ADDENDUM NUMBER FOUR

CHHS SCIENCE LAB RENOVATION
HAYWOOD COUNTY SCHOOLS

MLA PROJECT NUMBER: 19017

Mark Lusk Architecture, PLLC
128 Woodburn Drive
Swannanoa, NC 28778
(828) 808-9757

DATE OF ISSUE: February 5, 2020

TO: ALL BIDDERS OF RECORD

This Addendum modifies the Contract Documents only in the manner and to the extent stated herein and shown on any accompanying drawings and will become a part of the Contract Documents. Except as specified or otherwise indicated by this Addendum, all work shall be in accordance with the basic requirements of the Contract Documents.

BIDDERS SHALL ACKNOWLEDGE RECEIPT OF ADDENDUM ON BID FORM.

This Addendum consists of one page(s) and any enclosures noted:

I. ENCLOSURES:

1. A202, P1, P2, M1, M2, E3

II. GENERAL INFORMATION / CLARIFICATIONS:

1. Base Bid and Alternates 1 & 2: Fixtures for gas and water can be supplied from the counter top manufacturer who will coordinate location and size of openings.

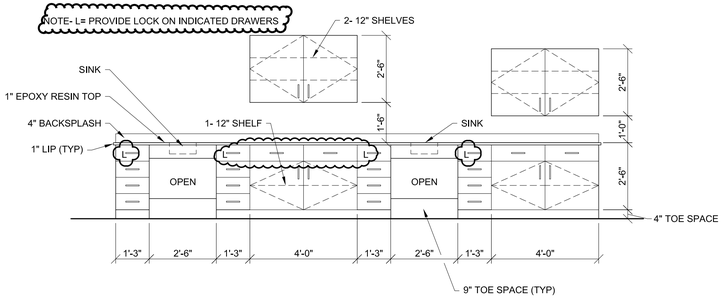
III. CHANGES TO PROJECT MANUAL:

1. None

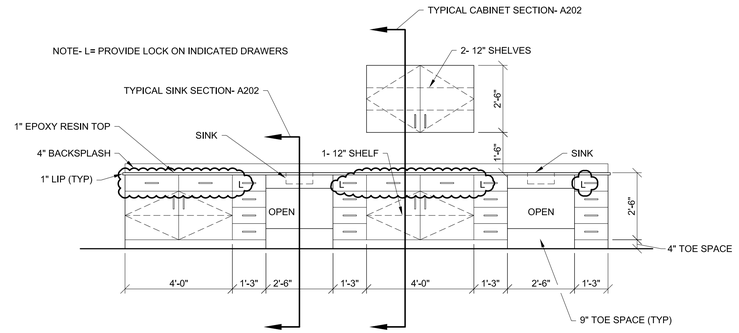
IV. CHANGES TO DRAWINGS:

1. A202: Drawers are revised, lock drawers added, backsplash noted, table legs size revised
2. M1, P1: Mechanical and plumbing specifications are on sheets M1 and P1 respectively
3. P2: See revised sheet P2 for acid neutralization tank detail
4. P1, P2: See revised sheets P1 and P2 for clarification regarding acid resistant fixtures and piping
5. M1: See revised exhaust fan schedule on sheet M1 indicating EF1, EF2 shall run continuously
6. M2: See revised General Note #1 on sheet M2 requiring 250 cfm of outside air which is in accordance with 2018 NCMC
7. M2: See revised General Note #2 on sheet M2 which directs the contractor to clean and re-use existing diffusers and returns

END OF ADDENDUM



CASEWORK ELEVATION A
SCALE: ⅜" = 1'-0"



CASEWORK ELEVATION B
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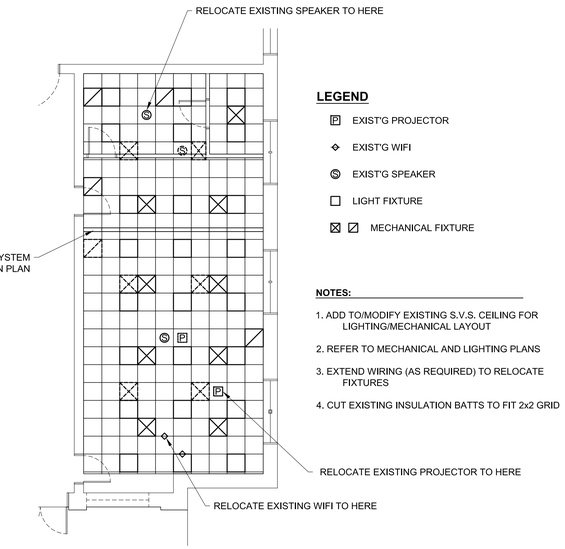


