ADDENDUM No. 1 DATED December 5, 2011
TO THE PROJECT MANUAL and PLANS

(Bid No. 11-12/11) Berkeley City College Build-Out Phase 3

This addendum supersedes items of the original contract documents wherein it is inconsistent with it. All other conditions remain unchanged. The following changes, modifications, corrections, additions or clarifications shall apply to the contract documents and shall be made a part of and subject to all of the requirements thereof as if originally specified or shown. It is the responsibility of the bidder to review the list of attachments to ensure that the addendum is full and complete. This Addendum modifies the original Bid Documents for the above Bid. **Acknowledgement receipt of this addendum in the space provided on the BID FORM. Failure to do so may subject Bidder to disqualification.**

List of attachments:

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<th>Description</th>
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A. **The original bid documents are updated by the information as follows:**

Item 1: Updated Bid Form (3 pages)

B. **The original specs and drawings are updated by the information as follows:**

Item 2: Specification Section 06410, Casework (10 pages)

Item 3: ASK-1 (1 page)

Item 4: ASK-2 (1 page)

Item 5: Sheet M2.4 (MSK-1) (1 page)

Item 6: Sheet M2.5 (MSK-2) (1 page)

Item 7: Specification Section 15900, Revised page 16 of Specification Section 15900 – HVAC Instrumentation and Controls. (1 page)

Item 8: Sheet E0.1 (ESK-1), Added Detail 9 (motor starter for LEF fans). (1 page)

Item 9: Sheet E2.4 (ESK-2, 3) - Added (2) FSD, Revised FSD circuit to EL4E-8 (2 pages)

Item 10: Sheet E2.5 (ESK-4, 5, 6) - Added Sheet Notes #15 and #16, Added combination motor starters on east side wall of Storage 5148, Added FSD between Columns 3 and 4 and E and F, Revised FSD circuit for EL4E-6. (3 pages)

Item 11: Sheet E2.6 (ESK-7, 8) - Added Sheet Note 5, Revised Sheet Notes 2, 3 & 4, Revised power to LEF-3 & LEF-4. (2 pages)

Item 12: Sheet E4.6 (ESK-9) - Added (2) IOM and (2) duct smoke detectors. (1 page)
Item 13: Sheet E4.5 (ESK-10, 11) - Added IOM and duct smoke detector, Revised FSD numbering. (2 pages)

Item 14: Sheet E5.1 (ESK-12, 13, 14) - Added General Note #3, Revised FSD numbering, Added FSD-414, 417 & FSD-530. (3 pages)

Item 15: Specification Section 16420, Motor Controls (7 pages)

C. RFI's and RFI Responses:

- **#1:**
  - “Floor Plan note F3/A1.1 and keynote E12/A8.1 both call out for Plastic Laminate tops. Please provide specifications for these tops.”
  - **Response:** Please see attached revised Specification Section 06410 – Casework.

- **#2:**
  - “Elevation 1-B/A8.2 references detail 8/A7.4 for filler panel above wall hung cabinets. Please provide detail as A7.4 does not exist for this project.”
  - **Response:** Elevation 1-B/A8.2 should reference detail 8/A9.4 instead of detail 8/A7.4 as sheet A7.4 does not exist. Please see attached drawing ASK-1.

- **#3:**
  - “Section 3-D/A9.3 references detail 7/A7.4. Should this have been noted as 7/A9.4?”
  - **Response:** Yes, Section 3-D/A9.3 should reference detail 7/A9.4 instead of detail 7/A7.4. Please see attached drawing ASK-2.
Peralta Community College District

BID FORM (Page 1 of 3)

Bid No.: 11-12/11 Berkeley City College Build-Out Phase 3
(Project # 2335)

The undersigned having carefully examined the location of the proposed work, the local conditions of the place where the work is to be done, the Invitation for Bid, the General Conditions and Instructions to Bidders, the Peralta Community College District (District) Contract, the Specifications and all of the contract documents for this project, and accurately completed the Vendor's Questionnaire, proposes to perform the contract, including all of its component parts, and to furnish any and all required labor, materials, equipment, insurance, permit, bonding, transportation and services required for the construction of the project in strict conformity with the plans and specifications prepared, including any Addenda, within the time specified for the lump sum price of (including all taxes):

**Total Bid Price**

<table>
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<tr>
<th>Total lump sum bid price (including all allowances) of</th>
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<tbody>
<tr>
<td>$__________________ (Numeric amount)</td>
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<td>________________________________ (Written amount)</td>
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Written amount prevails if any discrepancy exists.

**Bid Elements** (This Total Bid Price is composed of the following elements)

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<tr>
<th>Item</th>
<th>Description</th>
<th>Amount</th>
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<tr>
<td>1</td>
<td>All Base Bid Items</td>
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<tr>
<td>2</td>
<td>All Allowances (see page 3 of this bid form)</td>
<td>$100,000</td>
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<td></td>
<td>Total (equating to the Total lump sum bid price shown above)</td>
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**Agreement Terms**

1. If awarded the contract, the undersigned hereby agrees to sign said contract and furnish the necessary Payment Bond, Performance Bond, and Certificates of Insurance within 10 calendar days after the Notice of the Award of this contract and agrees to commence construction within 10 calendar days after the Notice to Proceed is issued by the District.

2. The undersigned has checked carefully all the above figures and understands that the District will not be responsible for any errors or omissions on the part of the undersigned in making up this bid.

3. Peralta Community College District reserves the right to reject any or all bids, to waive any irregularities or informalities not affected by law, to evaluate the bids submitted and to award the contract according to the proposal which best serves the interests of the District.
BID FORM (Page 2 of 3)
Bid No.: 11-12/11 Berkeley City College Build-Out Phase 3
(Project # 2335)

Agreement Terms Continued

4. All pages of this Bid Form must be completed and signed in ink. The bid will be awarded to the lowest responsive, responsible bidder.

