anchors, as manufactured by panel manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION
A. Do not begin installation until substrates have been properly prepared.
B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION
A. Clean panel surfaces thoroughly prior to installation. Remove cutting or drilling dust from the surface of the panel using a microfiber soft cloth.
B. Prepare surfaces using the methods recommended by manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION
A. Install in accordance with manufacturer's instructions and approved submittals.
B. For exterior applications, comply with local codes and structural engineer's fastening calculations along with manufacturer's recommendations for fastener spacing.

3.04 RAINESSCREEN REQUIREMENTS

A. Detailing Requirements:
   1. Air space inlets and outlets are required at top and bottom of building or wall termination, equivalent to a continuous 1/2-inch to 3/4-inch space to facilitate airflow behind the panels. Do not block vertical airflow at windows, doors, eaves, or at the base of the building. Airflow shall be continuous from bottom to top so there is air movement behind each panel. Air flow behind the panels is critical to the performance of the rain screen constructions.
   2. Fasteners in profile shall accommodate thermal expansion/contraction of metal and not interfere with panel application.

B. Rainscreen Installation: Comply with manufacturer's installation requirements.

3.05 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION
PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Door hardware trim, and related accessories for exterior and interior openings.
   1. Refer to Section 087105 for installation of door hardware.

B. Referenced Sections:
   1. Section 012500 - Substitution Procedures.
   2. Section 013300 - Submittal Procedures.
   3. Section 017823 - Operation and Maintenance Data.
   4. Section 018113 - Sustainable Design Requirements.
   5. Section 079200 - Joint Sealants.
   7. Section 081416 - Flush Wood Doors.
   8. Section 087105 - Door and Hardware Installation.
   9. Division 26 Sections: Electrical requirements.

C. Related Sections:
   1. Section 084229 - Automatic Entrances.

D. Hardware Specified Elsewhere: Hardware for the following is specified or indicated in other Sections.
   2. Cabinets of all kinds, including open wall shelving and locks.
   3. Access doors and panels, except cylinders where locks are specified.
   4. Overhead rollup doors and grilles.
   5. Glazed entry doors.
   6. Toilet compartments and accessories.
   7. Fire extinguisher cabinets.

E. Related Work Specified Elsewhere:
   1. Angle sill threshold.
   2. Weatherstripping for aluminum/all-glass entry doors.
   3. Door hardware installation.
   4. Lock boxes.
   5. Signs, including code required signage.
   6. Toilet accessories.
   7. Wall and corner guards.
   8. Card readers, motion detectors, and power supplies.
   9. Conduit, junction boxes & wiring.
1.02 REFERENCED STANDARDS

A. ASTM International (ASTM):

B. California Code of Regulations (CCR):
   1. Title 24, rt 1- California Administration Code (CBC), 2013 edition:
         1) Section 1008 - Doors, Gates and Turnstiles.
            a) 1008.1.9 - Door Operations.
            b) 1008.1.10 - Panic and Fire Exit Hardware.
      b. Chapter 11B - Accessibility to Public Buildings, Public Accommodations, Commercial Buildings, and Public Housing:
         1) Division 3 - Building Blocks.
            a) Section 11B-309 - Operable Parts.
         2) Division 4 - Accessible Routes.
            a) Section 11B-404 - Doors, Doorways, and Gates.

C. American National Standards Institute (ANSI):
   1. 115 - Specifications for Steel Door and Frame Preparation of Hardware.
   2. 115W - Wood Door Hardware Standards; Hardware Preparation.

D. Builders Hardware Manufacturers Association/American National Standards Institute (BHMA/ANSI):
   3. A156.3-2001 - Exit Devices.
   4. A156.4-2000 - Door Controls--Closers.
   5. A156.5-2001 - Auxiliary Locks.
   6. A156.6-2001 - Architectural Door Trim.
   7. A156.8-2000 - Overhead Stops.
   9. A156.16-2002 - Auxiliary Hardware.
   10. A156.18-2000 - Materials and Finishes.

E. Door Hardware Institute (DHI):
   1. Abbreviations and Symbols.
   2. Sequence and Format for the Hardware Schedule.
   3. For Processing Hardware Schedules and Templates.

F. National Fire Protection Association (NFPA):
   1. 80-13 - Fire Doors and Other Opening Protectives.
   2. 105-13 - Standard for the Installation of Smoke and Door Assemblies.
   3. 252-03 - Standard Methods of Fire Tests of Door Assemblies.

G. Underwriters Laboratories (UL):
   1. 10B-97 - Fire Tests of Door Assemblies.
2. 10C-98 - Positive Pressure Fire Tests of Door - Panic Hardware.

H. United States Green Building Council (USGBC):
   1. Leadership in Energy and Environmental Design (LEED):

1.03 DEFINITIONS

A. Exit Doors: Doors that are openable at all times from the inside without the use of a key or any special knowledge or effort.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Refer to Section 018113 regarding procedures for implementing sustainable design requirements.

B. Coordination: Coordinate door hardware with other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents.
   1. Furnish related trades with the following information:
      a. Location of embedded and attached items to concrete.
      b. Location of wall-mounted hardware, including wall stops.
      c. Location of finish floor materials and floor-mounted hardware.
      d. Locations for conduit and raceways as needed for electrical, electronic and electro-pneumatic hardware items. Fire/life-safety system interfacing. Point-to-point wiring diagrams plus riser diagrams to related trades.
      e. Manufacturer templates to door and frame fabricators.
   2. To greatest extent possible, obtain each type of hardware (i.e. latchsets, locksets, hinges, closers, etc.) from a single manufacturer.
   3. Provide secondary materials that are produced or are specifically recommended by manufacturer to ensure compatibility.
   4. Electrified Security Hardware: Coordinate installation of the electrified security hardware with the contract hardware supplier and provide installation diagrams and technical data. Coordinate voltages of electrically operated hardware with electrical contractor.

C. Preinstallation Meetings:
   1. Initiate and conduct preinstallation meetings with hardware suppliers, including electronic hardware suppliers, hardware installers, and related trades. Coordinate materials, techniques, and installation sequence of complex hardware items. Include manufacturers' representatives of locks, panic hardware, and door closers in the meetings. Convene prior to commencement of related work.
   2. Conference attendees shall include Contractor, Owner, Architect, door hardware installers, and representatives of hardware supplier and/or manufacturers.
   3. Topics to be discussed at meeting shall include:
      a. A review of Contract Documents and accepted hardware schedule shall be made and deviations or differences shall be resolved.
b. Building code, National Fire Protection Association (NFPA), and Underwriters' Laboratories (UL) requirements shall be reviewed and conflicts in building code, NFPA, or UL requirements and Project conditions shall be resolved.
c. Review items such as proper installation sequence, adjustments, attachment, and location of door hardware. If a conflict exists between what is considered proper hardware application and Contract Documents, these differences shall be defined.

4. Inventory door hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.

5. Pre-installation conference shall serve to clarify Contract Documents, application requirements and what work should be completed before hardware installation can begin.

6. Prepare and submit, to parties in attendance, a written report of pre-installation conference. Report shall be submitted within 3 days following conference.

D. Scheduling: Submit templates to door and frame manufacturers sufficiently in advance to avoid delay in work.

1.05 SUBMITTALS

A. Product Data: In accordance with the provisions of Section 013300, submit manufacturer's product data containing drawings or cuts of all hardware items at same time hardware schedule is submitted. Make submittal in a neat brochure form and include an index list of all items, with manufacturer's names and catalog numbers. When proposing substitutions, conform to the requirements of Section 012500.
   1. Name, part number and manufacturer of each item.
   2. Use BHMA Finish codes per ANSI A156.18.
   3. Fastenings and other pertinent information.
   4. Catalog cuts.
   5. Include a list of each manufacturer's nearest representative with address and phone number.
   6. Manufacturer's product data sheets for hand-operated hardware.

B. Samples: Submit sample of each hardware item for review and acceptance.
   1. When proposing substitutions, submit full size samples of both the specified hardware and the proposed hardware for comparison by Architect. Samples will be returned to Contractor after selection.

C. Shop Drawings: In accordance with the provisions of Section 013300, submit six copies of detailed hardware schedule.
   1. Organize schedule into Hardware Sets in vertical style as illustrated by the Sequence of Format for Hardware Schedule as published by the Door and Hardware Institute, indicating complete designations of every item required for each door or opening. Include the following information:
      a. For doors of different sizes or where hinges, closers, or locks are different, a separate heading shall be used.
      b. Labeled openings shall not be combined with non-labeled openings.
2. Include the following:
   a. Type, style, function, size, quantity and finish of hardware items.
   b. Use BHMA Finish codes per ANSI A156.18.
   c. Name, part number and manufacturer of each item.
   d. Fastenings and other pertinent information.
   e. Location of hardware set coordinated with floor plans and door schedule and cross-referenced to door designations on drawings both on floor plans and in door schedule.
   f. Explanation of abbreviations, symbols, and codes contained in schedule.
   g. Mounting locations for hardware.
   h. Door and frame sizes, materials and degrees of swing.
   i. List of manufacturers used and their nearest representative with address and phone number.
   j. Catalog cuts.
   k. Wiring Diagrams.
   l. Manufacturer's technical data and installation instructions for electronic hardware.

3. Bid and submit manufacturer's updated/improved item if scheduled item is discontinued.

4. Deviations: Highlight, encircle or otherwise identify deviations from Schedule of Finish Hardware on submittal with notations clearly designating those portions as deviating from this section.

5. If discrepancy between drawings and scheduled material in this section, bid the more expensive of the two choices, note the discrepancy in the submittal and request direction from Architect for resolution.

6. Substitutions: In accordance with Division 01. Include product data and indicate benefit to the Project. Furnish operating samples on request.

D. Quality Control Submittals:

1. Test Reports: Submit certified laboratory test reports confirming physical characteristics of materials used in the performance of the work of this Section.

2. Certificates: Furnish certificate executed by a representative of the manufacturer of the door closers and floor hinges that closers have been inspected and adjusted, are operating as designed, and have been installed in accordance with the manufacturer's instructions.

3. Manufacturer's Instructions:
   a. Templates: Where required, furnish hardware templates to each fabricator of doors, frames and other work to be factory-prepared for the installation of hardware.
      1) Follow procedures established by DHI Publication For Processing Hardware Schedules and Templates.
   b. Keying Schedule: Submit three copies of a separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.
      1) Use format described in DHI Manual of Keying Systems and Nomenclature
      2) Provide copies of manufacturers wiring diagrams for installation of electrified hardware.
1.06 SUSTAINABLE DESIGN SUBMITTALS

A. Material & Resources Submittals:
   1. Product Data and Certification Letter for MR Credit 4: Indicate percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.
   2. Product Data for MR Credit 5: For regional materials indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include statement indicating cost for each regional material and the fraction by weight that is considered regional.

1.07 CLOSEOUT SUBMITTALS

A. Closeout Submittals:
   1. Operation and Maintenance Data: Submit operating and maintenance data specified in Section 017823.
      a. Include a copy of wiring diagrams and elevation drawings for electronic hardware in Operation and Maintenance Data Manual.
      b. Provide complete operational descriptions of electronic components listed by opening in hardware submittals.
      c. Operational descriptions to detail how each electro-mechanical component functions within opening incorporating conditions of ingress and egress.
      d. Include a copy of operational descriptions in Operation and Maintenance Data Manual.
   2. Warranty: Submit copies of written warranty, as signed by the applicator, agreeing to repair or replace defective work during the warranty period.
   3. Key Transcript: Supply to Owner upon completion.
   4. Follow Up Inspection: Submit letter of agreement described in Article 3.03 - Field Quality Requirements.

1.08 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Stock Materials:
   1. Furnish 50 extra key blanks upon completion of project.
   2. Furnish six each of typical fasteners used to install hardware.
   3. Return new hardware not installed to the Owner.

B. Tools: Furnish the following and deliver directly to Owner's representative.
   1. One set of adjusting tools.
   2. One set of maintenance manuals for locksets, door closers, floor hinges, and exit devices.

1.09 QUALITY ASSURANCE

A. Qualifications:
   1. Obtain each kind of hardware (such as latch and lock sets, hinges, closers) from only one manufacturer, although several may be indicated as offering products complying with requirements.
      a. Comply with CBC 1008.1.9.
2. Hardware Supplier: Direct factory contract supplier who employs a certified architectural hardware consultant (AHC), available at reasonable times during course of work for project hardware consultation to Owner, Architect, and Contractor.
   a. Responsible for detailing, scheduling and ordering of finish hardware. Detailing implies that the submitted schedule of hardware is correct and complete for the intended function and performance of the openings.

3. Hardware supplier shall have a maintenance and service facility located within 100 miles of the project site. This facility shall stock parts for products supplied and be capable of repairing and replacing any hardware item found defective within the warranty period specified in Article 1.11 - Warranty.

B. Hardware Schedule Designations: The use of one manufacturer's numeric designation system in schedules does not imply that another manufacturer's products will not be acceptable, unless they are not equal in design, size, weight, finish, function, or other significant quality. However, product items with acceptable substitutes that are noted as NONE, OWNER STANDARD, NO KNOWN EQUAL, or substitutions made after the Architect's acceptance of hardware supplier's completed hardware schedule, will not be permitted.

C. Hardware shall be free of defects, blemishes and excessive play. Obtain each kind of hardware (latch and locksets, exit devices, hinges and closers) from one manufacturer.

D. Exit Doors: Operable from inside with single motion without the use of a key or special knowledge or effort.

E. Fire-Rated Openings: NFPA 80 compliant. Hardware UL 10C (positive pressure) compliant for given type/size opening and degree of label. Provide proper latching hardware, non-flaming door closers, approved-bearing hinges, and resilient seals. Coordinate with wood door section for required intumescent seals. Furnish openings complete.

F. Note that scheduled resilient seals may exceed selected door manufacturer's requirements.

G. Refer to Paragraph 2.12-C.1 for resilient seals.

H. Refer to Paragraph 2.12-C.2 for intumescent seals.

I. Furnish hardware items required to complete the work in accordance with specified performance level and design intent, complying with manufacturers' instructions.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Coordinate delivery to appropriate locations (shop or field).
   1. Permanent keys and cores: Secured delivery direct to Owner's representative.
B. Packing, Shipping, Handling, and Unloading:
   1. Individually package each unit of door hardware complete with proper fastening and appurtenances, clearly marked on the outside to indicate contents and specific locations in the work. Pack each item complete with necessary parts and fasteners.
   2. Properly wrap and cushion each item to prevent scratches and dents during delivery and storage.

C. Acceptance at Site:
   1. Deliver packaged hardware items to the jobsite in a timely manner for installation.
   2. Deliver materials in manufacturer’s original unopened packaging with labels intact, complete with proper fasteners and related pieces. Clearly mark packages to indicate contents, locations in hardware schedule and door numbers.
   3. Deliver construction keys to Contractor at job site. Deliver change keys and master keys only to Owner’s representative. Change out of construction keys to permanent keys shall be performed by Contractor Owner’s representative upon acceptance of project.

D. Storage and Protection:
   1. Provide securely locked storage area for hardware, protected from moisture, sunlight, paint, chemicals, dust, and excessive heat and cold.
   2. Store hardware delivered to Project, but not yet installed, in a secure locked area.
   3. Control handling and installation of hardware items that are not immediately replaceable so that Work will not be delayed by hardware losses both before and after installation.

1.11 WARRANTY

A. Provide guaranty from hardware supplier as follows:
   1. Locksets: Three years.
   2. Extra Heavy Duty Cylindrical Lock: Seven years.
   3. Extra Heavy Duty Mortise Lock: Three years.
   4. Exit Devices:
      a. Mechanical: Three years.
      b. Electrical: One year.
   5. Closers:
      a. Mechanical: Ten years.
      b. Electrified: Two years.
   6. Hinges: One year.
   7. Continuous Hinges: Ten years.
   8. Other Hardware: Two years.
PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Design is based on the use of products of the following manufacturers for the items noted:

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESIGN-BASIS MANUFACTURER</th>
<th>ACCEPTABLE SUBSTITUTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Astragals</td>
<td>Zero, National Guard</td>
<td>Pemko</td>
</tr>
<tr>
<td>Closers</td>
<td>LCN</td>
<td>District Standard</td>
</tr>
<tr>
<td>Coordinators</td>
<td>Ives</td>
<td>Trimco, BBW, DCI</td>
</tr>
<tr>
<td>Cylinders, Key System</td>
<td>Corbin-Russwin</td>
<td>District Standard</td>
</tr>
<tr>
<td>Dust Proof Strike</td>
<td>Ives</td>
<td>Trimco, BBW, DCI</td>
</tr>
<tr>
<td>Exit Devices</td>
<td>Von Duprin</td>
<td>District Standard</td>
</tr>
<tr>
<td>Automatic Flush Bolts,</td>
<td>Ives</td>
<td>Trimco, BBW, DCI</td>
</tr>
<tr>
<td>Hinges</td>
<td>Ives</td>
<td>Hager, Stanley, McKinney</td>
</tr>
<tr>
<td>Kick Plates</td>
<td>Ives</td>
<td>Trimco, BBW, DCI</td>
</tr>
<tr>
<td>Locksets</td>
<td>Corbin-Russwin</td>
<td>District Standard</td>
</tr>
<tr>
<td>Pulls</td>
<td>Ives</td>
<td>Trimco, BBW, DCI</td>
</tr>
<tr>
<td>Push Plates</td>
<td>Ives</td>
<td>Trimco, BBW, DCI</td>
</tr>
<tr>
<td>Seals &amp; Bottoms</td>
<td>Zero, National Guard</td>
<td>Pemko, Zero</td>
</tr>
<tr>
<td>Stops &amp; Holders</td>
<td>Ives</td>
<td>Trimco, BBW, DCI</td>
</tr>
<tr>
<td>Thresholds</td>
<td>Zero, National Guard</td>
<td>Pemko, Zero</td>
</tr>
</tbody>
</table>

1. Manufacturer contact data is available at the web site of Door Hardware Institute (DHI):

B. Except as otherwise accepted, like items shall be the products of one manufacturer and shall be either the ones upon which the design is based, the products of a manufacturer listed as an acceptable substitute, or a manufacturer accepted in advance in accordance with Section 012500.

1. Items listed with no acceptable substitute either have no equivalent known to the Architect.

2. Where exact types of hardware specified are not adaptable to the finished shape or size of the members requiring hardware, furnish suitable types having as nearly as practicable the same operation and quality as the type specified, subject to the acceptance of the Architect.

C. Coordinate door hardware with existing system in use on other buildings on site for extension of keying and maintenance issues.
2.02 REGULATORY REQUIREMENTS

A. Regulations:
   1. Conform to federal, state, and local codes affecting this Section, including CBC and local governing agency security ordinances.
      a. Door locks and latches required to be accessible shall comply the requirements of CBC 1008.1.9 (Door Operations), CBC 11B-404 (Doors, Doorways, and Gates).
      b. Operable parts of hand-activated door opening hardware on accessible doors shall comply with CBC 11B-309.4 (Operation).
      c. Door hardware mounting height shall comply the requirements of CBC 1008.1.9.2 (Hardware Height) and CBC 11B-404.2.7 (Door and Gate Hardware).
      d. Door operating force shall comply with the requirements of CBC 11B-404.2.9 (Door and Gate Operating Force).
         1) Interior hinged doors and gates shall have a maximum opening force of 5 pounds maximum in accordance with CBC 11B-404.2.9.1.
         2) Required fire doors shall have a maximum opening force not to exceed 15 pounds in accordance with CBC 11B-404.2.9.3.
         3) Exterior hinged doors shall have a maximum opening force of 5 pounds maximum in accordance with CBC 11B-404.2.9.4.
      e. Door closer sweep period shall comply with CBC 11B-404.2.8.
      f. Threshold height shall comply with CBC 1008.1.7 and CBC 11B-404.2.5.
      g. Floor stops shall not be located in the path of travel, and not protrude more than 4 inches maximum from walls.
   2. Fire endurance test shall establish neutral pressure level at 40 inches above finished floor after 5 minutes and maintain that condition during remainder of entire test period.
   3. Provide door hardware complying with positive pressure requirements of UL 10C.
   4. Refer to Paragraph 2.06-A.8 for maximum pressure to operate doors.
   5. Refer to Section 087105 for code-required mounting heights.

B. Night Latch hardware shall not be used for accessible doors or gates unless the following conditions are met:
   1. Such hardware has a dogging feature.
   2. It is dogged during the time the facility is open.
   3. Such dogging operation is performed only by employees as their job function (non-public use).
C. Fire-Rated Openings: Provide all necessary hardware for fire-rated openings in compliance with NFPA 80 whether indicated in Schedule of Door Hardware or not. This requirement takes precedence over other requirements for such hardware, even if not indicated on Contract Drawings. Provide hardware which has been tested and listed by Underwriters Laboratories (UL) for the type and size of each door required, and which complies with the requirements of the door and frame labels.

1. Door closers, ball bearing hinges, and seals are required at fire-rated openings, whether listed in the Schedule of Door Hardware or not.

2. Where panic exit devices are required on fire-rated doors, provide supplementary marking on door UL label indicating **FIRE DOOR TO BE EQUIPPED WITH FIRE EXIT HARDWARE**, and provide UL label on exit device indicating **FIRE EXIT HARDWARE**.

### 2.03 SUSTAINABILITY REQUIREMENTS

A. LEED Goals for Materials & Resources: For additional information on LEED goal requirements, refer to Section 018113.

1. MR Credit 4 - Recycled Content: Use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer content constitutes 10 percent of the total value of the materials in the project.

2. MR Credit 5 - Regional Materials: Use building materials or products that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of the project site for a minimum of 10 percent of the total materials value.

B. Indoor Environmental Quality Submittals: Refer to Section 018113 for additional information on LEED submittals.

1. Product Data for IEQ Credit 5: For entryway mats, documentation including printed statement indicating product complies with requirements for a permanent installation to capture dirt and particulates from entering building.

### 2.04 HARDWARE COMPONENTS

A. General: Furnish all items of door hardware necessary to satisfy the requirements of code and function. Required door hardware shall be furnished even if inadvertently omitted from this Section. Such items shall be of equal quality and type.

1. Manufacturers part numbers indicated are intended to be a guide as to design, quality, function, and service. Proposed substitutions shall be in accordance with Section 012500, accompanied by substantiating data to support equivalency of design, quality, function, and service of requested substitute items.

2. Hand of lock shall be as indicated on Contract Drawings. If door hand is changed during construction, Contractor shall make necessary changes in hardware at no additional expense to Owner.

3. Hinging: Although drawings typically depict doors at 90 degrees, doors shall actually swing to maximum allowable. Use wide-throw conventional or continuous hinges as needed up to 8 inches in width.
to allow door to stand parallel to wall for true 180-degree opening. Advise architect if 8-inch width is insufficient.

2.05 HINGES

A. Hinges: Exterior doors and doors subject to corrosive atmospheric conditions shall have hinges manufactured from stainless steel. Interior and fire labeled doors shall be steel. Exterior hinges with prime finish shall have ZN base. Conform to the requirements of ANSI A156.1.

1. Although Contract Drawings typically depict doors at 90 degrees, doors shall swing to maximum allowable.
   a. Provide wide-throw conventional or continuous hinges as required, up to 8 inches in width, to allow door to swing parallel to adjacent wall for true 180-degree opening.
      1) Advise Architect if 8-inch width is insufficient.

2. Conform to manufacturer’s published hinge standard for door dimensions, weight, and frequency of intended use for specified hinge. Where manufacturer’s standard exceeds the specified product, furnish the heavier hinge.
   a. Notify Architect of deviations from scheduled hardware.

3. Hinges shall have stainless steel pins and concealed bearings.
   a. Furnish extra heavy weight 4-ball bearing hinges on doors over 3 feet 5 inches wide.
   b. Provide thrust pivots at doors with panic devices.

4. Outswinging exterior doors shall have non-removable (NRP) pin with security studs.

5. Size: Hinge open widths shall be minimum, but of sufficient size to permit door to swing 180 degrees.
   a. Provide 4-1/2 x 4-1/2 on doors up to 36 inches wide.
   b. Provide 5 x 4-1/2 on doors over 36 inches wide.

6. Furnish three hinges per leaf for doors up to 7-foot 5-inch height. Add one hinge per leaf for each additional 2-foot 6-inch height above 7-feet 5-inch height.
   a. Doors less than 5 feet high shall have 2 hinges.

7. Provide metal shims and shimming instructions for proper door adjustment.

8. Finish: Match other hardware on door.

B. Continuous Hinges:

1. Geared-Type:
   a. Use wide-throw aluminum units where needed for maximum degree of swing.
      1) Advise Architect if commonly available hinges are insufficient.

2. Pinned Type: Continuous stainless steel, 0.25-inch diameter stainless-steel hinge pin.
   a. Provide engineered application-specific wide-throw units as required to provide maximum swing degree of swing.
      1) Advise Architect if 8-inch width exceeds 8 inches.
   b. Provide continuous hinge cut to net size for specific door height.
2.06 CLOSERS

A. Surface Closers:
   1. Features:
         1) Place closers inside building, stairs, and rooms. Conform to the requirements of ANSI A156.4.
      b. ISO 2000 certified. Units stamped with date-of-manufacture code.
      b. Plates, brackets and special templating when needed for interface with particular header, door and wall conditions and neighboring hardware.
      c. Adjustable in accordance with CBC 11B-404.2.9.
      d. Provide separate adjusting valves for closing speed, latching speed, and backcheck. Provide fourth valve for delayed action where scheduled.
      e. Extra-Duty Arms (EDA): Rigid main and forearm with reinforced elbow.
         1) Provide at exterior doors scheduled with parallel arm units.
      f. Exterior Door Closers: Tested to 100 hours in accordance with ASTM B 117 salt spray test.
         1) Furnish data on request.
      g. Fluid: Non-flaming, will not fuel door or floor covering fires.
      h. Pressure Relief Valves (PRV): Not permitted.
   2. Independent lab-tested 10,000,000 cycles.
   3. Exterior Doors: Seasonal adjustments not required for temperatures from 120 degrees F to -30 degrees F.
      a. Furnish checking fluid data on request.
   4. Provide size 2 through 6, unless otherwise specified, at exterior and interior fire-rated doors. Installer shall individually set spring tension at each door.
      a. Provide size 1 through 4 at interior non-rated doors for barrier-free access.
   5. Flush transom offset brackets shall be used where parallel arm closers are indicated for doors with fixed transom panels.
   6. Provide drop brackets, mortise shoes, and long arms as required for narrow head rails.
   7. Provide separate valves and adjust for spring setting, closing speed, latch speed, and back check.
   8. In compliance with CBC 11B-404.2.9 accessibility regulations, provide the following maximum opening resistances:
      a. Exterior Doors: 5 pounds.
      b. Interior Doors: 5 pounds.
      c. Fire-Rated Doors: 5 pounds. (Note: The maximum effort to operate the door may be increased to the maximum allowable by the appropriate administrative authority, not to exceed 15 pounds).
9. Provide delayed closing action as required for accessibility in accordance with CBC 11B-404.2.8.
   a. Sweep of door with closer shall be adjusted to move from 90 degrees open position to a point 12 inches from latch in 5 seconds, measured at the leading edge.
10. Door closers in exterior locations shall be tested to 100 hours of ASTM B 117 salt spray test.
11. Refer to Section 081416 for blocking requirements and Section 087105 for mounting surface attached door hardware to wood doors. *No through bolting will be allowed where visible in public areas.*

### 2.07 LOCKSETS

**A. Locks, General:**

1. Provide heavy duty mortise type with lever handles conforming to requirements for required fire rating, security, and handicapped access, as required by code.
   a. Comply with requirements of local security ordinances.
   b. Mounting: Latching hardware shall be located between 36 inches and 44 inches above finished floor surface in accordance with CBC 11B-404.2.7.
   c. Refer to Section 087105 for complete list of mounting heights.
2. Backset: 2-3/4 inches typically, more or less as needed to accommodate frame, door or other hardware.
   a. Deadbolts shall have 1-inch minimum throw with 3/4-inch minimum embedment in accordance with security ordinance of local governing agency.
4. Strikes: 16 gage curved steel lip, bronze or brass, with 1-inch deep box wrought construction, and have lips of sufficient length to clear trim and protect clothing.
6. Levers for labeled doors shall have specified fusible links.
7. Locks shall have interchangeable cores.
8. Provide visual key control on face of cylinder and keys.

**B. Mortise Locksets and Latchsets:** As scheduled.

1. Design: Equal to Schlage L-9000 Series, 06L style.
2. Chassis: Cold-rolled steel, handing field-changeable without disassembly.
3. Lever Trim: Through-bolted, accessible design, cast lever or solid extruded bar type levers as scheduled. Filled hollow tube design unacceptable.
   a. Spindles: Security design independent breakaway. Breakage of outside lever does not allow access to inside lever’s hubworks to gain wrongful entry.
4. Furnish solid cylinder collars with wave springs. Wall of collar to cover rim of mortise cylinder.
5. Electric Operation: Manufacturer-installed continuous duty solenoid.
6. Strikes: 16 gage curved steel, bronze or brass with 1-inch deep box construction, lips of sufficient length to clear trim and protect clothing.
7. Certifications: Conform to the requirements of:
   a. ANSI A156.13, Grade 1 Operational, Grade 1 Security.

2.08 EXIT DEVICES

A. Exit Devices, General:
   1. End Caps: Impact-resistant, flush-mounted. No raised edges or lips to catch carts or other equipment.
   2. No exposed screws to show through glass doors.
   3. Non-handed basic device design with center case interchangeable with all functions. No extra parts required to effect change of function.
   4. Where devices span over door lite frame and the face of the selected lite manufacturer’s frame is raised from the face of the door, provide panic hardware manufacturer’s fitted shims or glass-bead kits.

B. Exit Devices, Performance Requirements:
   1. At fire-label doors, provide exit devices with UL and fire marshal approvals.
   2. Panic hardware operation shall comply with CBC 11B-309.4.
   3. Device push bar release mechanism shall be operable with a force of 5 pounds in accordance with CBC 11B-404.2.9.3.
      a. Maximum effort to open required fire doors may be increased to the minimum allowable by the appropriate administrative authority, not to exceed 15 pounds in accordance with and CBC 11B-404.2.9, Item 4.
   4. Maximum unlatching force applied to panic hardware at required fire doors shall not exceed 5 pounds in the direction of travel, in accordance with CBC 11B-309.4.
   5. Panic hardware shall be located between 34 inches and 44 inches above finished floor surface in accordance with CBC 1008.1.9.2.
   6. Panic hardware shall comply with CBC 1008.1.10.
   8. Independent lab-tested to 1,000,000 cycles.

C. Exit Devices, Design Requirements:
   1. Provide rim device at single doors. Provide removable mullion with rim devices at double doors. Conform to the requirements of ANSI A156.3, Grade 1.
      a. At glazed aluminum doors, provide appropriate product series as required for width of stile.
   3. Construct of brass, bronze, or stainless steel base metal.
   4. Lever handle trim shall match locksets.
   5. Touch bar type devices shall have quiet return, deadlocking latch-bolt, and non-handed stainless steel touchpads.

D. Exit Devices, Functional Requirements:
   1. Non-Fire Rated Devices: Cylinder dogging.
2. Lever Trim: Breakaway type, forged brass or bronze escutcheon min 0.130-inch thickness, compression spring drive, match lockset lever design.
4. Electrically Operated Devices: Single manufacturer source for electric latch retraction devices, electrically controlled trim, power transfers, power supplies, monitoring switches and controls.

2.09 DOOR BOLTS
A. Automatic Flush Bolts: Provide low operating force automatic flush bolts at emergency exits in path of travel.
1. Embed 5/8-inch into head and threshold at inactive leaf of double doors in accordance with security ordinance of local governing agency. Conform to the requirements of ANSI A156.5.

2.10 PUSH/PULLS
A. Push/Pulls: Conform to the requirements of ANSI A156.6.
1. Push: 4 inches x 16 inches x 0.050-inch thick plate, beveled four sides. Attach with oval head screws, back-to-back installation with pull plates.
2. Pulls: 4 inches x 16 inches x 0.050-inch thick plate, beveled four sides with 8-inch pull. Attach with oval head screws, back-to-back installation with push plates.

2.11 PLATES
A. Protective Plates: Provide with all four exposed edges beveled. Conform to the requirements of ANSI A156.6.
1. Sizes: Thickness shall be 0.050-inch thick.
   a. Kick Plates: 10 inches high by width of door less 2 inches for single doors, and 10 inches x door width less 1 inch for pair of doors.
   b. Mop Plates: 6 inches x door width less 2 inches for single doors, and 6 inches x door width less 1 inch for pair of doors.
2. Furnish with machine or wood oval head screws of bronze or stainless steel to match predominate finish of other adjacent hardware.
   a. Countersink screw holes.

2.12 DOOR GASKETING
A. Seals: Conform to the requirements of ANSI A156.22.
1. Materials: Door sweeps and seals shall be Santoprene, solid high-grade neoprene, silicone rubber, polyurethane, polypropylene, or nylon brush, as scheduled. Vinyl seal material is not acceptable.
   a. Solid neoprene shall conform to MIL R6855-CL III, Grade 40.
   b. Sponge neoprene shall conform to MIL R6130, Type II, Group C.
2. Match adjacent frame color as closely as possible.
3. UL label shall be applied to seals at all rated doors. Provide at 20-minute openings at head and jambs.
4. Non-corroding fasteners at in-swinging exterior doors.
5. Refer to Schedule of Finish Hardware for smoke seals.
B. Seals at Sound Control Openings:
   1. Use components tested as a system using nationally accepted standards by independent laboratories. Ensure that the door leaves have the necessary sealed-in-place STC ratings. Fasten applied seals over bead of sealant.
   2. Refer to door sections for additional sound seal requirements.

C. Seals at Fire-rated Doors:
   1. Resilient Seals: UL10C compliant. Coordinate with selected door manufacturers and selected frame manufacturer's requirements.
      a. Where rigid housed resilient seals are scheduled and the door manufacturer only requires an adhesive-mounted resilient seal, furnish rigid housed seal at minimum, or both the rigid housed seal plus the adhesive applied seal. Adhesive applied seals alone are deemed insufficient for this Project where rigid housed seals are scheduled.
   2. Intumescent Seals: Fire-labeled opening assembly complete and in full compliance with UL10C. Where required, Provide factory-installed intumescent seals meeting the requirements for door type and door manufacturer.

D. Automatic Door Bottoms: low operating force units. Doors with automatic door bottoms plus head and jamb seals cannot require more than two pounds operating force to open when closer is disconnected.

2.13 STOP AND HOLDERS

A. Stops: Conform to the requirements of ANSI A156.16.
   1. Provide stops to protect walls, casework, or other hardware.
      a. Wall Stops: Unless otherwise indicated in Schedule of Door Hardware, furnish wall type with appropriate fasteners. Where wall type cannot be used, furnish floor type. If neither can be used, furnish overhead type.
      b. Floor Stops: Unless otherwise noted in Schedule of Hardware Sets, provide floor type with appropriate fasteners. Where floor type cannot be used, provide wall type. If neither can be used, provide overhead type.
         1) Floor stops shall not be located in the path of travel. Distance from walls shall be 4 inches maximum.

B. Overhead Stops: Conform to the requirements of ANSI A156.8.
   1. Furnish units with non-plastic mechanisms and finished metal end caps. Field-changeable hold-open, friction and stop-only functions.
   2. Locate overhead stops for maximum possible opening. Consult with Owner for furniture locations.
      a. Minimum: 90-degree stop/95 degree deadstop.
      b. Note degree of opening in submittal.
2.14 SILENCERS

A. Silencers: Furnish silencers for interior hollow metal frames, three for single doors, and four for pairs of doors. Omit where sound or light seals occur, and at fire-resistive-rated door assemblies.
1. Leave no unfilled/uncovered pre-punched silencer holes.

2.15 THRESHOLDS

A. Thresholds: Comply with CBC 11B-404.2.5 regarding threshold requirements. Maximum height shall be 1/2-inch and maximum slopes shall be 1:2 vertical to horizontal.
1. Provide stainless steel thresholds at main entries and aluminum thresholds at other locations, unless otherwise specified.
2. Fire-Rated Openings, 90 Minutes or Less Duration: Use thresholds to interrupt floor covering material under the door where that material has a critical radiant flux value less than 0.22 watts per square centimeter, per NFPA 253. Use threshold unit as scheduled. If none scheduled, request direction from Architect.
3. Sound Control Openings: Set units in full bed of acoustical sealant specified in Section 079200. Leave no air space between threshold and substrate.
4. Fasteners: Generally, exposed screws to be Phillips or Robertson drive. Pinned TORX drive at high security areas. Flat head sleeve anchors (FHSL) may be slotted drive. Sheet metal and wood screws: full-thread. Sleeve nuts: full length to prevent door compression.
   a. Plastic plugs with wood or sheet metal screws are not an acceptable substitute for specified fastening methods.

2.16 MISCELLANEOUS DOOR HARDWARE

A. Silencers: Furnish silencers for interior hollow metal frames, three for single doors, and four for pairs of doors. Omit where sound or light seals occur, and at fire-resistive-rated door assemblies.

B. Padlocks: Provide one each at roof hatches, trash gates, roll-up doors, chain link gates, and other similar items where hasps are provided.

C. Overhead Door Hardware: Garage doors shall be secured with a cylinder lock, padlock with hardened steel shackle, metal slide bolt, or equivalent when not otherwise locked by electric power operation. Springs shall conform to applicable ordinance requirements regarding quality, certification, containment devices, identification and installation.

2.17 ELECTRO-MECHANICAL HARDWARE

A. General Requirements:
1. Comply with CBC Section 1008.1.3.4 with regard to access-controlled egress doors.
2. Coordinate installation of electro-mechanical hardware to ensure proper size wire is used to power loads.
   a. Voltage drop shall not exceed 5% of load’s stated voltage.
   b. Voltage drop shall be calculated by first determining resistance of load (R=E/I voltage divided by AMP draw). Next, determine
resistance of wire (per below chart). Divide this number by resistance of load. If result exceeds 5 percent, wire thickness shall be increased.

c. Wire length shall equal distance to load and back to supply (Lock 50 feet from power supply; wire length = 100 feet). Two loads powered by one pair of wires draw double current and have half (50 percent) of resistance.

<table>
<thead>
<tr>
<th>Wire Size</th>
<th>Resistance/1,000 LF</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 Gage</td>
<td>1.6 OHM</td>
</tr>
<tr>
<td>14 Gage</td>
<td>2.5 OHM</td>
</tr>
<tr>
<td>16 Gage</td>
<td>4.1 OHM</td>
</tr>
<tr>
<td>18 Gage</td>
<td>6.4 OHM</td>
</tr>
<tr>
<td>20 Gage</td>
<td>10.1 OHM</td>
</tr>
<tr>
<td>22 Gage</td>
<td>16.0 OHM</td>
</tr>
</tbody>
</table>

3. Furnish electro-mechanical hardware with power supply units, junction boxes, and other accessories needed for a complete, efficient installation.
   a. Connector plugs shall be furnished on electrified hardware and power transfers. Power wires shall be equipped with male connectors on the solenoid (electric lock / electric panic) side. Signal conductors shall have female connectors on the solenoid (lock / panic) side.

4. Power Supply Units:
   a. Power supply units shall be designed for use with electro-mechanical locksets.
   b. Output power shall be field selectable for either 24 volts DC at 1 ampere or 12 volts DC at 2 amperes. Input power shall be 120 volts AC at 0.6 ampere, unless otherwise indicated.
   c. Units shall have a terminal block that shall accept 14 gage stranded wire.
   d. Enclosure shall be not less than 10 inches x 10 inches x 4 inches deep, constructed of 19 gage steel with a hinged cover. Provide not less than six, 1/2-inch knock out holes for conduit connection.

5. Power Transfer Devices:
   a. Provide a means to transfer power from frame to door stile. Devices shall be reversible and allow a full 180-degree door swing with 4 1/2 inches x 4 1/2 inches butt hinges or 3/4 inches offset pivots. When door is in closed position, transfer unit shall be concealed.
   b. Transfer units shall contain ten AWG UL approved conductors.
   c. Rating: 10 Amps at 24 VDC (Class 1 low voltage)

B. Electro-Mechanical Locksets:
1. Electro-mechanical locks shall comply with requirements for size, quantity, type, etc., as set forth for non-electric locks and shall conform to ANSI A156.23. Locks shall be UL listed for labeled doors.
2. Solenoids used in electro-mechanical locks shall meet UL requirements for cycle life, low operating temperature and shock and fire hazard qualifications; and be designed for intermittent and continuous duty.
   a. Power Requirements: 1.0 amps; 24 VAC/DC.

3. Products: Schlage Electrified L Series

2.18 KEYING

A. Key System: Key system shall be Schlage 6-pin, Primus existing keyway, GMKD, interchangeable-core, as directed by Owner.