LEGEND

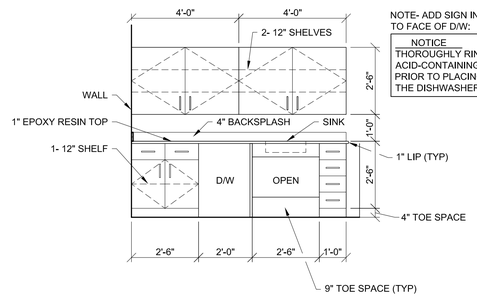
- EXIST'G PROJECTOR
- EXIST'G WIFI
- EXIST'G SPEAKER
- LIGHT FIXTURE
- MECHANICAL FIXTURE

NOTES:

1. ADD TO/MODIFY EXISTING S.V.S. CEILING FOR LIGHTING/MECHANICAL LAYOUT
2. REFER TO MECHANICAL AND LIGHTING PLANS
3. EXTEND WIRING (AS REQUIRED) TO RELOCATE FIXTURES
4. CUT EXISTING INSULATION BATTS TO FIT 2x2 GRID

PROJ NORTH

REFLECTED CEILING PLAN
SCALE: ⅛" = 1'-0"



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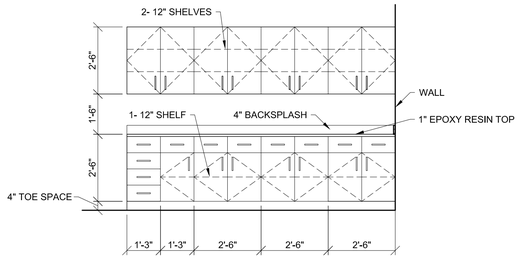

CASEWORK ELEVATION D
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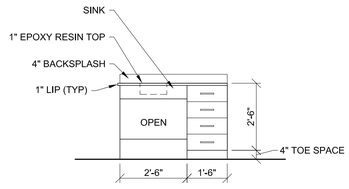

CASEWORK ELEVATION E
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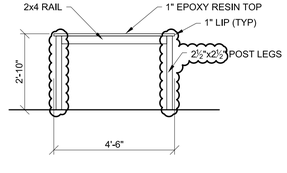

TABLE ELEVATION A
SCALE: ⅜" = 1'-0"

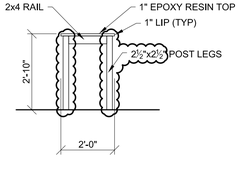

TABLE ELEVATION B
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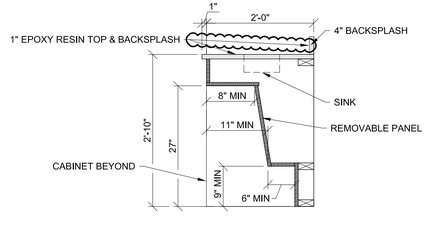
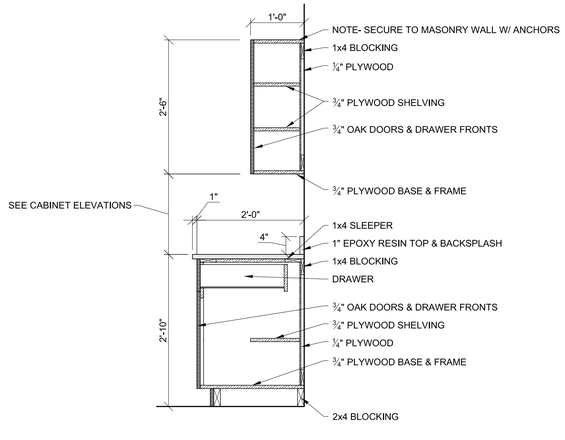


SINK SECTION
SCALE: ¾" = 1'-0"



CABINET SECTION
SCALE: ¾" = 1'-0"

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CHHS SCIENCE LAB RENOVATION

Project Number: 19017
Checked:
Drawn: A. Rognas
Date: 1/7/2020

Addenda: 1/24/2020
No. 4: 2/4/2020

ELEVATIONS

A202

PLUMBING LEGEND

Cold Water Piping Below Grade	
Cold Water (CW)	
Hot Water (TW)	
Hot Water Return (TWR)	
140°F Water (HW)	
140°F Water Return (HWR)	
Natural Gas Piping	G
Sanitary Waste Piping	
Vent Piping	
Vent Thru Roof (VTR)	
Primary Roof Drainage Piping (Slashes Indicate Below Grade)	RD
Secondary Roof Drainage Piping (All Above Grade)	SRD
Point of Connection (NEW) (field verify exact location)	
Point of Removal (OLD)	
Floor Drain (FD)	
Floor Sink (FS)	
Floor Cleanout (FCO)	
Grade Cleanout (GCO)	
Wall Cleanout (WCO)	
Pipe Drop	
Water Service Riser	
Ball Valve	
Check Valve	
Gate Valve	
Globe Valve	
Balancing Valve	
Pressure Reducing Valve	
Solenoid Valve	
Water Hammer Arrestor (WHA)	
Hose Bibb (HB)	
Wall Hydrant (WH)	
Yard Hydrant (YH)	
Air Admittance Valve (AAV)	
Mixing Valve	