Bid Bond
Each bid shall be accompanied by a cashier’s check payable to the Peralta Community College District, or a bidder’s bond executed by an admitted surety insurer, licensed to do business in the State of California as a surety, made payable to the Peralta Community College District in an amount not less than ten percent (10%) of the maximum amount of the bid. The check or bid bond shall be given as a guarantee that the bidder to whom the contract is awarded shall execute the contract documents and shall provide the required payment and performance bonds as specified therein within ten (10) days after the notification of the award of the contract.

Amount – Bidders must enclose an amount of not less than 10 percent of the entire bid as either:

- Cashier’s Check: Check Number: ________________________________
  Issuing Bank: ________________________________
  Amount: $ ________________________________

- Bidder’s Bond: Surety Company: ________________________________

Addendum Acknowledgement
The following addendum(s) are acknowledged in this bid: ________________________________

Bidder Information and Signature

Contractor Name: ________________________________ Title: ________________________________
Contact Person (print name): ________________________________
Address: ________________________________
Telephone: ________________________________ Fax: ________________________________
Contractor License #: ________________________________ Expiration Date: ________________________________
Authorized Signature: ________________________________ Date: ________________________________
ALLOWANCES
All allowances shall be used at the discretion of the District. Any allowances not approved through a formal change order procedure shall be credited back to the District as a deductive change order. Contractor shall be aware that all allowances are for work not included in the base bid work as called out, specified or shown on the contract documents.

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<tr>
<th>No.</th>
<th>Description</th>
<th>Amount</th>
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<tr>
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<tr>
<td>3</td>
<td>Electrical, Data and IT, AV</td>
<td>20,000</td>
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<tr>
<td>4</td>
<td>Carpentry, Millwork</td>
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<tr>
<td>5</td>
<td>Roofing</td>
<td>10,000</td>
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$100,000
(place amt on line 2 of bid form)

Contractor Name: ____________________________  Initials: ____________________________

Contractor Name: ____________________________  Initials: ____________________________
SECTION 06410 - CASEWORK

PART I - GENERAL

1.1 SUMMARY

A. In general, the intent of this Section is to match the overall appearance of the existing laboratory casework.

B. All casework, working surfaces and other items specified herein shown on the drawings shall be furnished, installed, and shall be demonstrated to properly perform in accordance with the function specified herein. Provide all necessary fillers, scribes and miscellaneous accessories and hardware to provide a complete installation.

C. Section Includes (but is Not Necessarily Limited to):
   A. Wood laboratory casework (includes all casework in all locations).
   B. Work Surfaces.
   C. Storage Cabinets.
   D. Wall Cabinets.
   E. Adjustable Shelving.
   F. Laboratory Drying Rack.

D. RELATED SECTIONS

   A. Division 09 Section(s) for backing in walls for casework, anchorage, and resilient base.
   B. Division 11 Section(s) for laboratory fume hoods.
   C. Division 15 Section(s) for laboratory fixtures and fittings, plumbing, and mechanical.
   D. Division 16 Section(s) for electrical.

1.2 DELIVERY, STORAGE AND HANDLING

A. Schedule delivery of casework and equipment so that spaces are sufficiently complete to allow for installation immediately following delivery.

B. Protect finished surfaces from soiling or damage during handling and installation. Cover working surfaces with cardboard. Mark large lettering “NO STANDING”.

1.3 PROJECT CONDITIONS

A. Do not deliver or install equipment until the following condition have been met:

   A. Windows and doors are installed and the building is secure and weather tight.
   B. Ceiling, overhead ductwork, and lighting are installed.
   C. All painting is complete and floor finish is installed.
   D. Casework and related materials require the interior building temperature not to exceed 80-degrees (F) to avoid undue structural fatigue and damage. Additionally, frequent and/or excessive changes in temperature and/or humidity levels during the course of the material installation, or once materials are installed, must be avoided to prevent damage to equipment.
E. Under no conditions should moisture levels exceed 50% relative humidity.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's data for each item of laboratory furnishing, and equipment. Include component dimensions, configuration, construction details, joint details and attachments. Indicate location, size and service requirement for each utility connection. See Specification Division I for additional general requirements.

B. Shop Drawings: Provide 1/2"=1'-0" scale elevations of each individual and battery of casework units showing cross sections, rough-in and anchor placements, tolerances and clearances. Indicate relationship of units to fume hoods, other laboratory equipment, surrounding walls, ceilings, windows, doors and other building components. Provide 1/4"=1'-0" scale rough-in plan drawings for coordination with trades. Rough-in shall show free area.

C. Top Material Samples: Submit 3" by 3" product sample of each type of bench top.

D. Hardware Samples: Provide sample of door and drawer pulls, lock, and hinges.

E. Finish Samples: Submit 3" by 5" samples of each color of finish from manufacturer's standard color offering for casework and accessories for section by the District's representative.

F. Product Test Reports for Casework: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating compliance of laboratory casework with requirements of specified product standard.

G. Product Test Reports for Countertop Surface Material: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating compliance of laboratory countertop surface materials with requirements specified for chemical and physical resistance.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.

B. Source Limitations: Obtain laboratory casework from single source from single manufacturer unless otherwise indicated. Proposal from brokers or multiple suppliers will not be accepted.

C. The supplier for work in this section shall use manufacturers with production facilities including all tools, equipment, and special machinery necessary for specializing in the fabrication and installation of the type of equipment specified, with skilled personnel, factory trained workmen and an experienced engineering department. Each shall have demonstrated knowledge, ability and the proven capability to complete an installation of this size and type within the required time limits: Ten years or more experience in manufacture of laboratory casework and equipment of type specified. Ten installations of equal or larger size and requirements within the last five years.