1. Cylinders and key system shall be of the same manufacturer as lockset manufacturer, unless otherwise scheduled.

2. Initiate and conduct meetings with Owner and door hardware consultants to determine system keyways, keybow styles, structure, and degree of geographic exclusivity.
   a. Meet with Owner and hardware supplier to develop Keying Schedule for great grand master keying, master keying, pass key, and change key groups.
   b. For bidding use great grand master keying charge.
   c. Owner will order and supply permanent cylinders/cores. Owner/Contractor will install permanent cylinders/cores.

3. Keying system will be approved by Owner in writing.
   a. For protection of the Owner, locks and cylinders shall be keyed at the factory of the lock manufacturer where permanent records are maintained. Written approval by Owner of keying diagram shall be furnished to lock manufacturer at time of order for locks and cylinders.

4. Key system shall be coordinated with existing campus key system.

5. Furnish keys of nickel silver only.
   a. Key blanks shall be available only from factory-direct sources, not available from after-market key blank manufacturers.
   b. Extend utility patent protection until 2014.

6. Permanent Keys: Deliver only to Owner’s representative.

7. New factory registered master key system.

8. Key Cylinders: Furnish utility patented, 6-pin solid brass construction.

9. Permanent Keys: Use secured shipment direct from point of origination to Owner.

10. For Estimate: Three keys per change combination, 5 master keys per group, 5 grand-master keys, 3 control keys.
   a. Bitting List: Use secured shipment direct from point of origination to Owner upon completion.

B. Construction Keying: Furnish construction key system with temporary keys that can be rendered inoperative by removing the temporary core.

1. Permanent cylinders shall be assembled and shipped with separate exterior door locksets, including locksets for glazed entry doors.
   a. Where interchangeable core systems are specified, use temporary cores for construction keying.

2. Change keys shall be packed in separately identified envelopes and shipped to the Owner by certified mail.
3. Construction keys shall be shipped with the door locks.
4. Construction insert extractor keys shall be shipped to the Owner by certified mail.
5. Furnish temporary keyed-alike cores. Remove at substantial completion and install permanent cylinders/cores in Owner's presence.
6. At completion of Project, Contractor shall install permanent cores in the presence of the Owner, remove the construction cores from the lock cylinders and turn over construction cores to the Supplier.
   a. Demonstrate that construction key no longer operates.

C. Key Identification: Master keys and grand master keys shall be identified with a registry number, and not stamped with MASTER or the letter M. Individual room keys shall not be stamped with a key cut, but with a plain identification number using standard DHI nomenclature.
   1. For the IC cores the keyway will be N23.
   2. Stamp with **DO NOT DUPLICATE**.

D. Key Quantities:
   1. Change Keys: Furnish three keys for each core with a maximum of 10 keys per keyed alike group. Furnish balance due as blanks.
   5. Grand Master Keys: Furnish 6 keys per set.

E. Key Cabinet: Provide wall mounted key cabinet with 150 percent capacity.
   1. Cabinet: 18 gage steel enclosure, piano hinged door with lock.
   2. Accessories: Manufacturer's standard two-tag system, including cross-reference binder, envelopes, labels, tags with self-locking key clips, receipt forms, and temporary and permanent markers. Label hooks from 1 to 100.

F. Key Control Software: Same manufacturer as key cylinders. Supply to Owner.

### 2.19 FABRICATION

A. Base Metals: Produce door hardware units of base metal, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.

### 2.20 FINISHES

A. Typical Finish: Except as otherwise specified in Schedule of Door Hardware, furnish hardware finished in accordance with ANSI/BHMA A156.18 for BHMA 630 (Satin Stainless Steel) unless scheduled otherwise in Door Hardware Schedule.

B. Door Closers: Surface mounted door closers shall be factory powder coated to match other dominant hardware finish on natural finish doors, or match color of door finish if painted.

C. Hinges: Except as otherwise scheduled, hinges used on painted doors shall be BHMA 600 (Prime Coat finish).
D. Finish natural aluminum items in BHMA 689 to match predominant adjacent material.
   1. Provide satin-chrome plated arms, tracks and covers where scheduled bright metallic powder coat (MTLPC) not available.

E. Seals: Coordinate to match frame color.
   1. Finish of metal parts shall be furnished in BHMA 600 match finish, but field painted to match color of door frame.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Site Verification of Conditions:
   1. Examine doors, frame, and related items for conditions that would prevent proper application of hardware.
   2. Correct conditions detrimental to timely and proper execution of work.
   3. Do not proceed until unsatisfactory conditions have been corrected.

B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

3.02 INSTALLATION

A. Hardware Locations and Installation Procedures:
   1. Refer to Section 087105.

3.03 FIELD QUALITY REQUIREMENTS

A. Inspection: Hardware supplier shall inspect all installed hardware within 10 days of Contractor’s request, and certify in writing that the hardware is complete, correctly installed, and properly adjusted. Further corrections of defective material shall be the responsibility of hardware installer.

B. Follow Up Inspection: Installer shall provide a letter of agreement to the Owner that approximately 6 months after substantial completion, installer shall visit the jobsite with the representatives of the manufacturers of the locking devices and door closers and accomplish the following:
   1. Re-adjust all hardware.
   2. Evaluate maintenance procedures and recommend changes or additions, and instruct Owner’s personnel.
   3. Identify items that have deteriorated or failed.
   4. Submit a written report identifying current problems and likely future problems.

C. Certify in writing that the supplier has made an inspection of the finished installation, including the electrified and pneumatic hardware, and has verified that the hardware is functioning properly.
3.04 SYSTEMS STARTUP

A. Commissioning: Conduct these tests prior to request for certificate of substantial completion:
1. With installer present, test door hardware operation with climate control system and stairwell pressurization system both at rest and while in full operation.
2. With installer, access control contractor, and electrical contractor present, test electrical, electronic and electro-pneumatic hardware systems for satisfactory operation.
3. With installer and electrical contractor present, test hardware interfaced with fire/life-safety system for proper operation and release.

3.05 LEGENDS

A. Legend of listed manufacturers:

<table>
<thead>
<tr>
<th>ABBREVIATION</th>
<th>MANUFACTURER</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-R</td>
<td>Corbin-Russwin</td>
</tr>
<tr>
<td>GLY</td>
<td>Glynn-Johnson</td>
</tr>
<tr>
<td>IVE</td>
<td>Ives</td>
</tr>
<tr>
<td>LCN</td>
<td>LCN</td>
</tr>
<tr>
<td>NGP</td>
<td>National Guard</td>
</tr>
<tr>
<td>VON</td>
<td>Von Duprin</td>
</tr>
<tr>
<td>ZER</td>
<td>Zero International</td>
</tr>
</tbody>
</table>

B. Legend of material finishes:

<table>
<thead>
<tr>
<th>BHMA</th>
<th>US</th>
<th>DESCRIPTION</th>
<th>BASE METAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>626</td>
<td>US26D</td>
<td>CHROMIUM PLATED (SATIN)</td>
<td>Brass/Bronze</td>
</tr>
<tr>
<td>628</td>
<td>US28</td>
<td>SATIN ALUMINUM, Clear Anodized</td>
<td>Aluminum</td>
</tr>
<tr>
<td>630</td>
<td>US32D</td>
<td>STAINLESS STEEL (SATIN)</td>
<td>St. Stl, 300</td>
</tr>
<tr>
<td>652</td>
<td>US26D</td>
<td>CHROMIUM PLATED (SATIN)</td>
<td>Steel</td>
</tr>
<tr>
<td>682</td>
<td>US26D</td>
<td>SATIN CHROMIUM PLATED</td>
<td>Zinc</td>
</tr>
<tr>
<td>689</td>
<td>US28</td>
<td>ALUMINUM PAINTED</td>
<td>Any</td>
</tr>
<tr>
<td>BLK</td>
<td>US19</td>
<td>SATIN BLACK, Flat Black Coated (617)</td>
<td>Aluminum</td>
</tr>
<tr>
<td>2</td>
<td>AL, ANCLR</td>
<td>CLEAR ANODIZED ALUMINUM</td>
<td>Aluminum</td>
</tr>
<tr>
<td>2</td>
<td>GRY</td>
<td>GREY</td>
<td>Any</td>
</tr>
<tr>
<td>2</td>
<td>LGR</td>
<td>LACQUER GRAY (PAINTED )</td>
<td>Any</td>
</tr>
</tbody>
</table>
3.06 SCHEDULES

A. Door Schedule on the Drawings indicates which Hardware Set is used with each door.

B. Hardware Sets listed in the Schedule of Door Hardware shall conform throughout to the requirements of the foregoing specification.
   1. The last column in the Hardware Schedule refers to the manufacturer abbreviations listed above.
   2. Hinge size listed in Schedule of Door Hardware indicates width by height in open position.

<table>
<thead>
<tr>
<th>BHMA</th>
<th>US</th>
<th>DESCRIPTION</th>
<th>BASE METAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>--</td>
<td>SP</td>
<td>PAINT TO MATCH DOOR</td>
<td>Any</td>
</tr>
<tr>
<td>--</td>
<td>S-BK</td>
<td>SILICONE - BLACK</td>
<td>Any</td>
</tr>
</tbody>
</table>
## SCHEDULE OF DOOR HARDWARE

<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
<th>FIN</th>
<th>MFR</th>
</tr>
</thead>
</table>

### HARDWARE GROUP NO. 01

<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
<th>FIN</th>
<th>MFR</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>CONT. HINGE</td>
<td>224HD EPT</td>
<td>628</td>
<td>IVE</td>
</tr>
<tr>
<td>2</td>
<td>POWER TRANSFER</td>
<td>EPT10</td>
<td>689</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>ELEC PANIC HARDWARE</td>
<td>RX-QEL+-9849-EO</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>ELEC PANIC HARDWARE</td>
<td>RX-QEL+-9849-NL-OP</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>RIM CYLINDER</td>
<td>3080-114 CT6 X CYLINDER COLLAR</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>2</td>
<td>90 DEG OFFSET PULL</td>
<td>8190HD 12&quot; O</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>2</td>
<td>OH STOP</td>
<td>100S</td>
<td>630</td>
<td>GLY</td>
</tr>
<tr>
<td>1</td>
<td>SURF, AUTO OPERATOR</td>
<td>9553 REG2 MS (POWER ASSIST - PUSH AND GO - NO ACTUATORS)</td>
<td>ANCLR</td>
<td>LCN</td>
</tr>
<tr>
<td>2</td>
<td>DOOR SWEEP</td>
<td>39A</td>
<td>A</td>
<td>ZER</td>
</tr>
<tr>
<td>1</td>
<td>_THRESHOLD</td>
<td>PER DETAIL</td>
<td>AL</td>
<td>ZER</td>
</tr>
<tr>
<td>1</td>
<td>POWER SUPPLY</td>
<td>PS914 900-2RS</td>
<td>LGR</td>
<td>VON</td>
</tr>
</tbody>
</table>

CARD READER, DOOR CONTACTS & WIRING FURNISHED BY ACCESS CONTROL SUPPLIER
WEATHER-STRIPPING FURNISHED WITH DOOR & FRAME ASSEMBLY

### HARDWARE GROUP NO. 01A

<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
<th>FIN</th>
<th>MFR</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>CONT. HINGE</td>
<td>224HD EPT</td>
<td>628</td>
<td>IVE</td>
</tr>
<tr>
<td>2</td>
<td>POWER TRANSFER</td>
<td>EPT10</td>
<td>689</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>ELEC PANIC HARDWARE</td>
<td>RX-QEL+-9849-EO</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>ELEC PANIC HARDWARE</td>
<td>RX-QEL+-9849-NL-OP</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>RIM CYLINDER</td>
<td>3080-114 CT6 X CYLINDER COLLAR</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>2</td>
<td>90 DEG OFFSET PULL</td>
<td>8190HD 12&quot; O</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>2</td>
<td>OH STOP</td>
<td>100S</td>
<td>630</td>
<td>GLY</td>
</tr>
<tr>
<td>1</td>
<td>SURF. AUTO OPERATOR</td>
<td>9553 REG2 MS</td>
<td>ANCLR</td>
<td>LCN</td>
</tr>
<tr>
<td>2</td>
<td>ACTUATOR, WALL MOUNT</td>
<td>8310-836T</td>
<td>630</td>
<td>LCN</td>
</tr>
<tr>
<td>2</td>
<td>DOOR SWEEP</td>
<td>39A</td>
<td>A</td>
<td>ZER</td>
</tr>
<tr>
<td>1</td>
<td>_THRESHOLD</td>
<td>PER DETAIL</td>
<td>AL</td>
<td>ZER</td>
</tr>
<tr>
<td>1</td>
<td>POWER SUPPLY</td>
<td>PS914 900-2RS</td>
<td>LGR</td>
<td>VON</td>
</tr>
</tbody>
</table>

CARD READER, DOOR CONTACTS & WIRING FURNISHED BY ACCESS CONTROL SUPPLIER
WEATHER-STRIPPING FURNISHED WITH DOOR & FRAME ASSEMBLY
KNOX BOX TO BE LOCATED @ DOOR SU-115

### HARDWARE GROUP NO. 02

<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
<th>FIN</th>
<th>MFR</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>HW HINGE</td>
<td>5BB1HW 4.5 X 4.5 NRP</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>PANIC HARDWARE</td>
<td>LD-AX-98-EO</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>OH STOP &amp; HOLDER</td>
<td>100H</td>
<td>630</td>
<td>GLY</td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER</td>
<td>4111 AVB EDA</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>GASKETING</td>
<td>1885-BK</td>
<td>S-BK</td>
<td>ZER</td>
</tr>
<tr>
<td>1</td>
<td>DOOR SWEEP</td>
<td>39A</td>
<td>A</td>
<td>ZER</td>
</tr>
<tr>
<td>1</td>
<td>_THRESHOLD</td>
<td>PER DETAIL</td>
<td>AL</td>
<td>ZER</td>
</tr>
</tbody>
</table>

DOOR CONTACT & WIRING FURNISHED BY ACCESS CONTROL SUPPLIER
WEATHER-STRIPPING FURNISHED WITH DOOR & FRAME ASSEMBLY
<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
<th>FIN</th>
<th>MFR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HARDWARE GROUP NO. 03</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>CONT. HINGE</td>
<td>224HD EPT</td>
<td>628</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>POWER TRANSFER</td>
<td>EPT10</td>
<td>689</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>ELECTRIC PANIC HARDWARE</td>
<td>EX-EL-AX-98-QL-OP</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>RIM CYLINDER</td>
<td>3080-114 CT6 X CYLINDER COLLAR</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>90 DEG OFFSET PULL</td>
<td>8190HD 12&quot; O</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER</td>
<td>4111 AVB EDA</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>FLOOR STOP</td>
<td>FS18L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>DOOR SWEEP</td>
<td>39A</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>THRESHOLD</td>
<td>PER DETAIL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>POWER SUPPLY</td>
<td>PS914 900-2RS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CARD READER, DOOR CONTACT & WIRING FURNISHED BY ACCESS CONTROL SUPPLIER
WEATHER-STRIPPING FURNISHED WITH DOOR & FRAME ASSEMBLY

<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
<th>FIN</th>
<th>MFR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HARDWARE GROUP NO. 04</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>CONT. HINGE</td>
<td>224HD</td>
<td>628</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>CONT. HINGE</td>
<td>224HD EPT</td>
<td>628</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>POWER TRANSFER</td>
<td>EPT10</td>
<td>689</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>ELECTRIC LOCK</td>
<td>CL33905 NZD M17 CT6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>COORDINATOR</td>
<td>COR X FL</td>
<td>628</td>
<td>IVE</td>
</tr>
<tr>
<td>2</td>
<td>SURFACE CLOSER</td>
<td>4011 H</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>ASTRAGAL</td>
<td>41AA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>DOOR SWEEP</td>
<td>39A</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>THRESHOLD</td>
<td>PER DETAIL</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CARD READER, DOOR CONTACTS & WIRING FURNISHED BY ACCESS CONTROL SUPPLIER
WEATHER-STRIPPING FURNISHED WITH DOOR & FRAME ASSEMBLY

<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
<th>FIN</th>
<th>MFR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HARDWARE GROUP NO. 05</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>CONT. HINGE</td>
<td>224HD</td>
<td>628</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>STOREROOM LOCK</td>
<td>CL3357 NZD M17 CT6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>LOCK GUARD</td>
<td>LG13</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER</td>
<td>4111 SCUSH</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>DOOR SWEEP</td>
<td>39A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>THRESHOLD</td>
<td>PER DETAIL</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

WEATHER-STRIPPING FURNISHED WITH DOOR & FRAME ASSEMBLY

<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
<th>FIN</th>
<th>MFR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HARDWARE GROUP NO. 06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>CYLINDER</td>
<td>VERIFY TYPE WITH DOOR MFR</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
</tbody>
</table>

BALANCE OF HARDWARE BY DOOR MANUFACTURER

DOOR HARDWARE
087100 - 26
## HARDWARE GROUP NO. 07

<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
<th>FINISH</th>
<th>MFR</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>CONT. HINGE</td>
<td>224HD</td>
<td>628</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>PANIC HARDWARE</td>
<td>CD-9849-E0</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>PANIC HARDWARE</td>
<td>CD-9849-NL-OP-110MD</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>2</td>
<td>MORTISE CYLINDER</td>
<td>1080-CT6 X CYLINDER COLLAR</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>RIM CYLINDER</td>
<td>3080-114 CT6 X CYLINDER COLLAR</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>3</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>2</td>
<td>90 DEG OFFSET PULL</td>
<td>8190HD 12&quot; O</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>2</td>
<td>OH STOP</td>
<td>100S</td>
<td>630</td>
<td>GLY</td>
</tr>
<tr>
<td>2</td>
<td>SURFACE CLOSER</td>
<td>4111 AVB EDA</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>2</td>
<td>DOOR SWEEP</td>
<td>39A</td>
<td>A</td>
<td>ZER</td>
</tr>
<tr>
<td>1</td>
<td>THRESHOLD</td>
<td>PER DETAIL</td>
<td>AL</td>
<td>ZER</td>
</tr>
</tbody>
</table>

WEATHER-STRIPPING FURNISHED WITH DOOR & FRAME ASSEMBLY

## HARDWARE GROUP NO. 07A

<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
<th>FINISH</th>
<th>MFR</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>CONT. HINGE</td>
<td>224HD</td>
<td>628</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>PANIC HARDWARE</td>
<td>CD-9849-E0</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>PANIC HARDWARE</td>
<td>CD-9849-NL-OP-110MD</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>2</td>
<td>MORTISE CYLINDER</td>
<td>1080-CT6 X CYLINDER COLLAR</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>RIM CYLINDER</td>
<td>3080-114 CT6 X CYLINDER COLLAR</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>3</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>2</td>
<td>90 DEG OFFSET PULL</td>
<td>8190HD 12&quot; O</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>2</td>
<td>OH STOP</td>
<td>100S</td>
<td>630</td>
<td>GLY</td>
</tr>
<tr>
<td>1</td>
<td>SURF. AUTO OPERATOR</td>
<td>9553 REG2 MS</td>
<td>ANCLR</td>
<td>LCN</td>
</tr>
<tr>
<td>2</td>
<td>DOOR SWEEP</td>
<td>39A</td>
<td>A</td>
<td>ZER</td>
</tr>
<tr>
<td>1</td>
<td>THRESHOLD</td>
<td>PER DETAIL</td>
<td>AL</td>
<td>ZER</td>
</tr>
</tbody>
</table>

WEATHER-STRIPPING FURNISHED WITH DOOR & FRAME ASSEMBLY

## HARDWARE GROUP NO. 08

<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
<th>FINISH</th>
<th>MFR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CONT. HINGE</td>
<td>224HD</td>
<td>628</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>PANIC HARDWARE</td>
<td>CD-AX-98-NL-OP-110MD</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>MORTISE CYLINDER</td>
<td>1080-CT6 X CYLINDER COLLAR</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>RIM CYLINDER</td>
<td>3080-114 CT6 X CYLINDER COLLAR</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>2</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>90 DEG OFFSET PULL</td>
<td>8190HD 12&quot; O</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>OH STOP &amp; HOLDER</td>
<td>100H</td>
<td>630</td>
<td>GLY</td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER</td>
<td>4111 AVB EDA</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>DOOR SWEEP</td>
<td>39A</td>
<td>A</td>
<td>ZER</td>
</tr>
<tr>
<td>1</td>
<td>THRESHOLD</td>
<td>PER DETAIL</td>
<td>AL</td>
<td>ZER</td>
</tr>
</tbody>
</table>

DOOR CONTACTS & WIRING FURNISHED BY ACCESS CONTROL SUPPLIER
WEATHER-STRIPPING FURNISHED WITH DOOR & FRAME ASSEMBLY
<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
<th>FINISH</th>
<th>MFR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HARDWARE GROUP NO. 09</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>CONT. HINGE</td>
<td>224HD</td>
<td>628</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>PANIC HARDWARE</td>
<td>AX-98-L-2-06</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>2</td>
<td>RIM CYLINDER</td>
<td>3080-114 CT6 X CYLINDER COLLAR</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>2</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER</td>
<td>4111 EDA</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>FLOOR STOP</td>
<td>FS439</td>
<td>682</td>
<td>IVE</td>
</tr>
<tr>
<td></td>
<td>DOOR CONTACTS &amp; WIRING FURNISHED BY ACCESS CONTROL SUPPLIER</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GASKETING FURNISHED WITH ALUMINUM FRAME ASSEMBLY</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>HARDWARE GROUP NO. 09A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>CONT. HINGE</td>
<td>224HD</td>
<td>628</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>PANIC HARDWARE</td>
<td>AX-98-L-2-06</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>2</td>
<td>RIM CYLINDER</td>
<td>3080-114 CT6 X CYLINDER COLLAR</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>2</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER</td>
<td>4111 EDA</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>FLOOR STOP</td>
<td>FS439</td>
<td>682</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>DOOR BOTTOM</td>
<td>220SA</td>
<td>CL</td>
<td>NGP</td>
</tr>
<tr>
<td>1</td>
<td>THRESHOLD</td>
<td>411</td>
<td>AL</td>
<td>NGP</td>
</tr>
<tr>
<td></td>
<td>DOOR CONTACTS &amp; WIRING FURNISHED BY ACCESS CONTROL SUPPLIER</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GASKETING FURNISHED WITH ALUMINUM FRAME ASSEMBLY</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>HARDWARE GROUP NO. 10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>CONT. HINGE</td>
<td>224HD EPT</td>
<td>628</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>POWER TRANSFER</td>
<td>EPT10</td>
<td>689</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>ELECTRIC PANIC HARDWARE</td>
<td>RX-AX-98-L-E996-06-FSE</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>RIM CYLINDER</td>
<td>3080-114 CT6 X CYLINDER COLLAR</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER</td>
<td>4111 EDA</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>FLOOR STOP</td>
<td>FS439</td>
<td>682</td>
<td>IVE</td>
</tr>
<tr>
<td></td>
<td>CARD READER, DOOR CONTACT &amp; WIRING FURNISHED BY ACCESS CONTROL SUPPLIER</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GASKETING FURNISHED WITH ALUMINUM FRAME ASSEMBLY</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>HARDWARE GROUP NO. 10A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>CONT. HINGE</td>
<td>224HD EPT</td>
<td>628</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>POWER TRANSFER</td>
<td>EPT10</td>
<td>689</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>ELECTRIC PANIC HARDWARE</td>
<td>RX-AX-98-L-E996-06-FSE</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>RIM CYLINDER</td>
<td>3080-114 CT6 X CYLINDER COLLAR</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER</td>
<td>4111 EDA</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>FLOOR STOP</td>
<td>FS439</td>
<td>682</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>DOOR BOTTOM</td>
<td>220SA</td>
<td>CL</td>
<td>NGP</td>
</tr>
<tr>
<td>1</td>
<td>THRESHOLD</td>
<td>411</td>
<td>AL</td>
<td>NGP</td>
</tr>
<tr>
<td></td>
<td>CARD READER, DOOR CONTACT &amp; WIRING FURNISHED BY ACCESS CONTROL SUPPLIER</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GASKETING FURNISHED WITH ALUMINUM FRAME ASSEMBLY</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DOOR HARDWARE

087100 - 28
<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
<th>FIN</th>
<th>MFR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HARDWARE GROUP NO. 11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>CONT. HINGE</td>
<td>224HD EPT</td>
<td>628</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>POWER TRANSFER</td>
<td>EPT10</td>
<td>689</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>ELECTRIC LOCK</td>
<td>CL33905 NZD M17 CT6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER</td>
<td>4111 EDA</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>FLOOR STOP</td>
<td>FS439</td>
<td>682</td>
<td>IVE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CARD READER, DOOR CONTACT &amp; WIRING FURNISHED BY ACCESS CONTROL SUPPLIER</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GASKETING FURNISHED WITH ALUMINUM FRAME ASSEMBLY</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| HARDWARE GROUP NO. 11A |
| 1   | CONT. HINGE          | 224HD EPT      | 628  | IVE |
| 1   | POWER TRANSFER       | EPT10          | 689  | VON |
| 1   | ELECTRIC LOCK        | CL33905 NZD M17 CT6 | 626  | C-R |
| 1   | STD IC CORE          | 8000-6         | 626  | C-R |
| 1   | SURFACE CLOSER       | 4111 EDA       | 689  | LCN |
| 1   | FLOOR STOP           | FS439          | 682  | IVE |
| 1   | DOOR BOTTOM          | 2205A          | CL   | NGP |
| 1   | THRESHOLD            | 411            | AL   | NGP |
|     |                      |                |      |     |
|     | CARD READER, DOOR CONTACT & WIRING FURNISHED BY ACCESS CONTROL SUPPLIER |
|     | GASKETING FURNISHED WITH ALUMINUM FRAME ASSEMBLY |

| HARDWARE GROUP NO. 12 |
| 4   | HINGE                | 5BB1 4.5 X 4.5  | 652  | IVE |
| 1   | ENTRANCE LOCK        | CL3351 NZD M17 CT6 | 626  | C-R |
| 1   | STD IC CORE          | 8000-6         | 626  | C-R |
| 1   | FLOOR STOP           | FS439          | 682  | IVE |

| HARDWARE GROUP NO. 13 |
| 4   | HINGE                | 5BB1 4.5 X 4.5  | 652  | IVE |
| 1   | CLASSROOM LOCK       | CL3355 NZD M17 CT6 | 626  | C-R |
| 1   | STD IC CORE          | 8000-6         | 626  | C-R |
| 1   | FLOOR STOP           | FS439          | 682  | IVE |

| HARDWARE GROUP NO. 14 |
| 3   | HINGE                | 5BB1 4.5 X 4.5  | 652  | IVE |
| 1   | ELECTRIC HINGE       | 5BB1 4.5 X 4 TW8 | 652  | IVE |
| 1   | ELECTRIC LOCK        | CL33905 NZD M17 CT6 | 626  | C-R |
| 1   | STD IC CORE          | 8000-6         | 626  | C-R |
| 1   | SURFACE CLOSER       | 4111 EDA       | 689  | LCN |
| 1   | KICK PLATE           | 8400 10" X 2" LDW B4E | 630  | IVE |
| 1   | FLOOR STOP           | FS439          | 682  | IVE |
| 1   | GASKETING            | 1885-BK        | S-BK | ZER |
|     |                      |                |      |     |
|     | CARD READER, DOOR CONTACT & WIRING FURNISHED BY ACCESS CONTROL SUPPLIER |

DOOR HARDWARE
087100 - 29
<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
<th>FINISH</th>
<th>MFR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HINGE</td>
<td>5BB1 4.5 X 4.5</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>ELECTRIC HINGE</td>
<td>5BB1 4.5 X 4 TW8</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>ELECTRIC LOCK</td>
<td>CL3905 NZD M17 CT6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER</td>
<td>4011</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>FLOOR STOP</td>
<td>FS439</td>
<td>682</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>GASKETING</td>
<td>1885-BK</td>
<td>S-BK</td>
<td>ZER</td>
</tr>
</tbody>
</table>

(HARDWARE GROUP NO. 15)

CARD READER, DOOR CONTACT & WIRING FURNISHED BY ACCESS CONTROL SUPPLIER

<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
<th>FINISH</th>
<th>MFR</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>HINGE</td>
<td>5BB1 4.5 X 4.5</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>STOREROOM LOCK</td>
<td>CL3357 NZD M17 CT6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>KICK PLATE</td>
<td>8400 10&quot; X 2&quot; LDW B4E</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>3</td>
<td>SILENCER</td>
<td>SR64</td>
<td>GRY</td>
<td>IVE</td>
</tr>
</tbody>
</table>

(HARDWARE GROUP NO. 16)

<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
<th>FINISH</th>
<th>MFR</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>HINGE</td>
<td>5BB1 4.5 X 4.5</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>ELECTRIC HINGE</td>
<td>5BB1 4.5 X 4 TW8</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>ELECTRIC LOCK</td>
<td>CL3905 NZD M17 CT6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER</td>
<td>4011</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>KICK PLATE</td>
<td>8400 10&quot; X 2&quot; LDW B4E</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>WALL STOP</td>
<td>WS406/407CCV</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>GASKETING</td>
<td>1885-BK</td>
<td>S-BK</td>
<td>ZER</td>
</tr>
</tbody>
</table>

HARDWARE GROUP NO. 17

CARD READER, DOOR CONTACT & WIRING FURNISHED BY ACCESS CONTROL SUPPLIER

<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
<th>FINISH</th>
<th>MFR</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>HINGE</td>
<td>5BB1 4.5 X 4.5</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>PRIVACY LOCK</td>
<td>CL3320 NZD M17</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER</td>
<td>4011</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>KICK PLATE</td>
<td>8400 10&quot; X 2&quot; LDW B4E</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>WALL STOP</td>
<td>WS406/407CCV</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>GASKETING</td>
<td>1885-BK</td>
<td>S-BK</td>
<td>ZER</td>
</tr>
</tbody>
</table>

(HARDWARE GROUP NO. 18)
<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
<th>FIN</th>
<th>MFR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HARDWARE GROUP NO. 19</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>HW HINGE</td>
<td>5BB1HW 4.5 X 4.5 NRP</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>CONST LATCHING BOLT</td>
<td>FB51T 24&quot;</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>CLASSROOM LOCK</td>
<td>CL3355 NZD M17 CT6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>2</td>
<td>KICK PLATE</td>
<td>8400 10&quot; X 2&quot; LDW B4E</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>2</td>
<td>WALL STOP</td>
<td>WS406/407CCV</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>ASTRAGAL</td>
<td>44SP</td>
<td>SP</td>
<td>ZER</td>
</tr>
<tr>
<td>2</td>
<td>SILENCER</td>
<td>SR64</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>HARDWARE GROUP NO. 19A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>HW HINGE</td>
<td>5BB1HW 4.5 X 4.5 NRP</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>ELECTRIC HW HINGE</td>
<td>5BB1HW 4.5 X 4.5 TW8</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>CONST LATCHING BOLT</td>
<td>FB51T 24&quot;</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>ELECTRIC LOCK</td>
<td>CL3390S NZD M17 CT6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>COORDINATOR</td>
<td>COR X FL</td>
<td>628</td>
<td>IVE</td>
</tr>
<tr>
<td>2</td>
<td>MOUNTING BRACKET</td>
<td>MB</td>
<td>689</td>
<td>IVE</td>
</tr>
<tr>
<td>2</td>
<td>SURFACE CLOSER</td>
<td>4111 SHCUSH</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>2</td>
<td>KICK PLATE</td>
<td>8400 10&quot; X 2&quot; LDW B4E</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>ASTRAGAL</td>
<td>44SP</td>
<td>SP</td>
<td>ZER</td>
</tr>
<tr>
<td>2</td>
<td>SILENCER</td>
<td>SR64</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>HARDWARE GROUP NO. 20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>HW HINGE</td>
<td>5BB1HW 4.5 X 4.5</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>ELECTRIC HW HINGE</td>
<td>5BB1HW 4.5 X 4.5 TW8</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>ELECTRIC LOCK</td>
<td>CL3390S NZD M17 CT6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER</td>
<td>4011</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>KICK PLATE</td>
<td>8400 10&quot; X 2&quot; LDW B4E</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>WALL STOP</td>
<td>WS406/407CCV</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>GASKETING</td>
<td>188S-BK</td>
<td>S-BK</td>
<td>ZER</td>
</tr>
<tr>
<td></td>
<td>CARD READER, DOOR CONTACT &amp; WIRING FURNISHED BY ACCESS CONTROL SUPPLIER</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>HARDWARE GROUP NO. 21</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>HINGE</td>
<td>5BB1 4.5 X 4.5</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>STOREROOM LOCK</td>
<td>CL3357 NZD M17 CT6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER</td>
<td>4011</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>WALL STOP</td>
<td>WS406/407CCV</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>GASKETING</td>
<td>188S-BK</td>
<td>S-BK</td>
<td>ZER</td>
</tr>
<tr>
<td>QTY</td>
<td>DESCRIPTION</td>
<td>CATALOG NUMBER</td>
<td>FINISH</td>
<td>MFR</td>
</tr>
<tr>
<td>-----</td>
<td>-------------</td>
<td>----------------</td>
<td>--------</td>
<td>-----</td>
</tr>
<tr>
<td><strong>HARDWARE GROUP NO. 22</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>HW HINGE</td>
<td>5BB1HW 4.5 X 4.5</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>FIRE EXIT HARDWARE</td>
<td>AX-98-L-NL-F-06</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>RIM CYLINDER</td>
<td>3080-114 CT6 X CYLINDER COLLAR</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>2</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER</td>
<td>4111 EDA</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>FLOOR STOP</td>
<td>FS439</td>
<td>682</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>GASKETING</td>
<td>1885-BK</td>
<td>S-BK</td>
<td>ZER</td>
</tr>
<tr>
<td><strong>HARDWARE GROUP NO. 23</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>CONT. HINGE</td>
<td>224HD</td>
<td>628</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>CONT. HINGE</td>
<td>224HD EPT</td>
<td>628</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>POWER TRANSFER</td>
<td>EPT10</td>
<td>689</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>CONST LATCHING BOLT</td>
<td>FB51T</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>ELECTRIC LOCK</td>
<td>CL33905 NZD M17 CT6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>COORDINATOR</td>
<td>COR X FL</td>
<td>628</td>
<td>IVE</td>
</tr>
<tr>
<td>2</td>
<td>SURFACE CLOSER</td>
<td>4011</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>2</td>
<td>WALL STOP</td>
<td>WS406/407CCV</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td><strong>CARD READER, DOOR CONTACTS &amp; WIRING FURNISHED BY ACCESS CONTROL SUPPLIER</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>HARDWARE GROUP NO. 24</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>HW HINGE</td>
<td>5BB1HW 4.5 X 4.5 NR</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>2</td>
<td>ELECTRIC HW HINGE</td>
<td>5BB1HW 4.5 X 4.5 TW8</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>ELEC PANIC HARDWARE</td>
<td>RX-AX-9849-E0-249-LBL</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>ELEC PANIC HARDWARE</td>
<td>RX-AX-9849-L-E996-06-FS-249-LBL</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>RIM CYLINDER</td>
<td>3080-114 CT6 X CYLINDER COLLAR</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>2</td>
<td>SURFACE CLOSER</td>
<td>4111 AVB EDA</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>2</td>
<td>KICK PLATE</td>
<td>8400 10&quot; X 2&quot; LDW B4E</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>2</td>
<td>FLOOR STOP/HOLDER</td>
<td>FS41</td>
<td>626</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>GASKETING</td>
<td>1885-BK</td>
<td>S-BK</td>
<td>ZER</td>
</tr>
<tr>
<td><strong>CARD READER, DOOR CONTACTS &amp; WIRING FURNISHED BY ACCESS CONTROL SUPPLIER</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>HARDWARE GROUP NO. 25</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>HW HINGE</td>
<td>5BB1HW 4.5 X 4.5</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>2</td>
<td>PUSH PLATE</td>
<td>8200 6&quot; X 16&quot;</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>2</td>
<td>PULL PLATE</td>
<td>8302 8&quot; 4&quot; X 16&quot;</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>2</td>
<td>SURFACE CLOSER</td>
<td>4111 AVB EDA</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>2</td>
<td>KICK PLATE</td>
<td>8400 10&quot; X 2&quot; LDW B4E</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>2</td>
<td>FLOOR STOP/HOLDER</td>
<td>FS41</td>
<td>626</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>GASKETING</td>
<td>1885-BK</td>
<td>S-BK</td>
<td>ZER</td>
</tr>
<tr>
<td><strong>HARDWARE GROUP 26 (NOT USED)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>HARDWARE GROUP 27 (NOT USED)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DOOR HARDWARE**

087100 - 32
<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
<th>FIN</th>
<th>MFR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HARDWARE GROUP 28 (NOT USED)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>HARDWARE GROUP NO. 29</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>HW HINGE</td>
<td>5BB1HW 4.5 X 4.5 NRP</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>2</td>
<td>ELECTRIC HW HINGE</td>
<td>5BB1HW 4.5 X 4.5 TW8</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>ELEC PANIC HARDWARE</td>
<td>RX-AX-9850-WDC-EO-LBL</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>ELEC PANIC HARDWARE</td>
<td>RX-AX-9850-WDC-L-E996-06-FS-LBL</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>RIM CYLINDER</td>
<td>3080-114 CT6 X CYLINDER COLLAR</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>2</td>
<td>SURFACE CLOSER</td>
<td>4111 AVB EDA</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>2</td>
<td>KICK PLATE</td>
<td>8400 10&quot; X 2&quot; LDW B4E</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>FLOOR STOP/HOLDER</td>
<td>FS41</td>
<td>626</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>GASKETING</td>
<td>188S-BK</td>
<td>S-BK</td>
<td>ZER</td>
</tr>
<tr>
<td></td>
<td>HARDWARE GROUP NO. 30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>HW HINGE</td>
<td>5BB1HW 4.5 X 4.5</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>CLASSROOM SEC LOCK</td>
<td>CL3372 NZD M17 CT6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>2</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER</td>
<td>4011</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>KICK PLATE</td>
<td>8400 10&quot; X 2&quot; LDW B4E</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>FLOOR STOP/HOLDER</td>
<td>FS41</td>
<td>626</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>GASKETING</td>
<td>188S-BK</td>
<td>S-BK</td>
<td>ZER</td>
</tr>
<tr>
<td></td>
<td>HARDWARE GROUP NO. 30A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>HW HINGE</td>
<td>5BB1HW 5 X 4.5</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>CLASSROOM SEC LOCK</td>
<td>CL3372 NZD M17 CT6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>2</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER</td>
<td>4011</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>KICK PLATE</td>
<td>8400 10&quot; X 2&quot; LDW B4E</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>FLOOR STOP/HOLDER</td>
<td>FS41</td>
<td>626</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>GASKETING</td>
<td>188S-BK</td>
<td>S-BK</td>
<td>ZER</td>
</tr>
<tr>
<td></td>
<td>SET</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SOUND SEAL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ASTRAGAL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>THRESHOLD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>HARDWARE GROUP NO. 31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>HW HINGE</td>
<td>5BB1HW 4.5 X 4.5</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>CONST LATCHING BOLT</td>
<td>FB51T 24&quot;</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>STOREROOM LOCK</td>
<td>CL3357 NZD M17 CT6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>COORDINATOR</td>
<td>COR X FL</td>
<td>628</td>
<td>IVE</td>
</tr>
<tr>
<td>2</td>
<td>SURFACE CLOSER</td>
<td>4011</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>2</td>
<td>KICK PLATE</td>
<td>8400 10&quot; X 2&quot; LDW B4E</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>2</td>
<td>FLOOR STOP/HOLDER</td>
<td>FS41</td>
<td>626</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>ASTRAGAL</td>
<td>44SP</td>
<td>SP</td>
<td>ZER</td>
</tr>
<tr>
<td>2</td>
<td>SILENCER</td>
<td>SR64</td>
<td>GRY</td>
<td>IVE</td>
</tr>
</tbody>
</table>