INSTANTANEOUS GAS WATER HEATER SCHEDULE

tag	IGWH
manufacturer	Rheem
model	RTGH-C95XLN
type	Outdoor instantaneous gas-fired
heating input (mbh)	199
thermal efficiency	95%
recovery (gpm at 45° rise)	8.4
volts/phase	120V/1Ø
mca	4.0
mcop	15
shipping weight (lbs)	82
notes	1,2,3
1. Provide service access in accordance with Code and manufacturer's recommendations.	
2. Provide 5 gal expansion tank.	
3. See piping detail.	

PLUMBING EQUIPMENT SCHEDULE

TAG	EQUIPMENT
AAV	Air Admittance Valve: Studor Mini-Vent or equal with Oatey or equal Sure-Vent model 39010 wall box with metal grille faceplate.
ANT	Acid neutralization tank: MIFAB MI-NEUT-30 or equal. Protect with bollards.
EFW	Emergency Eye/Face Wash: Guardian Equipment GBF1704 or equal. Barrier Free, pedestal mounted eye/face wash with stainless steel bowl, Schedule 40 galvanized pipe and fittings, ½" U.S. made chrome plated stay open ball valve, powder coated cast aluminum flag handle and floor flange. Unit shall have (4) polypropylene 'GS Plus' spray heads with integral "flip-top" dust covers, filters and 1.8-GPM flow control orifices mounted on a chrome plated brass eyewash assembly. Unit shall include ANSI compliant sign. Unit complies with ADA requirements for accessibility by handicapped persons. Unit shall be hydrostatically tested to meet or exceed ANSI Z358.1 - 2009, and come with a full 2-year warranty. Provide TMV G3600 thermostatic mixing valve to deliver tepid water.
EWS	Emergency Eye Wash/Shower: Guardian Equipment GBF1909 or equal. Barrier Free, combination eye/face wash and shower safety station with ABS plastic shower head, stainless steel bowl, powder coated cast aluminum flag handle and floor flange, 1 ¼" IPS Schedule 40 galvanized pipe and fittings, 1" IPS and ½" IPS U.S. made chrome plated brass stay open ball valves, and polished stainless steel pull rod. Unit shall have (4) polypropylene 'GS Plus' spray heads with integral "flip-top" dust covers, filters, and 1.8-GPM flow control orifices mounted on a chrome plated brass eyewash assembly. Unit shall include ANSI compliant sign. Unit complies with ADA requirements for accessibility by handicapped persons. Unit shall meet or exceed ANSI Z358.1 - 2009, and come with a full 2-year warranty. Provide FC29 regulator (20 gpm), and TMV G3800 thermostatic mixing valve to deliver tepid water.
ET	Expansion Tank: Amtrol ST-12 or equal. 4.4 gallons, 3.2 gallons acceptance.
FCO	Floor cleanout. Zurn model ZN-1400-T-AR or equal. Acid resistant. See detail.
FD	Floor drain. Zurn model ZN-415-6S-AR or equal. Acid resistant.
GCO	Ground cleanout: Zurn Z-1440-BP or equal. Dura-coated cast iron body with bronze plug. Set in 12"x12"x4" concrete pad flush with grade. See detail.
MV	Mixing valve - point of use. Lawler TMM-1000 or equal.