D. Casework Product Standard: Comply with SEFA 8, "Laboratory Furniture - Casework, Shelving and Tables - Recommended Practices."

E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

F. Preinstallation Conference: Conduct conference at Project site.
PART 2 - PRODUCTS

2.1 LABORATORY CASEWORK

A. General: It is the intent of the documents to match the existing casework. Contractor shall verify existing casework manufacturer and design.

B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Advanced Lab Concepts.

2.2 DESIGN REQUIREMENTS

A. Construction: All cabinets to be constructed of veneer core FSC-certified plywood, plain sliced select Maple, grade A veneer finish on exposed surfaces; Plain sliced select white Maple, grade B finish veneer on semi-exposed surfaces. Particle board or medium density fiberboard (MDF) materials are not acceptable.

B. Door and drawer design: Flush Overlay.

C. Grain pattern on end panels to be vertical.

D. Grain pattern on cabinet drawers and doors; Vertical matched grain (drawers and doors), slip matched.

E. Modular, self-supporting units capable of interchangeable use.

F. Flush interiors: Set cupboard bottom flush with front end facers. Surface mounted bottoms and offsets cause by front face frames which interfere with ease of cleaning are not acceptable.

G. Joinery: 32mm doweled joinery system glued, clamped, and screwed. Dowels are to be hardwood, laterally fluted with chamfered ends and a minimum diameter of 8mm.

H. Cabinet edge banding: 3mm solid Maple on exposed and semi-exposed surfaces of cabinet box frames, and for all base, wall, tall, and open adjustable shelf cabinet box frames.

I. Adjustable shelves edge banding: Adjustable shelves insides based, tall, wall, and open adjustable shelf cabinets to be 1" Baltic Birch veneer core, FSC-certified plywood. The edge condition of the adjustable shelves shall reveal the exposed layers of the Baltic Birch veneer core plywood. The individual layers of the veneer core plywood shall not exceed 1/16" thickness. Adjustable shelves inside base, tall, and wall cabinets with doors shall have Maple veneer finish. Adjustable shelves inside open adjustable shelf cabinets (without doors) shall have Maple veneer finish on top and bottom surfaces.

J. Door and drawer edge banding: All door and drawer fronts to be constructed of 3/4" Baltic Birch veneer core FSC-certified plywood with the edge of the veneer core exposed to view. The individual layers of the veneer core shall not exceed 1/16" thickness.

K. Sinks: Refer to Drawings.

L. Casework color: Natural Maple clear finish.
2.3 DEFINITIONS OF CABINET COMPONENTS BY SURFACE VISIBILITY

A. Exposed surfaces: Surfaces visible when drawers and solid doors are closed. Front edges of cabinet body members are visible or seen through a gap of greater than 1/8" with doors and drawers closed. Portions of cabinets visible when fixed appliances are installed.

B. Semi-exposed surfaces: Surfaces visible when doors and drawers are open. Surfaces visible behind clear glass doors. Interior surfaces of open units. Bottoms of cabinets 30" or more above finished floor. Tops of cabinets less than 78" above finished floor, or are visible from an upper floor or staircase after installation.

C. Unexposed surfaces: Surfaces not normally visible after installation. Bottoms of cabinets less than 30" above finished floor. Tops of cabinets over 78" above finished floor, which are not visible from an upper floor or staircase after installation. Stretcher, blocking, and/or components concealed by drawers.

D. Hardwood: Hardwood lumber, clean and free of defects. All lumber kiln dried to uniform moisture content of six (6) percent. Exposed material: Maple. Semi-exposed material: Maple. Unexposed material: Solid hardwood of species suitable for the intended purpose.

E. Plywood: Hardwood plywood featuring a balanced construction glued with water resistant resin glue. Veneer core Baltic Birch plywood for drawer fronts, cabinet doors, and adjustable shelves.

F. Glass: Float glass – 3mm (nominal 1/8") on framed glass doors on wall and upper cased and 6mm (nominal 7/32") on tall cases. Glass to be without imperfections or marred surfaces.

G. Finish: Highly chemical resistant acrylic urethane finish with built-in UV blocker applied over stain of selected color from manufacturer's full range of colors. Provide chemical resistant finish conforming to Woodwork Institute (WI) premium grade TR-6 finish, with no less than two topcoats.

2.4 BASE CABINETS

A. All base cabinet components shall consist of solid Maple lumber and veneer core plywood. Particle board and/or medium density fiberboard (MDF) are not acceptable.

B. Removable cabinet backs. Sink base back shall be full half height construction to allow for plumbing and sink waste connection. Sink base backs shall be 1/4" Baltic Birch veneer core plywood.

C. Provide split back on drawer cabinets.

D. Vertical dividers: Full height dividers shall be 1-1/2" thick plywood, glued and screwed in place. Provide 3mm (nominal 1/8") thick hardwood facer on exposed edge.

E. Base unit shelves are to be adjustable on 32mm centers.

F. Drawer bottoms: 1/2" Baltic Birch veneer core finished both sides.

G. Security Panels: Provide 1/4" Baltic Birch security panels between drawers at fixed island benches in Organic Chemistry and Biology Labs.
2.5 WALL AND TALL CABINETS

A. Wall, and tall cabinet ends: 1” thick veneer core plywood as specified, with 3mm (1/8” nominal) thick exposed hardwood facer on front edges. Bore interior faces, as appropriate, for security panels, rails, and four rows of shelf bracket support holes.

B. Veneer core plywood with 3mm (nominal 1/8”) hardwood facer on front edge. Bottom hardwood kick rail on all case 5-1/8” high joined to cabinet side with 8mm (nominal 5/16”) dowels. Finish to match exposed surfaces.