DOOR HARDWARE

087100 - 33
<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
<th>FINISH</th>
<th>MFR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HARDWARE GROUP NO. 32</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>HINGE</td>
<td>5BB1 4.5 X 4.5</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>ENTRANCE LOCK</td>
<td>CL3351 NZD M17 CT6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER</td>
<td>4011</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>FLOOR STOP</td>
<td>FS439</td>
<td>682</td>
<td>IVE</td>
</tr>
<tr>
<td></td>
<td>HARDWARE GROUP NO. 33</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>HW HINGE</td>
<td>5BB1HW 4.5 X 4.5</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>CLASSROOM LOCK</td>
<td>CL3355 NZD M17 CT6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER</td>
<td>4011</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>KICK PLATE</td>
<td>8400 10&quot; X 2&quot; LDW B4E</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>WALL STOP</td>
<td>WS406/407CCV</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td></td>
<td>CARD READER, DOOR CONTACTS &amp; WIRING FURNISHED BY ACCESS CONTROL SUPPLIER</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>HARDWARE GROUP NO. 34</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>HW HINGE</td>
<td>5BB1HW 4.5 X 4.5</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>ELECTRIC HW HINGE</td>
<td>5BB1HW 4.5 X 4.5 TW8</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>CONST LATCHING BOLT</td>
<td>FB51P 36&quot;</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>DUST PROOF STRIKE</td>
<td>DP1</td>
<td>626</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>ELECTRIC LOCK</td>
<td>CL33905 NZD M17 CT6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>COORDINATOR</td>
<td>COR X FL</td>
<td>628</td>
<td>IVE</td>
</tr>
<tr>
<td>2</td>
<td>MOUNTING BRACKET</td>
<td>MB</td>
<td>689</td>
<td>IVE</td>
</tr>
<tr>
<td>2</td>
<td>SURFACE CLOSER</td>
<td>4111 EDA</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>2</td>
<td>KICK PLATE</td>
<td>8400 10&quot; X 2&quot; LDW B4E</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>2</td>
<td>FLOOR STOP/HOLDER</td>
<td>FS43</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>GASKETING</td>
<td>188S-BK</td>
<td>S-BK</td>
<td>ZER</td>
</tr>
<tr>
<td>1</td>
<td>ASTRAGAL</td>
<td>44SP</td>
<td>SP</td>
<td>ZER</td>
</tr>
<tr>
<td>2</td>
<td>DOOR SWEEP</td>
<td>39A</td>
<td>A</td>
<td>ZER</td>
</tr>
<tr>
<td>1</td>
<td>THRESHOLD</td>
<td>PER DETAIL</td>
<td>PER DETAIL</td>
<td>AL</td>
</tr>
</tbody>
</table>

CARD READER, DOOR CONTACT & WIRING FURNISHED BY ACCESS CONTROL SUPPLIER

<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
<th>FINISH</th>
<th>MFR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HARDWARE GROUP NO. 35</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>HW HINGE</td>
<td>5BB1 4.5 X 4.5</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>ELECTRIC HW HINGE</td>
<td>5BB1HW 4.5 X 4.5 TW8</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>ELECTRIC LOCK</td>
<td>CL33905 NZD M17 CT6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER</td>
<td>4111 SHCUSH</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>KICK PLATE</td>
<td>8400 10&quot; X 2&quot; LDW B4E</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>GASKETING</td>
<td>188S-BK</td>
<td>S-BK</td>
<td>ZER</td>
</tr>
<tr>
<td>1</td>
<td>DOOR SWEEP</td>
<td>154A</td>
<td>A</td>
<td>ZER</td>
</tr>
<tr>
<td>1</td>
<td>THRESHOLD</td>
<td>PER DETAIL</td>
<td>PER DETAIL</td>
<td>AL</td>
</tr>
</tbody>
</table>

CARD READER, DOOR CONTACT & WIRING FURNISHED BY ACCESS CONTROL SUPPLIER
<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
<th>FIN</th>
<th>MFR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HARDWARE GROUP NO. 36</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 EA</td>
<td>HW HINGE</td>
<td>5BB1HW 4.5 X 4.5 NRP</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>1 SET</td>
<td>CONST LATCHING BOLT</td>
<td>FBS1T 24&quot;</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1 EA</td>
<td>DUST PROOF STRIKE</td>
<td>DP2</td>
<td>626</td>
<td>IVE</td>
</tr>
<tr>
<td>1 EA</td>
<td>CLASSROOM SEC LOCK</td>
<td>CL3372 NZD M17 CT6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>2 EA</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1 EA</td>
<td>COORDINATOR</td>
<td>COR X FL</td>
<td>628</td>
<td>IVE</td>
</tr>
<tr>
<td>2 EA</td>
<td>SURFACE CLOSER</td>
<td>4111 EDA</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>2 EA</td>
<td>KICK PLATE</td>
<td>8400 10&quot; X 2&quot; LDW B4E</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>2 EA</td>
<td>FLOOR STOP/HOLDER</td>
<td>FS41</td>
<td>626</td>
<td>IVE</td>
</tr>
<tr>
<td>1 EA</td>
<td>GASKETING</td>
<td>1885-BK</td>
<td>S-BK</td>
<td>ZER</td>
</tr>
<tr>
<td></td>
<td>HARDWARE GROUP NO. 37</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 EA</td>
<td>HW HINGE</td>
<td>5BB1HW 5 X 4.5</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>1 EA</td>
<td>STOREROOM LOCK</td>
<td>CL3357 NZD M17 CT6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1 EA</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1 EA</td>
<td>SURFACE CLOSER</td>
<td>4040XP RW/PA</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1 SET</td>
<td>SOUND SEAL</td>
<td>FURNISHED BY DOOR MFR AL B/O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 EA</td>
<td>GASKETING</td>
<td>1885-BK</td>
<td>S-BK</td>
<td>ZER</td>
</tr>
<tr>
<td>1 EA</td>
<td>AUTO DOOR BOTTOM</td>
<td>FURNISHED BY DOOR MFR AL B/O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 EA</td>
<td>THRESHOLD</td>
<td>600CP</td>
<td>AL</td>
<td>ZER</td>
</tr>
<tr>
<td></td>
<td>HARDWARE GROUP NO. 38</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 EA</td>
<td>HW HINGE</td>
<td>5BB1HW 4.5 X 4.5 NRP</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1 EA</td>
<td>PANIC HARDWARE</td>
<td>AX-98-NL-OP</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>1 EA</td>
<td>RIM CYLINDER</td>
<td>3080-114 CT6 X CYLINDER COLLAR</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1 EA</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1 EA</td>
<td>DOOR PULL</td>
<td>VR910 NL</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1 EA</td>
<td>SURFACE CLOSER</td>
<td>4111 EDA</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1 EA</td>
<td>FLOOR STOP</td>
<td>FS18L</td>
<td>BLK</td>
<td>IVE</td>
</tr>
<tr>
<td>1 EA</td>
<td>GASKETING</td>
<td>1885-BK</td>
<td>S-BK</td>
<td>ZER</td>
</tr>
<tr>
<td>1 EA</td>
<td>DOOR SWEEP</td>
<td>39A</td>
<td>A</td>
<td>ZER</td>
</tr>
<tr>
<td>1 EA</td>
<td>THRESHOLD</td>
<td>PER DETAIL</td>
<td>AL</td>
<td>ZER</td>
</tr>
<tr>
<td></td>
<td>HARDWARE GROUP NO. 39</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 EA</td>
<td>HW HINGE</td>
<td>5BB1HW 4.5 X 4.5</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>1 EA</td>
<td>PUSH PLATE</td>
<td>8200 6&quot; X 16&quot;</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1 EA</td>
<td>PULL PLATE</td>
<td>8302 8&quot; 4&quot; X 16&quot;</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1 EA</td>
<td>SURFACE CLOSER</td>
<td>4111 SHCUSH</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1 EA</td>
<td>KICK PLATE</td>
<td>8400 10&quot; X 2&quot; LDW B4E</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td></td>
<td>HARDWARE GROUP NO. 40</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DESCRIPTION</td>
<td>CATALOG NUMBER</td>
<td>FIN</td>
<td>MFR</td>
</tr>
<tr>
<td></td>
<td>HARDWARE BY DOOR MANUFACTURER</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>QTY</td>
<td>DESCRIPTION</td>
<td>CATALOG NUMBER</td>
<td>FINIS</td>
<td>MFR</td>
</tr>
<tr>
<td>-----</td>
<td>------------------------------</td>
<td>----------------</td>
<td>-------</td>
<td>-----</td>
</tr>
<tr>
<td></td>
<td>HARDWARE GROUP NO. 41</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>CONT. HINGE</td>
<td>224HD EPT</td>
<td>628</td>
<td>IVE</td>
</tr>
<tr>
<td>2</td>
<td>POWER TRANSFER</td>
<td>EPT10</td>
<td>689</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>ELEC PANIC HARDWARE</td>
<td>RX-EL-AE-9849-EO-LBL</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>ELEC PANIC HARDWARE</td>
<td>RX-EL-AE-9849-NL-OP-110MD-LBL</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>RIM CYLINDER</td>
<td>3080-114 CT6 X CYLINDER COLLAR</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>90 DEG OFFSET PULL</td>
<td>8190HD 12&quot; O</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>SURF, AUTO OPERATOR</td>
<td>9553 REG2 MS (POWER ASSIST – PUSH AND GO - NO ACTUATORS)</td>
<td>ANCLR</td>
<td>LCN</td>
</tr>
<tr>
<td>2</td>
<td>FLOOR STOP</td>
<td>FS439</td>
<td>682</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>POWER SUPPLY</td>
<td>PS914 900-2RS</td>
<td>LGR</td>
<td>VON</td>
</tr>
<tr>
<td></td>
<td>CARD READER, DOOR CONTACTS &amp; WIRING FURNISHED BY ACCESS CONTROL SUPPLIER</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>HARDWARE GROUP NO. 42 (NOT USED)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>HARDWARE GROUP NO. 43</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>HINGE</td>
<td>5BB1 4.5 X 4.5</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>ELECTRIC HINGE</td>
<td>5BB1 4.5 X 4 TW8</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>AUTO FLUSH BOLT</td>
<td>FB41T</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>ELECTRIC LOCK</td>
<td>CL3905 NZD M17 CT6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>COORDINATOR</td>
<td>COR X FL</td>
<td>628</td>
<td>IVE</td>
</tr>
<tr>
<td>2</td>
<td>SURFACE CLOSER</td>
<td>4011</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>2</td>
<td>FLOOR STOP</td>
<td>FS439</td>
<td>682</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>ASTRAGAL</td>
<td>1585A</td>
<td>CL</td>
<td>NGP</td>
</tr>
<tr>
<td>2</td>
<td>DOOR BOTTOM</td>
<td>220SA</td>
<td>CL</td>
<td>NGP</td>
</tr>
<tr>
<td>1</td>
<td>THRESHOLD</td>
<td>411</td>
<td>AL</td>
<td>NGP</td>
</tr>
<tr>
<td></td>
<td>GASKETING FURNISHED WITH ALUMINUM FRAME ASSEMBLY</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>HARDWARE GROUP NO. 44</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>CONT. HINGE</td>
<td>224HD EPT</td>
<td>628</td>
<td>IVE</td>
</tr>
<tr>
<td>2</td>
<td>POWER TRANSFER</td>
<td>EPT10</td>
<td>689</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>ELEC PANIC HARDWARE</td>
<td>RX-AE-9849-EO-249-LBL</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>ELEC PANIC HARDWARE</td>
<td>RX-AE-9849-L-E996-06-FS-249-LBL</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>RIM CYLINDER</td>
<td>3080-114 CT6 X CYLINDER COLLAR</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>1</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
<td>C-R</td>
</tr>
<tr>
<td>2</td>
<td>SURFACE CLOSER</td>
<td>4111 EDA</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>2</td>
<td>FLOOR STOP</td>
<td>FS439</td>
<td>682</td>
<td>IVE</td>
</tr>
<tr>
<td></td>
<td>CARD READER, DOOR CONTACTS &amp; WIRING FURNISHED BY ACCESS CONTROL SUPPLIER</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>QTY</td>
<td>DESCRIPTION</td>
<td>CATALOG NUMBER</td>
<td>FINISH</td>
<td>MFR</td>
</tr>
<tr>
<td>-----</td>
<td>-----------------</td>
<td>-------------------------</td>
<td>--------</td>
<td>-----</td>
</tr>
<tr>
<td></td>
<td>HARDWARE GROUP 45</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>EA</td>
<td>HW HINGE</td>
<td>5BB1HW 4.5 X 4.5 NRP</td>
<td>630</td>
</tr>
<tr>
<td>1</td>
<td>EA</td>
<td>ELECTRIC HW HINGE</td>
<td>5BB1HW 4.5 X 4.5 TW8</td>
<td>630</td>
</tr>
<tr>
<td>1</td>
<td>EA</td>
<td>ELEC PANIC HARDWARE</td>
<td>RX-AX-98-L-E996-06-FSE</td>
<td>626</td>
</tr>
<tr>
<td>1</td>
<td>EA</td>
<td>RIM CYLINDER</td>
<td>3080-114 CT6 X CYLINDER COLLAR</td>
<td>626</td>
</tr>
<tr>
<td>1</td>
<td>EA</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
</tr>
<tr>
<td>1</td>
<td>EA</td>
<td>GATE CLOSER</td>
<td>TB400</td>
<td>630</td>
</tr>
<tr>
<td>1</td>
<td>EA</td>
<td>FLOOR STOP</td>
<td>FS18L</td>
<td>BLK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CARD READER, DOOR CONTACT &amp; WIRING FURNISHED BY ACCESS CONTROL SUPPLIER</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>HARDWARE GROUP 46</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>EA</td>
<td>HW HINGE</td>
<td>5BB1HW 4.5 X 4.5 NRP</td>
<td>630</td>
</tr>
<tr>
<td>1</td>
<td>EA</td>
<td>STORE DOOR LOCK</td>
<td>CL3382 NZD M17 CT6</td>
<td>626</td>
</tr>
<tr>
<td>2</td>
<td>EA</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
</tr>
<tr>
<td>1</td>
<td>EA</td>
<td>OH STOP &amp; HOLDER</td>
<td>100H</td>
<td>630</td>
</tr>
<tr>
<td>1</td>
<td>EA</td>
<td>SURFACE CLOSER</td>
<td>4111 AVB EDA</td>
<td>689</td>
</tr>
<tr>
<td>1</td>
<td>EA</td>
<td>GASKETING</td>
<td>188S-BK</td>
<td>S-BK</td>
</tr>
<tr>
<td>1</td>
<td>EA</td>
<td>DOOR SWEEP</td>
<td>39A</td>
<td>A</td>
</tr>
<tr>
<td>1</td>
<td>EA</td>
<td>THRESHOLD</td>
<td>411</td>
<td>AL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GASKETING FURNISHED WITH ALUMINUM FRAME ASSEMBLY</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>HARDWARE GROUP 47</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>EA</td>
<td>CONT. HINGE</td>
<td>224HD</td>
<td>628</td>
</tr>
<tr>
<td>1</td>
<td>EA</td>
<td>CLASSROOM SEC LOCK</td>
<td>CL3372 NZD M17 CT6</td>
<td>626</td>
</tr>
<tr>
<td>2</td>
<td>EA</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
</tr>
<tr>
<td>1</td>
<td>EA</td>
<td>SURFACE CLOSER</td>
<td>4111 EDA</td>
<td>689</td>
</tr>
<tr>
<td>1</td>
<td>EA</td>
<td>FLOOR STOP</td>
<td>FS439</td>
<td>682</td>
</tr>
<tr>
<td>1</td>
<td>EA</td>
<td>DOOR BOTTOM</td>
<td>220SA</td>
<td>CL</td>
</tr>
<tr>
<td>1</td>
<td>EA</td>
<td>THRESHOLD</td>
<td>411</td>
<td>AL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GASKETING FURNISHED WITH ALUMINUM FRAME ASSEMBLY</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>HARDWARE GROUP 48 (NOT USED)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>HARDWARE GROUP 49</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>EA</td>
<td>HINGE</td>
<td>5BB1 4.5 X 4.5 NRP</td>
<td>652</td>
</tr>
<tr>
<td>1</td>
<td>EA</td>
<td>STOREROOM LOCK</td>
<td>CL3357 NZD M17 CT6</td>
<td>626</td>
</tr>
<tr>
<td>1</td>
<td>EA</td>
<td>STD IC CORE</td>
<td>8000-6</td>
<td>626</td>
</tr>
<tr>
<td>1</td>
<td>EA</td>
<td>SURFACE CLOSER</td>
<td>4111 SCUSH</td>
<td>689</td>
</tr>
<tr>
<td>1</td>
<td>EA</td>
<td>GASKETING</td>
<td>188S-BK</td>
<td>S-BK</td>
</tr>
<tr>
<td>QTY</td>
<td>DESCRIPTION</td>
<td>CATALOG NUMBER</td>
<td>FIN</td>
<td>MFR</td>
</tr>
<tr>
<td>-----</td>
<td>------------------------------</td>
<td>---------------------</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>7</td>
<td>ELECTRIC HINGE 5BB1HW 4.5 X 4.5 NRP</td>
<td>630</td>
<td>IVE</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>KEYED REMOVABLE MULLION KR4954</td>
<td>689</td>
<td>VON</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>PANIC HARDWARE AX-98-E0</td>
<td>626</td>
<td>VON</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>ELECTRIC PANIC HARDWARE RX-AX-98-L-E996-06-FSE</td>
<td>626</td>
<td>C-R</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>MORTISE CYLINDER 1080-CT6 X CYLINDER COLLAR</td>
<td>626</td>
<td>C-R</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>RIM CYLINDER 3080-114 CT6 X CYLINDER COLLAR</td>
<td>626</td>
<td>C-R</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>OH STOP &amp; HOLDER 100H</td>
<td>630</td>
<td>GLY</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER 4111 AVB EDA</td>
<td>689</td>
<td>LCN</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>KICK PLATE 8400 10&quot; X 2&quot; LDW B4E</td>
<td>630</td>
<td>IVE</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>GASKETING 1885-BK</td>
<td>682</td>
<td>ZER</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>DOOR SWEEP 39A</td>
<td>689</td>
<td>ZER</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>THRESHOLD PER DETAIL</td>
<td>682</td>
<td>AL</td>
<td></td>
</tr>
</tbody>
</table>

CARD READER, DOOR CONTACTS & WIRING FURNISHED BY ACCESS CONTROL SUPPLIER

**HARDWARE GROUP NO. 51**

<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
<th>FIN</th>
<th>MFR</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>HINGE 5BB1 4.5 X 4.5</td>
<td>652</td>
<td>IVE</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>ELECTRIC HINGE 5BB1 4.5 X 4 TW8</td>
<td>652</td>
<td>IVE</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>ELECTRIC LOCK CL33905 NZD M17 CT6</td>
<td>626</td>
<td>C-R</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>STD IC CORE 8000-6</td>
<td>626</td>
<td>C-R</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER 4011</td>
<td>682</td>
<td>LCN</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>FLOOR STOP FS439</td>
<td>682</td>
<td>IVE</td>
<td></td>
</tr>
</tbody>
</table>

CARD READER, LOCAL ALARM, DOOR CONTACT & WIRING FURNISHED BY ACCESS CONTROL SUPPLIER

**HARDWARE GROUP NO. 52**

<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
<th>FIN</th>
<th>MFR</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>HINGE 5BB1 4.5 X 4.5</td>
<td>652</td>
<td>IVE</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>ELECTRIC HINGE 5BB1 4.5 X 4 TW8</td>
<td>652</td>
<td>IVE</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>EL MORTISE LOCK L9095LEL 06A</td>
<td>626</td>
<td>SCH</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>MORTISE CYLINDER 1080-CT6 X CYLINDER COLLAR</td>
<td>626</td>
<td>C-R</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>STD IC CORE 8000-6</td>
<td>626</td>
<td>C-R</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER 4011</td>
<td>682</td>
<td>LCN</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>FLOOR STOP FS439</td>
<td>682</td>
<td>IVE</td>
<td></td>
</tr>
</tbody>
</table>

CARD READER DOOR CONTACT & WIRING FURNISHED BY ACCESS CONTROL SUPPLIER

**HARDWARE GROUP NO. 53**

<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
<th>FIN</th>
<th>MFR</th>
</tr>
</thead>
</table>

CARD READERS, KEYPADS, DOOR CONTACTS & WIRING FURNISHED BY ACCESS CONTROL SUPPLIER

KNOX BOX TO BE LOCATED AT THIS OPENING

**END OF SECTION**

**DOOR HARDWARE**

087100 - 38
- SECTION 093000 -

TI LI NG

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Floor tile and wall tile installed with thin-set methods over prepared surfaces (mortar bed, backer board, and concrete slabs). Tile materials include:
   1. Porcelain tile.
   2. Quarry tile.
   3. Thresholds.

B. Referenced Sections:
   1. Section 012500 - Substitution Procedures.
   2. Section 013300 - Submittal Procedures.
   4. Section 014500 - Quality Control.
   5. Section 016600 - Product Storage and Handling Requirements.
   7. Section 018113 - Sustainable Design Requirements.
   8. Section 033100 - Structural Concrete.
   9. Section 092900 - Gypsum Board.
   10. Section 092216 - Non-Structural Metal Framing
   11. Section 096513 - Resilient Base and Accessories
   12. Section 102116 - Plastic Shower and Dressing Compartments.

1.02 DEFINITIONS

A. Large Format Tile (LFT): Having a dimension of 15" or greater in any dimension, based on requirements of the TCNA Handbook, latest edition.

1.03 REFERENCES

A. ASTM International (ASTM):
   2. D 2047-11 - Test Method Static Coefficient of Friction of Polish-Coated Floor Surfaces as Measured by the James Machine.
B. California Code of Regulations (CCR):
   1. Title 24, Part 2 - California Building Code (CBC), 2013 edition:
      a. Chapter 11B - Accessibility to Public Buildings, Public Accommodations, Commercial Buildings, and Public Housing:
         1) Division 2 - Scoping Requirements.
            a) Section 11B-247 - Detectable Warnings and Detectable Directional Texture.
               (1) 11B-247.1 - Detectable Warnings.
                  (a) 11B-247.1.2 - Where Required.
                     i) 11B-247.1.2.2 - Curb Ramps.
               (2) 11B-247.2 - Detectable Directional Texture.
         2) Division 3 - Building Blocks.
            b) Section 11B-302 - Ground and Floor Surfaces.

C. American National Standards Institute (ANSI):
   1. A108.1B-2010 - Installation of Ceramic Tile in the Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar.
   2. A108.4-2009 - Installation of Ceramic Tile with Organic Adhesives or Water-Cleanable Tile Setting Epoxy Adhesive.
   3. A108.5-2010 - Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar.
   4. A108.6-2010 - Installation of Ceramic Tile with Chemical-Resistant, Water-Cleanable, Tile-Setting and -Grouting Epoxy.
   5. A108.8-2010 - Installation of Ceramic Tile with Chemical-Resistant Furan Resin Mortar and Grout.
   6. A108.9-2010 - Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout.
   8. A108.11-2010 - Interior Installation of Cementitious Backer Units.
   15. A118.3-2013 - Specifications for Chemical-Resistant, Water-Cleanable Tile-Setting and -Grouting Epoxy and Water-Cleanable Tile-Setting Epoxy Adhesive.
   16. A118.4-2012 - Specifications for Modified Dry-Set Cement Mortar.
   17. A118.6-2010 - Specifications for Standard Cement Grouts for Tile Installation.
   18. A118.7-2010 - Specifications for High Performance Cement Grouts for Tile Installation.
19. A118.8-2010 - Specifications for Modified Epoxy Emulsion Mortar/Grout.
20. A118.9-2010 - Specifications for Test Methods and Specifications for Cementitious Backer Units.
22. A118.15-2013 - Specifications for Improved Modified Dry-Set Cement Mortar.

D. Tile Council of North America (TCNA):

E. National Tile Contractors Association (NTCA):

F. United States Green Building Council (USGBC):
   1. Leadership in Energy and Environmental Design (LEED):

1.04 DEFINITIONS

A. *Thin-Set*: As used in this Section, the term thin-set refers to a product or material rather than to a method. Dry-set and latex portland cement mortars are thin-set bonding materials used to secure tile materials to any substrate, including cured mortar setting beds and concrete slabs.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Refer to Section 017419 regarding procedures for implementing construction waste management requirements.

B. Coordination: Refer to Section 018113 regarding procedures for implementing sustainable design requirements.

C. Coordination: Coordinate location of expansion and contraction joints in concrete slabs with spacing requirements of tilework joint spacing where tile finishes occur.

1.06 SUBMITTALS

A. Product Data: In accordance with the provisions of Section 013300, submit complete manufacturer's descriptive literature and specifications.

B. Samples:
   1. Tile: Submit full-size samples of each type and color of tile indicated in the Contract Drawings.
   2. Grout: Submit samples of grout from manufacturer's standard and customer palettes.

C. Certificates:
   1. Furnish manufacturer's Master Grade Certificates for tile proposed for use. Certificates shall be on standard forms of the Tile Council of North America certifying type, grade, and quality of tile.
   2. Furnish manufacturer's certificate that coefficient of friction of floor products provided meet the requirements of this Section.
D. Substrate Condition Field Report: Furnish report from installer confirming that surfaces, alignments, and tolerances to which materials of this Section will be applied are in a suitable and acceptable condition to receive finish materials specified in this Section.

1.07 SUSTAINABLE DESIGN SUBMITTALS

A. Materials & Resources Submittals: Refer to Section 018113 for additional information on LEED submittals.
   1. Letter Template for MR Credit 2: Letter template, signed by Contractor, tabulating total waste material, quantities diverted and means by which it is diverted, and statement that requirements for the credit have been met.
      a. Comply with Section 017419 Construction Waste Management and Disposal.
   2. Product Data and Certification Letter for MR Credit 4: Indicate percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.
   3. Product Data for MR Credit 5: For regional materials indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include statement indicating cost for each regional material and the fraction by weight that is considered regional.

B. Indoor Environmental Quality Submittals: Refer to Section 018113 for additional information on LEED submittals.
   1. Product Data for IEQ Credit 4.1: For adhesives and sealants used on the inside of the weatherproofing system, documentation including printed statement of VOC content.

1.08 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Materials: At time of completing the installation, deliver stock of maintenance material to the Owner.
   1. Furnish an amount equal to 2 percent of each type, size, and color of tile installed, minimum one full carton.
   2. Furnish full size units matching the units installed, packaged with protective covering for storage, and identified with appropriate labels.

1.09 QUALITY ASSURANCE

A. Qualifications:
   1. Manufacturer's Qualifications: Licensed by the Tile Council of North America to produce mortar and grout.
   2. Tile Installer's Qualifications: In accordance with Section 014100.

B. Mockups: Prior to commencing work, provide a 48-inch by 48-inch section of tile grouted and finished with required trim for each color, texture, shape, size, and type of tile selected.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Comply to the general delivery, storage, and handling requirements of Section 016600.
1.11 FIELD CONDITIONS

A. Ambient Conditions: Set and grout tile when the temperature is at least 50 degrees F and rising.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Tile Manufacturers:
   1. American-Olean Tile Company, a Division of Daltile, Dallas, TX (214)398-1411, with offices in Anaheim, CA (714)634-4300.

B. Acceptable Accessory Products Manufacturers:

C. Like materials shall be the products of one manufacturer and shall be either the ones upon which the design is based or equal products of other manufacturers accepted in advance in accordance with Section 012500.

2.02 REGULATORY REQUIREMENTS

A. Regulations:
   1. Slip Resistance: Comply with ADA Guidelines, CBC Section 11B-302, and CBC Section 403.
      a. Floor tile products shall comply with a DCOF (dynamic coefficient of friction) value of 0.42 minimum for level interior floors when wet, as specified in ANSI A137.1, Section 9.6 - DCOF AcuTest.
   2. Comply with health department requirements regarding floor sealers.

B. Waste Management: Comply with CALGreen Section 5.408 Construction Waste Reduction, Disposal and Recycling. Establish a construction waste management plan for the diverted material.
   1. Recycle or salvage for reuse a minimum of 50 percent of the non-hazardous construction and demolition waste in accordance with CALGreen 5.408.1.3.
C. Comply with CALGreen 5.504.4.1 Adhesives, Sealants, and Caulks: Adhesives, sealants, primers, and caulks in amounts greater than 16 ounces shall comply with SCAQMD Rule 1168 VOC limits, as indicated in Table 5.504.4.1 and Table 5.504.4.2.
   1. Aerosol adhesives and smaller sizes of adhesives and sealant or caulking shall comply with CCR Title 17, commencing with Section 94507.

2.03 SUSTAINABILITY REQUIREMENTS

A. LEED Goals for Materials & Resources: For additional information on LEED goal requirements, refer to Section 018113.
   1. MR Credit 2 - Construction Waste Management: Recycle and/or salvage at least 75 percent of non-hazardous construction and demolition debris.
   2. MR Credit 4 - Recycled Content: Use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer content constitutes 10 percent of the total value of the materials in the project.
   3. MR Credit 5 - Regional Materials: Use building materials or products that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of the project site for a minimum of 10 percent of the total materials value.

B. LEED Goals for Indoor Environmental Quality: For additional information on LEED goal requirements, refer to Section 018113.
   1. IEQ Credit 4.1 - Low-Emitting Materials--Adhesives and Sealants: Interior adhesives and sealants used on the interior of the building shall comply with the requirements of the following reference standards:

2.04 PERFORMANCE CRITERIA

A. VOC Content of Interior Sealants: Provide sealants and sealant primers that comply with the following limits for low VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
   1. Architectural Sealants: 250 g/L.

2.05 TILE MATERIALS

A. General: Refer to Contract Drawings for specific manufacturers, material group codes, product descriptions, colors, and locations of use.

B. Porcelain Tile: Conform to requirements of ANSI A137.1. Refer to Finish Schedule on Contract Drawings for location of use and colors.
   1. Floor Tile Type T-1: Porcelain.
      a. Manufacturer: SpecCeramics
      b. Size: 12" x 12.
      c. Style: Newstone.
      d. Finish: Bush hammered.
      e. Base Type B7: Match Type T-1 floor tile.
2. Wall Tile **Type T-2:** Porcelain.
   a. Manufacturer: SpecCeramics
   b. Size: 12" x 24".
   c. Style: Newstone.
   d. Finish: Polished.
3. Provide required matching standard coved base, trim shapes, and patterns as selected by Architect.
4. Provide both field and accent color patterns as indicated on the Contract Drawings.
5. Slip Resistance Comply with CBC Section 11B-302 and ANSI A137.1, Section 9.6 - DCOF AcuTest, for slip resistance.

C. Engineered Stone: Conform to requirements of ANSI A137.1. Refer to Finish Schedule on Contract Drawings for location of use and colors.
1. Stair Tread Tile **Type T-3:** Engineered Stone.
   a. Manufacturer: HG Stones.
   b. Size: Provide as indicated on Contract Drawings.
   c. Style: Neolith Iron Collection.
   d. Finish: Satin.
2. Provide required matching standard coved base, trim shapes, and patterns as selected by Architect.
3. Provide both field and accent color patterns as indicated on the Contract Drawings.
4. Slip Resistance Comply with CBC Section 11B-302 and ANSI A137.1, Section 9.6 - DCOF AcuTest, for slip resistance.

D. Quarry Tile: Standard Grade units conforming to the requirements of ANSI 137.1, 6 inches by 6 inches by 1/2-inch thick, with non-slip aggregate finish.
1. Floor Tile **Type QT-1:** Quarry tile.
   b. Size: 8" x 8".
   c. Style: Quarry Naturals.
   d. Finish: Slip resistant.
2. Wall Base **Type B-3:** Match QT-1. Grout joints shall align with floor tile grout joints.
   b. Size: 5" x 8".
   c. Style: Quarry Naturals.
   d. Finish: Smooth.
3. Provide cove base and other trim shapes, as required.
4. Provide non-slip aggregate finish for increased slip resistance at kitchen and other wet areas.
5. Slip Resistance Comply with CBC Section 11B-302 and ANSI A137.1, Section 9.6 - DCOF AcuTest, for slip resistance.

E. Trimmers: Provide necessary matching standard coved base, caps, stops, returns, trimmers, and other shapes to complete installation.

F. Thresholds: Daltile Natural Stone Threshold, matte finish.
1. Size: Length shall be full width of door opening. Width shall be as indicated on Contract Drawings.
2. **Profile:** As indicated or as required to provide transition between finished surface of tile and that of adjacent finished flooring. Taper and bevel in accordance with accessibility regulations to align with adjacent floor finish materials.

3. **Provide color selected by Architect.**

### 2.06 MORTAR SETTING MATERIALS

**A. Bonding Mortars:** Commercially prepared, factory-packaged mixtures conforming to the referenced standards. Provide products licensed by the Tile Council of North America and formulated specifically for the setting of tile and stone.

1. **Walls:**
   a. **Large Format Porcelain Tile:** Prolite Tile Large Format Tile & Stone Mortar, a flexible, polymer-modified mortar system conforming to ANSI A118.4 and A118.11, manufactured by Custom Building Products, or equal.
      1) Comply with A118.15 - Improved Modified Dry-Set Cement Mortar to meet 28-day shear bond of at least 400 psi.

2. **Floors:**
   a. **Large Format Porcelain Tile:** Prolite Tile Large Format Tile & Stone Mortar, a flexible, polymer-modified mortar system conforming to ANSI A118.4 and A118.11, manufactured by Custom Building Products, or equal.
      1) Comply with A118.15 - Improved Modified Dry-Set Cement Mortar to meet 28-day shear bond of at least 400 psi.

3. **Stair Treads and Countertops:**
   a. **Natural Stone:** ProLite Tile & Stone Mortar, a flexible, polymer-modified, mortar system, conforming to ANSI A118.11, manufactured by Custom Building Products, or equal.

4. **Thresholds:**
   a. **100% Solids Epoxy Mortar** three-component mortar system with mold and mildew protection, conforming to ANSI A118.8, manufactured by Custom Building Products, or equal.

### 2.07 GROUT MATERIALS

**A. Grouts:** Commercially prepared, factory-packaged mixtures. Provide products licensed by the Tile Council of North America and specifically formulated for grouting tile. Colors shall be as selected by Architect.

1. **Walls:**
   a. **Prism SureColor Grout:** Sanded, polymer-modified cementitious grout system, conforming to ANSI A118.6, manufactured by Custom Building Products, or equal, for joint widths over 1/8-inch.

2. **Floors:**
   a. **At Restrooms, Kitchens, Showers, and Thresholds:** 100% Solids Epoxy Grout, two-component 100 percent solids epoxy grout, conforming to ANSI A118.3, manufactured by Custom Building Products.
   b. **At Other Locations:** Prism SureColor Grout: Sanded, polymer-modified cementitious grout system, conforming to ANSI A118.6,
manufactured by Custom Building Products, or equal, for joint widths over 1/8-inch.

3. Countertops: 100% Solids Epoxy Grout, two-component 100 percent solids epoxy grout, conforming to ANSI A118.3, manufactured by Custom Building Products.

### 2.08 ACCESSORY MATERIALS

**A. Floor Preparation Accessories:**
   1. Concrete Crack Filler: Mapei solvent-free epoxy Planicrete EP, or equal.
   2. Spot Patching Compound: Mapei Plani/Patch fast-setting cement-based polymer-modified patching compound, or equal.
   3. Self-Leveling Underlayment:
   4. Latex Patching and Leveling Compound: Henry’s 335 or 336, Dura-bond Webpatch 90, or Durabond 60L.
   5. Floor Primer: As recommended by manufacturer.
   6. Wax Remover: As recommended by manufacturer.

**B. Waterproofing/Crack Isolation Control Membrane:** Use between tile and setting surface. Comply with ANSI A118.10 for waterproofing membranes and ANSI A118.12 for crack isolation membranes. Provide one of the following:
   1. Custom Building Products RedGard Waterproofing and Crack Prevention Membrane meeting ANSI A118.10 and IAPM R&T File No. 4244.
   2. Mapelastic two-component flexible fiber-reinforced mortar meeting ANSI A118.10 for waterproofing and having a nominal thickness of 1/16-inch minimum, as manufactured by Mapei Corporation, or equal.
   3. NobleSeal TS, chlorinated polyethylene sheeting with fiberglass scrim on both sides, and having a nominal thickness of 30 mils, manufactured by The Noble Company, or equal. Comply with ANSI A108.17.

**C. Sheet-Form Sound Isolation Control Membrane:** Use between tile and setting surface where acoustical control is indicated, including at second floor rest rooms in Building B.
   1. NobleSeal SIS, chlorinated polyethylene sheeting with fiberglass scrim on both sides, and having a nominal thickness of 30 mils, manufactured by The Noble Company, or equal. Comply with ANSI A108.17.

**D. Tile Backer Board:** Refer to Section 092900.

**E. Cleaner:** Provide specific products recommended for type of material and degree of staining to be cleaned.
   1. Aqua Mix Series of stone and tile cleaners.
2. Bostik Findley CeramaSeal Tile and Stone Cleaner.

F. Grout Sealer: Acrylic emulsion, 18 percent solids, clear, non-yellowing, slip resistant, equal to one of the following:
1. Aqua Mix Grout Sealer.
2. Custom Building Products Grout and Tile Sealer.
3. Impregnator 511 Grout Sealer.

G. Finishing Sealers: Clear, self-polishing, non-yellowing, slip resistant, suitable for interior unglazed, sealed floors, equal to one of the following:
1. Aqua-Mix Floor Shine and Hardener.
2. Custom Building Products Aqua Mix Sealer’s Choice Gold.

H. Sealants: Design is based on the use of Hydroment High-Performance Urethane Sealants manufactured by Bostick Findley.
1. Provide sealants color-matched to the design-basis grout manufacturer's standard colors.
2. Refer to Section 079200 for sealant requirements.

I. Metal Dividers: Stainless steel dividers with horizontal leg, 1/8-inch wide depth of adjacent surfaces, one continuous piece at each opening.

J. Metal Transition Strips: Refer to Section 096513.

2.09 MIXES

A. Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar: Provide mixes in accordance with the requirements of ANSI A108.5.


C. Epoxy Mortar and Grout: Provide mixes in accordance with the requirements of ANSI A108.6.

D. Proprietary Materials: When required to be field-mixed, mix in accordance with manufacturer's instructions.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verification of Conditions:
1. Where tile is designated to be adhered directly to a prepared surface, do not commence installation until substrate is found to be within the following tolerances:
   a. Horizontal Surfaces: Flat within 1/8-inch in 10 feet in all directions.
   b. Vertical Surfaces: Plumb within 1/8-inch in 8 feet in all directions.
      1) Prior to commencing work at tile walls illuminated from light coves above, take measurements to confirm flatness in presence of Architect.
      2) Surfaces exceeding flatness tolerances shall be repaired in accordance with corrections procedures specified in Section 092216 and Section 092900 prior to commencing tile work.
c. Sloped Surfaces: Where required for drainage, verify substrate is uniformly sloped to drain, as indicated on Contract Drawings.
2. Verify that surfaces to receive tile are firm, dry, clean, and free from oily or waxy films and curing compounds.
3. Verify that grounds, anchors, plugs, plumbing and mechanical work, electrical work, and similar items in or behind the finish have been installed before proceeding with the installation.
4. Verify that access panels, floor drains, and other devices will occur within tile module.

3.02 PREPARATION

A. Install crack isolation control membrane between prepared surface and tile in accordance with TCNA Method F125-Full and manufacturer's recommendations. Run membrane 6 inches high at vertical interruptions. Comply with ANSI A118.12.

B. Comply with manufacturer's surface preparation requirements for specified mortar.

C. Where concrete slab substrates are not fully cured (green concrete), provide uncoupling membrane over slab. Where slab is required to be waterproofed, tape edges.

D. Apply grout release to tile prior to grouting when specified to receive epoxy grout.

3.03 SYSTEM TYPES

A. System Applications:
1. Floors:
   a. Interior Slabs-on-Grade:
      1) Toilet Rooms on Slab with Crack Isolation Membrane: **System D4**.
      2) Kitchen Areas: **System G1**
      3) Shower Receptors: **System H3**.
   b. Interior Supported Floors:
      1) Toilet Rooms on Slab with Crack or Sound Isolation Membrane: **System D4**.
   c. Thresholds: **System Q2**.
2. Walls:
   a. Interior Walls:
      1) Toilet Rooms on Interior Tile Backer Board: **System K3**.
      2) Shower Walls on Interior Tile Backer Board Over Ceramic Tile Floor or Receptor: **System N3**.
3. Countertops: **System Q3**.

3.04 SYSTEM DESCRIPTIONS

A. Floor Systems:
   a. Method: Adhered to crack isolation membrane adhered directly to interior supported concrete slab.
b. Materials:
1) Porcelain Tile: In accordance with Article 2.05.
2) Membrane: Sheet-form crack isolation control membrane conforming to ANSI A118.12.
3) Cementitious Bond Coat: In accordance with ANSI A118.4.
4) Cementitious Grout: In accordance with ANSI A118.6.

c. Installation:
1) Porcelain Tile: In accordance with ANSI A108.5.
2) Membrane: In accordance with ANSI A108.17.
3) Cementitious Bond Coat: In accordance with ANSI A118.5.
4) Cementitious Grout: In accordance with ANSI A108.10.

d. Requirements:
1) Concrete surface shall have steel trowel finish, with maximum allowable variation of 1/8-inch in 10 feet from required plane, and no more than 1/16-inch in 24 inches when measured from the high points in the surface.
3) Integrate membrane into drain assembly and up base flashing to 4 inches above finished floor.
4) Comply with manufacturer's mixing, application, and curing requirements for specified mortar.