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PLUMBING SPECIFICATIONS

1. **Shop Drawings:** Provide product data for all equipment and materials. Include pertinent dimensions, materials of construction, performance characteristics, weights and factory and field wiring diagrams.
2. **Operation and Maintenance Manuals:** Provide 3 bound O&M Manuals at the completion of the project. Include approved shop drawings and manufacturer's maintenance manuals.
3. **Record Drawings:** Contractor shall maintain a set of drawings on the job site to record all differences between the project documents and "As-Built". Contractor shall provide a set of "As-Built" drawings to the Owner at the completion of the project.
4. **Warranty:** Contractor shall warranty the installation against defects for a period of one year from the date of Owner acceptance. Any defective materials or workmanship shall be replaced at no cost to the Owner.
5. **Permits and Fees:** Contractor shall obtain and pay for all permits, fees and inspections required under his portion of the work.
5. **Electrical Coordination:** The plumbing contractor shall be responsible for providing disconnect switches for plumbing equipment not provided with factory mounted disconnect switches and the wiring from plumbing equipment to the disconect switch. All wiring and devices shall be in accordance with the NEC and electrical specifications. The electrical contractor shall be responsible for wiring and all devices upstream of disconnect device.
6. **General Duty Valves:** Valve pressure and temperature ratings shall be not less than indicated and as required for system pressures and temperatures. Valve shall be the same as upstream piping unless otherwise indicated. Valves in insulated piping shall have 2-inch stem extensions on gate valves with rising stem. Ball valves shall be provided with extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation. Brass or bronze ball valves shall be two-piece, full-port, brass trim, MSS SP-110, 150 psig SWP, 600 psig CWP, two piece body, forged brass, threaded or solder ends, PTFE or PTE seats, and chrome plated ball. Bronze gate valves shall be Class 125, MSS SP-80, Type 1, non-rising stem or Type 2, rising stem, with a 200psig CWP, ASTM B 62 bronze body with integral seat, solid wedge bronze disc, asbestos free packing and threaded or solder joint ends. Bronze globe valves shall be Class 125, MSS SP-80, Type 1 with a 200psig CWP, ASTM B 62 bronze body with integral seat, asbestos free packing and threaded solder joint ends.
7. **Piping Insulation:** Flexible elastomeric insulation shall be closed-cell, sponge- or expanded-rubber materials complying with ASTM C 534, Type I for tubular materials. Mineral-fiber, preformed pipe insulation shall be Type I, 850 Deg F, mineral or glass fibers bonded with a thermosetting resin, complying with ASTM C 547, Type I, Grade A, with factory-applied ASJ or with factory-applied ASJ-SS. Install insulation continuously through non-fire rated walls and partitions. Install insulation continuously through penetrations of fire-rated walls and partitions and seal in accordance with a UL approved through penetration firestop system. Domestic cold, hot and recirculated hot water insulation shall be 1-inch thick. Insulate exposed piping including drain and water supplies under handicapped lavatories and sinks, to meet the requirements of ADA 4.19.4, ADAAG 606.5, ICC/ANSI A117.1 606.6, or GSA & DOD's ABA 606.5.requirement to "protect against contact - no sharp or abrasive surfaces"
8. **Pipe Hangers and Supports:** Carbon-steel pipe hangers and supports shall be MSS SP-58, Types 1 through 58, factory-fabricated components. Galvanized metallic coatings may be pregalvanized or hot dipped. Hanger rods shall be continuous-thread rod, nuts, and washer made of carbon steel. Copper pipe hangers shall be MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components. Hanger rods shall be continuous-thread rod, nuts, and washer made of carbon steel. Trapeze pipe hangers shall be MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts. Thermal-hanger shield inserts for shall be heavy duty with minimum 100psig compressive strength. For trapeze or clamped systems insert and shield shall cover entire circumference of pipe. For clevis or band hanger insert and shield shall cover lower 180 degrees of pipe. Pipe positioning systems shall be IAPMO PS 42, positioning system of metal brackets, clips, and straps for positioning piping in pipe spaces; for plumbing fixtures in commercial applications. Supports for piping installed above a roof shall be B-Line BD Series with 14 gauge galvanized channel and recycled rubber base.
9. **Domestic Water Piping (Metallic):** Hard copper tube shall be ASTM B 88, Type L water tube, drawn temper. Soft copper tube shall be ASTM B 88, Type K water tube, annealed temper. Fittings shall be cast-copper, solder-joint fittings, ASME B16.18, pressure fittings or wrought-copper, solder-joint fittings, ASME B16.22 pressure fittings. Bronze flanges shall be ASME B16.24, Class 150, with solder-joint ends. Copper unions shall be MSS SP-123 cast-copper-alloy, hexagonal-stock body with ball-and-socket, metal-to-metal seating surfaces and solder-joint or threaded ends. Above grade water piping shall be Type L hard copper. Below grade piping shall be Type K soft copper. Piping shall be tested for leaks in accordance with Chapter 312 of the 2018 NC Plumbing Code. Domestic water piping shall be sanitized in accordance with Chapter 610 of the 2018 NC Plumbing Code.
10. **Y-Pattern Strainers:** Bronze body, 125 psig pressure rating, threaded end connections, stainless steel with round 0.033 inch perforations and pipe plug on drain.
11. **Drain Valves:** MSS SP-110, standard-port, two-piece ball valves, 400-psig minimum CWP, bronze or brass body, chrome-plated brass ball, replaceable seats and seals, threaded or solder joint inlet, garden-hose thread outlet complying with ASME B1.20.7 and cap with brass chain.
12. **Chemical Drain and Vent Piping:** Special drainage system for corrosive or acid waste shall be manufactured from CPVC Type IV Grade I compounds with a minimum cell classification of 23447. Pipe and Fittings shall conform to ASTM F 2618. Pipe shall be Schedule 40 dimensions. One-Step solvent cement shall be specially formulated for chemical waste applications and conform to ASTM F493. All pipe, fittings and cement shall be supplied as a system by a single manufacturer and shall be certified by NSF International for use in corrosive waste drainage systems and shall bear the mark "NSF-cw". Special Drain system to be the ChemDrain® system as manufactured by Charlotte Pipe and Foundry Co. Installation to be in accordance with manufacturer's instructions and all applicable local code requirements. Buried pipe shall be installed in accordance with ASTM D 2321 and ASTM F 1668. The system is intended for use in non-pressure chemical waste applications with a maximum working temperature of 220° F.
13. **Fuel-Gas Piping:** Steel Pipe shall be ASTM A 53/A 53M, black steel, Schedule 40, Type E or S, Grade B with malleable-iron threaded fittings, ASME B16.3, Class 150, standard pattern. Unions shall be ASME B16.39, Class 150, malleable iron with brass-to-iron seat, ground joint, and threaded ends. Paint gas piping with two coats of safety yellow oil based enamel paint. Label gas piping in accordance with the section 401.5 of the NC Fuel Gas Code.
14. **Fuel-Gas Specialties:** Indoor, fixed-appliance flexible connectors shall comply with ANSI Z21.24. Outdoor, appliance flexible connectors: Comply with ANSI Z21.75. Connectors shall be corrugated stainless-steel tubing with polymer coating with an operating-pressure rating of 0.5 psig and zinc coated steel threaded ends (ASME B1.20.1). Y-Pattern Strainers shall be ASTM A 126, Class B, cast iron body with bolted cover and bottom drain connection and threaded end connections, 125 psig CWP rating. Strainer screen shall be 60-mesh startup strainer, and perforated stainless-steel basket with 50 percent free area.
15. **Installation:** Materials, fixtures, equipment, accessories and installation shall comply with the requirements of the 2018 NC Plumbing Code, 2018 NC Energy Code, applicable sections of the 2018 NC Building Code and local ordinances. Equipment and materials shall be installed in compliance with manufacturer's installation recommendations and acceptable industry standards. All pipe shall be substantially supported to prevent sags. Piping shall be run parallel to walls and structure unless indicated otherwise. All water piping and other piping subject to freezing shall be run within the thermal envelope of the building unless noted otherwise. Piping subject to freezing that is noted to be install outside of the thermal envelope shall be heat traced with self limiting heat tape and insulated per the insulation specification. It is the responsibility of the contractor to field verify existing conditions and dimensions prior to beginning work.