C. Solid door shall be of 3/4” Baltic Birch veneer core plywood with edge of veneer core exposed to view. Individual layers of veneer core shall not exceed 1/16” thickness.

D. Framed glazed doors: Veneer core construction, 1” x 3” Baltic Birch veneer core plywood vertical side panels and horizontal top and bottom panels, machined to accept glass. Provide extruded vinyl retaining molding on interior, designed so glass can be replaced without tools. Edge of wall cabinet doors to have exposed layer so Baltic Birch veneer core plywood, with individual layers not greater than 1/16” thickness.

2.6 ISLAND SHELF (FIXED)

A. Location: At all island benches in Biology and Chemistry Labs.

B. Material: 1” phenolic resin, Trespa TOPLAB.

C. Construction: Provide concealed fasteners and concealed joinery.

D. Safety Rail: Provide 1/4” diameter aluminum safety rail at 2” height at front edge of island shelf. Safety rail to be attached from bottom side of shelf with flush, recessed allen-head screws.

2.7 OPEN ADJUSTABLE SHELVES

A. Construction: 1” thick veneer core with Maple veneer to match base cabinets on top and bottom surfaces. Sizes as indicated. Particle board and/or medium density fiberboard (MDF) are not acceptable.

B. Edge: Adjustable shelf edge to have exposed layers of Baltic Birch veneer core. Individual layer shall not exceed 1/16” thickness.

C. Maximum support spacing shall be 24” on center.

D. Safety Rail: Provide 1/4” diameter aluminum safety rail at 2” height at front edge of all adjustable shelves. Safety rail to be attached from bottom side of shelf with flush, recessed allen-head screws.

2.8 HARDWARE

A. Drawer and hinged door pulls shall be 8” aluminum wire pulls, all horizontally mounted, and centered on doors and drawers.

B. Hinges: Heavy duty, exposed 3-knuckle hinge attached with sheet metal screws. Provide two hinges for doors up to 36” high. Three hinges for doors over 36” high.

C. Elbow catches: Spring type with strike.
D. Bolt for tall storage cabinets shall be 3" long and have an 18" pull and an angle strike to secure inactive door on cabinets over 72" in height. Elbow catches shall be used on inactive doors up to and including 72" in height.

E. Drawer suspension: Mechanical slide shall be full extension with overtravel, 150 lb. dynamic, zinc plated. Accuride or equal.

F. Shelf supports: Single pin metal support.

G. Locks: 5-disc tumbler for master key system. Master Key System: Master key system shall have 5-disc tumbler locks with capacity of 225 primary key changes. Master key one level with the potential of 40 different, non-interchangeable master key groups. Keys: Stamped brass available from manufacturer or local locksmith, and supplied in the following quantities unless otherwise specified: 2 for each keyed different lock; 3 for each group keyed alike locks; 2 master keys for each system. Lock types shall have heavy duty cylinder. Exposed lock nose finish to be dull nickel (stain) plated. Provide locks by National or equal. All door and drawer cabinets to be lockable.

2.9 WORK SURFACES

A. Phenolic Resin Work Surface: Provide Trespa “Top Lab” phenolic resin work surface, or approved equal, for all fixed laboratory casework tops, and moveable lab benches. 3/4" thickness unless otherwise noted.

B. Counter Backsplash: All backsplashes at laboratory countertops to be 6" in height, made of 3/4" thick phenolic resin Trespa “Top Lab”.

C. Sink Backsplash with drying rack above: All backsplashes at sinks to be 12" in height made of 3/4" thick phenolic resin Trespa “Top Lab”.

D. Sink Backsplash without drying rack above: Provide full height backsplash from counter top to underside of wall cabinet above, made of 3/4" thick phenolic resin Trespa “Top Lab”.

E. Exterior Window Backsplash: Where noted on drawings, provide nominal 8" backsplash to match counter at exterior window condition.

F. Sinks: Refer to Drawings.

2.10 ACID CABINET

A. Acid storage cabinet manufactured by SciMatCo, Product No. SC5060, or approved equal.

B. 100% polypropylene construction, no metal parts or connectors.

C. 200 cfm exhaust. Connection by Division 15.

D. Liquid tight interior seams, welded.

E. Must meet OSHA secondary containment standards.

F. Exterior dimensions: 18-3/8" deep by 48" wide by 60" tall.

G. Interior shelves with lipped edges.
2.11 FLAMMABLE CABINETS
   A. Solvent storage cabinet manufactured by Justrite, Model No. 894520, or approved equal.
   B. Cabinet shall comply with California Fire Code, Articles 79 and 80. Cabinet shall be Factory Mutual and UL certified. Cabinet shall comply with CAL OSHA requirements for flammable storage cabinets.
   C. Double wall construction.
   D. No external exhaust.
   E. Self-closing doors.
   F. 45 gallon capacity.
   G. Two adjustable interior shelves standard, plus one additional shelf.
   H. Dual vents with flame arrestors.
   I. Must conform to CAL OSHA requirements. Adjustable leveling feet on all four corners.
   J. Leak proof sill in cabinet base.
   K. Exterior dimensions: 18” deep by 43” wide by 65” high.

2.12 LABORATORY DRYING RACK
   A. In Biology and Chemistry Prep rooms, provide 36”x36” stainless steel drying rack with drain trough and tube hose to sink below. Drying pegs to be white polypropylene.