2. **Floor System G1:** TCNA Handbook for Method F131 - Concrete Subfloor, Epoxy Mortar and Grout.
   a. Method: Adhered directly to interior slab-on-grade floors.
   b. Materials:
      1) Mortar Bond Coat: Epoxy in accordance with ANSI A118.3.
         a) Use flexible bonding mortar at all areas where porcelain tile is required.
      2) Grout: Epoxy, in accordance with ANSI A118.8.
   c. Installation:
      1) Tile: In accordance with ANSI A108.6.
      2) Grout: In accordance with ANSI A108.10.
   d. Requirements:
      1) Slab shall be well cured, clean, and free of cracks.
      2) Provide expansion joints in accordance with recommendations of TCNA Handbook for Method TCNA.

3. **Shower Receptor System H3:** TCNA Handbook for Method B420 - Shower Receptors, Mortar Bed Floor, Ceramic Tile.
   a. Method: Thin-set to shower pan membrane at floors in individual shower stalls.
   b. Materials:
      1) Porcelain Tile: In accordance with ANSI A137.1.
      2) Membrane: Sheet-Form Shower Pan Membrane conforming to ANSI A118.10.
      3) Mortar Bed: In accordance with ANSI A118.02
      4) Cementitious Bond Coat: In accordance with ANSI A118.4.
         a) Use polymer-modified flexible bonding mortar at areas where porcelain tile is required.
      5) Epoxy Grout: In accordance with ANSI A118.3.
c. Installation:
   1) Porcelain Tile: In accordance with ANSI A108.5.
   2) Reinforced Mortar Bed: In accordance with ANSI A108.1C.
   3) Shower Pan Membrane: In accordance with ANSI A108.13.
   4) Cementitious Bond Coat: In accordance with ANSI A118.5.
   5) Epoxy Grout: In accordance with ANSI A108.6.

d. Requirements:
   1) Use in conjunction with Plastic Shower Compartments specified in Section 102116.
   2) Surround shower drain with crushed stone to prevent mortar from blocking weep holes.
   3) Cover joints and corners with 2-inch wide alkali-resistant glass fiber mesh tape. Apply skim coat cementitious bonding material over tape, and over fastener heads.
   4) Seal penetrations, corners, and abutments to dissimilar materials with flexible sealant.
   5) Turn shower pan waterproofing up wall to 6 inches above level of shower floor at base.

B. Wall Systems:

1. **Wall System K3**: TCNA Handbook for Method W245 - Interior Walls over Wood or Metal Studs, Coated Glass Mat Water-Resistant Gypsum Backer Board.
   a. Method: Thin-set to interior tile backer board at walls in wet areas.
   b. Materials:
      1) Porcelain Tile: In accordance with ANSI A137.1.
      2) Cementitious Bond Coat:
         a) Porcelain Tile: Polymer-modified flexible bonding mortar in accordance with ANSI A118.4 at areas where porcelain tile is required.
      3) Cementitious Grout: In accordance with ANSI A118.6.
   c. Installation:
      1) Porcelain Tile: In accordance with ANSI A108.5.
      2) Cementitious Bond Coat: In accordance with ANSI A118.5.
      3) Cementitious Grout: In accordance with ANSI A108.10.
   d. Requirements:
      1) Verify substrate is interior coated glass mat, water-resistant, tile backer board in accordance with Section 092900, attached to 0.033” thick (20 gage) galvanized metal studs with non-corrosive and non-oxidizing fasteners.
      2) Cover joints and corners with 2-inch wide alkali-resistant glass fiber mesh tape. Apply skim coat cementitious bonding material over tape, and over fastener heads.
      3) Seal penetrations, corners, and abutments to dissimilar materials with flexible sealant.
      4) Install expansion joints in accordance with TCNA Handbook for Method EJ171.

2. **Shower Wall System N3**: TCNA Handbook for Method B420 - Shower Receptors, Wood or Metal Studs, Coated Glass Mat Water-
Resistant Gypsum Backer Board Walls, Ceramic Tile (Over Ceramic Tile Receptor).

a. Method: Thin-set to interior glass mat tile backer board at walls of individual shower stalls.
   1) Porcelain: In accordance with ANSI A137.1.
   2) Membrane: Sheet-form crack isolation control membrane conforming to ANSI A118.12.
   3) Cementitious Bond Coat: In accordance with ANSI A118.4.
      a) Use polymer-modified flexible bonding mortar at areas where porcelain tile is required.
   4) Cementitious Grout: In accordance with ANSI A118.6.

b. Installation:
   1) Porcelain Tile: In accordance with ANSI A108.5.
   2) Membrane: In accordance with ANSI A108.13.
   3) Cementitious Bond Coat: In accordance with ANSI A118.5.
   4) Cementitious Grout: In accordance with ANSI A108.10.

c. Requirements:
   1) Use in conjunction with Floor Method B420 Shower Receptor floors.
   2) Verify substrate is interior coated glass mat, water-resistant tile backer board in accordance with Section 092900, attached to 0.033" thick (20 gage) galvanized metal studs with non-corrosive and non-oxidizing fasteners.
   3) Cover joints and corners with 2-inch wide alkali-resistant glass fiber mesh tape. Apply skim coat cementitious bonding material over tape, and over fastener heads.
   4) Seal penetrations, corners, and abutments to dissimilar materials with flexible sealant.
   5) Install expansion joints in accordance with TCNA Handbook for Method EJ171.

C. Special Systems:
   2. **Countertops Q3**:

### 3.05 INSTALLATION

A. Layout:
   1. Layout work according to patterns detailed or accepted. For heights shown, maintain full courses to produce nearest attainable height without cutting tile.
      a. Refer to Contract Drawings for installation layout pattern and orientation.
   2. Layout tile to center fields and patterns exactly on the areas and on architectural features. Whenever possible no tile that is less than half size shall occur. Locate cut tiles as indicated on Contract Drawings. Align joints vertically and horizontally from floors to walls. No stag-
gered joints will be permitted, unless specific pattern is indicated on Contract Drawings.
  a. Where running bond/brick joint patterns are indicated using tiles where the side being offset is greater than 18 inches nominal dimension, the running bond offset shall be a maximum of 33%, as defined in ANSI A108.2, Paragraph 4.3.8.1.
  3. Extend tile work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions, except as otherwise shown. Terminate work neatly at obstructions, edges, and at corners without disrupting pattern or joint alignments.
  4. Confirm layout with Architect prior to installation of tile work.

B. Cutting and Fitting: Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so that plates, collars, and covers overlap tile.

C. Setting Tile: Comply with applicable recommendation of the TCNA Handbook.
  1. Interior: Apply bond coat to substrate and to back of each piece.
     a. Large format tiles require backbuttering. If tiles have a mesh backing which is resinous or epoxy coated, use one of the following options:
        1) Use epoxy mortar in accordance with ANSI 118.3.
        2) Use Complete Contact Mortar as manufactured by Custom Building Products, or equal.
  2. Firmly embed and beat tile into mortar with finished surfaces brought to true and level planes.
     a. Restore workability if skinning has occurred.
     b. Space tiles a minimum of 1/8-inch. Do not allow tiles to touch each other or any other rigid material.
     c. Install control joints where tile abuts restraining surfaces, around the perimeter of the tile work and where two substrate materials of different composition meet in the same plane. Interior installations shall have expansion joints spaced a maximum of 24 feet by 24 feet.
     d. Backfill all molding pieces, making sure there are no gaps.

  1. Grout tile approximately 24 hours after setting. Thoroughly brush out floor tile joints before grouting. Apply grout release to tile prior to grouting when specified to receive epoxy grout.
  2. Grout shall be mixed and applied in accordance with manufacturer's instructions. Force a maximum of grout into joints. Before grout sets, strike or tool the joints of cushion-edge tile to depth of cushion, filling gaps. Fill joints of square-edged tile flush with surface. Surplus grout shall be cleaned from face of the tiles immediately.
E. Thresholds: Install with full bed of epoxy mortar in accordance with ANSI A108.9 at doorway transition between porcelain floor tile and other flooring materials.

F. Metal Dividers: Provide at transition to other floorings.

G. Transition Strips: Provide Reno-U at thin-set tile to concrete, and Reno-V at tile to resilient.

3.06 EXPANSION JOINTS

A. Expansion Joints: Comply with the recommendations of TCNA Handbook, except where more restrictive requirements are specified. Requirements for stone are the same as for tile.

1. Joint Spacing:
   a. Interior:
      1) Slabs on Grade: Space a maximum of 20' to 25' in each direction.
      a) Tilework Exposed to Direct Sunlight or Moisture: Space a maximum of 8' to 12" in each direction.
      2) Above Grade Slabs: Space a maximum of 8' to 12" in each direction.
      b. Expansion, construction, isolation, control, contraction, seismic, cold, and sawcut joints in the structure shall continue through the mortar bed, membrane, tile, and stone work, including such joints at vertical surfaces.
      1) Do not install crack isolation membrane as a slip plane over sawcut joints to relocate a movement joint.

2. Joint Width:
   a. Interior:
      1) Floor Tile and Wall Tile: Same as grout joint width, but not less than 1/4-inch.
      2) Quarry and Paver Tile: Preferred not less than 1/4-inch, but never less than 1/8-inch.
   b. General Recommendations:
      1) Joints in tile and setting bed materials shall never be less than the width of the sawcut control joint width.
      2) Joints through tilework directly over structural concrete joints must never be narrower than the structural joint.

3. Perimeter: Provide movement joints where tilework abuts restraining surfaces such as perimeter walls, dissimilar floors, curbs, columns, pipes, ceilings, and where changes occur in substrate materials, but not at drain strainers.

4. Materials:
   a. Backer Rod Material: Refer to Section 079200 for closed cell type.
   b. Sealant: Refer to Paragraph 2.08-H.
      a) Color: Custom color as selected by Architect.

3.07 SEALANTS

A. Seal plumbing and electrical penetrations through tile with specified sealant.
B. Fill expansion joints with elastomeric sealant as recommended by the Tile Council of North America using back-up rods to prevent sealant from bonding to substrate.

3.08 ADJUSTING

A. Leave finished installation clean and free of cracked, chipped, broken, unbonded, or otherwise defective tile work.
B. Tile having stains or discolorations from any cause that are not removable with soap and clean water shall be replaced.

3.09 CLEANING

A. Apply a protective coat of specified cleaner, or a neutral solution of one part cleaner to one part water, to clean completed tile work.
1. Clean excess grout with specified cleaner using burlap bag, cloths, or non-staining soft wood excelsior. Sponge and wash tiles thoroughly and then polish with clean, dry cloths. Use no acids or abrasive soaps on tile, except as approved by the tile manufacturer.
B. Seal non-epoxy tile grout joints and floor tile with specified tile and grout sealers in accordance with manufacturer's instructions.
C. Waste Management: Recycle or salvage waste tile and packaging materials in accordance with Section 017419.

3.10 PROTECTION

A. Apply non-staining laminated and reinforced Kraft paper having a bituminous or latex binder over floor tile as soon as pointing and grouting and cleaning are completed. Lap the sheets at least 4 inches and seal the laps against escape of moisture. Leave curing paper in place until job is ready for final cleaning, at least 7 full days. Keep traffic off floors during the curing period of 3 days.
B. Immediately prior to final acceptance of tile work, rinse protective coat of neutral cleaner from all tile surfaces.
1. Apply one coat of specified tile sealer.
- SECTION 096723 -

RESINOUS FLOORING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Resinous Epoxy flooring system as shown on the Contract Drawings and in schedules.

B. Related Sections:
   1. Section 012500 - Substitution Procedures.
   2. Section 013300 - Submittal Procedures.
   3. Section 018113 - Sustainable Design Requirements.
   4. Section 033100 - Structural Concrete.

1.02 REFERENCES

A. ASTM International (ASTM):
   4. D 635-10 - Test Method for Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position.
   11. F 1869-16 - Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
B. California Code of Regulations (CCR):
      a. Chapter 11B - Accessibility to Public Buildings, Public Accommodations, Commercial Buildings, and Public Housing:
         1) Division 3 - Building Blocks.
            a) Section 11B-302 - Floor or Ground Surfaces.
               (1) 11B-302.1 - General.
            b) Section 11B-303 - Changes in Level.
         2) Division 4 - Accessible Routes.
            a) Section 11B-403 - Walking Surfaces.

C. California Code of Regulations (CCR):

D. American National Standards Institute (ANSI):
   1. A137.1-2012 - Ceramic Tile.

E. United States Green Building Council (USGBC):
   1. Leadership in Energy and Environmental Design (LEED):

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Refer to Section 017419 regarding procedures for implementing construction waste management requirements.

B. Coordination: Refer to Section 018113 regarding procedures for implementing sustainable design requirements.

C. Coordination: Coordinate the installation of the work of this Section after installation of adjacent epoxy wall coatings specified in Section 099656.

D. Preinstallation Conference:
   1. General contractor shall arrange a meeting not less than 30 days prior to starting work.
   2. Attendance: Contractor, Architect, Owner, and representatives of the manufacturer and installer.
   3. Review and clarify this specification, application procedure, quality control, inspection, and acceptance criteria and production schedule.

1.04 SUBMITTALS

A. General: Make submittals in accordance with provisions of Section 013300.

B. Product Data: Submit manufacturer's technical data, installation instructions, and general recommendations for resinous flooring material.
   1. Include certification indicating compliance of materials with requirements, descriptive literature, and specifications.

C. Samples: Submit for verification purposes, 6-inch square samples of resinous flooring, applied to a rigid backing, in color and finish coating selected by Architect.
   1. For initial selection of colors and finishes, submit manufacturer's color charts showing full range of colors and finishes available.
D. Substrate Condition Field Report: Furnish report from installer confirming that surfaces, alignments, and tolerances to which materials of this Section will be applied are in a suitable and acceptable condition to receive finish materials specified in this Section.

1.05 SUSTAINABLE DESIGN SUBMITTALS

A. Material & Resources Submittals:
   1. Letter Template for MR Credit 2: Letter template, signed by Contractor, tabulating total waste material, quantities diverted and means by which it is diverted, and statement that requirements for the credit have been met.
      a. Comply with Section 017419 Construction Waste Management and Disposal.
   2. Product Data and Certification Letter for MR Credit 4: Indicate percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.
   3. Product Data for MR Credit 5: For regional materials indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include statement indicating cost for each regional material and the fraction by weight that is considered regional.

B. Indoor Environmental Quality Submittals:
   1. Product Data for IEQ Credit 4.1: For adhesives and sealants used on the inside of the weatherproofing system, documentation including printed statement of VOC content.
   2. Product Data for IEQ Credit 4.3: For flooring, documentation indicating compliance with at least one of the following requirements:
      a. Option 1 (Hard Surface Flooring): Manufacturer’s certification as compliant with FloorScore standard by an independent third party.
      b. Option 2 (All Flooring): Documentation that flooring systems meets testing and product requirements of California Department of Health Services’ Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.

1.06 QUALITY ASSURANCE

A. Qualifications:
   1. Manufacturer: Obtain primary resinous flooring materials including primers, resins, hardening agents, finish or sealing coats from a single manufacturer with not less than 10 years of successful experience in manufacturing and installing principal materials described in this section.
   2. Applicator shall have been approved by the flooring system manufacturer in preparation and application, and shall have completed at least five projects of similar size and complexity. Provide secondary
materials only of type and from source recommended by manufacturer of primary materials.

B. Manufacturer of approved system shall be single source and made in the USA.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Packing: Materials shall be factory pre-weighed and pre-packaged in single batch containers to eliminate on site mixing errors. No on site weighing or volumetric measurements will be allowed.

B. Shipping: Material shall be delivered to job site clearly identified with the product type and batch number, and checked by flooring contractor for completeness and shipping damage prior to job start.

C. Storage: Material shall be stored in a dry, enclosed area protected from exposure to moisture. Temperature of storage area shall be maintained between 60°F and 85°F.

D. Waste Disposal:
1. The Applicator shall be provided with adequate disposal facilities for non-hazardous waste generated during installation of the system.

1.08 FIELD CONDITIONS

A. Ambient Conditions:
1. Air, material, and substrate temperatures shall be between 55°F and 85°F providing the substrate temperature is above the dew point. Outside of this range, the Manufacturer shall be consulted.
2. Relative humidity in the specific location of the application shall be less than 85% and the surface temperature shall be at least 5°F above the dew point.
3. Applicator shall ensure that adequate ventilation is available for the work area. This shall include the use of manufacturer’s approved fans, smooth bore tubing and closure of the work area.
4. Applicator shall be supplied with adequate lighting equal to the final lighting level during the preparation and installation of the system. Provide adequate ventilation in work area.

B. Avoid moisture of any kind in floor area during installation and curing.

C. Job area shall be free of other trades during and, for a period of 24 hours, after floor installation.

D. Exercise caution with caustic materials.

E. Conditions of new concrete to be coated with cementitious urethane material.
1. Concrete shall be moisture cured for a minimum of 3 days and have fully cured a minimum of 5 days in accordance with ACI-308 prior to the application of the coating system pending moisture tests.
2. Concrete shall have a flat rubbed finish, float or light steel trowel finish (a hard steel trowel finish is neither necessary nor desirable).
3. Sealers and curing agents shall not to be used.
4. Concrete shall have minimum design strength of 3,500 psi and a maximum water/cement ratio of 0.45.
5. Concrete surfaces on grade shall have been constructed with a vapor barrier to protect against the effects of vapor transmission and possible delamination of the system.

F. Safety Requirements:
1. Open flames and spark-producing equipment shall be removed from the work area prior to commencement of application.
2. NO SMOKING signs shall be posted at the entrances to the work area.
3. Contractor shall be responsible for the removal of foodstuffs from the work area.
4. Non-related personnel in the work area shall be kept to a minimum.

1.09 WARRANTY
A. Manufacturer warrants that material shipped to buyers at the time of shipment is substantially free from material defects and will perform substantially to Dur-A-Flex, Inc. published literature if used in accordance with the latest prescribed procedures and prior to the expiration date.

B. Comply with the warranty provisions of the General Conditions.

PART 2 - PRODUCTS

2.01 MANUFACTURERS
A. Acceptable Manufacturers:

B. Acceptable Manufacturers of Accessory Products:

C. Like materials shall be products of one manufacturer and shall be either the ones upon which the design is based or equal products of a manufacturer accepted in advance in accordance with Section 012500.

2.02 REGULATORY REQUIREMENTS
A. Regulations:
   1. Slip Resistance: Comply with CBC Section 11B-302 and CBC Section 403 ADA Guidelines.
      a. Floor tile products shall comply with a DCOF (dynamic coefficient of friction) value of 0.42 minimum for level interior floors when wet, as specified in ANSI A137.1, Section 9.6 - DCOF AcuTest.

B. Comply with requirements of United States Department of Agriculture (USDA), Food, Drug Administration (FDA), and local Health Department.
   1. Comply with local health department requirements regarding sanitary surfaces under food service equipment.
C. Comply with CALGreen 5.504.4.3 - Paints and Coatings:
   1. Architectural paints and coatings shall comply with VOC limits in Table 5.504.4.3 - VOC Content for Architectural Coatings.
   2. Aerosol paints and coatings shall comply with CALGreen 5.504.4.3.1 - Aerosol Paints and Coatings.

D. Comply with CALGreen 5.504.4.6 - Resilient Flooring Systems:
   1. A minimum of 80 percent of the resilient flooring installed in the Project shall at least one of the following:
      a. Certified under the Resilient Floor Covering Institute (RFCI) FloorScore program.
      b. Compliant with VOC emission limits and testing requirements specified in the California Department of Public Health's 1010 Standard Method for the Testing and Evaluation Chambers.
   2. Provide documentation that verifies compliance with pollutant emission limits.

2.03 SUSTAINABILITY REQUIREMENTS

A. LEED Goals for Materials & Resources: For additional information on LEED goal requirements, refer to Section 018113.
   1. MR Credit 2 - Construction Waste Management: Recycle and/or salvage at least 5075 percent of non-hazardous construction and demolition debris.
   2. MR Credit 4 - Recycled Content: Use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer content constitutes 1020 percent of the total value of the materials in the project.
   3. MR Credit 5 - Regional Materials: Use building materials or products that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of the project site for a minimum of 1020 percent of the total materials value.

B. LEED Goals for Indoor Environmental Quality: For additional information on LEED goal requirements, refer to Section 018113.
   1. IEQ Credit 4.1 - Low-Emitting Materials--Adhesives and Sealants: Interior adhesives and sealants used on the interior of the building shall comply with the requirements of the following reference standards:
   2. IEQ Credit 4.3- Low-Emitting Materials--Flooring Systems: Flooring systems shall comply with at least one of the following requirements.
      a. Option 1 (Hard Surface Flooring): Provide hard surface flooring certified as compliant with FloorScore standard by an independent third party.
      b. Option 2 (All Flooring): All flooring systems must meet testing and product requirements of California Department of Health Services' Standard Practice for the Testing of Volatile Organic
2.04 PERFORMANCE REQUIREMENTS

A. Topping: Poly-Crete SL:
   1. Percent Reactive 100 %
   2. VOC 0 g/L
   3. Bond Strength to Concrete ASTM D 4541 400 psi, substrates fails
   4. Compressive Strength, ASTM C 579 9,000 psi
   5. Tensile Strength, ASTM D 638 2,175 psi
   6. Flexural Strength, ASTM D 790 5,076 psi
   7. Impact Resistance @ 125 mils, MIL D-3134 160-inch lbs
      No visible damage or deterioration

B. Broadcast Coat: Dur-A-Glaze #4 Resin:
   1. Percent Reactive, 100 %
   2. VOC < 4 g/L
   3. Water Absorption, ASTM D 570 0.04%
   4. Tensile Strength, ASTM D 638 4000 psi
   5. Coefficient of thermal expansion, ASTM D 696 2 x 10^{-5} in/in/F
   6. Flammability, ASTM D 635 Self-Extinguishing
   7. Flame Spread/NFPA 101, ASTM E 84 Class A

C. Topcoat: Armor Top:
   1. VOC 0 g/L
   2. 60 Degree Gloss ASTM D-523 75+/-5
   3. Mixed Viscosity, (Brookfield 25oC) 500 cps
   4. Tensile strength, ASTM D 638 7,000 psi
   5. Abrasion Resistance, ASTM D 4060 Gloss Satin CS 17 wheel (1,000 g load) 1,000 cycles
      4 to 8 mg loss with grit
      10 to 12 mg loss without grit
   6. Pot life @ 70o F 50% RH 2 hours
   7. Full Chemical resistance 7 days

2.05 SYSTEM DESCRIPTION

A. Work shall consist of preparation of the substrate, furnishing and applying cementitious urethane based self-leveling seamless flooring system with decorative quartz aggregate broadcast, epoxy broadcast, and topcoats.

B. The system shall have the color and texture as selected by the Architect with a nominal thickness of 1/4-inch. It shall be applied to the prepared areas as indicated on Contract Drawings and in accordance with the manufacturer's recommendations.

C. Cove base shall be applied where indicated on Contract Drawings and in accordance with manufacturers standard details.
2.06 FLOORING

A. **Epoxy Flooring Type EP-1:** Dur-A-Flex, Inc, Hybri-Flex EQ self-leveling, broadcast quartz, epoxy/aliphatic urethane topcoat seamless flooring system.
   1. System Materials:
      b. Broadcast aggregate shall be Dur-A-Flex Q28 or Q11 quartz aggregate.

   2. Patch Materials:
      b. Deep Fill and Sloping Material (over 1/4-inch): Use Dur-A-Flex Poly-Crete WR.


PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas and conditions, with Applicator present, for compliance with requirements for maximum moisture content, installation tolerances and other conditions affecting flooring performance.
   1. Verify that substrates and conditions are satisfactory for flooring installation and comply with requirements specified.

3.02 PREPARATION

A. General:
   1. New and existing concrete surfaces shall be free of oil, grease, curing compounds, loose particles, moss, algae growth, laitance, friable matter, dirt, and bituminous products.
   2. Moisture Testing: Perform tests recommended by manufacturer and as follows.
      a. Perform anhydrous calcium chloride test ASTM F 1869. Application will proceed only when the vapor/moisture emission rates from the slab is less than and not higher than 20 lbs/1,000 sf/24 hrs.
      b. Perform relative humidity test using is situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 99% relative humidity level measurement.
      c. If the vapor drive exceeds 99% relative humidity or 20 lbs/1,000 sf/24 hrs then the Owner and/or Engineer shall be notified and advised of additional cost for the possible installation of a vapor mitigation system that has been approved by the manufacturer or other means to lower the value to the acceptable limit.
3. Mechanical surface preparation
   a. Shot blast all surfaces to receive flooring system with a mobile steel shot, dust recycling machine (Blastrac or equal). All surface and embedded accumulations of paint, toppings hardened concrete layers, laitance, power trowel finishes and other similar surface characteristics shall be completely removed leaving a bare concrete surface having a minimum profile of CSP 4-5 as described by the International Concrete Repair Institute.
   b. Floor areas inaccessible to the mobile blast machines shall be mechanically abraded to the same degree of cleanliness, soundness and profile using diamond grinders, needle guns, bush hammers, or other suitable equipment.
   c. Where the perimeter of the substrate to be coated is not adjacent to a wall or curb, a minimum 1/4-inch key cut shall be made to properly seat the system, providing a smooth transition between areas. The detail cut shall also apply to drain perimeters and expansion joint edges.
   d. Cracks and non-moving joints greater than 1/8-inch wide shall be chiseled or chipped-out and repaired per manufacturer's recommendations.
4. At spalled or worn areas, mechanically remove loose or delaminated concrete to a sound concrete and patch per manufactures recommendations.

3.03 APPLICATION
A. General
   1. The system shall be applied in five distinct steps as listed below:
      a. Substrate preparation
      b. Topping/overlay application with quartz aggregate broadcast.
      c. Resin application with quartz aggregate broadcast.
      d. Topcoat application
      e. Second topcoat application.
   2. Immediately prior to the application of components, surface shall be dry and remaining dust or loose particles removed using a vacuum or clean, dry, oil-free compressed air.
   3. Handling, mixing, and addition of components shall be performed in a safe manner to achieve the desired results in accordance with the manufacturer's recommendations.
   4. System shall follow the contour of the substrate unless leveling work has been specified by the Architect.
   5. Provide neat finish with well-defined boundaries and straight edges.
B. Topping
   1. Apply topping as a self-leveling system in one lift with a nominal thickness of 1/8-inch as specified by the Architect.
   2. Topping shall be comprised of three components, a resin, hardener, and filler as supplied by the manufacturer.
3. Add hardener to resin and thoroughly disperse by suitably approved mechanical means. Add SL aggregate to catalyzed mixture and mixed in a manner to achieve a homogenous blend.

4. Apply topping over horizontal surfaces using 1/2-inch V-notched squeegee, trowels or other system approved by the manufacturer.

5. Immediately upon placing, degas topping with a loop roller.

6. Broadcast quartz aggregate to excess into the wet material at the rate of 0.8 lbs/sf.

7. Allow material to fully cure. Vacuum, sweep, and/or blow to remove loose aggregate.

C. Broadcast:
   1. Broadcast coat resin at the rate of 90 sf/gal (Q28), or 50 sf/gal (Q11).
   2. Broadcast coat shall be comprised of liquid components, combined at a ratio of 2 parts resin to 1 part hardener by volume, and shall be thoroughly blended by mechanical means such as a high-speed paddle mixer.
   3. Broadcast quartz aggregate into wet resin at the rate of 0.5 lbs/sf.
   4. Allow material to fully cure. Vacuum, sweep and/or blow to remove loose aggregate.

D. Grout Coat:
   1. Apply grout coat with a coverage at rate of 90 sf/gal (Q28) or 50 sf/gal (Q11).
   2. Grout coat shall be comprised of liquid components, combined at a ratio of 2 parts resin to 1 part hardener by volume, and shall be thoroughly blended by mechanical means such as a high-speed paddle mixer.
   3. Backroll grout coat and crossrolled to provide a uniform texture and finish.

E. Topcoat
   1. Topcoat shall be roller applied with a coverage rate of 500 sf/gal.
   2. Finished floor shall have a nominal thickness of 1/4-inch.

3.04 FIELD QUALITY CONTROL

A. Tests, Inspection:
   1. The following tests shall be conducted by the Applicator:
      a. Temperature.
   2. Air, substrate temperatures, and dew point.
      a. Coverage Rates.
   3. Rates for all layers shall be monitored by checking quantity of material used against the area covered.

3.05 CLEANING

A. Cure flooring material in compliance with manufacturer’s directions, taking care to prevent their contamination during stages of application and prior to completion of the curing process.
B. Remove masking. Perform detail cleaning at floor termination, to leave cleanable surface for subsequent work of other Sections.

END OF SECTION
PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Metal lockers and accessories in Locker Rooms in Building A.
   1. Include locker benches.

B. Related Sections:
   1. Section 012500 - Substitution Procedures.
   2. Section 013300 - Submittal Procedures.
   3. Section 018113 - Sustainable Design Requirements.

1.02 REFERENCES

A. ASTM International (ASTM):

B. California Code of Regulations (CCR):
   1. Title 24, Part 2 - California Building Code (CBC), 2013 edition:
      a. Chapter 11B - Accessibility to Public Buildings, Public Accommodations, Commercial Buildings, and Public Housing:
         1) Division 2 - Scoping Requirements.
            a) Section 11B-225 - Storage.
               (1) 11B-225.2 - Storage.
                  (a) 11B-225.2.1 - Lockers.
         2) Division 3 - Building Blocks.
            a) Section 11B-309 - Operable Parts.
               (1) 11B-309.4 - Operation.
         3) Division 8 - Special Rooms, Spaces and Elements:
            a) Section 11B-811 - Storage:
               (1) 11B-811.2 - Clear Floor or Ground Space.
               (2) 11B-811.3 - Height.
               (3) 11B-811.4 - Operable Parts.

C. United States Green Building Council (USGBC):
   1. Leadership in Energy and Environmental Design (LEED):
1.03 ADMINISTRATIVE REQUIREMENTS
   A. Coordination: Refer to Section 018113 regarding procedures for implementing sustainable design requirements.

1.04 SUBMITTALS
   A. Product Data: Submit complete manufacturer's descriptive literature, materials list, and specifications in accordance with the provisions of Section 013300.
   B. Shop Drawings: In accordance with the provisions of Section 013300, submit Shop Drawings comprehensively describing the fabrication and installation of lockers.
   C. Samples: In accordance with the provisions of Section 013300, submit the manufacturer's standard palettes, for the selection of metal finish and color.

1.05 SUSTAINABLE DESIGN SUBMITTALS
   A. Material & Resources Submittals:
      1. Letter Template for MR Credit 2: Letter template, signed by Contractor, tabulating total waste material, quantities diverted and means by which it is diverted, and statement that requirements for the credit have been met.
         a. Comply with Section 017419 Construction Waste Management and Disposal.
      2. Product Data and Certification Letter for MR Credit 4: Indicate percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.
      3. Product Data for MR Credit 5: For regional materials indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include statement indicating cost for each regional material and the fraction by weight that is considered regional.

1.06 CLOSEOUT SUBMITTALS
   A. Operation and Maintenance Data:
      1. Submit operating and maintenance data.
         a. Keys: Upon completion of the installation, deliver locker keys and lock combinations to the Owner's representative.
   B. Warranty Documentation: Submit copies of written warranty, as signed by the installer, agreeing to repair or replace defective work during the warranty period.

1.07 DELIVERY, STORAGE, AND HANDLING
   A. Do not schedule delivery of metal lockers to Project until building is fully enclosed.
1.08 FIELD CONDITIONS

   A. Field Dimensions: Verify relevant dimensions in field prior to preparation of Shop Drawings.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

   A. Acceptable Manufacturers:
      3. Lyons Workspace Products, Inc., Aurora, IL (630)892-8941, (800)323-0082.

   B. Like materials shall be the products of one manufacturer and shall be either the ones upon which the design is based or equal products of other manufacturers accepted in advance in accordance with Section 012500.

2.02 REGULATORY REQUIREMENTS

   A. Regulations: Comply with CBC Section 11B-811 relating to location, height, operating parts, and quantity of lockers for persons with disabilities.
      1. A minimum of five percent of total lockers shall be accessible lockers.

2.03 SUSTAINABILITY REQUIREMENTS

   A. LEED Goals for Materials & Resources: For additional information on LEED goal requirements, refer to Section 018113.
      1. MR Credit 2 - Construction Waste Management: Divert 75 percent of construction waste from landfill in accordance with County requirements and to achieve LEED certification point as defined by the U.S. Green Building Council.
         a. Note that excavated soils and land-clearing debris (organic material) does not count toward construction waste credits, but all material shall be disposed of responsibly.
      2. MR Credit 4 - Recycled Content: Use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer content constitutes 10 percent of the total value of the materials in the project.
      3. MR Credit 5 - Regional Materials: Use building materials or products that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of the project site for a minimum of 10 percent of the total materials value.

2.04 MATERIALS

   A. Sheet Steel: Cold-rolled and leveled sheet steel for doors and door frames. Mild rolled steel for other parts. Steel shall be free from buckle,
2.05 LOCKER COMPONENTS

A. Lockers *Type L-2*: Design is based on Marquis Champion All-Welded Fully-Framed Athletic Lockers, manufactured by List Industries, or equal. Provide free-standing single-tier and double-tier type standard metal lockers in sizes indicated on the Contract Drawings. Total height shall be as indicated on the Contract Drawings and mounted on concrete base. 

1. Types:
   a. Accessible General Lockers: Double tier 15 inches wide by 15 inches deep by 60 inches high mounted on concrete curb.

2. Body Construction: Design-basis manufacturer's fully-framed all-welded Hollow-T construction, 13 gage 1/2" fully-framed flattened expanded metal sides, 16 gage continuous top, 18 gage solid back, and 16 gage galvannealed bottom.

3. Tops, Bottoms, and Shelves: Minimum 16 gage steel, flanged edges. Provide two shelves with rolled front approximately 9 inches on centers below locker top.


5. Closed Base: Where supported on metal legs, provide matching sheet metal continuous recessed closed base anchored to floor and secured to locker.


B. Doors: One-piece, minimum 14 gage diamond perforated sheet steel, flanged at edges with a full height 3-inch wide 18 gage door stiffener. Construct doors to prevent springing when opening or closing.

1. Provide design-basis manufacturer's Security-Plus side-hinged door styles as indicated on the Contract Drawings.

2. Provide stamped louvered vents in door faces, as follows:
   a. Double-tier Lockers: Not less than two louver openings top and bottom.

3. Hinges: Heavy-duty, not less than 13 gage thick, 7-knuckle 3-1/2-inch tight pin steel hinges. Weld hinges to inside of frame and secure to door with not less than two factory-installed fasteners, completely concealed and tamperproof when locker door is closed. Provide at least three hinges for each door 42 inches high and over.

4. Latching: Provide latch and locking hardware that does not require twisting, pinching, or grasping to operate, in accordance with CBC 11B-309.4 - Operable Parts.
   a. Provide single-point, maintenance-free quiet latching with 11 gage MIG welded latch with pry-resistant lug.
   b. Positive, automatic, pre-locking, pry-resistant, quiet-type latch and pull with rubber silencers.
5. Handle: Deep-drawn heavy-duty, vandalproof and kick-proof single-point seamless stainless steel recessed handle containing strike and hole for padlock.
   a. Provide three-point latching for single-tier lockers.

C. Trim: 16 gage baked enamel finish. Provide necessary closures, fillers, and other trim members as required for a complete installation.

D. Fasteners: Cadmium, zinc, or nickel plated steel. Exposed bolt heads, slotless type. Provide self-locking nuts or lock washers for nuts on moving parts, or otherwise prevent loosening of nuts. Do not expose bolts or rivet heads on fronts of lockers or frames.

E. Equipment: Furnish hooks and hang rods of cadmium-plated steel or cast aluminum.

2.06 LOCKER ACCESSORIES

A. Handles: Manufacturer's standard chrome plated handle.
   1. At lockers designated as accessible provide stainless steel ADA compliant latching hardware that does not require twisting, pinching, or grasping to operate, in accordance with CBC 11B-309.4 - Operable Parts.

2. Locker doors shall have a seamless drawn, ANSI Type 304 stainless steel recessed handle, shaped to receive a padlock. Recess pan shall be deep enough for the lock to be completely flush with the outer door face. Pull handle shall be drawn into the left side of the handle for easy opening of the locker door.
   a. No lock shall be located more than 67 inches above the finished floor.
   b. The lock at accessible lockers shall be located at 48 inches above the finished floor.

B. Equipment: Furnish each locker with the following accessories, unless otherwise shown.
   1. Number Plates: Manufacturer's standard etched, embossed, or stamped, non-ferrous 1-inch high metal number plates with numerals not less than 3/8-inch high. Number the lockers in sequence as directed by the Architect.
      a. Attach plates to each locker door above handle, with at least two fasteners of the same finish as number plate.

2. Hooks: Steel with ball points attach with two bolts. Provide the following:
   a. Full height lockers 12 inches wide and wider: One double-prong ceiling hook and three single-prong wall hooks.

   a. Provide ADA compliant shelf and pole at 48 inches maximum above finish floor, and lower shelf at 15 inches minimum above finish floor.
C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of ASTM A 176 AISI Type 304 stainless steel, satin finish to match hardware.
   1. Use one-way type theft-resistant heads and nuts for exposed anchorages.
   2. For concealed anchors use hot-dip galvanized cadmium-plated, or other rust-resistant protective-coated steel.

D. Benches: 9-1/2 inches wide by 1-1/4 inches thick clear lacquered natural finished hardwood.
   1. Lengths shall be as indicated on Contract Drawings. Provide single pieces up to 12-foot long and equal length pieces over 12 feet.
   2. Provide rounded corners, eased edges, and sand all surfaces smooth.
   3. Mount on manufacturer's heavy duty steel pedestals finished to match lockers. Space pedestals 6 feet on centers maximum.

2.07 FABRICATION

A. Construction: Fabricate lockers square, rigid, and without warp, with metal faced flat and free of dents or distortion. Grind all exposed metal edges safe to the touch. Weld frames together. Weld or bolt other joints and connections as standard with manufacturer. Grind exposed welds flush.
   1. Lockers shall be factory-assembled of MIG welded construction, in multiple column units to meet project conditions. Assembly of locker bodies by means of bolts, screws, or rivets will not be permitted. Welding of knockdown locker construction is not acceptable.
   2. Frame and Vertical Side Panels: 13 gage 1/2-inch flattened expanded metal framed by 16 gage Hollow T tubular sections and channel frame members designed to enclose all four edges of the side panel with the entire assembly, MIG welded to form a rigid frame for each locker. The channel frame members shall be welded to the front and rear vertical frame members to create an anchor bearing surface of 1-1/4 inches wide by the depth of the locker at each side panel.
   3. Integral Frame Locker Base: 14 gage formed structural channels shall be MIG welded to the front and rear vertical side panel frame members to allow placement of locker bottom a minimum 2-3/4 inches above floor level. Locker bottom shelf located less than 2 inches above floor level will not be acceptable.
   4. Doors: Outer door shall be fabricated from single sheet prime 14 gage with single bends at top and bottom and double bends at the sides with a 3-inch wide 18 gage full height channel door stiffener MIG welded to the hinge side of the door as well as to the top and bottom door return bends, and spot welded to the inside of door face to form a rigid torque-free box reinforcement for the door. Doors shall be right hand side-hinged. Wardrobe doors 20 inches high and over shall be perforated with 5/8-inch x 1-1/2-inch diamonds. Gym doors 18 inches high and under shall be perforated with 7/16-inch x 15/16-inch diamonds. Fabricate doors shall swing 180 degrees.
   5. Hinges: Hinges shall not be less than 3-1/2 inches long 13 gage seven knuckle pin type, securely riveted to frame and welded to the
door. Secured doors to frame with a minimum of two tamper resistant rivets per hinge. Provide three hinges for doors 48" and higher and two hinges for doors shorter than 48 inches.

6. Latch Assembly: Single-point rigid non-moving positive latch by means of a heavy gage 11 gage minimum latch securely welded to the framed vertical divider. Latch assembly must be made of a single piece of steel and have a padlock loop that inserts through the recess pan. Latch must be able to accept either a padlock or built-in combination lock. Rubber bumpers shall be securely riveted to the door strike.

B. Finishing: Chemically pretreat metal with degreasing and phosphatizing process. Apply baked-on enamel finish to all surfaces, exposed and concealed, except plates and non-ferrous metal.

1. Flat Tops: Formed of one-piece 16 gage cold rolled sheet steel, be an integral part MIG welded to each vertical side panel frame member, and be continuous to cover the full width of a multiple framed locker unit.

2. Hat Shelves, Intermediate Shelves, and Bottoms: 16 gage galvannealed sheet steel, have double bends at front and shall engage slots in the Hollow T vertical frame members at all four corners and be securely welded to the frame and side.

3. Backs: 18 gage cold rolled sheet steel, be continuous to cover a multiple framed unit and be welded to each vertical side panel frame member.

4. Locker parts shall be cleaned and coated after fabrication with a seven-stage zinc/iron phosphate solution to inhibit corrosion, followed by a coat of high grade custom blended powder electrostatically sprayed and baked at 350 degrees Fahrenheit for a minimum of 20 minutes to provide a tough durable finish.

C. Color: Provide locker units in colors as selected by Architect from manufacturer's standard color palette.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that bases are level with sufficient backing to fasten lockers at bottom.