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028953 TILDEN A. WHITE

2/4/2020

TILDEN WHITE & ASSOCIATES, PLLC
58-1/2 N. Lexington, Asheville, NC 28801
828-255-4327 Project 19119

CHHS SCIENCE LAB RENOVATION

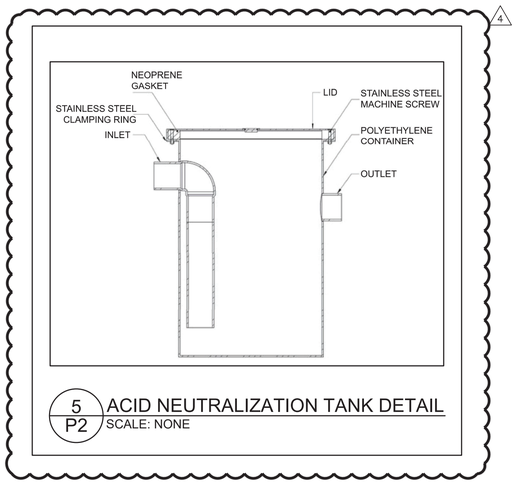
4 ADDENDUM 2020-2-4

Project Number: 19017
Checked: TW
Drawn: -
Date: 1/7/2020

1/24/2020
2/4/2020

PLUMBING NOTES & SCHEDULES

P1



5 P2 ACID NEUTRALIZATION TANK DETAIL
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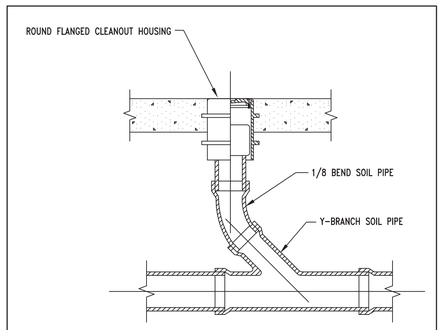
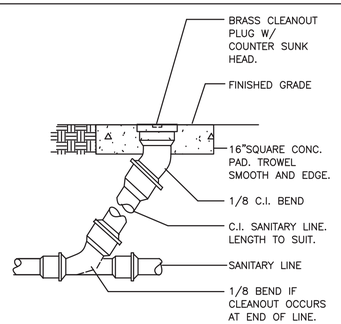
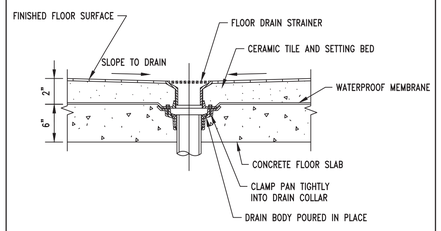