2.13 CUSTOM CASEWORK:
   A. Applicable Standard: WI Section 14 -Wood Casework,
   B. Grade: Custom,
   C. Construction Style: Style A Frameless,
   D. Construction Type: Type I,
   E. Door and Drawer Front Style: Flush Overlay,
   F. Scribing: Flush with door faces and per Premium Grade regardless of specified casework grade.
   G. Materials:
      1. Exposed Surfaces: Hardwood Plywood, align grain vertically.
      3. Edges: None
H. Fabrication

General:
1. Field Measurements: Verify dimensions and plumbness and trueness of wall of partition as required for proper fabrication of the Work.
2. Cut-outs: Insofar as possible, make cut-outs required to accommodate work of other Sections in shop.
3. Shop Fabrications: Shop-fabricate casework in whole units or in partial units as most practical for handling and transportation. Assemble partial units in place in such manner that each piece of casework becomes a unified whole visually and structurally. Fabricate fillers and scribe strips of same materials and finishes as cabinets with which they are associated.
4. Hardware: Make cuts for hardware neat and true. Install hardware and fit securely.
5. Adjustment: Adjust drawers, doors, and movable shelves to operate easily and smoothly without binding or excessive play.
6. Back Painting: Surfaces of casework which are not exposed to view at any time and abut walls or floor shall be thoroughly back painted with one heavy coat of finishing material of fabricator's choice before leaving fabricator's shop.

2.14 PLASTIC LAMINATE COUNTERTOPS:

A. Plastic Laminate:
1. General: Per requirements of NEMA publication LD3 and as manufactured by Formica, Nevamar, Laminart, or Wilsonart.
2. Countertops, Backsplashes, and Shelf Tops and Bottoms: General-purpose type, 0.050-inch thick nominal; postforming type, 0.043-inch thick nominal.
3. Vertical Surfaces: Vertical-surface type, minimum 0.028-inch thick.
4. Cabinet Liner: Minimum 0.020-inch thick plastic laminate.
5. Surface Finish and Color: As indicated.

B. Plastic Laminate Countertops:
1. General: Provide throughout unless otherwise specified or shown.
3. Grade: Custom.
4. Core Material: Hardwood Plywood, thickness as shown.
5. Edge Detail: As shown.
6. Back and End or Side Splashes: Top mount square butt joint.
7. Splash Top: Square with self-edge.
8. Splash Height: 4-inches, unless otherwise noted.
PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with installation requirements in SEFA 2.3. Install level, plumb, and true; shim as required, using concealed shims. Where laboratory casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.

B. Utility-Space Framing: Secure to floor with two fasteners at each frame. Fasten to partition framing, wood blocking, or metal reinforcements in partitions and to base cabinets.

C. Base Cabinets: Fasten cabinets to utility-space framing, partition framing, wood blocking, or reinforcements in partitions with fasteners spaced not more than 24 inches o.c. Bolt adjacent cabinets together with joints flush, tight, and uniform.
   
   A. Where base cabinets are installed away from walls, fasten to floor at toe space at not more than 24 inches o.c. and at sides of cabinets with not less than 2 fasteners per side.

D. Wall Cabinets: Fasten to hanging strips, masonry, partition framing, blocking, or reinforcements in partitions. Fasten each cabinet through back, near top, at not less than 24 inches o.c.

E. Install hardware uniformly and precisely. Set hinges snug and flat in mortises.

F. Adjust laboratory casework and hardware so doors and drawers align and operate smoothly without warp or bind and contact points meet accurately. Lubricate operating hardware as recommended by manufacturer.

G. Comply with installation requirements in SEFA 2.3. Abut top and edge surfaces in one true plane with flush hairline joints and with internal supports placed to prevent deflection. Locate joints only where shown on Shop Drawings.

H. Field Jointing: Where possible, make in same manner as shop-made joints using dowels, splines, fasteners, adhesives, and sealants recommended by manufacturer. Prepare edges in shop for field-made joints

I. Fastening:
   
   A. Secure countertops, except for epoxy countertops, to cabinets with Z-type fasteners or equivalent, using two or more fasteners at each cabinet front, end, and back.
   B. Secure epoxy countertops to cabinets with epoxy cement, applied at each corner and along perimeter edges at not more than 48 inches o.c.
   C. Where necessary to penetrate countertops with fasteners, countersink heads approximately 1/8 inch and plug hole flush with material equal to countertop in chemical resistance, hardness, and appearance.

J. Seal unfinished edges and cutouts in plastic-laminate countertops with heavy coat of polyurethane varnish.

K. Provide scribe moldings for closures at junctures of countertop, curb, and splash with walls as recommended by manufacturer for materials involved. Match materials and finish to adjacent laboratory casework. Use chemical-resistant, permanently elastic sealing compound where recommended by manufacturer.

L. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
M. Accessory Installation: Install accessories and fit in accordance with manufacturer's recommendation. Turn screws to seat flat; do not drive.

3.2 ADJUSTING
A. Repair or remove and replace defective work, as directed by owner's representative upon completion of installation.
B. Adjust door, drawers, hardware, fixtures and other moving or operating parts to function smoothly.

3.3 CLEANING AND PROTECTING
A. Provide all necessary protective measure to prevent exposure of casework and equipment from exposure to other construction activity during installation.
B. Advise contractor of procedures and precautions for protection of material, installed laboratory casework and fixtures from damage by work of other trades.

END OF SECTION 05410
TYPICAL SECTIONS AT LAB BENCHES

SCALE: 1/4" = 1'–0"

BERKELEY CITY COLLEGE
PHASE 3: BUILD-OUT

ADDENDUM NO. 1
a. Damper position estimate: If damper position on a floating damper actuator is estimated by counting open/close pulses, the position shall be recalibrated to 0% when the damper is known to be closed (more than enough close pulses to ensure damper is closed) and to 100% when damper is known to be fully open.

7. Overrides - Provide software points to:
   a. Force zone airflow setpoint to zero.
   b. Force zone airflow setpoint to $V_{cool-max}$.
   c. Force zone airflow setpoint to $V_{min}$.
   d. Force damper full closed/open.