3.02 INSTALLATION

A. Install metal lockers at the locations shown in accordance with the manufacturer's instructions for a plumb, level, rigid, and flush installation.

B. Space fastenings approximately 12 inches on centers, or at each tier minimum, and apply through back-up reinforcing plates where necessary to prevent metal distortion. Conceal fasteners wherever possible. Install fasteners in pre-drilled holes and confirm that all are pulled up tight.

C. Install trim, sloping tops, fillers, and cover panels where required. Provide flush hairline joint against adjacent surfaces.

D. Fasten pedestals securely to floor with lead expansion shields and non-ferrous bolts finished to match pedestal.
E. Provide ADA compliant lockers where indicated on Contract Drawings.
   1. Equip with ADA compliant lever handles.
   2. A decal with the international symbol of accessibility shall be applied to the face of the accessible locker doors.

3.03 ADJUSTING

A. Adjust doors and latches to operate easily without binding. Verify satisfactory operation of integral locking devices.

B. Touch-up marred finishes, or replace if not acceptable to the Architect. Use only materials and finishes as recommended or furnished by the locker manufacturer.

END OF SECTION
- SECTION 105126 -

SOLID PLASTIC LOCKERS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Solid plastic lockers at Break Room in Building B.

B. Related Sections:
   1. Section 012500 - Substitution Procedures.
   2. Section 013300 - Submittal Procedures.
   3. Section 018113 - Sustainable Design Requirements.

1.02 REFERENCES

A. ASTM International (ASTM):
   3. D 635-10 - Test Method for Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position.

B. California Code of Regulations (CCR):
   1. Title 24, Part 2- California Building Code (CBC), 2013 edition:
      a. Chapter 11B - Accessibility to Public Buildings, Public Accommodations, Commercial Buildings, and Public Housing:
         1) Division 2 - Scoping Requirements.
            a) Section 11B-225 - Storage.
               (1) 11B-225.2 - Storage.
                  (a) 11B-225.2.1 - Lockers.
         2) Division 3 - Building Blocks.
            a) Section 11B-309 - Operable Parts.
               (1) 11B-309.4 - Operation.
         3) Division 8 - Special Rooms, Spaces and Elements:
            a) Section 11B-811 - Storage:
               (1) 11B-811.2 - Clear Floor or Ground Space.
               (2) 11B-811.3 - Height.
               (3) 11B-811.4 - Operable Parts.
C. United States Green Building Council (USGBC):
   1. Leadership in Energy and Environmental Design (LEED):

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Refer to Section 018113 regarding procedures for implementing sustainable design requirements.

1.04 SUBMITTALS

A. Product Data: Submit complete manufacturer's descriptive literature and specifications in accordance with the provisions of Section 013300.
   1. Materials List: Submit complete lists of materials proposed for use, giving the manufacturer's name, catalog number, and catalog cut for each item where applicable.

B. Shop Drawings: In accordance with the provisions of Section 013300, submit Shop Drawings comprehensively describing the individual locker construction, overall dimensions, and installation of lockers. Show anchorage and accessory items.
   1. Submit setting drawings, templates, and instructions for the installation of anchorage devices built into other work.
   2. Indicate field measurements on Shop Drawings.

C. Samples: In accordance with Section 013300, submit sample of partition material, hardware, and manufacturer's standard color palette for selection of colors.

D. Quality Control Submittals:
   1. Test Reports: Submit certified laboratory test reports confirming physical characteristics of materials used in the performance of the work of this Section.
   2. Certification: Submit certification showing independent test calculations that compartments comply with ASTM E 84 to Class B requirements.

1.05 SUSTAINABLE DESIGN SUBMITTALS

A. Material & Resources Submittals: Refer to Section 018113 for additional information on LEED submittals.
   1. Product Data and Certification Letter for MR Credit 4: Indicate percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.
   2. Product Data for MR Credit 5: For regional materials indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include statement indicating cost for each regional material and the fraction by weight that is considered regional.
1.06 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data:
   1. Submit operating and maintenance data.
      a. Keys: Upon completion of the installation, deliver locker keys
         and lock combinations to the Owner’s representative.

B. Warranty Documentation:
   1. Submit copies of written warranty, as signed by the installer, agreeing to repair or replace defective work during the warranty period.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Do not schedule delivery of metal lockers to Project until building is fully enclosed.

B. Storage and Protection: Use all means necessary to protect the materials of this Section before, during, and after installation. Locker components shall be stored flat until assembly. Finishes shall be protected from soiling and damage during handling.

1.08 FIELD CONDITIONS

A. Field Measurements: Prepare required Shop Drawings based on field measurements taken specifically for the work of this Section.

1.09 WARRANTY

A. Provide manufacturer's standard 20-year warranty for HDPE plastic panels, doors, dividers, and shelves against rust and other types of corrosion, delamination, or breakage under normal use.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers:

B. Like materials shall be the products of one manufacturer and shall be either the ones upon which the design is based or equal products of other manufacturers accepted in advance in accordance with Section 012500.

2.02 REGULATORY REQUIREMENTS

A. Regulatory Requirements:
   1. Comply with applicable codes and regulations of governmental agencies having jurisdiction.
      a. Comply with CBC Section 803.1 for flame spread and smoke developed classifications based on building based on location and group classification.
2. Comply with CBC Section 11B-811 relating to quantity and locations, height, operating parts, and quantity of lockers for persons with disabilities.
   a. Five percent of total lockers shall be accessible lockers.

B. Solid Plastic Material: High density polyethylene (HDPE) containing a minimum of 10 percent recycled resin, manufactured under high pressure forming a single component section that is waterproof, impact resistant, non-absorbent, and having with homogeneous color throughout.
   1. Comply with required fire codes for this Project when tested in accordance with ASTM E 84, ASTM D 635 and ASTM D 1929.
   2. HDPE components shall have a smooth orange peel finish. Locker doors and door frames shall be of the same color and selected by Architect from manufacturer’s full color palette.

2.03 SUSTAINABILITY REQUIREMENTS

A. LEED Goals for Materials & Resources: For additional information on LEED goal requirements, refer to Section 018113.
   1. MR Credit 4 - Recycled Content: Use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer content constitutes 10 percent of the total value of the materials in the project.
   2. MR Credit 5 - Regional Materials: Use building materials or products that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of the project site for a minimum of 10 percent of the total materials value.

2.04 COMPONENTS

A. Locker Types L-3: Design is based on the use of free-standing five-tier and type standard HDPE plastic lockers—equal to Model Lenox locker cubby manufactured by Bradley Corporation, or equal.
   1. Size: As indicated on Contract Drawings.
   2. Total locker height shall be 72 inches, mounted on closed base 4 inches high.
   3. Provide sloping top.
   4. Color and pattern as selected by Architect.

B. Doors and Frames: 1/2-inch thick HDPE.

C. Sides, Tops, Bottoms, Backs, Base, and Shelves: 3/8-inch thick with homogenous natural color throughout. Components shall have machined edges to accept assembly brackets. Outside, insides, tops, bottoms, backs, dividers, and shelves shall be natural in color.

D. Hinges: Extruded aluminum with powder coating to match the locker door and frame. Door hinge shall be full length assembled onto the door and front.
E. Door Hardware:
   1. Latch: HDPE plastic capable of accepting various locking mechanisms. Latch shall be securely fastened to the entire length of the door, providing a continuous latch.
      a. Positive, automatic, pre-locking, Pry-resistant, quiet-type latch and pull with rubber silencers.
      b. Provide two-point latching for double-tier lockers.
   2. Handles: Manufacturer's standard chrome plated handle.
      a. Provide hole in handle for user's padlock.
      b. At lockers designated as accessible, provide ADA compliant latching hardware that does not require twisting, pinching, or grasping to operate, in accordance with CBC 11B-309.4 - Operable Parts.

   1. Keypad operated electronic locks shall have the following operating functionality:
      a. The lockset shall be operable by a user selected four-digit user code, an electronic ADA-compliant User Key or an electronic Manager Bypass Key. Entry of a valid user code or user key shall lock the lockset by throwing its' deadbolt. Entry of the same user code/user key that it was locked with shall unlock the lockset by retracting its deadbolt allowing the opening of the door by pulling the lockset's optional pull handle or other handles provided by the locker vendor. The lockset shall remain unlocked until another user code/user key is entered to lock the lockset. In case the user code is forgotten, entry of the electronic bypass key or programming key shall unlock the lockset. In case of battery failure, entry of the electronic bypass key or programming key shall provide external power to the lock to unlock the lockset. The lockset shall automatically lockout for one minute after three consecutive entries of invalid operating codes/keys. The lockset shall contain an LED for visual feedback as well as a buzzer for audio feedback. When locked, the LED shall emit a flashing red light to indicate use. The buzzer shall emit an audio feedback in the case of each keypad stroke, entry of valid/invalid code, low battery and binding. Upon locking the lockset shall contain a programmable feature to automatically unlock after a pre-selected number of hours up to an 8-hour maximum. The electronic Manager Bypass Keys shall be registered to the lock with an electronic Programming Key that is unique to the lock/system. The lockset shall not require the user to insert cards or other peripherals to operate.
      b. The lockset shall be battery operated. The batteries shall be included with the lockset. The lockset shall work stand-alone with no wiring required from a lockset to another or to a central processor. The batteries shall last a minimum of 3 years based on 10 operations per day.
      c. Housing and dead bolt shall be made of metal and contain a keypad with the buttons. Lockset shall consist of two modules.
with the front module containing the keypad and the rear module containing the dead bolt.

d. Front and rear modules shall contain a built-in connector capable of mating when the modules are installed on the door.

e. The locksets front module containing the keypad shall not be larger than 2.14 inches wide x 3.85 inches high with a receptacle for the management bypass key.


2. Handles: ADA compliant latching hardware that does not require twisting, pinching, or grasping to operate, in accordance with CBC 11B-309.4 - Operable Parts.

   a. Door pull handle shall not be a separate component from the lockset's front module. The pull handle shall be a permanently affixed handle built as part of the lockset's front module.

3. Electronic Keys:

   a. Furnish ADA User Keys equal to 150 percent of number of lockers installed.

   b. Furnish ten Manager Bypass Keys.

   c. Furnish two Programming Keys.

4. Software: Provide hardware and software management system required by Owner's personnel to operate and maintain system.

G. Accessories: Furnish each locker with the following field mounting accessories, unless otherwise indicated on Contract Drawings.

1. Number Plates: Manufacturer's standard etched, embossed, or stamped, non-ferrous 1-inch high metal number plates with numerals not less than 3/8-inch high. Number the lockers in sequence as directed by the Architect.

   a. Attach plates to each locker door above handle, with at least two fasteners of the same finish as number plate.

H. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of ASTM A 240 AISI Type 304 stainless steel, satin finish to match hardware.

   1. Use one way type theft-resistant heads and nuts for exposed anchorages.

   2. For concealed anchors use hot-dip galvanized cadmium-plated, or other rust-resistant protective-coated steel.

2.05 FABRICATION

A. Provide components fabricated, finished, and prepared to receive accessories and hardware in the factory. Deliver components ready for assembly and installation.

   1. Field fabrication, including preparation for accessories, will not be permitted.

   2. Locker components shall snap together in a group of no more than five adjacent lockers. Adjacent lockers shall share a common side panel.

   3. Finish exposed surfaces free of saw marks with edges machined to 1/4-inch radius.

   4. Bevel corners and edges of cutouts.
B. Trim: HDPE plastic material to match lockers. Provide necessary closures, fillers, and other trim members as required for a complete installation. Provide one piece filler units, free of overlapped joints.

C. Heat Sink: Fasten a continuous 1-inch aluminum strip to bottom of doors and panels.

D. Color: As selected by Architect.

**PART 3 - EXECUTION**

**3.01 EXAMINATION**

A. Inspect the areas and conditions under which lockers are to be installed. Verify correct spacing between fixed walls. Do not proceed with the work until unsatisfactory conditions have been corrected.

1. Verify that solid blocking or metal backing plates have been furnished and installed under other Sections for anchorage of lockers to walls.

**3.02 INSTALLATION**

A. Lockers:

1. Erect compartments rigid, straight, plumb and level, and in accordance with manufacturer’s printed instructions.
2. No mounting brackets shall be exposed on the exterior surfaces of doors.
3. Anchor locker units to wall studs through the locker back and to the floor using 1-1/2-inch pan head screws. Furring shall be installed between lockers and wall of installation.
4. Install trim, sloping tops, fillers, and cover panels where required. Provide flush hairline joint against adjacent surfaces, using concealed bolts. Align trim with flush with face of locker.

B. Provide ADA compliant lockers in lower tiers of two-tier installations and where indicated on Contract Drawings. Affix the international accessibility symbol to face of locker.

1. Equip with ADA compliant lever handles.

C. Erection Tolerances:

1. Maximum variation from true position shall be 1/4-inch.
2. Clearance at vertical edges of doors shall be uniform top to bottom and shall not exceed 1/8-inch.
3. Maximum variation from plumb shall be 1/8-inch.

**3.03 ADJUSTING**

A. Perform final adjustments to door hardware, and other operating parts of the locker assembly just prior to final inspection.

**3.04 CLEANING**

A. Clean exposed surfaces of lockers, hardware, fittings, and accessories.
B. Clean exposed surfaces of panels, hardware, fittings, and accessories. Touch up minor scratches and other finish imperfections using materials and methods recommended by the partition manufacturer.
   1. Replace units that have been scratched or damaged. Field touch-up will not be permitted.
   2. Remove identification and assembly stickers and remove residue left by gummed labels.

3.05 CLOSEOUT ACTIVITIES

A. Demonstration and Training: Engage a factory-authorized service representative to train owner's maintenance personnel to program, operate, and maintain digital locksets for lockers.

3.06 PROTECTION

A. Protect units so that there will be no indication of use or damage at the time of acceptance.

END OF SECTION
SECTION 23 05 16

EXPANSION FITTINGS AND LOOPS FOR HVAC PIPING

PART 1  GENERAL

1.01  SECTION INCLUDES

   A. Flexible pipe connectors.
   B. Expansion joints and compensators.
   C. Pipe loops, offsets, and swing joints.

1.02  RELATED REQUIREMENTS

   A. Section 23 21 13 - Hydronic Piping.
   Section 23 23 00 - Refrigerant Piping

1.03  REFERENCE STANDARDS

   B. EJMA (STDS) - EJMA Standards; Tenth Edition.

1.04  SUBMITTALS

   A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
   B. Product Data:  Indicate maximum temperature and pressure rating, face-to-face length, live length, hose wall thickness, hose convolutions per foot (meter) and per assembly, fundamental frequency of assembly, braid structure, and total number of wires in braid.
   C. Design Data:  Indicate selection calculations.
   D. Manufacturer's Instructions:  Indicate manufacturer's installation instructions, special procedures, and external controls.
   E. Maintenance Data:  Include adjustment instructions.
   F. Project Record Documents:  Record installed locations of flexible pipe connectors, expansion joints, anchors, and guides.

PART 2  PRODUCTS

2.01  FLEXIBLE PIPE CONNECTORS - STEEL PIPING

   A. Inner Hose:  Bronze.
   C. Pressure Rating:  125 psi and 450 degrees F (862 kPa and 232 degrees C).
D. Joint: Flanged.
E. Size: Use pipe sized units.
F. Maximum offset: 3/4 inch (20 mm) on each side of installed center line.

2.02 FLEXIBLE PIPE CONNECTORS - COPPER PIPING
A. Inner Hose: Bronze.
B. Exterior Sleeve: Braided bronze.
C. Pressure Rating: 125 psi and 450 degrees F (862 kPa and 232 degrees C).
D. Joint: Flanged.
E. Size: Use pipe sized units.
F. Maximum offset: 3/4 inch (20 mm) on each side of installed center line.
G. Application: Copper piping.

2.03 EXPANSION JOINTS - SINGLE SPHERE, FLEXIBLE COMPENSATOR
A. Body: Teflon.
B. Pressure Rating, Sizes 3/4 Inch to 2 Inch (20 mm to 50 mm): 150 psi and 210 degrees F (1040 kPa and 99 degrees C).
C. Pressure Rating, Sizes 1-1/2 Inch to 12 Inch (32 mm to 300 mm): 150 psi and 250 degrees F (1040 kPa and 121 degrees C).
D. Pressure Rating, Sizes 14 Inch to 24 Inch (350 mm to 600 mm): 105 psi and 250 degrees F (725 kPa and 121 degrees C).
E. Maximum Compression: 1/2 inch (13 mm).
F. Maximum Elongation: 3/8 inch (10 mm).
G. Maximum Offset: 3/8 inch (10 mm).
H. Maximum Angular Movement: 15 degrees.
I. Joint: Tapped steel flanges.
J. Size: Use pipe sized units.
K. Accessories: Control rods.
L. Application: Steel piping 2 inches (50 mm) and over.

PART 3 EXECUTION

3.01 INSTALLATION
A. Install in accordance with manufacturer's instructions.
B. Install in accordance with EJMA (Expansion Joint Manufacturers Association) Standards.
C. Install flexible pipe connectors on pipes connected to vibration isolated equipment. Provide line size flexible connectors.
D. Install flexible connectors at right angles to displacement. Install one end immediately adjacent to isolated equipment and anchor other end. Install in horizontal plane unless indicated otherwise.
E. Anchor pipe to building structure where indicated. Provide pipe guides so movement is directed along axis of pipe only. Erect piping such that strain and weight is not on cast connections or apparatus.
F. Provide support and equipment required to control expansion and contraction of piping. Provide loops, pipe offsets, and swing joints, or expansion joints where required.

END OF SECTION 23 05 16
SECTION 23 07 19

HVAC PIPING INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Piping insulation.
B. Jackets and accessories.

1.02 RELATED REQUIREMENTS

Section 01 61 16 – Volatile Organic Compound Restriction

A. Section 07 84 00 - Firestopping.
B. Section 23 21 13 - Hydronic Piping: Placement of hangers and hanger inserts.

Section 23 23 00 — Refrigerant Piping

1.03 REFERENCE STANDARDS

A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
1.04 SUBMITTALS
   A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
   B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.
   C. Manufacturer's Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

1.05 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING
   A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

1.07 FIELD CONDITIONS
   A. Maintain ambient conditions required by manufacturers of each product.
   B. Maintain temperature before, during, and after installation for minimum of 24 hours.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS
   A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.02 GLASS FIBER
   A. Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible.
      1. 'K' ('Ksi') Value: ASTM C177, 0.24 at 75 degrees F (0.035 at 24 degrees C).
      3. Maximum Moisture Absorption: 0.2 percent by volume.
   B. Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible, with wicking material to transport condensed water to the outside of the system for evaporation to the atmosphere.
      1. 'K' ('Ksi') Value: ASTM C177, 0.23 at 75 degrees F (0.034 at 24 degrees C).
      3. Maximum Moisture Absorption: 0.2 percent by volume.
   C. Insulation: ASTM C547 and ASTM C795; semi-rigid, noncombustible, end grain adhered to jacket.
      1. Maximum Service Temperature: 650 degrees F (343 degrees C).
      2. Maximum Moisture Absorption: 0.2 percent by volume.
   D. Vapor Barrier Jacket: White kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches (0.029 ng/Pa s m).
   E. Tie Wire: 0.048 inch (1.22 mm) stainless steel with twisted ends on maximum 12 inch (300 mm) centers.
2.03 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

A. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 3; use molded tubular material wherever possible.
   1. Minimum Service Temperature: Minus 40 degrees F (Minus 40 degrees C).

B. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.

2.04 JACKETS

A. PVC Plastic.
   1. Jacket: One piece molded type fitting covers and sheet material, off-white color.
      a. Minimum Service Temperature: 0 degrees F (minus 18 degrees C).
      b. Maximum Service Temperature: 150 degrees F (66 degrees C).
      c. Moisture Vapor Permeability: 0.002 perm inch (0.0029 ng/Pa s m), maximum, when tested in accordance with ASTM E96/E96M.
      d. Thickness: 10 mil (0.25 mm).
      e. Connections: Brush on welding adhesive.
   2. Covering Adhesive Mastic: Compatible with insulation.

B. Stainless Steel Jacket: ASTM A666, Type 304 stainless steel.
   1. Thickness: 0.010 inch (0.25 mm).
   2. Finish: Smooth.
   3. Metal Jacket Bands: 3/8 inch (10 mm) wide; 0.010 inch (0.25 mm) thick stainless steel.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that piping has been tested before applying insulation materials.
B. Verify that surfaces are clean and dry, with foreign material removed.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.
B. Install in accordance with NAIMA National Insulation Standards.
C. Exposed Piping: Locate insulation and cover seams in least visible locations.
D. Insulated pipes conveying fluids below ambient temperature; insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.
E. Glass fiber insulated pipes conveying fluids below ambient temperature:
   1. Provide vapor barrier jackets, factory-applied or field-applied; secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
   2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.
F. For hot piping conveying fluids 140 degrees F (60 degrees C) or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.

G. For hot piping conveying fluids over 140 degrees F (60 degrees C), insulate flanges and unions at equipment.

H. Glass fiber insulated pipes conveying fluids above ambient temperature.
   1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples.
   2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.

I. Inserts and Shields:
   1. Application: Piping 1-1/2 inches (40 mm) diameter or larger.
   2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
   3. Insert location: Between support shield and piping and under the finish jacket.
   4. Insert Configuration: Minimum 6 inches (150 mm) long, of same thickness and contour as adjoining insulation; may be factory fabricated.
   5. Insert Material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.

J. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, refer to Section 07 84 00.

K. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces (less than 10 feet (3 meters) above finished floor): Finish with PVC jacket and fitting covers.

L. Exterior Applications: Provide vapor barrier jacket. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe, and finish with glass mesh reinforced vapor barrier cement. Cover with aluminum jacket with seams located on bottom side of horizontal piping. Provide two coats of UV resistant finish for flexible elastomeric cellular insulation without jacketing.

END OF SECTION 23 07 19
SECTION 23 09 13

INSTRUMENTATION AND CONTROL DEVICES FOR HVAC

PART 1  GENERAL

1.01  SECTION INCLUDES

A. Air supply system.
B. Thermostats.
C. Control valves.
D. Automatic dampers.
E. Damper operators.

1.02  RELATED REQUIREMENTS

Section 22 05 129—Meters and Gages for Plumbing Piping

A. Section 22 05 48 - Vibration and Seismic Controls for Plumbing Piping and Equipment.
B. Section 23 05 19 - Meters and Gages for HVAC Piping: Thermometer sockets, gage taps.
C. Section 23 05 48 - Vibration and Seismic Controls for HVAC Piping and Equipment.
D. Section 23 09 23 - Direct-Digital Control System for HVAC.
E. Section 26 27 17 - Equipment Wiring: Electrical characteristics and wiring connections.

1.03  REFERENCE STANDARDS

B. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2013.
E. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2013.
H. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
I.  NEMA DC 3 - Residential Controls - Electrical Wall-Mounted Room Thermostats; 2013.

1.04  ADMINISTRATIVE REQUIREMENTS

A.  Preinstallation Meeting:  Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

B.  Sequencing:  Ensure that utility connections are achieved in an orderly and expeditious manner.

1.05  SUBMITTALS

A.  See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B.  Product Data:  Provide description and engineering data for each control system component.  Include sizing as requested.  Provide data for each system component and software module.

C.  Shop Drawings:  Indicate complete operating data, system drawings, wiring diagrams, and written detailed operational description of sequences.  Submit schedule of valves indicating size, flow, and pressure drop for each valve.  For automatic dampers indicate arrangement, velocities, and static pressure drops for each system.

D.  Samples:  Submit two of each type of room thermostat and cover.

E.  Design Data:  Provide design data for sizing and selection of compressor.

F.  Manufacturer's Instructions:  Provide for all manufactured components.

G.  Operation and Maintenance Data:  Include inspection period, cleaning methods, recommended cleaning materials, and calibration tolerances.

H.  Project Record Documents:  Record actual locations of control components, including panels, thermostats, and sensors.  Accurately record actual location of control components, including panels, thermostats, and sensors.

1.06  QUALITY ASSURANCE

A.  Designer Qualifications:  Design system under direct supervision of a Professional Engineer experienced in design of this work and licensed at the State in which the Project is located.

B.  Manufacturer Qualifications:  Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

C.  Installer Qualifications:  Company specializing in performing the work of this section with minimum 10 years experience approved by manufacturer.

D.  Products Requiring Electrical Connection:  Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

1.07  WARRANTY

A.  See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
PART 2 PRODUCTS

2.01 EQUIPMENT - GENERAL

A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

2.02 CONTROL PANELS

A. Unitized cabinet type for each system under automatic control with relays and controls mounted in cabinet and temperature indicators, pressure gauges, pilot lights, push buttons and switches flush on cabinet panel face.

B. NEMA 250, general purpose utility enclosures with enamelled finished face panel.

C. Provide common keying for all panels.

2.03 CONTROL VALVES

A. Globe Pattern:
   1. Over 2 inches (50 mm): Iron body, bronze trim, rising stem, plug-type disc, flanged ends, renewable seat and disc.
   2. Hydronic Systems:
      a. Rate for service pressure of 125 psig at 250 degrees F (860 kPa at 121 degrees C).
      b. Replaceable plugs and seats of stainless steel.
      c. Size for 3 psig (20 kPa) maximum pressure drop at design flow rate.
      d. Two way valves shall have equal percentage characteristics, three way valves linear characteristics. Size two way valve operators to close valves against pump shut off head.

B. Electronic Operators:
   1. Valves shall spring return to normal position as indicated on freeze, fire, or temperature protection.
   2. Select operator for full shut off at maximum pump differential pressure.

2.04 DAMPERS

A. Performance: Test in accordance with AMCA 500-D.

B. Frames: Galvanized steel, welded or riveted with corner reinforcement, minimum 12 gage, 0.1046 inch (2.66 mm).

C. Blades: Galvanized steel, maximum blade size 8 inches (200 mm) wide, 48 inches (1200 mm) long, minimum 22 gage, 0.0299 inch (0.76 mm), attached to minimum 1/2 inch (13 mm) shafts with set screws.

D. Blade Seals: Synthetic elastomeric inflatable mechanically attached, field replaceable.

E. Jamb Seals: Spring stainless steel.

2.05 DAMPER OPERATORS

A. General: Provide smooth proportional control with sufficient power for air velocities 20 percent greater than maximum design velocity and to provide tight seal against maximum system pressures. Provide spring return for two position control and for fail safe operation.
B. Electric Operators:
   1. Spring return, adjustable stroke motor having oil immersed gear train, with auxiliary end switch.

2.06 INPUT/OUTPUT SENSORS

A. Temperature Sensors:
   1. Construct RTD of nickel or platinum with base resistance of 1000 ohms at 70 degrees F (26 degrees C).
   2. 100 ohm platinum RTD is acceptable if used with project DDC controllers.
   3. Temperature sensing device must be compatible with project DDC controllers.
   4. Performance Characteristics:
      a. RTD:
         1) Room Sensor Accuracy: Plus/minus 0.50 degrees F (0.28 degrees C) minimum.
         2) Duct Averaging Accuracy: Plus/minus 0.50 degrees F (0.28 degrees C) minimum.
         3) All Other Accuracy: Plus/minus 0.75 degrees F (0.42 degrees C) minimum.
      b. Room Sensors: Locking cover matching the pneumatic thermostats used.
      c. Outside Air Sensors: Watertight inlet fitting shielded from direct rays of the sun.
      d. Immersion Temperature Sensors: A sensor encased in a corrosion-resistant probe with an indoor junction box service entry body.
      e. Ceiling and Recessed Mount Temperature Sensors: Ceiling-mounted sensor in a low-profile housing.
      f. Room Temperature Sensors:
      g. Room Temperature Sensors with Integral Digital Display:
         1) Construct for surface or wall box.
         2) Provide a four button keypad with the following capabilities:

2.07 THERMOSTATS

A. Electric Room Thermostats:
   1. Type: NEMA DC 3, 24 volts, with setback/setup temperature control.
   2. Service: Cooling only.
   3. Covers: Locking with set point adjustment, with thermometer.

B. Line Voltage Thermostats:
   1. Integral manual On/Off/Auto selector switch, single or two pole as required.
   2. Dead band: Maximum 2 degrees F (one degree C).
   3. Cover: Locking with set point adjustment, with thermometer.

C. Room Thermostat Accessories:

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.
B. Verify that systems are ready to receive work.
C. Beginning of installation means installer accepts existing conditions.
D. Sequence work to ensure installation of components is complementary to installation of similar components in other systems.

E. Coordinate installation of system components with installation of mechanical systems equipment such as air handling units and air terminal units.

F. Ensure installation of components is complementary to installation of similar components.

G. Coordinate installation of system components with installation of mechanical systems equipment such as air handling units and air terminal units.

### 3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Check and verify location of thermostats with plans and room details before installation. Locate 60 inches (1500 mm) above floor. Align with lighting switches and humistats. Refer to Section 26 27 26.

C. Mount freeze protection thermostats using flanges and element holders.

D. Mount outdoor reset thermostats and outdoor sensors indoors, with sensing elements outdoors with sun shield.

E. Provide valves with position indicators and with pilot positioners where sequenced with other controls.

F. Provide mixing dampers of opposed blade construction arranged to mix streams. Provide pilot positioners on mixed air damper motors. Provide separate minimum outside air damper section adjacent to return air dampers with separate damper motor.

G. Provide isolation (two position) dampers of parallel blade construction.

H. Install damper motors on outside of duct in warm areas. Do not install motors in locations at outdoor temperatures.

I. Mount control panels adjacent to associated equipment on vibration free walls or free standing angle iron supports. One cabinet may accommodate more than one system in same equipment room. Provide engraved plastic nameplates for instruments and controls inside cabinet and engraved plastic nameplates on cabinet face.

J. Provide conduit and electrical wiring in accordance with Section 26 27 17. Electrical material and installation shall be in accordance with appropriate requirements of Division 26.

END OF SECTION 23 09 13
SECTION 23 09 23

DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC

PART 1 GENERAL

1.01 SECTION INCLUDES

A. System description.
B. Operator interface.
C. Controllers.
D. Power supplies and line filtering.
E. System software.
F. Controller software.
G. HVAC control programs.

1.02 RELATED REQUIREMENTS

A. Section 23 09 13 - Instrumentation and Control Devices for HVAC.

B. Section 23 09 93 Sequence of Operations HVAC

C. Section 26 27 17 - Equipment Wiring: Electrical characteristics and wiring connections.

C. Section 28 31 00 - Fire Detection and Alarm.

1.03 REFERENCE STANDARDS


D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data for each system component and software module.
C. Shop Drawings:
   1. Indicate trunk cable schematic showing programmable control unit locations, and trunk data conductors.
   2. Indicate system graphics indicating monitored systems, data (connected and calculated) point addresses, and operator notations. Provide demonstration diskette containing graphics.
   3. Show system configuration with peripheral devices, batteries, power supplies, diagrams, modems, and interconnections.
   4. Indicate description and sequence of operation of operating, user, and application software.

D. Manufacturer's Instructions: Indicate manufacturer's installation instructions for all manufactured components.

E. Project Record Documents: Record actual locations of control components, including control units, thermostats, and sensors.

F. Operation and Maintenance Data:
   1. Include interconnection wiring diagrams complete field installed systems with identified and numbered, system components and devices.
   2. Include keyboard illustrations and step-by-step procedures indexed for each operator function.
   3. Include inspection period, cleaning methods, cleaning materials recommended, and calibration tolerances.

G. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

1.06 PROTECTION OF SOFTWARE RIGHTS

A. Prior to delivery of software, the Owner and the party providing the software will enter into a software license agreement with provisions for the following:
   1. Limiting use of software to equipment provided under these specifications.
   2. Limiting copying.
   3. Preserving confidentiality.
   4. Prohibiting transfer to a third party.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Andover Continuum by Scheider Electric Campus Standard No Exceptions.

2.02 SYSTEM DESCRIPTION

A. Automatic temperature control field monitoring and control system using field programmable micro-processor based units.

B. Base system on distributed system of fully intelligent, stand-alone controllers, operating in a multi-tasking, multi-user environment on token passing network, with central and remote hardware, software, and interconnecting wire and conduit.

C. Include computer software and hardware, operator input/output devices, control units, local area networks (LAN), sensors, control devices, actuators.
D. Controls for variable air volume terminals, radiation, reheat coils, unit heaters, fan coils, and the like when directly connected to the control units. Individual terminal unit control is specified in Section 23 09 13.

E. Provide control systems consisting of thermostats, control valves, dampers and operators, indicating devices, interface equipment and other apparatus and accessories required to operate mechanical systems, and to perform functions specified.

F. Include installation and calibration, supervision, adjustments, and fine tuning necessary for complete and fully operational system.

2.03 OPERATOR INTERFACE

A. PC Based Work Station:

B. Workstation, controllers, and control backbone to communicate using BACnet protocol and addressing.

C. Hardware:

2.04 CONTROLLERS

A. BUILDING CONTROLLERS

1. General:
   a. Manage global strategies by one or more, independent, standalone, microprocessor based controllers.
   b. Provide sufficient memory to support controller's operating system, database, and programming requirements.
   c. Share data between networked controllers.
   d. Controller operating system manages input and output communication signals allowing distributed controllers to share real and virtual object information and allowing for central monitoring and alarms.
   e. Utilize real-time clock for scheduling.
   f. Continuously check processor status and memory circuits for abnormal operation.
   g. Controller to assume predetermined failure mode and generate alarm notification upon detection of abnormal operation.
   h. Communication with other network devices to be based on assigned protocol.

2. Communication:
   a. Controller to reside on a BACnet network using ISO 8802-3 (ETHERNET) Data Link/Physical layer protocol.
   b. Perform routing when connected to a network of custom application and application specific controllers.
   c. Provide service communication port for connection to a portable operator's terminal or hand held device with compatible protocol.

3. Anticipated Environmental Ambient Conditions:
   a. Outdoors and/or in Wet Ambient Conditions:
      1) Mount within waterproof enclosures.
      2) Rated for operation at 40 to 150 degrees F (4 to 65 degrees C).
   b. Conditioned Space:
      1) Mount within dustproof enclosures.
      2) Rated for operation at 32 to 120 degrees F (0 to 50 degrees C).

DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC
23 09 23 - 3
4. Provisions for Serviceability:
   a. Diagnostic LEDs for power, communication, and processor.
   b. Make all wiring connections to field removable, modular terminal strips, or to a termination card connected by a ribbon cable.
5. Memory: In the event of a power loss, maintain all BIOS and programming information for a minimum of 72 hours.
6. Power and Noise Immunity:
   a. Maintain operation at 90 to 110 percent of nominal voltage rating.
   b. Perform orderly shutdown below 80 percent of nominal voltage.
   c. Operation protected against electrical noise of 5 to 120 Hz and from keyed radios up to 5 W. at 3 feet (1 m).

B. CUSTOM APPLICATION CONTROLLERS
1. General:
   a. Provide sufficient memory to support controller's operating system, database, and programming requirements.
   b. Share data between networked, microprocessor based controllers.
   c. Controller operating system manages input and output communication signals allowing distributed controllers to share real and virtual object information and allowing for central monitoring and alarms.
   d. Utilize real-time clock for scheduling.
   e. Continuously check processor status and memory circuits for abnormal operation.
   f. Controller to assume predetermined failure mode and generate alarm notification upon detection of abnormal operation.
   g. Communication with other network devices to be based on assigned protocol.
2. Communication:
   a. Controller to reside on a BACnet network using MS/TP Data Link/Physical layer protocol.
   b. Provide service communication port for connection to a portable operator's terminal or hand held device with compatible protocol.
3. Anticipated Environmental Ambient Conditions:
   a. Outdoors and/or in Wet Ambient Conditions:
      1) Mount within waterproof enclosures.
      2) Rated for operation at 40 to 150 degrees F (4 to 65 degrees C).
   b. Conditioned Space:
      1) Mount within dustproof enclosures.
      2) Rated for operation at 32 to 120 degrees F (0 to 50 degrees C).
4. Provisions for Serviceability:
   a. Diagnostic LED's for power, communication, and processor.
   b. Make all wiring connections to field removable, modular terminal strips, or to a termination card connected by a ribbon cable.
5. Memory: In the event of a power loss, maintain all BIOS and programming information for a minimum of 72 hours.
6. Power and Noise Immunity:
   a. Maintain operation at 90 to 110 percent of nominal voltage rating.
   b. Perform orderly shutdown below 80 percent of nominal voltage.
   c. Operation protected against electrical noise of 5 to 120 Hz and from keyed radios up to 5 W. at 3 feet (1 m).
C. APPLICATION SPECIFIC CONTROLLERS

1. General:
   a. Not fully user programmable, microprocessor based controllers dedicated to control specific equipment.
   b. Customized for operation within the confines of equipment served.
      c. Communication with other network devices to be based on assigned protocol.

2. Communication:
   a. Controller to reside on a BACnet network using MS/TP Data Link/Physical layer protocol.
   b. Provide service communication port for connection to a portable operator's terminal or hand held device with compatible protocol.

3. Anticipated Environmental Ambient Conditions:
   a. Outdoors and/or in Wet Ambient Conditions:
      1) Mount within waterproof enclosures.
      2) Rated for operation at 40 to 150 degrees F (4 to 65 degrees C).
   b. Conditioned Space:
      1) Mount within dustproof enclosures.
      2) Rated for operation at 32 to 120 degrees F (0 to 50 degrees C).

4. Provisions for Serviceability:
   a. Diagnostic LEDs for power, communication, and processor.
   b. Make all wiring connections to field removable, modular terminal strips, or to a termination card connected by a ribbon cable.

5. Memory: In the event of a power loss, maintain all BIOS and programming information for a minimum of 72 hours.

6. Power and Noise Immunity:
   a. Maintain operation at 90 to 110 percent of nominal voltage rating.
   b. Perform orderly shutdown below 80 percent of nominal voltage.
   c. Operation protected against electrical noise of 5 to 120 Hz and from keyed radios up to 5 W at 3 feet (1 m).

D. INPUT/OUTPUT INTERFACE

1. Hardwired inputs and outputs tie into the DDC system through building, custom application, or application specific controllers.

2. All Input/Output Points:
   a. Protect controller from damage resulting from any point short-circuiting or grounding and from voltage up to 24 volts of any duration.
   b. Provide universal type for building and custom application controllers where input or output is software designated as either binary or analog type with appropriate properties.

3. Binary Inputs:
   a. Allow monitoring of On/Off signals from remote devices.
   b. Provide wetting current of 12 mA minimum, compatible with commonly available control devices and protected against the effects of contact bounce and noise.
   c. Sense dry contact closure with power provided only by the controller.

4. Pulse Accumulation Input Objects: Conform to all requirements of binary input objects and accept up to 10 pulses per second.

5. Analog Inputs:
a. Allow for monitoring of low voltage 0 to 10 VDC, 4 to 20 mA current, or resistance signals (thermistor, RTD).
b. Compatible with and field configurable to commonly available sensing devices.

6. Binary Outputs:
   a. Used for On/Off operation or a pulsed low-voltage signal for pulse width modulation control.
   b. Outputs provided with three position (On/Off/Auto) override switches.
   c. Status lights for building and custom application controllers to be selectable for normally open or normally closed operation.

7. Analog Outputs:
   a. Monitoring signal provides a 0 to 10 VDC or a 4 to 20 mA output signal for end device control.
   b. Provide status lights and two position (AUTO/MANUAL) switch for building and custom application controllers with manually adjustable potentiometer for manual override on building and custom application controllers.
   c. Drift to not exceed 0.4 percent of range per year.

8. Tri State Outputs:
   a. Coordinate two binary outputs to control three point, floating type, electronic actuators without feedback.
   b. Limit the use of three point, floating devices to the following zone and terminal unit control applications:
   c. Control algorithms run the zone actuator to one end of its stroke once every 24 hours for verification of operator tracking.

9. System Object Capacity:
   a. System size to be expandable to twice the number of input output objects required by providing additional controllers, including associated devices and wiring.
   b. Hardware additions or software revisions for the installed operator interfaces are not to be required for future, system expansions.

2.05 POWER SUPPLIES AND LINE FILTERING

A. Power Supplies:
   1. Provide UL listed control transformers with Class 2 current limiting type or over-current protection in both primary and secondary circuits for Class 2 service as required by the NEC.
   2. Limit connected loads to 80 percent of rated capacity.
   3. Match DC power supply to current output and voltage requirements.
   4. Unit to be full wave rectifier type with output ripple of 5.0 mV maximum peak to peak.
   5. Regulation to be 1 percent combined line and load with 100 microsecond response time for 50 percent load changes.
   6. Provide over-voltage and over-current protection to withstand a 150 percent current overload for 3 seconds minimum without trip-out or failure.
   7. Operational Ambient Conditions: 32 to 120 degrees F (0 to 50 degrees C).
   8. EM/RF meets FCC Class B and VDE 0871 for Class B and MIL-STD 810 for shock and vibration.
   9. Line voltage units UL recognized and CSA approved.