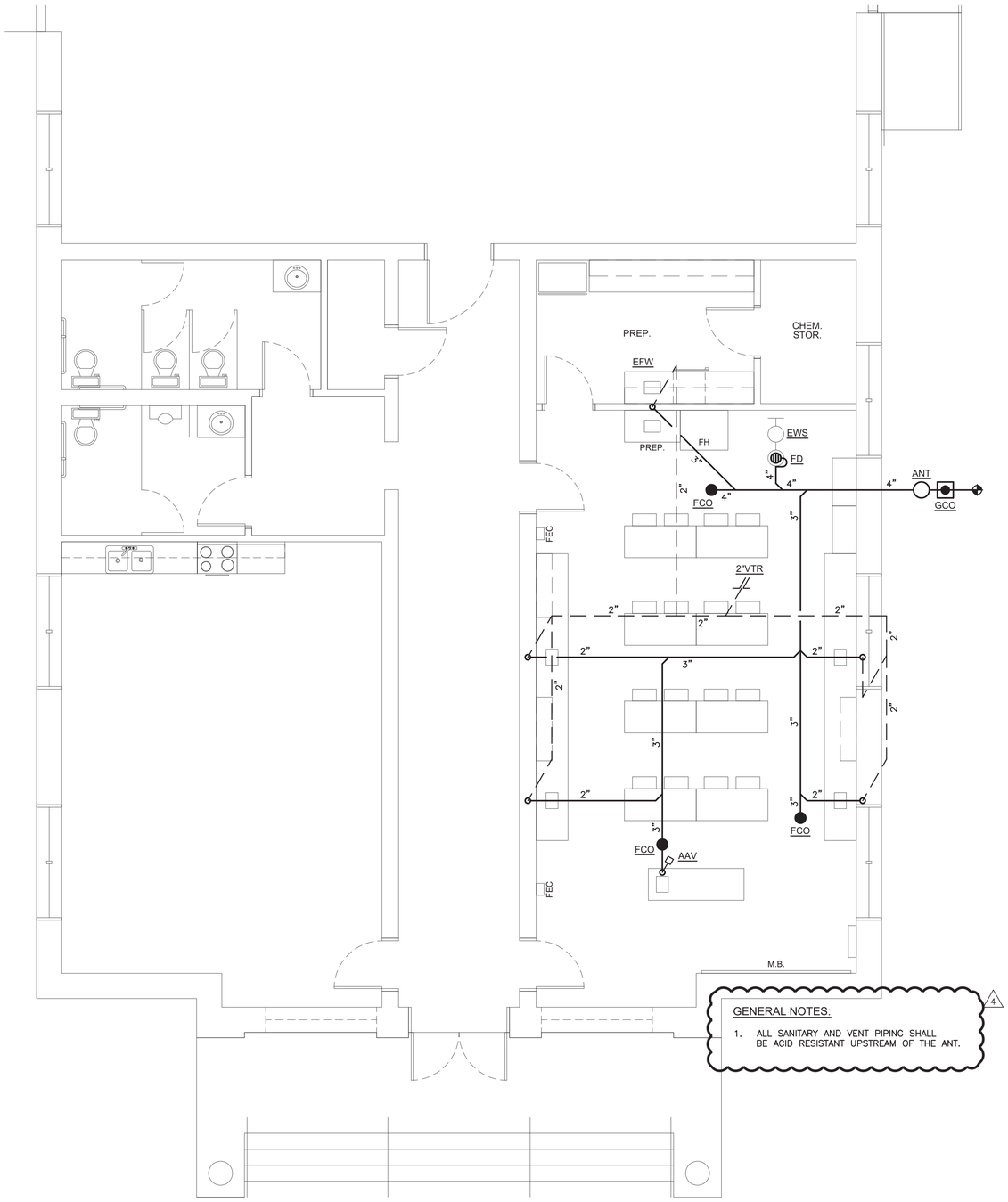
3 P2 FLOOR CLEANOUT DETAIL
SCALE: NONE



4 P2 GROUND (GRADE) CLEANOUT DETAIL
SCALE: NONE



2 P2 FLOOR DRAIN IN OPEN AREA DETAIL
SCALE: NONE



1 P2 SANITARY PIPING PLAN
SCALE: 1/4" = 1'-0"

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NORTH CAROLINA REGISTERED PROFESSIONAL SEAL 028953 ENGINEER TILDEN A. WHITE

2/4/2020

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4 ADDENDUM 2020-2-4

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SANITARY PIPING PLAN

P2

MECHANICAL SPECIFICATIONS

1. **Shop Drawings:** Provide product data for all equipment and materials for approval prior to purchasing. Include pertinent dimensions, materials of construction, performance characteristics, weights and factory and field wiring diagrams.
2. **Operation and Maintenance Manuals:** Provide 3 bound O&M Manuals at the completion of the project. Include approved shop drawings and manufacturer's maintenance manuals.
3. **Record Drawings:** Contractor shall maintain a set of drawings on the job site to record all differences between the project documents and "As-Built". Contractor shall provide a set of "As-Built" drawings to the Owner at the completion of the project.
4. **Warranty:** Contractor shall warranty the installation against defects for a period of one year from the date of Owner acceptance. Any defective materials or workmanship shall be replaced at no cost to the Owner.
5. **Electrical Coordination:** The mechanical contractor shall be responsible for providing disconnect switches for mechanical equipment not provided with factory mounted disconnect switches and the wiring from mechanical equipment to the disconect switch. All wiring and devices shall be in accordance with the NEC and electrical specifications.
6. **Permits and Fees:** Contractor shall obtain and pay for all permits, fees and inspections required under his portion of the work.
7. **Testing and Balancing:** Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance", ASHRAE 111, NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" or SMACNA's "HVAC Systems - Testing, Adjusting, and Balancing" and in this Section. Prepare test reports for both fans and outlets. Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer. Include a list of instruments used for procedures, along with proof of calibration. The final report shall contain the following in addition to certified field-report data, fan curves, manufacturers' test data and field test reports prepared by system and equipment installers, other information relative to equipment performance; do not include Shop Drawings and product data. In addition to form