8. Alarms
   a. Low airflow,
      1) If the measured airflow is less than 70% of setpoint for 5 minutes, generate a Level 3 alarm.
      2) If the measured airflow is less than 50% of setpoint for 5 minutes, generate a Level 2 alarm.
   b. Low supply air temperature
      1) If the supply air temperature is 5°F less than setpoint for 5 minutes, generate a Level 3 alarm.
      2) If the supply air temperature is 10°F less than setpoint for 5 minutes, generate a Level 2 alarm.
   c. For floating point damper actuators, the zone controller will count the total number of damper movements (open or close) for each damper during each 24 hour period. If the total number of movements for any damper in a period exceeds 700, generate a Level 3 alarm indicating a control stability problem and excess damper motor wear.

D. Plant Biology Exhaust Fan (EF-3).
   1. Relocate existing on-off switch to new location next to room thermostat.

E. Art Lab Exhaust Fans (EF-15, 16).
   1. Install on-off switch with pilot light and 0-12 hour timer next to thermostat.

F. Fume Hood Exhaust System Switched Two Stage System (Organic Chemistry Room 513)
   1. Fume Exhaust Valve Control
      a. Provide software switch to enable occupied/unoccupied control logic. Use of this mode must be approved by Cal-OSHA.
      b. When the room is occupied (based on occupancy sensor) then all two-position exhaust valves in that room shall be commanded to “normal” flow position.
      c. When the room is unoccupied (based on occupancy sensor) then all two-position exhaust valves in that room shall be commanded to “setback” flow position.
      d. Alarms
         1) Hood flow alarm Level 1.

2. Supply Air VAV Reheat Boxes
   a. Constant volume reheat boxes: Air flow shall be controlled at constant volume to “normal” setpoint when room is occupied and to “setback” flow setpoint when room is unoccupied.

3. Lab Exhaust Fan Control (LEF-3, 4)
   a. Lab exhaust fans are active.
   b. Alarms
      1) Commanded on, status off: Level 1
      2) Commanded off, status on: Level 2

4. Exhaust Plenum Pressure Control
   a. Modulating bypass damper at exhaust fan controlled with integral controls furnished with fan to maintain exhaust plenum pressure at setpoint.
MOTOR STARTER FOR LEF FANS

SCALE: NOT TO SCALE
CABINET FOR AV AND DATA.

15 PROVIDE FUSIBLE COMBINATION MOTOR STATER, SIZE 1, 460V, 3 PHASE, NEMA 1 ENCLOSURE WITH KEYED H-O-A SWITCH, LOCK-ON PROVISIONS FOR DISCONNECT HANDLE. MOUNT +6'-6" TO TOP. SEE DETAIL 9 SHEET EO1.

16 CONCEAL CONDUIT IN WALL TO STARTERS.

ELECTRICAL - FIFTH FLOOR POWER PLAN
SCALE: 1/8" = 1'-0"
SHEET NOTES:

1. STUB UP CONDUITS WITH UNIT CURB.
2. COMBINATION MOTOR STARTER IN ROOM 514B.
3. NOT USED.
4. 30A/3P NEMA 3R DISCONNECT SWITCH.
5. EF-6 AND EF-15 SHALL SHUT DOWN UPON RESPECTIVE FSD ACTIVATION VIA EMS SYSTEM. COORDINATE WITH MECHANICAL AND EMS CONTRACTOR. SMD.

DATE SIGNED: Nov 29, 11
GENERAL NOTES:

1. FIRE ALARM SYSTEM IS AN EXISTING SIMPLEX/GRIINELD ADDRESSABLE SYSTEM APPROVED UNDER DAS 01-105617. SCOPE OF WORK FOR THIS PROJECT IS ADDING & RELOCATING HORN/STROBE & STROBE & ONE NEW FIRE SMOKE DAMPER CONTROL.

2. COORDINATE WITH SIMPLEX FOR EXACT ADDRESS POINTS & WIRING PRIOR TO INSTALLATION. ADDRESSES SHOWN ARE BASED ON RECORD DRAWINGS RECEIVED FROM THE COLLEGE AND MAY NOT BE CURRENT. RECORD CHANGES ON RECORD DRAWINGS.

3. PROVIDE SPREADSHEET OF ALL ADDRESSES WITH FIRE ALARM SEQUENCE OF OPERATION AT THE START OF PROJECT AND NEW SPREADSHEET AT COMPLETION OF PROJECT WITH ACTUAL PROGRAMMED INFORMATION.

ELECTRICAL - FOURTH & FIFTH FLOOR PARTIAL FIRE ALARM RISER DIAGRAM
SCALE: NONE

DATE SIGNED: Nov 29, 11
SECTION 16420 - MOTOR CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Work Included: Labor, materials and equipment necessary to complete the installation required for the item specified under this division, including but not limited to:
   1. Manual Motor Starters
   2. Magnetic Motor Starters
   3. Combination Magnetic Motor Starters

B. Related Work: Consult all other sections, determine the extent and character of related work and properly coordinate work specified herein with that specified elsewhere to produce a complete installation.
   1. Division 9: Painting - Touchup of painted surfaces

1.2 REFERENCES

A. Comply with the latest edition of the following applicable specifications and standards except as otherwise shown or specified.
   1. Federal Specifications (FS):
      a. FS W-C-375 Circuit Breakers, Molded Case, Branch Circuit and Service
      b. FS-W-F-870 Fuseholders (for plug and enclosed cartridge fuses)
      c. FS W-P-115 Power Distribution Panel
      d. FS W-S-865 Switch Box (Enclosed) Surface-Mounted
   2. Underwriters Laboratories, Inc. (UL):
      a. UL 198 Fuses (Applicable Subsections)
      b. UL 489 Molded Case Circuit Breakers and Circuit Breaker Enclosures
   3. National Electrical Manufacturer Association (NEMA):
      a. NEMA ISC 2 Industrial Control Devices, Controllers, and Assemblies
      b. NEMA ISC 6 Enclosures for Industrial Controls and Systems
      c. NEMA AB 1 Molded Case Circuit Breakers
      d. NEMA KS 1 Enclosed Switches

1.3 SUBMITTALS

A. Items specified under this Section are Priority 1. Refer to Section 16010: Basic Electrical Requirements for specific Priority 1 requirements.