B. Power Line Filtering:
1. Provide external or internal transient voltage and surge suppression component for all workstations and controllers.

2. Minimum surge protection attributes:
   a. Dielectric strength of 1000 volts minimum.
   b. Response time of 10 nanoseconds or less.
   c. Transverse mode noise attenuation of 65 dB or greater.
   d. Common mode noise attenuation of 150 dB or greater at 40 to 100 Hz.

2.06 LOCAL AREA NETWORK (LAN)

A. Provide communication between control units over local area network (LAN).

B. LAN Capacity: Not less than 60 stations or nodes.

C. Break in Communication Path: Alarm and automatically initiate LAN reconfiguration.

D. LAN Data Speed: Minimum 19.2 Kb.

E. Communication Techniques: Allow interface into network by multiple operation stations and by auto-answer/auto-dial modems. Support communication over telephone lines utilizing modems.

F. Transmission Median: Fiber optic or single pair of solid 24 gage twisted, shielded copper cable.

G. Network Support: Time for global point to be received by any station, shall be less than 3 seconds. Provide automatic reconfiguration if any station is added or lost. If transmission cable is cut, reconfigure two sections with no disruption to system's operation, without operator intervention.

2.07 SYSTEM SOFTWARE

A. Operating System:
   1. Concurrent, multi-tasking capability.
   2. System Graphics:
      a. Allow up to 10 graphic screens, simultaneously displayed for comparison and monitoring of system status.
      b. Animation displayed by shifting image files based on object status.
      c. Provide method for operator with password to perform the following:
         1) Move between, change size, and change location of graphic displays.
         2) Modify on-line.
         3) Add, delete, or change dynamic objects consisting of:
            (a) Analog and binary values.
            (b) Dynamic text.
            (c) Static text.
            (d) Animation files.
   3. Custom Graphics Generation Package:
      a. Create, modify, and save graphic files and visio format graphics in PCX formats.
      b. HTML graphics to support web browser compatible formats.
      c. Capture or convert graphics from AutoCAD.
   4. Standard HVAC Graphics Library:
a. HVAC Equipment:
   b. Ancillary Equipment:

B. Workstation System Applications:
   1. Automatic System Database Save and Restore Functions:
      a. Current database copy of each Building Controller is automatically stored on hard disk.
      b. Automatic update occurs upon change in any system panel.
      c. In the event of database loss in any system panel, the first workstation to detect the loss automatically restores the database for that panel unless disabled by the operator.
   2. Manual System Database Save and Restore Functions by Operator with Password Clearance:
      a. Save database from any system panel.
      b. Clear a panel database.
      c. Initiate a download of a specified database to any system panel.
   3. Software provided allows system configuration and future changes or additions by operators under proper password protection.
   4. On-line Help:
      a. Context-sensitive system assists operator in operation and editing.
      b. Available for all applications.
      c. Relevant screen data provided for particular screen display.
      d. Additional help available via hypertext.
   5. Security:
      a. Operator log-on requires user name and password to view, edit, add, or delete data.
      b. System security selectable for each operator.
      c. System supervisor sets passwords and security levels for all other operators.
      d. Operator passwords to restrict functions accessible to viewing and/or changing system applications, editor, and object.
      e. Automatic, operator log-off results from keyboard or mouse inactivity during user-adjustable, time period.
      f. All system security data stored in encrypted format.
   6. System Diagnostics:
      a. Operations Automatically Monitored:
         1) Workstations.
         2) Printers.
         3) Modems.
         4) Network connections.
         5) Building management panels.
         6) Controllers.
      b. Device failure is annunciated to the operator.
   7. Alarm Processing:
      a. All system objects are configurable to "alarm in" and "alarm out" of normal state.
      b. Configurable Objects:
         1) Alarm limits.
         2) Alarm limit differentials.
         3) States.
         4) Reactions for each object.
   8. Alarm Messages:
      b. Recognizable Features:
1) Source.
2) Location.
3) Nature.

9. Configurable Alarm Reactions by Workstation and Time of Day:
   a. Logging.
   b. Printing.
   c. Starting programs.
   d. Displaying messages.
   e. Dialing out to remote locations.
      f. Paging.
      g. Providing audible annunciation.
      h. Displaying specific system graphics.

10. Custom Trend Logs:
    a. Definable for any data object in the system including interval, start time, and stop time.
    b. Trend Data:
       1) Sampled and stored on the building controller panel.
       2) Archivable on hard disk.
       3) Retrieveable for use in reports, spreadsheets and standard database programs.
       4) Archival on LAN accessible storage media including hard disk, tape, Raid array drive, and virtual cloud environment.
       5) Protected and encrypted format to prevent manipulation, or editing of historical data and event logs.

11. Alarm and Event Log:
    a. View all system alarms and change of states from any system location.
    b. Events listed chronologically.
    c. Operator with proper security acknowledges and clears alarms.
    d. Alarms not cleared by operator are archived to the workstation hard disk.

12. Object, Property Status and Control:
    a. Provide a method to view, edit if applicable, the status of any object and property in the system.
    b. Status Available by the Following Methods:
       1) Menu.
       2) Graphics.
       3) Custom Programs.

13. Reports and Logs:
    a. Reporting Package:
       1) Allows operator to select, modify, or create reports.
       2) Definable as to data content, format, interval, and date.
       3) Archivable to hard disk.
    b. Real-time logs available by type or status such as alarm, lockout, normal, etc.
    c. Stored on hard disk and readily accessible by standard software applications, including spreadsheets and word processing.
    d. Set to be printed on operator command or specific time(s).

14. Reports:
    a. Standard:
       1) Objects with current values.
       2) Current alarms not locked out.
       3) Disabled and overridden objects, points and SNVTs.
4) Objects in manual or automatic alarm lockout.
5) Objects in alarm lockout currently in alarm.
6) Logs:
   (a) Alarm History.
   (b) System messages.
   (c) System events.
   (d) Trends.
   b. Custom:
      1) Daily.
      2) Weekly.
      3) Monthly.
      4) Annual.
      5) Time and date stamped.
      6) Title.
      7) Facility name.
   c. Tenant Override:
      1) Monthly report showing total, requested, after-hours HVAC and lighting services on a daily basis for each tenant.
      2) Annual report showing override usage on a monthly basis.
   d. Electrical, Fuel, and Weather:
      1) Electrical Meter(s):
         (a) Monthly showing daily electrical consumption and peak electrical demand with time and date stamp for each meter.
         (b) Annual summary showing monthly electrical consumption and peak demand with time and date stamp for each meter.
      2) Fuel Meter(s):
         (a) Monthly showing daily natural gas consumption for each meter.
         (b) Annual summary showing monthly consumption for each meter.
      3) Weather:
         (a) Monthly showing minimum, maximum, average outdoor air temperature and heating/cooling degree-days for the month.

C. Workstation Applications Editors:
1. Provide editing software for each system application at PC workstation.
2. Downloaded application is executed at controller panel.
3. Full screen editor for each application allows operator to view and change:
   a. Configuration.
   b. Name.
   c. Control parameters.
   d. Set-points.
4. Scheduling:
   a. Monthly calendar indicates schedules, holidays, and exceptions.
   b. Allows several related objects to be scheduled and copied to other objects or dates.
   c. Start and stop times adjustable from master schedule.
5. Custom Application Programming:
a. Create, modify, debug, edit, compile, and download custom application programming during operation and without disruption of all other system applications.

b. Programming Features:
   1) English oriented language, based on BASIC, FORTRAN, C, or PASCAL syntax allowing for free form programming.
   2) Alternative language graphically based using appropriate function blocks suitable for all required functions and amenable to customizing or compounding.
   3) Insert, add, modify, and delete custom programming code that incorporates word processing features such as cut/paste and find/replace.
   4) Allows the development of independently, executing, program modules designed to enable and disable other modules.
      5) Debugging/simulation capability that displays intermediate values and/or results including syntax/execution error messages.
   6) Support for conditional statements (IF/THEN/ELSE/ELSE-F) using compound Boolean (AND, OR, and NOT) and/or relations (EQUAL, LESS THAN, GREATER THAN, NOT EQUAL) comparisons.
   7) Support for floating-point arithmetic utilizing plus, minus, divide, times, square root operators; including absolute value; minimum/maximum value from a list of values for mathematical functions.
   8) Language consisting of resettable, predefined, variables representing time of day, day of the week, month of the year, date; and elapsed time in seconds, minutes, hours, and days where the variable values can be used in IF/THEN comparisons, calculations, programming statement logic, etc.
   9) Language having predefined variables representing status and results of the system software enables, disables, and changes the set points of the controller software.

2.08 CONTROLLER SOFTWARE

A. All applications reside and operate in the system controllers and editing of all applications occurs at the operator workstation.

B. System Security:
   1. User access secured via user passwords and user names.
   2. Passwords restrict user to the objects, applications, and system functions as assigned by the system manager.
   3. User Log On/Log Off attempts are recorded.
   4. Automatic Log Off occurs following the last keystroke after a user defined delay time.

C. Object or Object Group Scheduling:
   1. Weekly Schedules Based on Separate, Daily Schedules:
      a. Include start, stop, optimal stop, and night economizer.
      b. 10 events maximum per schedule.
      c. Start/stop times adjustable for each group object.

D. Provide standard application for equipment coordination and grouping based on function and location to be used for scheduling and other applications.
E. Alarms:
   1. Binary object is set to alarm based on the operator specified state.
   2. Analog object to have high/low alarm limits.
   3. All alarming is capable of being automatically and manually disabled.
   4. Alarm Reporting:
      a. Operator determines action to be taken for alarm event.
      b. Alarms to be routed to appropriate workstation.
      c. Reporting Options:

F. Maintenance Management: System monitors equipment status and generates maintenance messages based upon user-designated run-time limits.

G. Sequencing: Application software based upon specified sequences of operation in Section 23 09 93.

H. PID Control Characteristics:
   1. Direct or reverse action.
   2. Anti-windup.
   3. Calculated, time-varying, analog value, positions an output or stages a series of outputs.

I. Staggered Start Application:
   1. Prevents all controlled equipment from simultaneously restarting after power outage.
   2. Order of equipment startup is user selectable.

J. Energy Calculations:
   1. Accumulated instantaneous power or flow rates are converted to energy use data.
   2. Algorithm calculates a rolling average and allows window of time to be user specified in minute intervals.
   3. Algorithm calculates a fixed window average with a digital input signal from a utility meter defining the start of the window period that in turn synchronizes the fixed-window average with that used by the power company.

K. Anti-Short Cycling:
   1. All binary output objects protected from short-cycling.
   2. Allows minimum on-time and off-time to be selected.

L. On-Off Control with Differential:
   1. Algorithm allows binary output to be cycled based on a controlled variable and set-point.
   2. Algorithm to be direct-acting or reverse-acting incorporating an adjustable differential.

M. Run-Time Totalization:
   1. Totalize run-times for all binary input objects.
   2. Provides operator with capability to assign high run-time alarm.

2.09 HVAC CONTROL PROGRAMS

PART 3 EXECUTION

3.01 EXAMINATION

   A. Verify existing conditions before starting work.
B. Verify that conditioned power supply is available to the control units and to the operator work station. Verify that field end devices, wiring, and pneumatic tubing is installed prior to installation proceeding.

3.02 INSTALLATION

A. Install control units and other hardware in position on permanent walls where not subject to excessive vibration.

B. Install software in control units and in operator work station. Implement all features of programs to specified requirements and appropriate to sequence of operation. Refer to Section 23 09 93.

C. Provide conduit and electrical wiring in accordance with Section 26 27 17. Electrical material and installation shall be in accordance with appropriate requirements of Division 26.

3.03 MANUFACTURER’S FIELD SERVICES

A. Start and commission systems. Allow sufficient time for start-up and commissioning prior to placing control systems in permanent operation.

3.04 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate complete and operating system to Owner.

3.05 MAINTENANCE

A. Provide service and maintenance of energy management and control systems for one years from Date of Substantial Completion.

B. Provide two complete inspections, one in each season, to inspect, calibrate, and adjust controls as required, and submit written reports.

C. Provide complete service of systems, including call backs. Make minimum of 5 complete normal inspections of approximately 8 hours duration in addition to normal service calls to inspect, calibrate, and adjust controls, and submit written reports.

END OF SECTION 23 09 23
PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal ductwork.
B. Casing and plenums.
C. Kitchen hood ductwork.
D. Duct cleaning.

1.02 RELATED REQUIREMENTS

A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
B. Section 23 07 13 - Duct Insulation: External insulation and duct liner.
C. Section 23 33 00 - Air Duct Accessories.
D. Section 23 37 00 - Air Outlets and Inlets.
E. Section 23 05 93 - Testing, Adjusting, and Balancing for HVAC.

1.03 REFERENCE STANDARDS

B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
G. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005.

1.04 SUBMITTALS

A. See Section 01 3000 - Submittal Procedures, for submittal procedures.
B. Product Data: Provide data for duct materials.
C. Shop Drawings: Indicate duct fittings, particulars such as gages, sizes, welds, and configuration prior to start of work for 2 in wg pressure class and higher systems.
D. Test Reports: Indicate pressure tests performed. Include date, section tested, test pressure, and leakage rate, following SMACNA (LEAK).

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience, and approved by manufacturer.

B. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum ___ years of documented experience.

1.06 FIELD CONDITIONS

A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.

B. Maintain temperatures within acceptable range during and after installation of duct sealants.

PART 2 PRODUCTS

2.01 DUCT ASSEMBLIES

A. Regulatory Requirements: Construct ductwork to NFPA 90A standards.

B. Ducts: Galvanized steel, unless otherwise indicated.

C. Low Pressure Supply (System with Cooling Coils): 1 inch w.g. (250 Pa) pressure class, galvanized steel.

D. Medium and High Pressure Supply: 5 inch w.g. (1250 Pa) pressure class, galvanized steel.

E. Return and Relief: 1 inch w.g. (250 Pa) pressure class, galvanized steel.

F. General Exhaust: 1 inch w.g. (250 Pa) pressure class, galvanized steel.

G. Kitchen Cooking Hood Exhaust: 1/2 inch w.g. (125 Pa) pressure class, galvanized steel.

1. Pre-fabricated single-wall grease duct for use with Type 1 kitchen hoods.
   a. 0.047 thick stainless steel; supports, fan plate adaptor, hood connections, fittings and expansion joint required shall be included
   b. Grease duct joints to be held together by means of formed vee clamps and sealed with 3M Fire Barrier 2000+
   c. UL and ETL listed
   d. Manufacturers:
      1) CaptiveAire
      2) Ampco

2. Access Doors:
   a. Provide for duct cleaning inside horizontal duct at drain pockets, every 20 feet and at each change of direction.
   b. Use same material and thickness as duct with gaskets and sealants rated 1500 degrees F for grease tight construction.

H. Outside Air Intake: 1/2 inch w.g. (125 Pa) pressure class, galvanized steel.

2.02 MATERIALS

A. Galvanized Steel for Ducts: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G60/Z180 coating.
B. Stainless Steel for Ducts: ASTM A666, Type 304.

C. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
   1. Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.
   2. VOC Content: Not more than 250 g/L, excluding water.
   3. Surface Burning Characteristics: Flame spread index of zero and smoke developed index of zero, when tested in accordance with ASTM E84.

D. Hanger Rod: ASTM A36/A36M; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

E. Hanger Fasteners: Attach hangers to structure using appropriate fasteners, as follows:
   1. Concrete Wedge Expansion Anchors: As indicated on Structural Drawings.
   2. Concrete Screw Type Anchors: As indicated on Structural Drawings.
   3. Concrete Adhesive Type Anchors: As indicated on Structural Drawings.
   4. Other Types: As required.

2.03 DUCTWORK FABRICATION

A. Fabricate and support in accordance with SMACNA (DCS) and as indicated.

B. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.

C. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows must be used, provide air foil turning vanes of perforated metal with glass fiber insulation.

D. Provide turning vanes of perforated metal with glass fiber insulation when acoustical lining is indicated.

E. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.

F. Fabricate continuously welded round and oval duct fittings in accordance with SMACNA (DCS).

G. Where ducts are connected to exterior wall louvers and duct outlet is smaller than louver frame, provide blank-out panels sealing louver area around duct. Use same material as duct, painted black on exterior side; seal to louver frame and duct.

2.04 MANUFACTURED DUCTWORK AND FITTINGS

A. Flexible Ducts: Two ply vinyl, polyethylene, or nylon film supported by helically wound spring steel wire.
   1. Insulation: Fiberglass insulation with aluminized vapor barrier film.
   2. Pressure Rating: 2 inches WG (___ kPa) positive and 0.5 inches WG (___ Pa) negative.
   3. Maximum Velocity: 4000 fpm (20.3 m/sec).
   4. Temperature Range: Minus 10 degrees F to 160 degrees F (Minus 23 degrees C to 71 degrees C).
   5. Manufacturers:
      a. Casco.
b. Flexmaster, Type 1M or Type 6M.
c. Substitutions: See Section 01 60 00 - Product Requirements.

B. Kitchen Cooking Hood and Grease Exhaust: Nominal 3 inches (76.2 mm) thick ceramic fiber insulation between 20 gage, 0.0375 inch (0.95 mm), Type 304 stainless steel liner and 24 gage, 0.0239 inch (0.61 mm) aluminized steel sheet outer jacket.
   1. Tested and UL listed for use with commercial cooking equipment in accordance with NFPA 96.
   2. Certified for zero clearance to combustible material in accordance with:
   3. Materials and construction of the modular sections and accessories to be in accordance with the terms of the following listings:
   4. Manufacturers:

2.05 CASINGS

A. Fabricate casings in accordance with SMACNA (DCS) and construct for operating pressures indicated.

B. Mount floor mounted casings on 4 inch (100 mm) high concrete curbs. At floor, rivet panels on 8 inch (200 mm) centers to angles. Where floors are acoustically insulated, provide liner of galvanized 18 gage, 0.0478 inch (1.21 mm) expanded metal mesh supported at 12 inch (300 mm) centers, turned up 12 inches (300 mm) at sides with sheet metal shields.

C. Reinforce door frames with steel angles tied to horizontal and vertical plenum supporting angles. Install hinged access doors where indicated or required for access to equipment for cleaning and inspection.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install, support, and seal ducts in accordance with SMACNA (DCS).

B. Install in accordance with manufacturer's instructions.

C. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

D. Flexible Ducts: Connect to metal ducts with adhesive.

E. Kitchen Hood Exhaust: Provide residue traps at base of vertical risers with provisions for clean out.

F. Duct sizes indicated are inside clear dimensions. For lined ducts, maintain sizes inside lining.

G. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pilot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.

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

I. At exterior wall louvers, seal duct to louver frame and install blank-out panels.
3.02 CLEANING

A. Clean duct systems with high power vacuum machines. Protect equipment that could be harmed by excessive dirt with filters, or bypass during cleaning. Provide adequate access into ductwork for cleaning purposes.

END OF SECTION 23 31 00
SECTION 23 33 19

DUCT SILENCERS

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Duct silencers.
      1. Absorptive silencers.
   B. Ductwork lagging.

1.02 RELATED REQUIREMENTS
   A. Section 23 31 00 - HVAC Ducts and Casings: Connections to silencers.
   B. Section 23 33 00 - Air Duct Accessories: Flexible duct connections.

1.03 REFERENCE STANDARDS
   E. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data; 2014.
   G. AMCA 303 - Application of Sound Power Level Ratings for Fans; 1979 (Reaffirmed 2012).

P. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide catalog information indicating, materials, dimensional data, pressure losses, and acoustical performance.

C. Shop Drawings: Indicate assembly, materials, thicknesses, dimensional data, pressure losses, acoustical performance, layout, and connection details.

D. Design Data: Provide engineering calculations, referenced to specifications and AHRI 270, AMCA 301, AMCA 302, AMCA 303, and ANSI S12.1 standards indicating that maximum room sound levels are not exceeded.

E. Test Reports: Indicate dynamic insertion loss and noise generation values of silencers.

F. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

B. Design application of duct silencers under direct supervision of a Professional Engineer experienced in design of this work.

PART 2 PRODUCTS

2.01 DUCT SILENCERS

A. Manufacturers:

B. Description: Duct section with sheet metal outer casing, sound absorbing fill material, and inner casing of perforated sheet metal; incorporating interior baffles of similar construction. Fabricate in accordance with SMACNA (DCS) HVAC Duct Construction Standards.

C. General Requirements:
   1. Casing, sealants, adhesives, accessory materials, and packing materials to comply with ASTM E84.
   2. Airstream surfaces installed in a return air plenum to comply with requirements in ASHRAE Std 62.1.
   3. Factory-fabricated, field-installed products.

D. Geometry:
   1. Rectangular straight with splitters or baffles.
   2. Rectangular elbows with splitters or baffles.
E. Materials:
   1. Outer Casing: Minimum 20 gage, 0.0359 inch (0.91 mm) thick galvanized steel stiffened as required, with mastic filled lock formed seams, 2 inch (50 mm) long, 11 gage, 0.1196 inch (3.04 mm) slip joints on both ends.
   2. Inner Casing and Splitters: Minimum 24 gage, 0.0239 (0.61 mm) thick perforated galvanized steel.
   3. Fill: Glass fiber or mineral wool of minimum 4 lb/cu ft (64 kg/cu m) density.
   4. Fill Liner: Bonded glass fiber matting.

2.02 DUCTWORK LAGGING
   A. Acoustic Insulation: 2 inch (50 mm) thick, 3 to 5 lb/cu ft (50 to 80 kg/cu m) density glass fiber or mineral wool insulation.
   B. Covering: Sheet lead with surface weight minimum 4 lb/sq ft (20 kg/sq m).

PART 3 EXECUTION

3.01 INSTALLATION
   A. Install in accordance with manufacturer's instructions.
   B. Support duct silencers independent of ducts. Refer to Section 23 31 00 and Section 23 33 00.
   C. Where indicated, lag ductwork by wrapping with insulation and covering. Apply covering to be air tight. Do not attach covering rigidly to ductwork.

3.02 FIELD QUALITY CONTROL
   A. Provide services of an independent testing agency to take noise measurements in accordance with provisions of NEBB (STDS). Use meters meeting requirements of ANSI/ASA S1.4 PART 3.
   B. After start-up, final corrections and balancing of systems take octave band sound measurements over full audio frequency range in areas adjacent to mechanical equipment rooms, duct and pipe shafts, and other critical locations, as directed.
   C. Provide one-third octave band measurements of artificial sound sources in areas indicated as having critical requirements.
   D. Submit complete report of test results including sound curves.

END OF SECTION 23 33 19
PART 1 GENERAL

1.01 SUBMITTALS

A. Product Data: Manufacturer’s data sheets on each product to be used shall include:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Power and mounting requirements.

B. Application Drawings: Submit plan, section, elevation and isometric views as necessary to convey the information required to detail all installation conditions for each unit specified.

1.02 QUALITY ASSURANCE

A. Manufacturer Qualifications: MacroAir shall provide sole source for design, engineering, manufacturing and warranty claims handling.

B. Installer Qualifications: Any and all work outside the scope of the installation guide shall be outsourced. Factory trained installers are recommended and available upon request.

1.03 REFERENCES

A. Underwriters Laboratories (UL 507).

1.04 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity and ventilation) within limits recommended by manufacturer for optimal results. Do not install products in environmental conditions outside MacroAir’s absolute limits.

1.05 COORDINATION

A. The fan shall be capable of receiving a stop command from the fire panel, an ASD (Aspirating Smoke Detection) device, or any number of smoke, flame or heat detectors.

B. The fans shall be as follows:
   1. The fan shall meet the air velocity requirements of FM Global’s 2.0 data sheet for ESFR sprinklers.
   2. If required by the local fire prevention authority or desired by the purchaser, the fan shall be wired into the building’s fire suppression system so that the fan will automatically shut off within a maximum of 90 seconds after sprinklers are activated. To facilitate this automatic shut-down, the fan shall include a Variable Frequency Drive (VFD) within the control panel. The low voltage wire and relay needed to accomplish this must be supplied by the Fire Alarm installer.
   3. Upon fire detection as described above, the fans shall coast to stop as required by NFPA guidelines.
1.06 WARRANTY

A. MacroAir shall repair or replace warranted defective parts as follows:
   1. Lifetime warranty on airfoils, hub, frame and mounting.
   2. Twelve-year service life prorated limited warranty on all other components, which include but are not limited to:
      a. Motor
      b. Gear reducer
      c. VFD

B. At project closeout, provide to Owner or Owner’s Representative an executed copy of MacroAir’s standard limited warranty against manufacturing defect, outlining its terms, conditions and exclusions from coverage.

PART 2 PRODUCTS

2.01 APPROVED MANUFACTURERS

A. Acceptable Manufacturer: MacroAir Technologies, Inc. Web: macroairfans.com

2.02 MACROAIR – COMMERCIAL / INDUSTRIAL HVLS FANS

A. Performance; See drawings

B. Airfoils: The fan shall be equipped with six (6) NASA developed XL airfoils. The airfoils shall consist of anodized 6061 T4 precision extruded aluminum and be of the MacroAir XL design, with fan diameters ranging from 8 to 20 feet in two (2) foot increments and one (1) 24-foot diameter fan. The airfoils shall be connected to six (6) individual aluminum 6005 T6 struts by means of two (2) 5/16-24 x 2-inch grade 5 hex bolts, two (2) 5/16-inch flat washers and two (2) 5/16-inch nylon lock nuts per airfoil.
   1. Number of Airfoils: 6.
   4. Optional Airfoil Finish: Custom powder coated colors per Drylac RAL color chart.

C. Motor: The fan shall be equipped with a WEG 1 Hp, 3-phase motor (explosion proof and stainless steel wash down configurations available). The motor shall be of Class 1.0, Div. 2.0, Gr. B, C and D. The motor shall be of Class I, Zone II, IIC. Motor winding shall meet NEMA MG1 Part 30 and 31. Motor shall have CSA and CE markings.
   1. HP: 1.
   2. 3-Phase.
   3. RPM: 1750.
   4. Service Factor: 1.0.
   5. Full Load Amp draw: 3.25 – 3.10/1.55.
   6. Insulation Class: F.
   8. Enclosure: TEFC.
   9. Frame: D56C.

D. Motor (600 Volt): The fan shall be equipped with a Baldor Reliance 1 Hp, 3-phase motor. The motor shall have NEMA CSA and RU markings.
   1. HP: 1.
   2. 3-Phase.
3. RPM: 1760.
5. Full Load Amp draw: 1.2.
6. Insulation Class: F.
8. Enclosure: TEFC.
9. Frame: D56C.
10. Duty: Continuous

E. Motor Control Panel (MCP) and Remote: Each Motor Control Panel is built pursuant to UL Standards as Industrial. Control Panels and pursuant to construction guidelines set forth by UL article 508A and the National Electrical Code. The controls shall be housed in a NEMA 1 (optional NEMA 4X) enclosure to prevent unwanted exposure and to exclude entry of unwanted contaminants. The MCP shall include a Yaskawa J1000/V1000 Variable Frequency Drive (VFD). The VFD shall operate on carrier frequency of no less than 8 kHz in order to minimize sound. The VFD shall have a UL, CE and RoHS rating. Motor cable shall be a Belden foil-shielded cable with no more than 25 feet in length and provided by MacroAir. No motor cable substitutions are allowed. The fan shall include a NEMA 4X Remote Switchbox for wall mounting and 100 feet of remote cable (up to 600 feet in length optional). Remote Switchbox shall include a forward, off, reverse and a speed control knob. 

1. 1. Electrical Requirements
   a. 120VAC single (1) phase 50/60 Hz.
   b. 208-240VAC single (1) phase 50/60 Hz.
   c. 208-240VAC three (3) phase 50/60 Hz.
   d. 380-415VAC three (3) phase 50 Hz.
   e. 460-480VAC three (3) phase 50/60 Hz.
   f. Lockable disconnect switch.

2. Pre-programmed VFD with dynamic acceleration and deceleration.
3. MODBUS option available.
4. BacNet option available.
5. Fire panel integration contacts.
6. Network touch-screen option available with:
   a. Live energy consumption monitor.
   b. Live fault code monitor.
   c. Live fan speed monitor.
   d. Impact and solvent resistant.
   e. NEMA 4X rated.
   f. IP65 rated.

F. Gear Reducer: The fan shall be equipped with a Nord SK22 sealed gear reducer with pressure relief valve. The gear reducer shall be an inline two-stage helical gear reducer, precision finished for low noise and high performance.
   1. Reducer Type: Two-Stage Helical.
   2. Lubrication: Mobil SHC 600 Series.
   7. Output Shaft: Stainless steel 1-1/4” diameter.

G. Mounting and Frame: The fan mounting system shall be equipped with hardware, no less than SAE grade 5 for safe installation. The fan shall be
equipped with a universal mount consisting of an upper yoke, knuckle and lower yoke. The fan shall be properly equipped for multiple mounting options for Ibeam, Purlin and Glulam applications (specified upon order).

1. Attachment of fan to structure shall be per DSA approved plans.
2. Optional Mounting Hardware: Glulam Mounting Brackets.
4. Mounting Drops: Extensions available in one (1) to ten (10) foot lengths in one (1) foot increments and available in custom sizes.
7. Optional Frame Finish: Custom powder coated colors per Drylac RAL color chart.
9. Optional Mount Finish: Custom powder coated colors per Drylac RAL color chart.

H. Hybrid Hub: The fan shall be equipped with a patent-pending, aluminum hybrid hub. The hybrid hub shall have six (6) removable, black anodized, 6005 T6
SECTION 23 36 00

AIR TERMINAL UNITS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Single-duct terminal units.
   1. Single-duct, constant-volume units.
   2. Single-duct, variable-volume units.

B. Fan-powered units.

1.02 RELATED REQUIREMENTS

A. Section 23 05 48 - Vibration and Seismic Controls for HVAC Piping and Equipment.

B. Section 23 09 23 - Direct-Digital Control System for HVAC.

C. Section 23 21 13 - Hydronic Piping: Connections to heating coils.

D. Section 23 21 14 - Hydronic Specialties: Connections to heating coils.

E. Section 23 31 00 - HVAC Ducts and Casings.

F. Section 23 33 00 - Air Duct Accessories.

1.03 REFERENCE STANDARDS


B. AHRI 880 (I-P) - Performance Rating of Air Terminals; 2011 with Addendum 1.


D. ASHRAE Std 130 - Methods of Testing Air Terminal Units; 2008 (R2014).


I. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.


L. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; current edition, including all revisions.


1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data indicating configuration, general assembly, and materials used in fabrication. Include catalog performance ratings that indicate air flow, static pressure, and NC designation. Include electrical characteristics and connection requirements.

C. Shop Drawings: Indicate configuration, general assembly, and materials used in fabrication, and electrical characteristics and connection requirements.

D. Certificates: Certify that coils are tested and rated in accordance with AHRI 410.

E. Manufacturer's Installation Instructions: Indicate support and hanging details, installation instructions, recommendations, and service clearances required.

F. Project Record Documents: Record actual locations of units and locations of access doors required for access of valving.

G. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, maintenance and repair data, and parts lists. Include directions for resetting constant-volume regulators.

H. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.05 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide five year manufacturer warranty for air terminal units.

PART 2 PRODUCTS

2.01 SINGLE-DUCT, VARIABLE-VOLUME AND CONSTANT-VOLUME UNITS

A. Manufacturers:
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Basis of Design: Price Industries, Inc.

C. General:
1. Factory-assembled, AHRI 880 (I-P) rated and bearing the AHRI seal, air volume control terminal with damper assembly, flow sensor, externally mounted volume controller, duct collars, and all required features.

2. Control box bearing identification, including but not necessarily limited to nominal cfm, maximum and minimum factory-set airflow limits, coil type and coil (right or left hand) connection, where applicable.

D. Unit Casing:
1. Minimum 22 gage, 0.0299 inch (0.76 mm) galvanized steel.
2. Air Inlet Collar: Provide round, suitable for standard flexible duct sizes.
3. Unit Discharge: Rectangular, with slip-and-drive connections.
4. Acceptable Liners:
   a. 1/2 inch (13 mm) thick, coated, fibrous-glass complying with ASTM C1071.
      1) Secure with adhesive.
      2) Coat edges exposed to airstream with NFPA 90A approved sealant.
      3) Cover liner with non-porous foil.
   b. Liner not to contain pentabrominated diphenyl ether (CAS #32534-81-9) or octabrominated diphenyl ether.

E. Damper Assembly:
1. Heavy-gage, galvanized steel or extruded aluminum construction with solid steel, nickel-plated shaft pivoting on HDPE, self-lubricating bearings.
2. Provide integral position indicator or alternative method for indicating damper position over full range of 90 degrees.
3. Incorporate low leak damper blades for tight airflow shutoff.
   a. Air Leakage Past Closed Damper: Maximum two percent of unit maximum airflow at 3 inch wg (750 Pa) inlet static pressure, tested in accordance with ASHRAE Std 130.

F. Hot Water Heating Coil:
1. Coil Casing: Minimum 22 gage, 0.0299 inch (0.76 mm) galvanized steel, factory-installed on terminal discharge with rectangular outlet, duct connection type.
   a. Access Door: Gasketed and insulated located on bottom, on top, and downstream of coils.
   b. Right or left coil inlets.
2. Coil Fins: Aluminum or aluminum plated fins, mechanically-bonded to seamless copper tubes.
3. Coil leak tested to minimum 350 psig (2413 kPa).
4. Base performance data on tests run in accordance with AHRI 410 and units to bear AHRI 410 label.

G. Controls:
1. Electronic:
   a. Damper Actuator: 24 volt, power closed, spring return open.
   b. Velocity Controller:
      1) Settings for minimum/maximum air volumes, factory-calibrated, and field adjustable at thermostat.
      2) Maintain constant airflow dictated by thermostat to within 5 percent of set point while compensating for inlet static-pressure variations up to 4 inch wg (1 kPa), when tested in accordance with ASHRAE Std 130.
2. Provide controller with multi-point with velocity sensors located in air inlets and outlet.

   a. Signal accuracy: Plus/minus five percent throughout terminal operating range.

2.02 FAN-POWERED SERIES UNITS

A. Manufacturers:

B. General:
   1. Factory-assembled and wired, AHRI 880 (I-P) rated, horizontal fan-powered terminal unit with blower, blower motor, mixing plenum, and primary air damper contained in a single unit housing.

C. Unit Casing:
   1. Minimum 22 gage, 0.0299 inch (0.76 mm) galvanized steel.
   2. Primary Air Inlet Collar: Suitable for standard flexible duct sizes.
   3. Unit Discharge: Rectangular, suitable for flanged duct connection.
   4. Acceptable Liners:
      a. 3/4 inch (19 mm) thick polyurethane foam adhesive complying with UL 181 erosion requirements in accordance with ASHRAE Std 62.1, and having a maximum smoke developed index of 50 for both insulation and adhesive, when tested in accordance with ASTM E84.

D. Primary Air Damper Assembly:
   1. Heavy-gage, galvanized steel or extruded aluminum construction with solid shaft rotating in bearings.
   2. Provide indicator on damper shaft or alternative method for indicating damper position over full range of 90 degrees.
   3. Incorporate low leak (2 percent) damper blades for tight airflow shutoff.
   4. Fan(s): Forward curved, centrifugal type.
   5. Fan Motor:
      a. ECM (Electrically Commutated Motor):
         1) Brushless DC controlled by an integrated controller/inverter that operates the wound stator and senses rotor position to electrically commutate the stator.
         2) Designed to maintain 70 percent efficiency over the entire operating range.
      b. Fan motor shaft directly connected to fan and isolated from unit casing to prevent transmission of vibration.

E. Hot Water Heating Coil:
   1. Coil Casing: Minimum 22 gage, 0.0299 inch (0.76 mm) galvanized steel, factory-installed on terminal unit with flanged discharge for attachment to downstream ductwork.
   2. Heavy-gage aluminum fins, mechanically bonded to tubes.
   3. Copper Tubes: 0.016 inch (0.406 mm) minimum wall thickness with male solder header connections.
   4. Coil leak tested to minimum 305 psig (2143 kPa).
   5. Base performance data on tests run in accordance with AHRI 410.

F. Electrical Requirements:
1. Single-point power connection.
2. Equipment wiring to comply with requirements of NFPA 70.

G. Controls:
1. Airflow Sensor: Differential pressure airflow device measuring total, static, and wake pressures.
      1) Plastic parts are fire-resistant, complying with UL 94.
      2) Provides accuracy within 5 percent with a 90 degree sheet metal elbow directly at the inlet of the assembly.
      3) Control tubing is protected by grommets at the wall of the airflow sensor's housing.
      4) Furnished with twelve total pressure sensing ports and a center averaging chamber that amplifies the sensed airflow signal.
      5) Provide sensor with a pressure transducer to interface with a DDC system.
      6) Provide velocity pressure sensor with a removable access section for maintenance.
   b. Signal accuracy: Plus/minus five percent throughout terminal operating range.
2. Control Sequence: See Section 23 09 93.

PART 3 EXECUTION

3.01 EXAMINATION
A. Verify that conditions are suitable for installation.

3.02 INSTALLATION
A. Install in accordance with manufacturer's instructions.
B. Install the inlets of air terminal units and airflow sensors a minimum of four duct diameters from elbows, transitions, and duct takeoffs.
C. Provide ceiling access doors or locate units above easily removable ceiling components.
D. Support units individually from structure with wire rope complying with ASTM A492 and ASTM A603 in accordance with SMACNA (SRM). See Section 23 05 48.
E. Do not support from ductwork.
F. Connect to ductwork in accordance with Section 23 31 00.

G. Not-Used

END OF SECTION 23 36 00
PART 1 GENERAL

1.01 REFERENCE STANDARDS

B. ASME BPVC-VIII-1 - Boiler and Pressure Vessel Code, Section VIII, Division 1 - Rules for Construction of Pressure Vessels; 2015.
E. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

1.02 PERFORMANCE REQUIREMENTS

A. Performance rating shall be in accordance with Hydronics Institute 1.

1.03 SUBMITTALS

A. Product Data: Provide data indicating rated capacity, general assembly, components, controls, safety controls, and wiring diagrams with electrical characteristics and connection requirements.
B. Shop Drawings: Detail equipment assemblies and indicate dimensions, required clearances, and method of field assembly, components, and location and size of each field connection.
   1. Wiring Diagrams: Detail wiring for power, signal, and control systems and differentiate between manufacturers installed and field installed wiring.
C. Manufacturer's Instructions: Indicate assembly, support details, connection requirements, and include start up instructions.
D. Manufacturer's Field Reports: Indicate condition of equipment after start-up including control settings and performance chart of control system.
E. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, cleaning procedures, replacement parts list, and maintenance and repair data.
F. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.04 REGULATORY REQUIREMENTS

A. Conform to applicable code for internal wiring of factory wired equipment.
B. Conform to ASME BPVC-IV and BPVC-VIII-1 for boiler construction.
C. Units: UL (DIR) listed and labeled.
D. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for the purpose specified and indicated.
E. ASME Compliance: Boilers shall bear ASME “H” stamp and be National Board listed.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect units before, during, and after installation from damage to casing by leaving factory shipping packaging in place until immediately prior to final acceptance.

1.06 WARRANTY

A. The pressure vessel/heat exchanger of the boiler shall carry a non-prorated 7 year warranty against failure due to condensate corrosion, thermal stress, mechanical defects or workmanship. All other components shall carry an 18-month warranty against failure due to defective materials or workmanship. A Warranty Certificate must be issued to the owner from the manufacturer and a copy of warranty must be submitted for engineer’s approval.

PART 2 PRODUCTS

2.01 GENERAL

A. Boiler modules shall be gas fired natural gas unit, condensing, modular, stainless steel water-tube design with a modulating forced draft power burner and positive pressure vent discharge. Manufactured by AERCO International Inc.

2.02 BURNER, MODULATING GAS VALVE, AND VARIABLE SPEED FAN

A. Each module shall have a dedicated isolation valve on the inlet side of the module. Each thermal module’s premix burner shall be metal fiber mesh covering a stainless steel head, with spark ignition and flame rectification. All burner material exposed to the combustion zone shall be of stainless steel construction. There shall be no moving parts within the burner itself. The burners shall produce <20 ppm of NOx corrected to 3% excess oxygen. A modulating gas valve and variable speed fan shall meter the natural gas and air input, respectively.

2.03 HEAT EXCHANGER

A. The heat exchanger is constructed of stainless steel and shall be capable of handling return water temperatures down to 40 F without any failure due to thermal shock or fireside condensation. It shall be ASME stamped for a working pressure not less than 160 psig. The water tubes shall have a maximum water volume of 4 gallons per module. The boiler water connections shall be 2” NPT for 399-500 and 2 ½” NPT for 750-1000. Inspection openings in the pressure vessel shall be in accordance with ASME Section IV pressure vessel code.
   1. Each module shall have a dedicated water flow meter installed that is capable of detecting water flow rate and displaying through the boiler’s display board.