titles and entries, include the following data title page, name and address of the TAB contractor, project name, project location, report date, signature of TAB supervisor who certifies the report, table of contents. The report shall contain a summary of contents including the following, indicated versus final performance, notable characteristics of systems, description of system operation sequence if it varies from the Contract Documents, nomenclature sheets for each item of equipment, data for terminal units, including manufacturer's name, type, size, and fittings, notes to explain why certain final data in the body of reports vary from indicated values, test conditions for fans performance forms including settings for outdoor-, return-, and exhaust-air dampers, conditions of filters, cooling coil, wet- and dry-bulb conditions, fan drive settings including settings and percentage of maximum pitch diameter and other system operating conditions that affect performance.
8. **Duct Insulation: Mineral-Fiber Blanket Insulation:** Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type III with factory-applied FSK jacket (FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II). FSK Jacket Adhesive shall comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints. Insulation nominal density of 1.5 lbs/cu.ft for 1½-2" thicknesses and 0.75 lbs/cu.ft for 3" thick. Mineral-Fiber Board Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 612, Type 1A or Type 1B with factory-applied FSK jacket (FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II). FSK Jacket Adhesive shall comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints. Insulation nominal density shall be 3 lbs/cu.ft.

Supply Air (concealed):	1-1/2" FG Blanket, R4.7 installed.
Supply Air (exposed):	1-1/2" FG Board, R6 installed.
Supply Air (above attic insulation):	3"FG Blanket, R8 installed.
Supply Air (outdoors):	2"FG Board, R8 installed with embossed aluminum jacket.
Return Air (concealed):	not required
Return Air (exposed):	not required
Return Air (above attic insulation):	3"FG Blanket, R8 installed.
Return Air (outdoors):	2"FG Board, R8 installed with embossed aluminum jacket.
Outside Air (concealed):	1-1/2" FG Blanket, R4.7 installed including intake plenum.
Outside Air (exposed):	1-1/2" FG Board, R6 installed including intake plenum.
Outside Air (above attic insulation):	not required.
Outside Air (outdoors):	not required.
Exhaust Air (exposed):	1" FG Board for the first 10 feet from wall or roof penetration including exhaust plenum.
Exhaust Air (concealed):	1-1/2" FG Blanket for the first 10 feet from outside wall or roof penetration including exhaust plenum.