B. Submit in accordance with the requirements of Section 16010: Basic Electrical Requirements, the following items:
   1. Datacatalog cuts for each product and component specified herein, listing all physical and electrical characteristics and rating indicating compliance with all listed standards.
   2. Describe system operation, equipment, and dimensions and indicate features of each component.
3. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
4. Include detailed control wiring diagrams for each starter.
5. Shop Drawings:
   a. Indicate front and side view elevations of motor control centers with overall dimensions shown.
   b. Conduit entrance locations and requirements
   c. Nameplate legend
   d. Size and number of bus bars per phase, neutral and ground
   e. Electrical characteristics including voltage, frame sizes and trip ratings, withstand ratings, and time current curves of all equipment and components.
6. Furnish structural calculations for equipment anchorage as described in Section 1601.0: Basic Electrical Requirements.
7. Outdoor weatherproof equipment enclosure and accessories
8. Submit manufacturer's installation instructions.
9. Complete Bill of Material listing all components.
10. Warranty.

C. Dimensions and configurations of panelboards shall conform to the spaces allocated on the Drawings for their installation. The contractor shall include with the submittal a layout of the electrical room if it differs from construction documents for review and approval by the engineer prior to release of order.

1.4 OPERATION AND MAINTENANCE MANUAL

A. Supply operation and maintenance manuals in accordance with the requirements of Section 16010: Basic Electrical Requirements, to include the following:
   1. Detailed explanation of the operation of the system
   2. Instructions for routine maintenance
   3. Pictorial parts list and parts number
   4. Telephone numbers for authorized parts and Service distributors
   5. Include all service bulletins and torque specifications for all terminations.
   6. Final testing reports.

1.5 QUALITY ASSURANCE

A. All materials, equipment and parts comprising the units specified herein shall be new and unused, and of current manufacturer.

B. Only products and applications listed in this section may be used on the project, unless otherwise submitted.

1.6 PRODUCE DELIVERY, STORAGE, AND HANDLING

A. Delivery: Motor control components shall not be delivered to the site until protected storage space is available. Storage outdoors covered by rainproof material is not acceptable. Equipment damaged during shipment shall be replaced and retimed to manufacturer at no cost to Owner.
B. Storage: Store in a clean, dry, ventilated space free from temperature extremes. Maintain factory wrapping or provide a heavy canvas/plastic cover to protect units from dirt, water, construction debris, and traffic. Provide heat where required to prevent condensation.

C. Handling: Handle in accordance with NEMA PB1.1 and manufacturer's written instructions. Be careful to prevent inertial component damage, breakage, denting and scoring. Damaged units shall not be installed. Replace damaged units and return equipment to manufacturer.

1.7 WARRANTY

A. Units and components offered under this Section shall be covered by a 1-year parts and labor warranty for malfunctions resulting from defects in materials and workmanship. Warranty shall begin upon acceptance by the owner.

1.8 EXTRA MATERIAL

A. Provide one spray can of matching finish paint for touching up damaged surfaces after installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Equal products by the following manufacturers will be considered providing that all features of the specified product are provided:
   1. Cutler-Hammer/Westinghouse
   2. General Electric
   3. IEM
   4. Siemens/ITE
   5. Square D

B. Substitutions: Under provisions of Section 16010: Basic Electrical Requirements

2.2 MANUAL MOTOR STARTERS

A. Manual motor starter AC general purpose Class A manually operated non-reversing full-voltage controller for induction motors rated in horsepower, with overload relay, red pilot light, auxiliary contacts when indicated on drawings, and pushbutton operator. Starter size and number of poles shall be as required for connections shown on drawings. Furnish in conformance with NEMA ICS 2.

B. Fractional horsepower manual starters: AC general-purpose Class A manually operated, full voltage controller for fractional horsepower induction motors, with thermal overload unit and toggle operator. Starter size and number of poles shall be as required for connections shown on drawings. Furnish in conformance with NEMA ICS 2.

C. Enclosure: NEMA ICS 6; Type 1 1B. 4.
2.3 MAGNETIC MOTOR STARTERS

A. General:
   1. AC general-purpose Class A magnetic controller for induction motors rated in
      horsepower, conforming to NEMA ICS 2. Furnish with thermal overload protection in
      all three phases.
   2. All starters shall be such that disconnection of power conductors shall automatically
      disconnect control power.
   3. Each starter shall have the following accessories:
      a. One NO and one NC auxiliary contact
      b. Heavy-duty oil tight green, push-to-test motor running indicating light
      c. Heavy-duty oil tight HOA switch (keyed type where noted)
      d. Three phase solid-state power monitor for anti-single phasing protection on motors
         20 HP and larger; Westinghouse SVM3 Series, or equal
   4. All starters shall be full-voltage, non-reversing, (FVNR), minimum NEMA Size 1, unless
      otherwise noted on the Drawings.
   5. Starters other than FVNR shall be equal in quality and by same manufacturer of starters
      specified above. Other types of starters, if required, shall be as described on the
      Drawings.
   6. Provide terminal strips and wiring as shown on the motor starter wiring diagram on the
      drawings

B. Reduced Voltage Starters: Autotransformer/Open Circuit transition; wye-delta Closed-circuit
   transition; wye-delta full-voltage part winding; Reduced-voltage part winding type

C. Two speed starters: Two speed, one two winding, constant torque variable torque constant
   horsepower type. Include integral time delay transitions between "FAST" and "SLOW" speeds.