2.04 EXHAUST MANIFOLD, CONDENSATE TRAP, AND CONDENSATE NEUTRALIZER

A. The exhaust manifold shall be of polypropylene with a 4”diameter flue connection for 399-500, or 6” diameter for 750-1000. The exhaust manifold shall terminate in a condensate trap. The condensate trap shall have a gravity drain for the elimination of the condensation into an integrated condensate neutralizer.
2.05 BOILER CONTROLS

A. The boiler control system shall consist of a master controller (Argus Controller) to which individual thermal module controllers are linked as slaves. The entire system shall be CSA or UL Recognized. Each of the thermal module controllers shall consist of a combustion safeguard and flame monitoring system. Individual thermal module controllers shall be field replaceable. The combustion safeguard/flame monitoring system shall utilize spark ignition and a rectification type flame sensor. The boiler control system shall annunciate boiler & sensor status and include extensive self-diagnostic capabilities.

B. Provide second communications board shall allow third party Building Automation System (BAS) to control and monitor the boiler via Modbus RS-485 communications.

C. Each boiler shall incorporate dual over-temperature protection with manual reset and either a flow switch or low water cut out, both in accordance with ASME Section IV and CSD-1.

D. Boiler Sequencer: The Boiler Manufacturer can supply as part of the boiler package the Sequencer to control all operation and energy input of the multiple boiler heating plant. The Cascade Sequencer shall be comprised of a microprocessor based control utilizing the Argus Bus protocol to communicate with each boiler’s Communication Board via the RS-485 port. One Cascade Sequencer shall have the ability to operate up to 8 AM boilers of any size combination.

E. CONTROLS INTEROPERABILITY

F. The communications module shall utilize the MODBUS open protocol to interface with third party Building Automation Systems (BAS).

G. Controls interface with BACnet, shall utilize an Communications Gateway to act as a MODBUS interface/translator. The Communications Gateway shall be comprised of a microprocessor based control utilizing the MODBUS protocol to communicate with the Boilers via the RS-485. Non-volatile backup of all point mappings and programs shall be internally provided as standard. Connection between Gateway and individual boilers shall be “daisy chain” with shielded, twisted-pair, low voltage wiring for ease of installation.

PART 3 EXECUTION

3.01 GENERAL

A. All aspects of installation of Boiler Plant shall be in strict accordance with manufacturer's instructions. The vent system must conform to all manufacturer's recommendations and shall utilize UL listed stainless steel AL-29-4C, Positive Pressure venting materials. The vent must be sized in accordance with manufacture’s recommendations.

3.02 EXAMINATION

A. Examine area to receive boiler for compliance with requirements for installation tolerances and other conditions affecting boiler performance. Do not proceed with installation until unsatisfactory conditions have been corrected.
3.03 INSTALLATION

A. Install in accordance with manufacturer’s instructions.

B. Install boilers level and plumb, according to manufacturer’s written instructions and referenced standards.
   1. Install gas fired boilers according to NFPA 54.
   2. Support boilers on 4 in (100 mm) thick concrete base, 4 in (100 mm) larger on each side than base of unit.
   3. Install electrical devices furnished with boiler, but not specified to be factory mounted.
   4. Install a 3/4” drain valve on the outlet piping prior to the first shut off valve.

C. Install circulator and diaphragm expansion tank on boiler.

3.04 CONNECTIONS

A. Connect gas piping full size to boiler gas train inlet with union.
   1. Connect hot water piping to supply and return boiler tappings with shutoff valve and union or flange at each connection.

B. Install piping from safety relief valves to nearest floor drain.
   1. Connect breeching to boiler outlet, full size of outlet. The boiler shall operate under positive (Category IV) or negative (Category II) stack pressure. Vent material must be listed AL29-4C Stainless Double Wall Stack for condensing appliances.
   2. Electrical: Comply with applicable requirements in Division 26 Sections.
   3. Ground equipment.
   4. Tighten electrical connectors and terminals according to manufacturer’s published torque-tightening values. If manufacturer’s torque values are not indicated, use those specified in UL 486A and UL 486B.

3.05 FIELD QUALITY CONTROL

A. Manufacturer’s Field Service: Engage a factory authorized service representative to supervise the field assembly of components and installation of boilers, including piping and electrical connections. Report results in writing.
   1. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
   2. Manufacturer’s representative shall supply a factory authorized service technician to start up the boilers.

3.06 CLEANING

A. Flush and clean boilers on completion of installation, according to manufacturer’s written instructions.
   1. After completing boiler installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finishes including chips, scratches, and abrasions with manufacturer’s stainless steel cleaner.

3.07 COMMISSIONING

A. Engage a factory authorized service representative to provide startup service. Start up to be performed only after complete boiler room operation is field verified to offer a substantial load, and complete system circulation. One year warranty shall be handled by factory authorized tech.
3.08 DEMONSTRATION

A. Engage a factory authorized service representative to train Owner’s maintenance personnel as specified below:
   1. Operate boiler, including accessories and controls, to demonstrate compliance with requirements.
   2. Train Owner’s maintenance personnel on procedures and schedules related to startup and shutdown, troubleshooting, servicing, and preventive maintenance.
   3. Review data in the maintenance manuals. Refer to Division 1 Section “Contract Closeout.”
   4. Review data in the maintenance manuals. Refer to Division 1 Section “Operation and Maintenance Data.”
   5. Schedule training with Owner with at least 7 days advance notice.

3.09 FIELD SERVICES

A. Contractor shall provide the services of a local factory authorized representative to supervise all phases of equipment startup. A letter of compliance with all factory recommendations and installation instructions shall be submitted to the engineer with operation and maintenance instructions.

END OF SECTION 23 52 33
PACKAGED ROOFTOP AC UNITS

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION

A. This section includes the design, controls and installation requirements for packaged rooftop units.

1.02 QUALITY ASSURANCE

A. Packaged air-cooled condenser units shall be certified in accordance with ANSI/AHRI Standard 340/360 performance rating of commercial and industrial unitary air-conditioning and heat pump equipment.

B. Unit shall be certified in accordance with UL Standard 1995/CSA C22.2 No. 236, Safety Standard for Heating and Cooling Equipment.

C. Unit and refrigeration system shall comply with ASHRAE 15, Safety Standard for Mechanical Refrigeration.

D. Unit Energy Efficiency Ratio (EER) shall be equal to or greater that prescribed by ASHRAE 90.1, Energy Efficient Design of New Buildings except Low-Rise Residential Buildings.

E. Unit shall be safety certified by ETL and ETL US listed. Unit nameplate shall include the ETL/ETL Canada label.

1.03 SUBMITTALS

A. Product Data: Literature shall be provided that indicates dimensions, operating and shipping weights, capacities, ratings, fan performance, filter information, factory supplied accessories, electrical characteristics and connection requirements. Installation, Operation, and Maintenance manual with startup requirements shall be provided.

B. Shop Drawings: Unit drawings shall be provided that indicate assembly, unit dimensions, construction details, clearances and connection details. Computer generated fan curves for each fan shall be submitted with specific design operation point noted. Wiring diagram shall be provided with details for both power and control systems and differentiate between factory installed and field installed wiring.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Unit shall be shipped with doors screwed shut and outside air hood closed to prevent damage during transport and thereafter while in storage awaiting installation.

B. Follow Installation, Operation, and Maintenance manual instructions for rigging, moving, and unloading the unit at its final location.

C. Unit shall be stored in a clean, dry place protected from construction traffic in accordance with the Installation, Operation, and Maintenance manual.

1.05 WARRANTY

A. Manufacturer shall provide a limited “parts only” warranty for a period of 24 months from the date of equipment startup or 36 months from the date of
PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Products shall be provided by the following manufacturers:
   1. AAON
   2. Substitute equipment may be considered for approval that includes at a minimum:
      a. R-410A refrigerant
      b. Variable capacity compressor with 10-100% capacity control
      c. VFD controlled variable speed compressor
      d. Direct drive supply fans
      e. Double wall cabinet construction
      f. Insulation with a minimum R-value of 13
      g. Stainless steel drain pans

2.02 ROOFTOP UNITS

A. General Description
   1. Packaged rooftop unit shall include compressors, evaporator coils, filters, supply fans, dampers, air-cooled condenser coils, condenser fans, hot water coils, exhaust fans, and unit controls.
   2. Unit shall be factory assembled and tested including leak testing of the DX coils, leak testing of the hot water coils, pressure testing of the refrigeration circuit, and run testing of the completed unit. Run test report shall be supplied with the unit in the service compartment’s literature pocket.
   3. Unit shall have decals and tags to indicate lifting and rigging, service areas and caution areas for safety and to assist service personnel.
   4. Unit components shall be labeled, including pipe stub outs, refrigeration system components and electrical and controls components.
   5. Estimated sound power levels (dB) shall be shown on the unit ratings sheet.
   6. Installation, Operation, and Maintenance manual shall be supplied within the unit.
   7. Laminated color-coded wiring diagram shall match factory installed wiring and shall be affixed to the interior of the control compartment’s hinged access door.
   8. Unit nameplate shall be provided in two locations on the unit, affixed to the exterior of the unit and affixed to the interior of the control compartment’s hinged access door.

B. Construction
   1. All cabinet walls, access doors, and roof shall be fabricated of double wall, impact resistant, rigid polyurethane foam panels.
   2. Unit insulation shall have a minimum thermal resistance R-value of 13. Foam insulation shall have a minimum density of 2 pounds/cubic foot and shall be tested in accordance with ASTM D1929-11 for a minimum flash ignition temperature of 610°F.
3. Unit construction shall be double wall with G90 galvanized steel on both sides and a thermal break. Double wall construction with a thermal break prevents moisture accumulation on the insulation, provides a cleanable interior, prevents heat transfer through the panel, and prevents exterior condensation on the panel.

4. Unit shall be designed to reduce air leakage and infiltration through the cabinet. Cabinet leakage shall not exceed 1% of total airflow when tested at 3 times the minimum external static pressure provided in AHRI Standard 340/360. Panel deflection shall not exceed L/240 ratio at 125% of design static pressure, at a maximum 8 inches of positive or negative static pressure, to reduce air leakage. Deflection shall be measured at the midpoint of the panel height and width. Continuous sealing shall be included between panels and between access doors and openings to reduce air leakage. Piping and electrical conduit through cabinet panels shall include sealing to reduce air leakage.

5. Panel deflection shall not exceed L/240 ratio at 125% of design static pressure, maximum 8 inches of positive or negative static pressure. Deflection shall be measured at the midpoint of the panel height and width. Continuous sealing shall be included between panels and between access doors and openings to reduce air leakage. Piping and electrical conduit through cabinet panels shall include sealing to reduce air leakage. Cabinet leakage shall not exceed 1% of total airflow when tested at 6 inches of static pressure.

6. Roof of the air tunnel shall be sloped to provide complete drainage. Cabinet shall have rain break overhangs above access doors.

7. Access to filters, dampers, cooling coils, exhaust fans, compressors, and electrical and controls components shall be through hinged access doors with quarter turn, zinc cast, lockable handles. Full length stainless steel piano hinges shall be included on the doors.

8. Exterior paint finish shall be capable of withstanding at least 2,500 hours, with no visible corrosive effects, when tested in a salt spray and fog atmosphere in accordance with ASTM B 117-95 test procedure.

9. Units with cooling coils shall include double sloped 304 stainless steel drain pans.

10. Unit shall be provided with base discharge and return air openings. All openings through the base pan of the unit shall have upturned flanges of at least 1/2 inch in height around the opening.

11. Unit shall include lifting lugs on the top of the unit.

12. Unit base shall be fabricated of 3-inch-thick double wall, impact resistant, rigid polyurethane foam panels.

13. Unit shall include factory installed, painted galvanized steel condenser coil guards on the face of the condenser coil.

C. Electrical
1. Unit shall be provided with factory installed and factory wired, non-fused disconnect switch.

D. Supply Fans
1. Unit shall include direct drive, unhoused, backward curved, plenum supply fans.
2. Blowers and motors shall be dynamically balance and mounted on rubber isolators.
3. Motors shall be premium efficiency ODP with ball bearings rated for 200,000 hours service with external lubrication points.
4. Variable frequency drives shall be factory wired and mounted in the unit. Fan motors shall be premium efficiency.
E. Exhaust Fans
   1. Exhaust dampers shall be sized for 100% relief.
   2. Fans and motors shall be dynamically balanced.
   3. Motors shall be premium efficiency ODP with ball bearings rated for
      200,000 hours service with external lubrication points.
   4. Access to exhaust fans shall be through double wall, hinged access
      doors with quarter turn lockable handles.
   5. Unit shall include belt driven, forward curved exhaust fans.
   6. Variable frequency drives shall be factory wired and mounted in the
      unit. Fan motors shall be premium efficiency.

F. Cooling Coils
   1. Evaporator Coils
      a. Coils shall be designed for use with R-410A refrigerant and
         constructed of copper tubes with aluminum fins mechanically
         bonded to the tubes and galvanized steel end casings. Fin design
         shall be sine wave rippled.
      b. Coils shall have interlaced circuitry and shall be standard capacity.
      c. Coils shall have interlaced circuitry and shall be standard capacity.
      d. Coils shall be hydrogen or helium leak tested.
      e. Coils shall be furnished with factory installed expansion valves.

G. Refrigeration System
   1. Unit shall be factory charged with R-410A refrigerant.
   2. Compressors shall be scroll type with thermal overload protection and
      carry a 5 year non-prorated warranty, from the date of original
      equipment shipment from the factory.
   3. Compressors shall be mounted in an isolated service compartment
      which can be accessed without affecting unit operation. Lockable
      hinged compressor access doors shall be fabricated of double wall, rigid
      polyurethane foam injected panels to prevent the transmission of noise
      outside the cabinet.
   4. Compressors shall be isolated from the base pan with the compressor
      manufacturer's recommended rubber vibration isolators, to reduce any
      transmission of noise from the compressors into the building area.
   5. Each refrigeration circuit shall be equipped with expansion valve type
      refrigerant flow control.
   6. Each refrigeration circuit shall be equipped with automatic reset low
      pressure and manual reset high pressure refrigerant safety controls,
      Schrader type service fittings on both the high pressure and low
      pressure sides and a factory installed replaceable core liquid line filter
      driers.
   7. AC-A2 & AC-A3 Units shall include a variable capacity scroll compressor
      on the lead refrigeration circuit which shall be capable of modulation
      from 10-100% of its capacity.
   8. AC-B1 & AC-A1 Unit shall include all VFD controlled, variable speed
      scroll compressors on all refrigeration circuits which shall be capable of
      modulating refrigerant capacity.
   9. AC-B1 & AC-A1 Lag refrigeration circuits shall be provided with factory
      installed hot gas bypass to protect against evaporator frosting and to
      prevent excessive compressor cycling.

H. Condensers
   1. Air-Cooled Condenser
      a. Condenser fans shall be a vertical discharge, axial flow, direct drive
         fans.
b. Coils shall be designed for use with R-410A refrigerant. Coils shall be multi-pass and fabricated from aluminum microchannel tubes.

c. Coils shall be designed for a minimum of 10°F of refrigerant sub-cooling.

d. Coils shall be hydrogen or helium leak tested.

e. AC-A2 Condenser fans shall be high efficiency electrically commutated motor driven with factory installed head pressure control module. Condenser airflow shall continuously modulate based on head pressure and cooling operation shall be allowed down to 35°F with adjustable compressor lockout.

f. AC-A3, AC-B1 & AC-A1 Condenser fans shall be VFD driven variable speed for condenser head pressure control. Factory provided and factory programmed VFDs shall continuously modulate the fan airflow to maintain head pressure at acceptable levels. Cooling operation shall be allowed down to 35°F with adjustable compressor lockouts.

I. Heating Coils

1. Hot Water Heating Coils

a. Coils shall be certified in accordance with AHRI Standard 410 and be hydrogen or helium leak tested.

b. Coils shall be constructed of copper tubes with aluminum fins mechanically bonded to the tubes and galvanized steel end casings. Fin design shall be sine wave rippled.

c. Coils shall be one row, half serpentine circuitry, and 10 fins per inch.

d. Coils shall be located in the reheat position downstream of the cooling coil.

J. Filters

1. Unit shall include 4-inch-thick, pleated panel filters with an ASHRAE efficiency of 85% and a MERV rating of 13, upstream of the cooling coil. Unit shall also include 2-inch-thick, pleated panel pre-filters with an ASHRAE efficiency of 30% and MERV rating of 8, upstream of the 4 inch standard filters.

2. Unit shall include 0-100% economizer consisting of a motor operated outside air damper and return air damper assembly constructed of extruded aluminum, hollow core, airfoil blades with rubber edge seals and aluminum end seals. Damper blades shall be gear driven and designed to have no more than 20 cfm of leakage per sq ft. at 4 in. w.g. air pressure differential across the damper. Low leakage dampers shall be Class 2 AMCA certified, in accordance with AMCA Standard 511. Damper assembly shall be controlled by spring returnenthalpy activated fully modulating actuator. Unit shall include outside air opening bird screen, outside air hood, and barometric relief dampers.

3. Economizer shall be furnished with the Constant Volume Outside Air ventilation control assembly which maintains a minimum amount of entering outside air. It shall measure the outside air velocity pressure and adjust the economizer dampers to maintain a constant velocity pressure and thus a constant volume of outside air.

K. Controls

1. All controls shall be Provided by the Andover control contractor and installed at the factory. A supervisory controller shall manage the refrigeration and be enable/disabled/setpoint adjusted by the EMS.

L. Accessories
1. Unit shall be provided with a smoke detector sensing the supply air of the unit, wired to shut off the unit’s control circuit.

PART 3 - EXECUTION

3.01 INSTALLATION, OPERATION, AND MAINTENANCE

A. Installation, Operation, and Maintenance manual shall be supplied with the unit.

B. Installing contractor shall install unit, including field installed components, in accordance with Installation, Operation, and Maintenance manual instructions.

C. Start up and maintenance requirements shall be complied with to ensure safe and correct operation of the unit.

END OF SECTION 23 71 11
SECTION 32 31 13

CHAIN LINK FENCES AND GATES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fence framework, fabric, and accessories.
B. Excavation for post bases; concrete foundation for posts.
C. Manual gates and related hardware.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Concrete anchorage for posts.
B. Section 08 71 00 - Door Hardware: Gate locking device.

1.03 REFERENCE STANDARDS

D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
G. ASTM F668 - Standard Specification for Polyvinyl Chloride (PVC) and Other Organic Polymer-Coated Steel Chain-Link Fence Fabric; 2011.
J. ASTM F1665 - Standard Specification for Poly(Vinyl Chloride)(PVC) and Other Conforming Organic Polymer-Coated Steel Barbed Wire Used with Chain-Link Fence; 2008 (Reapproved 2013).

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data on fabric, posts, accessories, fittings and hardware.

C. Shop Drawings: Indicate in plan layout and elevation, spacing of components, post foundation dimensions, hardware anchorage, and schedule of components.

D. Manufacturer's Installation Instructions: Indicate installation requirements, post foundation anchor bolt templates, and anchor

E. Project Record Documents: Accurately record actual locations of property perimeter posts relative to property lines and easements.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Chain Link Fences and Gates:
   2. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 MATERIALS


C. Concrete: Ready-mixed, complying with ASTM C 94/C 94M; normal Portland cement; 2,500 psi (17 MPa) strength at 28 days, 3 inch (75 mm) slump; 1.5 inch (38 mm) nominal size aggregate.

2.03 COMPONENTS

A. Line Posts: 2.38 inch (60 mm) diameter.

B. Corner and Terminal Posts: 4.0 inch (100 mm).

C. Gate Posts: 6.0 inch (155 mm) diameter.

D. Top and Brace Rail: 1.66 inch (42 mm) diameter, plain end, sleeve coupled.

E. Gate Frame: 1.66 inch (42 mm) diameter for welded fabrication.

F. Fabric: 2 inch (51 mm) diamond mesh interwoven wire, 6 gage, 0.1620 inch (4.12 mm) thick, top selvage knuckle end closed, bottom selvage twisted tight.

G. Tension Wire: 9 gage (3.75 mm) thick steel, single strand.

H. Tension Band: 3/8 inch (9.5 mm) thick steel.

I. Tie Wire: Aluminum alloy steel wire.

2.04 ACCESSORIES/HARDWARE

A. Caps: Cast steel galvanized; sized to post diameter, set screw retainer.
B. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings; steel.

C. Hardware for Single Swinging Gates: 180 degree hinges, 2 for gates up to 60 inches (1525 mm) high, 3 for taller gates; fork latch with gravity drop and padlock hasp; keeper to hold gate in fully open position.

D. Hardware for Double Swinging Gates: 180 degree hinges, 2 for gates up to 60 inches (1525 mm) high, 3 for taller gates; drop bolt on inactive leaf engaging socket stop set in concrete, active leaf latched to inactive leaf preventing raising of drop bolt, padlock hasp; keepers to hold gate in fully open position.

E. Privacy Slats: Vinyl strips, sized to fit fabric weave.

F. Gates that are part of the accessible route shall meet all the requirements of an accessible door in compliance with CBC Section 11B-404.

G. The lever of lever actuated latches or locks for an accessible gate shall be curved with a return to within 1/2" of the (face of) gate to prevent catching on the clothing or persons. California Referenced Standards code. T-24 part 12, Section 12-10-202, Item (F).

H. Swing doors and gate surfaces within 10" of the finish floor or ground shall have a smooth surface on the push side extending the full width of the door or gate. Parts creating horizontal or vertical joints in these surfaces shall be within 1/16" of the same plane as the other and be free of sharp or abrasive edges. Cavities created by added kick plates shall be capped. CBC Section 11B-404.2.10

I. The clear opening width for a door shall be 32" minimum. For a swinging doors it shall be measured between the face of the door and the stop, with the door open 90 degrees. There shall be no projections into it below 34" and 4" maximum projections into it between 34" and 80" above the finish floor or ground. Door closers and stops shall be permitted to be 78" minimum above the finish floor or ground. CBC Section 11B-404.2.3

J. Handles pulls, latches, locks, and other operable parts on accessible doors shall comply with CBC Section 11B-309.4 and shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. Operable parts of such hardware shall be 34" minimum and 44" maximum above finish floor or ground. Where sliding doors are in the fully open position, operating hardware shall be exposed and usable from both sides. CBC Section 11B-404.2.7

K. The force for pushing or pulling open a door shall be as follows: CBC Section 11B-404.2.9
   1. Interior hinged doors, sliding or folding doors: 5 pounds (22.2N) maximum. Required fire doors: the minimum opening force allowable by the DSA authority, not to exceed 15 pounds (67N). These forces do not apply to the force required to retract latch bolts or disengage other devices that hold the door in a closed position.
   2. The force required for activating any operable parts, such as lever hardware, or disengaging other devices shall be 5 pounds (22.2 N) maximum to comply with CBC Section 11B-309.4

L. Door closing speed shall be as follows: CBC Section 11B-404.2.8
1. Closer shall be adjusted so that the required time to move a door from an open position of 90 degrees to a position of 12 degrees from the latch is 5 seconds min.

2. Spring hinges shall be adjusted so that the required time to move a door from an open position of 70 degrees to the closed position is 1.5 seconds minimum.

M. Thresholds shall comply with CBC Section 11B-404.2.5

N. Floor stops shall not be located in the path of travel and 4" maximum from walls. DSA Policy 99-08.

O. Hardware (including panic hardware) shall not be provided with "Night Latch" (NL) function for any accessible doors or gates unless the following conditions are met per DSA Interpretation 10-08 DSA/AC (External), revised 4/28/09. Such conditions must be clearly demonstrated and indicated in the specifications:
   1. Such hardware has a 'dogging' feature.
   2. It is dogged during the time the facility is open.
   3. Such 'dogging' operation is performed only by employees as their job function (non-public use).

P. Pair of doors: limit swing of one leaf to 90 degrees so that a clear floor space is provided beyond the arc of the swing for the wall-mounted tactile sign. CBC Section 11B-703.4.2.1

2.05 FINISHES

A. Components and Fabric: Vinyl coated over coating of 1.8 oz/sq ft galvanizing (over coating of 550 g/sq m galvanizing).

B. Hardware: Hot-dip galvanized to weight required by ASTM A153/A153M.

C. Accessories: Same finish as framing.

D. Color(s): Black.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install framework, fabric, accessories and gates in accordance with ASTM F567.

B. Place fabric on outside of posts and rails.

C. Set intermediate posts plumb, in concrete footings with top of footing 2 inches above finish grade. Slope top of concrete for water runoff.

D. Line Post Footing Depth Below Finish Grade: ASTM F 567.

E. Corner, Gate and Terminal Post Footing Depth Below Finish Grade: ASTM F 567.

F. Brace each gate and corner post to adjacent line post with horizontal center brace rail and diagonal truss rods. Install brace rail one bay from end and gate posts.

G. Provide top rail through line post tops and splice with 6 inch (150 mm) long rail sleeves.

H. Install center brace rail on corner gate leaves.

I. Do not stretch fabric until concrete foundation has cured 28 days.
J. Stretch fabric between terminal posts or at intervals of 100 feet (30 m) maximum, whichever is less.

K. Position bottom of fabric 2 inches (50 mm) above finished grade.
   L. Fasten fabric to top rail, line posts, braces, and bottom tension wire with tie wire at maximum 15 inches (380 mm) on centers.
   M. Attach fabric to end, corner, and gate posts with tension bars and tension bar clips.
   N. Install bottom tension wire stretched taut between terminal posts.
   O. Install support arms sloped inward and attach barbed wire; tension and secure.
   P. Do not attach the hinged side of gate to building wall; provide gate posts.
   Q. Install hardware and gate with fabric and barbed wire overhang to match fence.
   R. Provide concrete center drop to footing depth and drop rod retainers at center of double gate openings.
   S. Ground fence in accordance with Section 33 79 00.

3.02 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch (6 mm).
B. Maximum Offset From True Position: 1 inch (25 mm).
C. Components shall not infringe adjacent property lines.
This and all other project documents and ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are the registered property of LPA, INC. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as described in the contractual agreement between LPA and Client. LPA hereby gives formal notice that any such project document use, reproduction or modification (misuse) is not only unlawful but automatically binds all parties involved with misuse to fully indemnify and defend LPA and LPA's Consultants to the maximum legal extent against all losses, demands, claims or liabilities arising directly or indirectly from project document misuse. Project documents describe design intent of work and are not a representation of as-built or existing conditions. LPA and LPA's Consultants make no representations concerning the accuracy of documents and are not responsible for any discrepancies between project documents and the existing conditions.
Note: Suggested Quantity of Bubbler's per tree and shrub size:
15 gal and 24" box = 2 flood bubbler's
36" box and 48" box = 2 flood bubbler's and 2 Deep root bubbler's
60" box and 72" box = 3 Flood Bubbler's and 3 Deep Root Bubbler's
PLANTING LEGEND

TREE LIST

SHRUB LIST

ORNAMENTAL GRASSES LIST

GROUNDCOVER LIST

TURF LIST

GROUNDCOVER LIST

MISCELLANEOUS

VINE LIST

This and all other project documents and all ideas, aesthetics and designs incorporated therein are instruments of service. All project documents are the registered property of LPA, INC. (LPA) and cannot be lawfully used in whole or in part for any project or purpose except as described in the contractual agreement between LPA and Client. LPA hereby gives formal notice that any such project document use, reproduction or modification (misuse) is not only unlawful but automatically binds all parties involved with misuse to fully indemnify and defend LPA and LPA's Consultants to the maximum legal extent against all losses, demands, claims or liabilities arising directly or indirectly from project document misuse.

Project documents describe design intent of work and are not a representation of as-built or existing conditions. LPA and LPA's Consultants make no representations concerning the accuracy of documents and are not responsible for any discrepancies between project documents and the existing conditions.

LOS MEDANOS COLLEGE

STUDENT UNION COMPLEX

2700 East Leland Road

Pittsburg, CA 94565

Contra Costa Community College District

CL/RF 04/13/2017

50% DESIGN DEVELOPMENT

02/26/2016

85% DESIGN DEVELOPMENT

04/01/2016

90% DESIGN DEVELOPMENT

04/15/2016

100% DESIGN DEVELOPMENT

05/06/2016

50% CONSTRUCTION DOCUMENTS

08/02/2016

90% CONSTRUCTION DOCUMENTS

09/26/2016

ID/STN

SIGNATURE

RENEWAL DATE
AM 09.06 WALL FURRING FOR RAIN WATER LEADER & ROOF OVER FLOW PIPING. PLACE CONCRETE BENCH, SEE 03/A8.12. ALIGN WITH EXTERIOR BENCH 10.08 MIRROR, SEE 03/A9.13.

36"W X 24"D X 84"H; FLOOR ANCHORED, SEE 20/A9.31 DOOR AND INTEGRATED SEAT BY WENGER; RE: FINISH SCHEDULE 26' - 1"

22' - 7 1/2"

AA3.22

15

7' - 7 7/8"

A6

6' - 8 3/4"

PE-107B

10.23

A22

6' - 6"

C6

EH

6' - 1"

9' - 1"

AA3.01

10.25

09

AA5.01

15

37' - 6"

116' - 10"

26.04

A07

40' - 0"
ALL SLOPES TO DRAIN AT EXIT BALCONY SHALL BE MAX. 2%.

T.O. CONC. SLAB @ +14'-7 1/2". TOPPING SLAB OVER CONC. SLAB @ 9' - 0".

CONCRETE CURB TO BE 6" WIDE & 6" HIGH, TYP. (UNO).

CONCRETE FILL OVER METAL DECK - SECOND FLOOR, SEE SPECIALITIES & SPECIALTIES.

CURB U.O.N. 1' - 2 1/2"; CONTRASTING STRIPE; 1/2'' DEPRESSION FOR CURB CONC.

6" CONC. MTL. DECK CURB 7" EDGE OF MTL. DECK.

INDICATES SLOPE, WHERE SHOWN

FS = FLOOR SINK   (COORDINATE FS W/ FOOD SERVICE DW GS)

AD = AREA DRAIN

FD = FLOOR DRAIN

LOCALIZED DEPRESSION, 2% MAX

LOCALIZED DEPRESSION, 2'x2', SLOPE TO DRAIN

SEE SPECIFICATIONS FOR ADDITIONAL INFO. DO NOT USE A CURING COMPOUND.

ADD WATERPROOFING ADMIXTURE TO ALL BUILDING 'SLAB ON GRADE' PLACED CONCRETE.

OPENING 3'-8"
TO EXTERIOR WALLS NOT SHOWN OR IDENTIFIED.

1. SEE DRAWINGS OF OTHER DISCIPLINES FOR DEVICES OR EQUIPMENT MOUNTED

GENERAL NOTES

TYP.

EQ.

A1

A1.3

05.01

3

A15

1' - 0"

A2

TO EXTERIOR WALLS NOT SHOWN OR IDENTIFIED.

1. SEE DRAWINGS OF OTHER DISCIPLINES FOR DEVICES OR EQUIPMENT MOUNTED

GENERAL NOTES

TYP.

EQ.

A14

EQ.

A4

EAST ENTRY - SOUTH ELEV

TYP.

3

3

28.02 FA DEVICE, SEE FIRE ALARM DWGS.

22.14 DRINKING FOUNTAIN, SURFACE MOUNTED, SEE 19/A9.  41, SEE PLUMBING DWGS

10.48 POWER ASSIST BUTTON (HI-LO) - MOUNTED @ 40" MA X. A.F.F FOR HIGH BUTTON, +7" A.F.F. FOR LOW

07.14 SEISMIC JOINT COVER ASSEMBLY - EXTERIOR, W/ AL UMN. PANEL, SEE DETAIL CALLOUT

08.03 COILING COUNTER DOOR (MOTORIZED), SEE DOOR SCHEDULE ON SHEET A6.01

08.02 ALUMINUM GLAZING SYSTEM, SEE OPENING TYPES.

08.01 ALUMINUM GLAZING SYSTEM, SEE OPENING TYPES.

07.01 U.H.P. CONC. PANEL SYSTEM,  ATTACHED TO SUBGRI D. SEE SHEET A8.11 FOR TYP. DTL'S &   ADD

05.53 PIN MOUNTED ALUMINUM CHANNEL LETTER SIGNAGE. S EE DTL 6,8,12/A8.12

05.40 ENTRY CANOPY ROOF STRUCTURE, SEE WALL SECTION & S.S.D.

05.32 ROOF SCREEN STRUCTURE W / PERFORATED MTL. PANE L. S.S.D.

05.19 HORIZONTAL ALUMINUM WINDOW FINS BY WINDOW MANU F., SEE OPENING TYPES & WALL SECTIONS

05.01 COVERED WALK - CANOPY STRUCTURE, SEE ENLARGED PLANS 02 & 04 AA4.06 & S.S.D.

ALTERNATE #2 SYSTEM DIFFERENCES.

OPENING TYPES WHERE OCCURS & ADDITIONAL INFO.

FOR ADD. INFO.

A1

A1.3

05.01

1/8" = 1'-0"

A1

05.32

1/8" = 1'-0"

A1

05.19

TYP.

07.14

1/8" = 1'-0"

A1

05.32

1/8" = 1'-0"

A1

05.40

1/8" = 1'-0"

A1

05.53

1/8" = 1'-0"

A1

05.40

1/8" = 1'-0"

A1

05.53

1/8" = 1'-0"

A1

05.32

1/8" = 1'-0"

A1

05.19

TYP.

07.14

1/8" = 1'-0"

A1

05.53

1/8" = 1'-0"

A1

05.40

1/8" = 1'-0"

A1

05.53

1/8" = 1'-0"

A1

05.40

1/8" = 1'-0"

A1
<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Manufacturer</th>
<th>Style / Number</th>
<th>Color / Finish</th>
<th>Section</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>UHPC-2 Ultra High Performance Concrete Panel (Accent)</td>
<td>TAKTL CASE/ MICROSEAL DUNE/ TEXTURE: REEDS 074273 PE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>UHPC-1 Ultra High Performance Concrete Panel</td>
<td>TAKTL CASE/ MICROSEAL NATURAL/ TEXTURE: REEDS 074273 SU, PE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>MCT-3 Linear Metal Suspended Ceiling System (3&quot;x1 1/4)</td>
<td>CEILINGS PLUS PLANKS SARANTE BLOND PEAR S-15 095425 PE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>MCT-1 Perforated Metal Ceiling (24x24)</td>
<td>CEILINGS PLUS ILLUSIONS WHITE/PERF PATTERN: LT22 095424 SU</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>ACT-1 Acoustic Ceiling Tile (24x48)</td>
<td>ARMSTRONG DUNE SECOND LOOK II WHITE 095100 SU, PE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>ACT-4 Acoustic Ceiling Tile (24x48)</td>
<td>ARMSTRONG CLEAN ROOM VL WHITE 095100 SU</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>ACT-3 Acoustic Ceiling Tile (48x48)</td>
<td>ARMSTRONG OPTIMA SQUARE TEGULAR WHITE 095100 SU</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>MP-1 Metal Wall Panel System (Wall)</td>
<td>CEILINGS PLUS WALLFORMS SATEEN 098433 SU</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>QZ-2 Engineered Quartz Surfacing</td>
<td>SILESTONE SILVER NUBE 123661 SU</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>PC-1 Polished Concrete - Polished Concrete Floor</td>
<td>033536 SU, PE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>RS-1 Solar Shade Fabric</td>
<td>MECOSHADE ECOVEIL SCREENS 0950 SERIES (1% OPEN) 0970 SHADOW GREY 122413 SU, PE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>SS-2 Stainless Steel Counter</td>
<td>BRUSHED 123616 SU, PE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>SP-1 Rubber Sports Floor</td>
<td>MONDO SPORT IMPACT (10MM) DARK GREY 096566 PE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>SP-2 Rubber Sports Floor</td>
<td>MONDO SPORT IMPACT (10MM) DARK GREY 096566 PE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>PL-1 Plastic Laminate (Typical Vertical Surfaces, U.N.O.)</td>
<td>FORMICA 1097-58 CITADEL/MATTE 064150 SU, PE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>PL-4 Plastic Laminate (Bookstore)</td>
<td>WILSONART 7941K-18 TAN ECHO 064000 SU</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>PL-3 Plastic Laminate (Wood Panel)</td>
<td>PIONITE WM 951 HONEY MAPLE/ SUEDE 064000 SU</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>PL-2 Plastic Laminate (Typical Countertop Surfaces, U.N.O.)</td>
<td>NEVAMAR WZ0057T CALYPSO 064150 SU, PE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>P-11 Paint (Accent Paint)</td>
<td>DUNN EDWARDS DE 5957 PRINCELY VIOLET 099100 SU - LEARNING 02 SU-221</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>P-10 Paint (Accent Paint)</td>
<td>DUNN EDWARDS DET 449 CITRUS NOTES 099100 SU - LEARNING 01 SU-224</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>P-12 Paint (Accent Paint)</td>
<td>DUNN EDWARDS DET 507 GOTHIC REVIVAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>P-5 Paint (Accent Paint)</td>
<td>DUNN EDWARDS DE 6363 POINTED ROCK 099100 SU - METAL COMPONENTS @ LOBBY STAIR,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>P-4 Paint (Accent Paint)</td>
<td>DUNN EDWARDS DE 6375, CASTLEROCK 099100 PE - HALLWAY &amp; CLASSROOMS, EXPOSED</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>P-8 Paint (Accent Paint)</td>
<td>DUNN EDWARDS DET 630 RENWICK BROWN 099100 SU, PE - MECH. ROOF SCRE EN</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>P-9 Paint (Accent Paint)</td>
<td>DUNN EDWARDS TBD 099100 SU - SERVERY SU-124</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>P-1 Paint (Typical Paint Throughout U.N.O.)</td>
<td>DUNN EDWARDS DE 6372 LACE VEIL 099100 SU, PE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>B-7 Epoxy Base - Finish to match EP-1</td>
<td>SPECCERAMICS NEWSTONE LONDON GREY/ NATURAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>B-5 6&quot;H Cov ed Concrete Curb Base</td>
<td>W/ SEALANT CLEAR 033536 SU, REFER TO DETAIL 04/A9.13</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>B-2 4&quot;H Vented Wall Base</td>
<td>CONNOR BLACK 096466 PE, REFER TO DETAIL 04/A9.13</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>T-5 Composite Stone (Stair Treads)</td>
<td>HG STONES IRON COLLECTION BETON SATINADO 093000 SU</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>T-3 Composite Stone (Stair Treads)</td>
<td>HG STONES NEOLITH IRON COLLECTION BETON SATINADO 093000 SU, SINGLE TILE TO SPAN FULL WIDTH/DEPTH OF</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>T-1 Porcelain Tile (12&quot;x12&quot;)</td>
<td>SPECCERAMICS NEWSTONE LONDON GREY/ NATURAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>T-2 Porcelain Tile (12&quot;x24&quot;)</td>
<td>SPECCERAMICS NEWSTONE LONDON GREY/ POLISHED</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>L-3 Plastic Lockers</td>
<td>BRADLEY LENOX S215 CHARCOAL GRAY 105126 SU</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>L-1 Steel Wire MTL. Lockers</td>
<td>WENGER GEARBOSS AIRPRO PAINTED STEEL: CUSTOM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
AT EACH PLATE, 2" EACH LEG
ENTRY CANOPY - AT CURTAIN WALL
AT 4'-0" O.C. MAX.
3/8" X 2" BENT PLATE
ROOF TOP UNIT BASE FLASHING
5" CLR.
PER ANCHORAGE SCHEDULE
5 3/4"
2"X2"X 18 EMBEDMENT, WHERE OCCURS.
1/2" X 2" STEEL CURTAIN WALL ASSEMBLY WHERE OCCURS O.C. MAX.
DWGS.
SEE STRUCTURAL ROOF BOARD 1/2" DENSDECK PRIME
16 GA. BENT SHEET METAL PLATE
#10 SCREWS WITH EPDM MECHANICAL UNIT, SEE
STEEL COLUMN, S.S.D.
STEEL BEAM, S.S.D.
1 1/2" = 1'-0"
METAL STUD BLOCKING STUD BLOCKING SHOWN.
PROVIDE DOUBLE STUDS @ STRUCT. DWGS.
CONCRETE PAD, SEE ROOF SYSTEM SINGLE PLY 1'-7"
1/2" DENS-DECK ROOF BOARD OVER RIGID INSULATION OVER ROOFING BOARD OVER RIGID INSULATION OVER ROOF 1/2" DENS-DECK PRIME ROOF BOARD REINFORCED SINGLE PLY ROOFING SYSTEM WITH INTEGRAL CAP FLASHING ROOF HATCH CURB ASSEMBLY ROOF PENETRATION 6" MIN.
OVERFLOW DRAIN VENT STACKS AND OTHER PIPES SHALL HAVE A MIN. OF 12" OF CLEARANCE PENETRATION MEMBER USE STAINLESS STEEL SEALS FOR TERMINATION TYP. ROOF PIPE / PLUMBING VENT HEAT WELD PREFORMED CORNER - PREFABRICATED ROOF METAL DECK, HOT-AIR WELDED TO SINGLE PLY ROOFING EDGE WITH EPDM WASHERS \*NOTE: 3/4" = 1'-0"
OVER PARAPET FRAMING WRAP ROOFING MEMBRANE IN INFORMATION NOT SHOWN SEE DTL. 19/A8.21 FOR (4) #8 EYEBOLT ANCHORS, KIT BY MFR (4) 1-1/2" EMT COMPRESSION STRUTS 12 GA SPLAY WIRE AT 45 DEG EA FREE END OF STRUTS 3/8" X 2" BENT PLATE ATTACHED TO ROOF W/ #10 SMS @ 12" STAGGERED 12", 16 GA. MTL. STUD SUBGRID. SUBGRID \*NOTE: 3/4" = 1'-0"
ATTACHED W/ #10 SMS @ 12" STAGGERED 12", 16 GA. MTL. STUD SIDE OF HSS POST. W/ 1/4" FILLET WELD EA. ROOFING SYSTEM BELOW STRUCTURE, S.S.D.
ROOF SCREEN 8" MIN.
4" MIN.
4" MIN.
WRAP UP ROOFING SEALANT AT TOP BEYOND TOP OF PARAPET
ATTACH SCREEN PANEL W/ #10 SMS W/ 5/8" WASHERS @ 8" O.C. OVER PARAPET FRAMING WRAP ROOFING MEMBRANE IN INFORMATION NOT SHOWN SEE DTL. 19/A8.21 FOR (4) #8 EYEBOLT ANCHORS, KIT BY MFR (4) 1-1/2" EMT COMPRESSION STRUTS 12 GA SPLAY WIRE AT 45 DEG EA FREE END OF STRUTS 3/8" X 2" BENT PLATE ATTACHED TO ROOF W/ #10 SMS @ 12" STAGGERED 12", 16 GA. MTL. STUD SIDE OF HSS POST. W/ 1/4" FILLET WELD EA. ROOFING SYSTEM BELOW STRUCTURE, S.S.D.
ROOF SCREEN 8" MIN.
4" MIN.
4" MIN.
WRAP UP ROOFING SEALANT AT TOP BEYOND TOP OF PARAPET
ATTACH SCREEN PANEL W/ #10 SMS W/ 5/8" WASHERS @ 8" O.C. OVER PARAPET FRAMING WRAP ROOFING MEMBRANE IN INFORMATION NOT SHOWN SEE DTL. 19/A8.21 FOR (4) #8 EYEBOLT ANCHORS, KIT BY MFR (4) 1-1/2" EMT COMPRESSION STRUTS 12 GA SPLAY WIRE AT 45 DEG EA FREE END OF STRUTS 3/8" X 2" BENT PLATE ATTACHED TO ROOF W/ #10 SMS @ 12" STAGGERED 12", 16 GA. MTL. STUD SIDE OF HSS POST. W/ 1/4" FILLET WELD EA. ROOFING SYSTEM BELOW STRUCTURE, S.S.D.
ROOF SCREEN 8" MIN.
4" MIN.
4" MIN.
WRAP UP ROOFING SEALANT AT TOP BEYOND TOP OF PARAPET
ATTACH SCREEN PANEL W/ #10 SMS W/ 5/8" WASHERS @ 8" O.C. OVER PARAPET FRAMING WRAP ROOFING MEMBRANE IN INFORMATION NOT SHOWN SEE DTL. 19/A8.21 FOR (4) #8 EYEBOLT ANCHORS, KIT BY MFR (4) 1-1/2" EMT COMPRESSION STRUTS 12 GA SPLAY WIRE AT 45 DEG EA FREE END OF STRUTS 3/8" X 2" BENT PLATE ATTACHED TO ROOF W/ #10 SMS @ 12" STAGGERED 12", 16 GA. MTL. STUD SIDE OF HSS POST. W/ 1/4" FILLET WELD EA. ROOFING SYSTEM BELOW STRUCTURE, S.S.D.
ROOF SCREEN 8" MIN.
4" MIN.
4" MIN.
WRAP UP ROOFING SEALANT AT TOP BEYOND TOP OF PARAPET
ATTACH SCREEN PANEL W/ #10 SMS W/ 5/8" WASHERS @ 8" O.C. OVER PARAPET FRAMING WRAP ROOFING MEMBRANE IN INFORMATION NOT SHOWN SEE DTL. 19/A8.21 FOR (4) #8 EYEBOLT ANCHORS, KIT BY MFR (4) 1-1/2" EMT COMPRESSION STRUTS 12 GA SPLAY WIRE AT 45 DEG EA FREE END OF STRUTS 3/8" X 2" BENT PLATE ATTACHED TO ROOF W/ #10 SMS @ 12" STAGGERED 12", 16 GA. MTL. STUD SIDE OF HSS POST. W/ 1/4" FILLET WELD EA. ROOFING SYSTEM BELOW STRUCTURE, S.S.D.
ROOF SCREEN 8" MIN.
4" MIN.
4" MIN.
WRAP UP ROOFING SEALANT AT TOP BEYOND TOP OF PARAPET
ATTACH SCREEN PANEL W/ #10 SMS W/ 5/8" WASHERS @ 8" O.C. OVER PARAPET FRAMING WRAP ROOFING MEMBRANE IN INFORMATION NOT SHOWN SEE DTL. 19/A8.21 FOR (4) #8 EYEBOLT ANCHORS, KIT BY MFR (4) 1-1/2" EMT COMPRESSION STRUTS 12 GA SPLAY WIRE AT 45 DEG EA FREE END OF STRUTS 3/8" X 2" BENT PLATE ATTACHED TO ROOF W/ #10 SMS @ 12" STAGGERED 12", 16 GA. MTL. STUD SIDE OF HSS POST. W/ 1/4" FILLET WELD EA. ROOFING SYSTEM BELOW STRUCTURE, S.S.D.
ROOF SCREEN 8" MIN.
4" MIN.
4" MIN.
WRAP UP ROOFING SEALANT AT TOP BEYOND TOP OF PARAPET
ATTACH SCREEN PANEL W/ #10 SMS W/ 5/8" WASHERS @ 8" O.C. OVER PARAPET FRAMING WRAP ROOFING MEMBRANE IN INFORMATION NOT SHOWN SEE DTL. 19/A8.21 FOR (4) #8 EYEBOLT ANCHORS, KIT BY MFR (4) 1-1/2" EMT COMPRESSION STRUTS 12 GA SPLAY WIRE AT 45 DEG EA FREE END OF STRUTS 3/8" X 2" BENT PLATE ATTACHED TO ROOF W/ #10 SMS @ 12" STAGGERED 12", 16 GA. MTL. STUD SIDE OF HSS POST. W/ 1/4" FILLET WELD EA. ROOFING SYSTEM BELOW STRUCTURE, S.S.D.
ROOF SCREEN 8" MIN.
4" MIN.
4" MIN.
WRAP UP ROOFING SEALANT AT TOP BEYOND TOP OF PARAPET
ATTACH SCREEN PANEL W/ #10 SMS W/ 5/8" WASHERS @ 8" O.C. OVER PARAPET FRAMING WRAP ROOFING MEMBRANE IN INFORMATION NOT SHOWN SEE DTL. 19/A8.21 FOR (4) #8 EYEBOLT ANCHORS, KIT BY MFR (4) 1-1/2" EMT COMPRESSION STRUTS 12 GA SPLAY WIRE AT 45 DEG EA FREE END OF STRUTS 3/8" X 2" BENT PLATE ATTACHED TO ROOF W/ #10 SMS @ 12" STAGGERED 12", 16 GA. MTL. STUD SIDE OF HSS POST. W/ 1/4" FILLET WELD EA. ROOFING SYSTEM BELOW STRUCTURE, S.S.D.
ROOF SCREEN 8" MIN.
4" MIN.
4" MIN.
1. ASSISTIVE LISTENING DEVICES FOR 4% OF ROOM OCCUPANT LOAD SHALL BE PROVIDED.
2. REFER TO 03/A10.21 FOR STATE FIRE MARSHALL NOTES.
3. REFER TO 12/A10.21 FOR SIGN ATTACHMENT DETAIL AT GLAZING.
4. FIRE BARRIERS, FIRE PARTITIONS, SHAFTS, SMOKE BARRIERS, AND SMOKE PARTITIONS OR ANY OTHER WALL REQUIRED TO HAVE PROTECTED OPENINGS OR PENETRATIONS SHALL BE EFFECTIVELY AND PERMANENTLY IDENTIFIED WITH SIGNS OR STENCILING PER 2013 CBC 703.7.
A. GENERAL

7. Applicable Code, Contract Documents, and applicable portions of AISI Specifications. If building
Submit design plans, details and calculations of Shop Drawings and Structural Calculations: Submit design plans, details and calculations of erection procedure, temperature differentials and weld shrinkage to minimize residue stresses. Provide photographs are not acceptable substitutes to engineering sketches.

b. Live load: 100 psf
d. Inelastic Story Drift:
e. Basic Seismic Resisting Force System:

F. CAST-IN-PLACE CONCRETE

11. d. Acceptance of Concretes:

P:1.000, 1.500 (respectively)
P:1.0
16 kips

1'-6" MIN.
5'-0" BEYOND THE EDGE

B. Horizontal Members: Place natural camber up.
Exposure to Soil: Encase structural steel in lean concrete with 4-inches concrete cover where reinforcing embedments will not be accepted.

E. Tubes:
Welding: Except in areas requiring pre-heat cooling, welds shall be made with minimum pre-heat temperature of 300°F. D. Electrical: Exposed structural steel shall be insulated with the following materials:

A. Structural Steel Welding: Apart from visual inspection and review of fabrication Structural Observation: 1.

L. Structural Welding: Pre-heat procedure:
Minimum Groove or Butt Weld Size: Provide complete penetration unless indicated otherwise. k. List of applicable electrical characteristics for he process employed. Clearly indicate specific manufacturer's recommendations (compare to AWS D1.1, Section 4.6.2).

7. Electrode manufacturer's technical information, with identification number listed, and welding classification. Include details showing shielding material to be used.

11. Water Repellent Concrete:

11. Water Repellent Concrete:

1'-6" MIN.
5'-0" BEYOND THE EDGE
TYP. A325-SC BOLTS - LOCATE AT BRACE MID-LENGTH STITCH PL3/8x4x0'-4" W/ 3/4"Ø (ARROW INDICATES LOW END)

PLAN - PROVIDE L4x3x3/8 LLV ENDS

AWS MINIMUM PERIMETER GIRDER OF INFO SEE TYPICAL (AS DEFINED BY AISC) PLUS 1/8" MAX.

3 TIMES BOLT Ø - FOR REMAINDER CONDITION

R 3/8" MINIMUM RADIUS (PLUS NOT LIMITED, OR MINUS 0)

B 3/4T" to Tf, 3/4" MINIMUM (±1/4"

"C" "Ba"

"H"

THICKNESS/GEOMETRY and QUANTITY OF FASTENERS SEE DETAIL 1B/- FOR FULL HEIGHT SHEAR PLATE

2 TIMES BOLT Ø TYP.

TYP. ENLARGED DETAIL AT WELD ACCESS

TYPICAL BOTTOM FLANGE BRACE (BRACE 2 1/2 TIMES BOLT Ø MIN.

2 TIMES BOLT Ø - TYP.

ANCHOR BOLTS PER SCHEDULE

THICKNESS/GEOMETRY and QUANTITY OF FASTENERS SEE DETAIL 1B/- FOR FULL HEIGHT SHEAR PLATE

2. WHERE OVERSIZED HOLES ARE NOT "SHEAR PLATE and FASTENERS (FOR SHEAR PLATE and FASTENERS)

NOTES SYMMETRICAL ABOUT 1/4"

1. PROVIDE THESE DRAG CONNECTIONS (BOTH COLUMNS)

2. LOCATION OF THE HANGER CONNECTION SHEET - TYPICAL SKEWED BEAM TO SUPPORT CONNECTIONS

3. PROVIDE CONNECTION PLATES (BOTH COLUMNS)

4. FOR BEAM BEARING ON COLUMN OPTION

5. FULL WIDTH STIFF PL3/8 BOTH ROW 1 and ROW 2

6. COLUMN FLANGE - 8A

7. 10° < B ≤ 30° SEE 9B/

8. 11B/-

9. TYPICAL TS HANGER DETAIL

10. HANGER SUPPORTED BEAM

11. TYPICAL DRAG CONNECTION SCHEDULE and DETAILS

12. TYP. ENLARGED DETAIL AT WELD ACCESS (HANGERS).
1. FOR GENERAL NOTES SEE S0.01 AND TYPICAL DETAILS SEE S0 SERIES SHEETS.

2. SEE ARCHITECTURAL, MECHANICAL, ELECTRICAL, AND PLUMBING DRAWINGS FOR TOP PLAN NOTES.

3. CENTER COLUMNS AT GRID INTERSECTIONS UNLESS INDICATED OTHERWISE.

4. SEE ARCHITECTURAL, MECHANICAL, ELECTRICAL, AND PLUMBING DRAWINGS FOR TOP PLAN NOTES.

5. CENTER COLUMNS AT GRID INTERSECTIONS UNLESS INDICATED OTHERWISE.

6. SEE ARCHITECTURAL, MECHANICAL, ELECTRICAL, AND PLUMBING DRAWINGS FOR TOP PLAN NOTES.

7. CENTER COLUMNS AT GRID INTERSECTIONS UNLESS INDICATED OTHERWISE.

8. NO PENETRATION IN STRUCTURAL STEEL IS PERMITTED UNLESS SPECIFICALLY INDICATED.

9. CENTER COLUMNS AT GRID INTERSECTIONS UNLESS INDICATED OTHERWISE.

10. CENTER COLUMNS AT GRID INTERSECTIONS UNLESS INDICATED OTHERWISE.
5/8" THICK "DENSDECK PRIME" SHEATHING BY GEORGIA PACIFIC W/ #8 SCREWS @ 8" O/C AT SHEET EDGES and INTERMEDIATE SUPPORTS - TYP. TOP and SIDE OF PLATFORM

NOTES SYMM. ABOUT CENTER LINE EQUIPMENT - SEE PLANS and MEP DRAWINGS FOR OPERATING WT. (275lbs. MAX.)

SECTION A-A STEEL BEAM PER PLAN - WHERE BEAMS NOT SHOWN ON PLAN, PROVIDE FRAMING PER 5/S0.22

BARE METAL DECKING - CONTINUE UNINTERRUPTED UNDER PLATFORM

600S162-54 METAL CRIPPLE STUDS @ 12" O/C FOR LEVELING - SECURE IN TRACK TOP and BOTTOM W/ #12 SCREW EA. FLANGE

CONT. 600S162-54 TRACK - 600S162-54 JOISTS @ 8" O/C - ALIGN W/ STUDS EACH END DECKING SPAN DIRECTION

SECTION B-B CONT. 12 GA. x 10 WIDE PLATE W/ (2) ROWS #12 SCREWS @ 12" O/C TO DECKING HIGH FLUTES

CONT. 400T150-54 TRACK W/ #12 SCREW EA. FLANGE TO EA. JOIST and W/ #12 SCREWS @ 4" O/C TO CRIPPLE WALL (2) #12 SCREWS EACH JOIST TO CRIPPLE WALL

CHANNEL PER PLAN

BARE METAL DECKING - CONTINUE UNINTERRUPTED UNDER PLATFORM

BEAM PER PLAN

BACK-TO-BACK JOISTS UNDER EDGES UNIT EDGES

CONT. 400T150-54 TRACK W/ #12 SCREW EA. FLANGE TO EA. BLKG. and W/ #12 SCREWS @ 6" O/C TO CRIPPLE WALL (2) ROWS #12 SCREWS @6" O/C TRACK TO PLATE

4006150-54 BLOCKING @12" O/C - ALIGN W/ STUDS EACH END - ATTACH TO BACK-TO-BACK JOISTS PER 10/S0.92

BACK-TO-BACK BLOCKING MATCHING JOIST MATERIAL (16 GA MIN.) SCREW TOGETHER W/ (2) #10 SMS @ 12" O/C - ATTACH TO JOISTS EA. END PER 10/S0.92 SIM.

ATTACH CURB TO BLKG. OR BACK-TO-BACK JOIST W/ (4) 1/4-14 HILTI SELF DRILLING SCREWS (ICC ESR-2196) AT EA. SIDE (16 TOTAL)

CONT. 600T150-54 TRACK W/ (2) ROWS #12 SCREWS TO EA. DECKING HIGH FLUTE (3) #8 SCREWS PER BLOCK 6" MAX.

800S162-54 METAL CRIPPLE STUDS @ 12" O/C FOR LEVELING - SECURE IN CONT. 800T150-54 TRACK TOP and BOTTOM W/ #12 SCREW EA. FLANGE
3 SLOT 1" LINEAR DIFFUSER W/ PRICE MODEL SDB PLENUM BOX 10" OPENING. PROVIDE W/ TEGULAR FRAME TYPE.

NOTES:
(WHERE INDICATED)
REFER TO SPECIFICATION SECTION 230719 HVAC PIPING INSULATION FOR FURTHER INFORMATION

INDOOR - EXPOSED
R-40: 48"x36" 3 PRICE 530L 2-RETURN SINGLE DEFLECTION GRILLE STEEL 1, 2, 3, 4
E-40: 20"x20" 1 PRICE 530L 3-EXHAUST SINGLE DEFLECTION GRILLE ALUMINUM 1, 2, 3, 4
E-1: 22"x22" 6 PRICE 530L 3-EXHAUST 24"x24" SINGLE DEFLECTION STEEL 1, 2, 3, 4
S-61: 18"x6" 3 PRICE SDGE 1-SUPPLY DUCT MOUNTED DOUBLE DEFLECTION ALUMINUM 1, 2, 3, 4
S-40: 8"x8" 1 PRICE 520 1-SUPPLY DOUBLE DEFLECTION DIFFUSER STEEL 1, 2, 3, 4
S-1: 6"ø 13 PRICE SPD 1-SUPPLY SQUARE PLAQUE FACE STEEL 1, 2, 3, 4

ALL SIZES
EXPOSED

TAG QTY.

2" AND LARGER
ABOVE GRADE

R=4.2, k-0.23, 0.75 LBS/ CF
POLYESTER - 1"
MAX. PD
(IN-WG)
NONE
NONE

SUPPLY FAN RELIEF FAN COOLING HOT WATER HEATING CONTROL

1. VERIFY REFRIGERANT PIPE SIZES AND ROUTING LIMITATION WITH MANUFACTURER
2. CONDENSATE PUMP (208V)- ASPEN MINI AQUA OR EQUAL
3. POWERED FROM OUTDOOR UNIT

REMARKS:
1. FACTORY 12" TALL ROOF CURB
2. BACKDRAFT DAMPER
3. FACTORY MOTOR TRANSFORMER AND DISCONNECT
4. EMS CONTROLLED.
5. PROVIDE VARI-GREEN CONSTANT PRESSURE CONTROL.
6. PROVIDE VARI-GREEN REMOTE DIAL

EQUIPMENT

HVLS-2 MACROAIR (370 AIRVOLUTION) MA08XS706 GENERAL WEIGHT TRAINING PE-104 8 1-146 ALUMINUM 40000 DIRECT DRIVE .25 208 1 74 10/M7.01 10/M6.03 233415 1
HVLS-1 MACROAIR (370 AIRVOLUTION) MA08XS706 CIRCUIT TRAINING PE-103 8 1-146 ALUMINUM 40000 DIRECT DRIVE .25 208 1 74 10/M7.01 10/M6.03 233415 1
HWP-A2 WILO STRATOS GIGA 1.5/3-80 SECONDARY 42 58 2 500-4000 ECM 88 460 3 89 01/M7.04 01/M6.01 232123
V-A2-7 PRICE / SDV5 24x20x18 14" PE 131, PE 133 TRAINING ROOM, STORAGE 2100 425 425 425 7 19 0.9 140 98 2 12 55 94 Y 200 2-WAY 120 1 80 1, 2, 3, 4, 5, 6, 7, 8
V-A2-6 PRICE / SDV5 20x12x10 6" PE 124, PE 125, PE 126 WORKROOM, OFFICE 250 50 75 50 1 4 0.6 140 128 2 12 55 95 N - 2-WAY 120 1 40 1, 2, 3, 4, 5, 6, 7, 8
V-A3-4 PRICE / SDV5 20x14x12.5 8" PE 147 MEN'S GENERAL LOCKER ROOM 675 125 125 125 5 9 0.6 140 108 2 12 55 95 N - 2-WAY 120 1 45 1, 2, 3, 4, 5, 6, 7, 8
V-A2-2 PRICE / SDV5 20x12x10 6" PE 117, PE 118 OFFICE 200 50 75 50 2 5 0.6 140 122 2 12 55 95 N - 2-WAY 120 1 40 1, 2, 3, 4, 5, 6, 7, 8
V-A1-5 PRICE / SDV5 24x20x18 16" PE 103 CIRCUIT TRAINING 2520 500 750 500 19 26 1.1 140 93 2 12 55 85 Y 365 2-WAY 120 1 80 1, 2, 3, 4, 6, 7, 8
V-A1-4 PRICE / SDV5 24x20x18 14" PE 104 GENERAL TRAINING 2160 425 650 425 17 22 0.9 140 91 2 12 55 85 Y 335 2-WAY 120 1 80 1, 2, 3, 4, 6, 7, 8
V-A1-3 PRICE / SDV5 24x20x18 14" PE 104 GENERAL TRAINING 2160 425 650 425 22 22 0.9 140 91 2 12 55 85 Y 265 2-WAY 120 1 80 1, 2, 3, 4, 6, 7, 8
V-A2-9 PRICE / SDV5 20x12x10 6" PE 119, PE121 OFFICE 250 50 125 50 2 5 0.6 140 122 2 12 55 95 N - 2-WAY 120 1 40 1, 2, 3, 4, 5, 6, 7, 8
V-A2-1 PRICE / SDV5 20x12x10 6" PE 114, PE 116 OFFICE 275 50 75 50 2 5 0.6 140 123 2 12 55 95 N - 3-WAY 120 1 40 1, 2, 3, 4, 5, 6, 7, 8
V-A1-9 PRICE / SDV5 20x16x15 10" PE 109 CLASSROOM 1000 200 300 200 3 12 0.6 140 99 2 12 55 92 Y 150 2-WAY 120 1 55 1, 2, 3, 4, 5, 6, 7, 8
V-A1-4 PRICE / SDV5 24x20x18 14" PE 104 GENERAL TRAINING 2160 425 650 425 17 22 0.9 140 91 2 12 55 85 Y 335 2-WAY 120 1 80 1, 2, 3, 4, 6, 7, 8
V-A1-3 PRICE / SDV5 24x20x18 14" PE 104 GENERAL TRAINING 2160 425 650 425 22 22 0.9 140 91 2 12 55 85 Y 265 2-WAY 120 1 80 1, 2, 3, 4, 6, 7, 8
V-A2-9 PRICE / SDV5 20x12x10 6" PE 119, PE121 OFFICE 250 50 125 50 2 5 0.6 140 122 2 12 55 95 N - 2-WAY 120 1 40 1, 2, 3, 4, 5, 6, 7, 8
V-A2-1 PRICE / SDV5 20x12x10 6" PE 114, PE 116 OFFICE 275 50 75 50 2 5 0.6 140 123 2 12 55 95 N - 3-WAY 120 1 40 1, 2, 3, 4, 5, 6, 7, 8
V-A1-9 PRICE / SDV5 20x16x15 10" PE 109 CLASSROOM 1000 200 300 200 3 12 0.6 140 99 2 12 55 92 Y 150 2-WAY 120 1 55 1, 2, 3, 4, 5, 6, 7, 8
2. FACTORY OUTDOOR AIR MONITORING STATION

4. DEMAND CONTROLLED VENTILATION

6. VIBRATION ISOLATION CURB VIBR E MODEL VIC-EQ W/ RMLA-EQ VIBRATION ISOLATORS

8. TWO VARIABLE SPEED COMPRESSORS, TWO CONSTANT SPEED COMPRESSORS

2. MATERIAL VARANCE: PROVIDE ALUMINUM GRILLES, REGISTERS AND DIFFUSERS WHERE INDICATED ABOVE AND IN THE FOLLOWING AREAS, LOCKER ROOMS

3. PROVIDE RECTANGULAR TO ROUND ADAPTOR AND VICE-VERSA AS REQUIRED.

SHOWERS, RESTROOMS.

4. COLOR COMPATIBILITY: PAINT AIR TERMINAL TO MATCH CEILING AND WALLS. REFER TO ARCHITECTURAL DRAWINGS AB2.41 & AB2.42 AND SPECIFICATION SECTION

REFER TO SPECIFICATION SECTION 232113 HYDRONIC PIPING FOR FURTHER INFORMATION

SDS-B1 PRICE RH72/7C 50x72x30 FORWARD 24000 2304 0.25 7 9 28 22 16 12 10 320 1

SDS-B2 PRICE RL48/UC 64x48x32 FORWARD 16000 1125 0.16 8 11 16 23 19 15 12 11 250 1

DUCT LINER

REFER TO SPECIFICATION SECTION 230719 HVAC PIPING INSULATION FOR FURTHER INFORMATION

INDOOR - EXPOSED

E-40: 24"x12" 1 PRICE 530L 3-EXHAUST SINGLE DEFLECTION GRILLE ALUMINUM 1, 2, 3, 4

S-40: 16"x16" 3 PRICE 520 1-SUPPLY DOUBLE DEFLECTION DIFFUSER STEEL 2, 3, 4

T-40: 36"x12" 1 PRICE 530L 4-TRANSFER SINGLE DEFLECTION TRANSFER GRILLE STEEL 1, 2, 3, 4

HEATING WATER

T-1: 22"x22" 6 PRICE 530L 4-TRANSFER 24"x24" SINGLE DEFLECTION STEEL 1, 2, 3, 4

2" AND LARGER

S-1: 10"ø 12 PRICE SPD 1-SUPPLY SQUARE PLAQUE FACE STEEL 1, 2, 3, 4

S-1: 8"ø 33 PRICE SPD 1-SUPPLY SQUARE PLAQUE FACE STEEL 1, 2, 3, 4

ALL SIZES

BURIED

NO INSULATION

SCHEDULE 40 STEEL

POLYURETHANE INSULATION

2" THICK

MATERIAL

SOLDER/BRAZED SERVICE TYPE

Capacity (BTU)

EER / (SEER)

VOLT. PHASE

MCA MOCP TYPE

DETAIL NO.

CONTROL

ELECTRICAL OPERATING

OPERATING LAT

D x W x H (in.)

INLET NECK SIZE (MBH)

HEATING CAPACITY (IN-Ø)

SPACE TEMPERATURE (°F)

IN-WG STATIC CONTROL D x W x H (in.)

CO2 EAT (GPM)

INSTALLATION

DCV MIN

DCV MAX

RATING

RATED INPUT POWER (MBH)

SOUND POWER

HUMIDIFIER UNIT / CURB (LBS)

MOTOR

ELECTRICAL OPERATING

CONTROL

MOTOR

ELECTRICAL

OPERATING

LOSS (MBH)

CO2

INSTALLATION

DCV MIN

DCV MAX

RATING

RATED INPUT POWER (MBH)

SOUND POWER

HUMIDIFIER UNIT / CURB (LBS)

MOTOR

ELECTRICAL OPERATING

CONTROL

MOTOR

ELECTRICAL

OPERATING

LOSS (MBH)

CO2

INSTALLATION

DCV MIN

DCV MAX

RATING

RATED INPUT POWER (MBH)

SOUND POWER

HUMIDIFIER UNIT / CURB (LBS)

MOTOR

ELECTRICAL OPERATING

CONTROL
1. SEE ARCHITECTURAL SHEET A8.21 FOR FLASHING AND WEATHERPROOFING DETAILS.

2. CAP TERMINATION CAP INSTALLED PER CONCENTRIC VENT MANUFACTURER'S PRINTED INSTRUCTIONS.

3. PROVIDE STRAP AND SUPPORT 8'-0" O.C. OPM-0043-13.

4. SECURE TO ROOF CURB WITH #8 SCREWS, OR WELDS, OR 1/4" X 20 BOLTS @ 12" O.C. MAX., A MIN OF 2 CONN. PER SIDE, TOP & BOTTOM.

5. SECURE TO WALL W/ 1/2" MB W/ UNISTRUT P1010 SHEET METAL CHANNEL

6. SUPPORT SHALL ALLOW +/- 4" MOVEMENT.

7. 1/2" THREADED ROD WITH CHANNEL NUT, TYP. EA SIDE OF PIPE SUPPORT

8. UNISTRUT MEDIAN CHANNEL NUT, TYP. EA SIDE OF PIPE SUPPORT

9./configuration as shown

10. PROVIDE GASKETED ACCESS TERMINATIONS. REFER TO ELECTRICAL PLANS FOR LOCATION.

11. MATERIAL LISTING NO. 3225-0368:110 & 3230-0368:111

12. UL 555S COMBINATION FIRE SMOKE DAMPER UL 555 FIRE RESISTANCE RATING OF 1 1/2" HOURS AND UL 555S FACTORY SUPPLIED THERMAL BLANKET INSERT AND STRUT/CLAMP ASSEMBLY

13. UP TO THE APOPLINE, SIZE PER PLANS NOTES:

14. PROVIDED TO LOAD THE SADDLE FULL LENGTH OF SADDLE PIPE SUPPORT

15. PROVISIONAL DUCT SHEET MADE AND FLUSH PRODUCTION

16. CONSTRUCTION ALUMINUM SHEET DUCT

17. CONSTRUCTION GALVANIZED SHEET METAL DUCT

18. CONSTRUCTION ALUMINUM REINFORCED DUCT

19. CONSTRUCTION STEEL CONCENTRIC DUCT

20. CONSTRUCTION STEEL DUCT WITH ADHESIVE.

21. GREATER THAN 6 SQ. FT. OF SUPPORT, OR HAVE A CROSS SECTIONAL AREA OF 6 SQ. FT. OR LESS.

22. EXPLODED INSULATION SHALL BE VISIBLE EXPOSED INSULATION SHALL BE VISIBLE END OF LINER SHALL BE BUTTED FIRMLY TOGETHER NO END OF LINER SHALL BE BUTTED FIRMLY TOGETHER NO
### Plumbing Fixtures Schedule

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Item Description</th>
<th>Make</th>
<th>Material</th>
<th>Color</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>GWH-2</td>
<td>Concentric Pipe</td>
<td>PVC</td>
<td>4&quot;</td>
<td>White</td>
<td>1</td>
</tr>
<tr>
<td>GWH-1</td>
<td>Concentric Pipe</td>
<td>PVC</td>
<td>4&quot;</td>
<td>White</td>
<td>1</td>
</tr>
<tr>
<td>RD&amp;OD</td>
<td>Roof &amp; Overflow</td>
<td>Zurn</td>
<td>Z-163-ZC-VP</td>
<td>White</td>
<td>1</td>
</tr>
<tr>
<td>WSM-1</td>
<td>Water Sub-Meter</td>
<td>Onicon</td>
<td>F-3200 Series</td>
<td>White</td>
<td>1</td>
</tr>
<tr>
<td>SHD-1</td>
<td>Faucet</td>
<td>Zurn</td>
<td>Z415BZ</td>
<td>White</td>
<td>1</td>
</tr>
<tr>
<td>BFP-1</td>
<td>Double Check Valve</td>
<td>Apollo</td>
<td>4A-104-A2F</td>
<td>White</td>
<td>1</td>
</tr>
<tr>
<td>HB-2</td>
<td>Wall Faucet</td>
<td>Woodford</td>
<td>Model B24</td>
<td>White</td>
<td>1</td>
</tr>
<tr>
<td>DF-1</td>
<td>Water Cooler</td>
<td>Elkay</td>
<td>LZSTL8WSSK</td>
<td>White</td>
<td>1</td>
</tr>
</tbody>
</table>

### Plumbing Fixtures Tables

#### Domestic Cold Water Pipe Sizing

<table>
<thead>
<tr>
<th>Fixture Units</th>
<th>Diameter</th>
<th>Length (Feet)</th>
<th>Flow Rate (CFH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>445-E35ABCP</td>
<td>3&quot;</td>
<td>3.7</td>
<td>58</td>
</tr>
<tr>
<td>186-0.125 ES-S</td>
<td>2-1/2&quot;</td>
<td>3</td>
<td>3.7</td>
</tr>
<tr>
<td>111-1.28 ES-S</td>
<td>3/4&quot;</td>
<td>1.5</td>
<td>2</td>
</tr>
</tbody>
</table>

#### Domestic Hot Water Pipe Sizing

<table>
<thead>
<tr>
<th>Fixture Units</th>
<th>Diameter</th>
<th>Length (Feet)</th>
<th>Flow Rate (CFH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>445-E35ABCP</td>
<td>3&quot;</td>
<td>3.7</td>
<td>58</td>
</tr>
<tr>
<td>186-0.125 ES-S</td>
<td>2-1/2&quot;</td>
<td>3</td>
<td>3.7</td>
</tr>
<tr>
<td>111-1.28 ES-S</td>
<td>3/4&quot;</td>
<td>1.5</td>
<td>2</td>
</tr>
</tbody>
</table>

### Plumbing Fixtures Additional Notes

- All pipe penetrations shall be provided with pipe sleeves in compliance with IPC-2009.
- Secure ends and seams by 3M Scotch, 10 mil, 2" wide pipe wrap sealing tape.
- Lead-free double check valve "A Series", top access modular check valve cartridges, provide captured springs, replaceable seats and reversible silicone seat discs, ball valve.
- 5.0 PSI inlet pressure and 6'-9" W.C outlet pressure, 3/4" inlet & outlet, 1" vent.
- Limit flow rate to 275 CFH, 3/16" orifice, or 500 CFH, 1/8" orifice.
- All systems shall be water-tested before final acceptance.
- Earth cover over tank shall not exceed 6 ft. Entire installation shall conform to manufacturer's recommendations.
- All level adjustments shall be made to finished floor.

---

### Plumbing Schedule Tables

#### Pipes

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Make</th>
<th>Material</th>
<th>Color</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 ADDENDUM</td>
<td>HEALTH DEPT SUBMITTAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DIVISION OF THE STATE ARCHITECT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>08/02/2016</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>R C S A R K R</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>06/14/2017</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>P L E X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
P-0015 FOR CONTINUATION SEE PLUMBING SITE PLAN SHEET P1.01.

P-4306 MEDIUM PRESSURE GAS UP IN WALL TO CEILING SPA CE.

P-4305 MEDIUM PRESSURE GAS UP TO 2'-0" ABOVE FINISHED FLOOR WITH SHUT-OFF COCK, SEISMIC SHUT-OFF VALVE [PACIFIC SEISMIC PRODUCTS, MODEL P-4301] MEDIUM PRESSURE GAS UP.

P-2301 HOT WATER RETURN UP.

P-2202 HOT WATER DOWN.

P-2201 HOT WATER UP.

P-2111 COLD WATER DOWN IN WALL, PROVIDE S.O.V. ON DROP WITH ACCESS PANEL.

P-2108 COLD WATER DOWN TO BELOW FINISH GRADE.

P-2102 COLD WATER DOWN.

P-2101 COLD WATER UP.

ITEM DESCRIPTION

[4" CW] AND GAS SUB-METER ON RISE. SEE DETAIL #5 ON SHEET P4.00.
ITEM DESCRIPTION

P-0321 POC CONDENSATE PIPING TO MECHANICAL UNIT WITH CONDENSATE TRAP, SEE DETAIL #4 ON SHEET P4.00.

P-2106 COLD WATER DOWN THRU ROOF.

P-3007 VENT THROUGH ROOF. SEE DETAIL #6 ON SHEET P4.00.

P-3509 CONDENSATE DOWN THROUGH ROOF.

P-4206 GAS DOWN THRU ROOF.

P-4304 MEDIUM PRESSURE GAS DOWN THRU ROOF.
1. FLOOR OR WALL ASSEMBLY - MIN 4-1/2 IN. (114 MM) THICK REINFORCED LIGHTWEIGHT OR NORMAL WEIGHT (100-150 PCF OR 1600-2400 KG/M3) CONCRETE. WALL MAY ALSO BE CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS*. MAX DIAM OF OPENING IS 6 IN. (152 MM). PIPE OR CONDUIT TO BE RIGIDLY SUPPORTED ON BOTH SIDES WITH MANUFACTURER'S INSTRUCTIONS.

2. FIRESTOP SYSTEM - THE FIRESTOP SYSTEM SHALL CONSIST OF THE FOLLOWING:

   A. COPPER TUBING - NOM 4 IN. (102 MM) DIAM (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING.

   B. COPPER PIPE - NOM 4 IN. (102 MM) DIAM (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE.

   C. STEEL PIPE SLEEVE
      - FOR INDOUS PIPE. FOR CONCRETE/MASONRY: U.L. FIRE RESISTANCE SYSTEMS AS FOLLOWS: FOR STUD PIPE AND C-AJ-5002 FOR INSULATED PIPE.

   D. HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC - FS-ONE SEALANT OR CP604 SELF-LEVELING FIRESTOP SEALANT.

   CP604 SHALL BE USED IN FLOOR APPLICATIONS ONLY. WHEN CP604 IS USED, F RATING IS 2 HR.

3. INSTALL DRIVE LINE WITH 90° BEND TO THIS POINT.

4. ALL WASHDOWN POINTS MUST COME FROM SYSTEM NO. C-AJ-1421 FOR INSULATED PIPE. FOR CONCRETE/MASONRY: U.L. FIRE RESISTANCE SYSTEMS AS FOLLOWS: FOR STUD PIPE AND C-AJ-5002 FOR INSULATED PIPE.

5. WHEN WASHDOWN CEASES THE VALVE WILL CLOSE ALLOWING ANY RAIN TO FILL THE CHAMBER AND LEAVE THE GRATE. WHEN WASHDOWN CEASES THE GRATE WILL BE ENGAGED BY THE PURCHASER. SYSTEM TO REQUIREMENTS. TRADESMEN TO BE ENGINEERS DETAILS AS ARRANGED BY CUSTOMER. ALL PLUMBING AND ELECTRICAL ONLY. SLAB SIZE AND GRADIENT TO BE MIN 0 IN. (0 MM) (POINT CONTACT) TO MAX 5-3/8 IN. (137 MM). PIPE OR CONDUIT TO BE RIGIDLY SUPPORTED ON BOTH SIDES WITH MANUFACTURER'S INSTRUCTIONS.

6.網站的英文介面
KEYNOTES

E.144 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.145 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.146 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.147 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.148 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.149 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.150 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.151 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.152 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.153 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.154 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.155 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.156 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.157 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.158 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.159 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.160 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.161 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.162 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.163 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.164 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.165 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.166 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.167 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.168 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.169 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.170 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.171 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.172 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.173 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.174 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.175 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.176 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.177 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.178 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.179 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.180 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.181 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.182 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.183 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.184 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.185 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.186 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.187 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.188 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.189 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.190 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.191 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.192 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.193 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.194 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
E.195 FLOOR JOINTS - All floor joints shall be detailed in accordance with the drawings. mismatch of floor finish shall be acceptable.
FIRE ALARM PLAN REQUIREMENTS

1. All areas required to be protected shall be protected by an approved fire alarm system. Design and installation shall comply with the California Fire Code (CFC) and the National Fire Protection Association (NFPA) standards. All areas, including hazardous areas, shall be properly protected.

2. All fire alarm wiring must be installed in accordance with NFPA 72 (2013) and shall comply with the California Fire Code (CFC) and the National Fire Protection Association (NFPA) standards. All areas, including hazardous areas, shall be properly protected.

3. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

4. All penetrations through rated assemblies, requiring opening protection, shall be provided with a penetration fire barrier.

5. All flow switches shall be 2 wire with non-electronic retard type similar to the system sensor model "WFD SERIES" only.

6. Areas shall be adequately protected by fire alarm systems. Provide updated plans and calculations through the "change order" process when installing additional systems.

7. NFPA 72 (2013) Sec. 24.3.2.1 All users of systems that have microphones for live voice announcements shall be provided with a properly functioning fire alarm system.

8. Under floors and in walls in a neat and protected manner as indicated on design documents. Exposed circuits are only allowed in service areas.

9. Point and common annunciation is prohibited. SLC may be t-tapped only at building factory if necessary. Install SLC looped.

10. Detectors shall not be installed until after the construction cleanup of all trades is complete and final.

11. Electrical contractor unless otherwise noted. Fire alarm panel, remotes, and components shall be secured to the fire alarm panel as scheduled.

12. All penetrations through rated assemblies shall be properly protected.

13. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

14. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

15. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

16. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

17. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

18. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

19. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

20. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

21. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

22. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

23. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

24. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

25. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

26. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

27. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

28. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

29. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

30. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

31. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

32. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

33. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

34. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

35. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

36. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

37. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

38. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

39. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

40. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

41. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

42. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

43. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

44. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

45. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

46. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

47. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

48. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

49. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.

50. All wiring used in underground conduits shall be listed for wet area applications, in accordance with CEC 760.