D. Combination motor starters: Combine motor starters with molded case circuit breaker motor
   circuit protector, or fusible switch device in common enclosure.

E. Control power transformers (CPT):
   1. Each 480 VAC starter shall contain a separately fused, heavy-duty control transformer
      within each motor starter cubicle to provide 120 VAC, 60 Hz. control transformer shall
      be adequate VA rating for all control/indicator components in the cubicle. Connect to
      load side of the fused switch.
   2. Overcurrent protection: Factory pre-wired fuse and fuse holder in the ungrounded leg of
      the control transformer primary and secondary.

F. Enclosure: NEMA ICS 6; Type I.R.4.12,open type

2.4 COMBINATION STARTER OVERCURRENT PROTECTIVE DEVICE

A. Refer to Section 16490: Overcurrent Protective Devices.

B. Overcurrent protective devices shall be molded case circuit breakers, motor circuit protectors,
   or fusible switch type with frame and trip ratings as shown on the drawings.

C. Motor control center devices shall have interrupting rating to match that of MCC.

D. See Paragraph 2.03 for starter requirements.
PART 3 - EXECUTION

3.1 EXAMINATION

A. Contractor shall thoroughly examine site conditions for acceptance of site motor control installation to verify conformance with manufacturer and specification tolerances. Do not commence with installation until all conditions are made satisfactory.

B. Install equipment where indicated on the drawings.

3.2 MOUNTING

A. Include construction channel and mounting hardware as required to support motor control equipment.

B. Coordinate locations of control equipment in the field to provide code clearances in front of devices.

C. Coordinate with mechanical contractor for location and size of starters for mechanical equipment. Coordinate overload relays with final motors provided.

3.3 IDENTIFICATION

A. Provide engraved machine screw-retained type NP nameplate on each motor control device.

3.4 FIELD QUALITY CONTROLS

A. Refer to Specification Section 16080: Electrical Commissioning.

B. Independent Testing: Electrical contractor shall arrange and pay for the services of an independent testing agency to perform all quality control electrical testing calibration and inspection required herein. Testing agencies objectives shall be to:
   1. Assure motor controls installation conforms to specified requirements and operates within specified tolerances.
   2. Field test and inspect to insure operation in accordance with manufacturers recommendations and specifications.
   3. Prepare final test report including results, observations, failures, adjustments and remedies.
   4. Apply label on motor controls upon satisfactory completion of tests and results.
   5. Verify ratings and settings and make final adjustments to overcurrent protective devices.

C. At least three weeks prior to any testing, notify the architect so that arrangement can be made for witnessing test, if deemed necessary. All pretesting shall have been tested satisfactorily prior to the witnessed test.

D. The electrical contractor shall supply suitable and stable source of electrical power to each test site. The testing agency shall specify the specific power requirements.
E. Testing of overcurrent protective devices shall be done only after all devices are installed and system is energized.

F. Prefunctional Testing:
   1. Provide testing agency with contract documents and manufacturer instructions for installation and testing.
   2. Visual and Mechanical Inspection:
      a. Inspect for physical damage, defects alignment and fit.
      b. Perform mechanical operational tests in accordance with manufacturer's instructions.
      c. Compare nameplate information and connections to contract documents.
      d. Check tightness of all power connections.
      e. Check that all covers, barriers, and doors are secure.
      f. Verify that motor controls meet specified requirements.
   3. Electrical Tests:
      a. Insulation Resistance: 1000 volt DC tests for one minute on all 600 volt and lower rated equipment, components, buses, feeder and branch circuits, and control circuits. Test phase-to-phase and phase-to-ground circuits showing less than 10 megohms resistance to ground shall be repaired or replaced.
      b. Circuit Continuity: All feeders shall be tested for continuity. All neutrals shall be tested for improper grounds.
      c. Ground Resistance: Test resistance to ground of system and equipment ground connection.
      d. Test overcurrent protection devices per Section 16490: Overcurrent Protective Devices.

G. In the event that the system fails to function properly during the testing as a result of inadequate pretesting or preparation. The contractor shall bear all costs incurred by the necessity for retesting including test equipment, transportation, subsistence and the employee's hourly rate.

H. Contractor shall replace at no costs to the owner all devices which are found defective or do not operate within factory specified tolerances.

I. Contractor shall submit the testing agency's final report for review prior to project closeout and final acceptance by the owner. Test report shall indicate test dates, devices tested, results, observation, deficiencies and remedies. Test report shall be included in the operation and maintenance manuals.

3.5 CLEANING

A. Prior to energizing of motor controls, the contractor shall thoroughly clean the interior of enclosure of all construction debris, scrap wire, etc. using manufacturer's approved methods and materials.

B. Upon completion of project prior to final acceptance the contractor shall thoroughly clean both the interior and exterior of motor controls per manufacturers approved methods and materials. Remove paint splatters and other spots, dirt, and debris.

C. Touch-up paint any marks, blemishes or other finish damage suffered during installation.
3.6 TRAINING

A. Refer to Specification Section 16080: Electrical Commissioning

B. Factory authorized service representative shall conduct a 2-hour training seminar for Owner's Representative upon completion and acceptance of system. Instructions shall include safe operation, maintenance and testing of equipment with both classroom training and hands-on instruction.

C. Contractor shall schedule training with a minimum of 7-days advance notice.

END OF SECTION