9. **Metal Ducts:** Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated. Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible." Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible." Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction, select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible." Materials shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections. Galvanized sheet steel shall comply with ASTM A 653/A 653M with a galvanized coating designation of G60. Carbon-Steel Sheets: Comply with ASTM A 1008/A 1008M, with oiled, matte finish for exposed ducts. Stainless-Steel Sheets: Comply with ASTM A 480/A 480M, Type 304 or 316, as indicated in the "Duct Schedule" Article; cold rolled, annealed, sheet. Aluminum Sheets: Comply with ASTM B 209 (ASTM B 209M) Alloy 3003, H14 temper; with mill finish for concealed ducts, and standard, one-side bright finish for duct surfaces exposed to view. Sealants and gaskets shall have surface-burning characteristics with a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL. Hanger rods for noncorrosive environments shall be cadmium-plated steel rods and nuts. Strap and rod sizes shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."
10. **Round Longinitudinal Seam Ducts (Single Wall):** General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Round Duct Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible." Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Round Duct Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible." Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
11. **Flexible Ducts:** Insulated, Flexible Duct: UL 181, Class 1, aluminum laminate and polyester film with latex adhesive supported by helically wound, spring-steel wire; fibrous-glass insulation; polyethylene vapor-barrier film with a pressure rating of 10-inch wg positive and 1.0-inch wg negative a maximum air velocity of 4000 fpm, a temperature range of minus 20 to plus 210 deg F and an insulation value of R4.
12. **In-Line Centrifugal Fans:** Housing shall be split, spun aluminum with aluminum straightening vanes, inlet and outlet flanges, and support bracket adaptable to floor, side wall, or ceiling mounting. Direct-drive units shall have motor mounted in airstream, factory wired to disconnect switch located on outside of fan housing. Belt-driven units shall have motor mounted on adjustable base, with adjustable sheaves, enclosure around belts within fan housing, and lubricating tubes from fan bearings extended to outside of fan housing. Fan wheels shall be aluminum, airfoil blades welded to aluminum hub. Provide fan with variable-speed controller, solid-state control to reduce speed from 100 to less than 50 percent, companion flanges on inlet and outlet duct connections, fan guards with 1/2- by 1-inch mesh of galvanized steel in removable frame. Provide guard for inlet or outlet for units not connected to ductwork and motor and drive cover (belt guard) of epoxy-coated steel. Provide elastomeric hangers and flexible connections on fans that are not internally isolated.
13. **Ceiling Fans:** Ceiling mounted exhaust fans shall be of the centrifugal direct drive type. The fan housing shall be constructed of heavy-gauge galvanized steel. The housing interior shall be lined with 1/2 inch (13 mm) acoustical insulation. The outlet duct collar shall include a polypropylene backdraft damper on SP-A50 - 90 and a spring loaded aluminum backdraft damper on SP-A110 and larger. Outlet shall be adaptable for horizontal or vertical discharge. The designer grille for sizes SP-A50 through SP-A390 shall be constructed of high-impact polystyrene and for sizes SP-A410 through SP-A1550, the grille shall be constructed of aluminum. Grilles shall be non-yellowing. The access for wiring shall be external. The motor disconnect shall be internal and of the plug-in type. The motor shall be mounted on vibration isolators. The fan wheel shall be of the forward-curved centrifugal type and dynamically balanced. All fans shall bear the AMCA Certified Ratings program AMCA Sound and Air Performance seal and shall be UL/cUL Listed. Ceiling or wall mount fans shall be model SP as manufactured by Greenheck Fan Corporation or equal.
14. **Centrifugal Roof Fans:** Housing shall be removable, spun-aluminum, dome top and outlet baffle; square, one-piece, aluminum base with venturi inlet cone. Upblast Units shall be provide with spun-aluminum discharge baffle to direct discharge air upward, with rain and snow drains and galvanized steel hinged subbase arrangement to permit service and maintenance. Fan wheels shall have aluminum hub and wheel with backward-inclined blades. Belt Drives shall be resiliently mounted to housing with steel fan shaft turned, ground, and polished; keyed to wheel hub. Shaft bearings shall be permanently lubricated, permanently sealed, self-aligning ball bearings. Pulleys shall be cast-iron, adjustable-pitch motor pulley. Fan and motor shall be isolated from exhaust airstream. Variable-speed controller shall be a solid-state controller to reduce speed from 100 to less than 50 percent. Disconnect switch shall be nonfusible type, with thermal-overload protection mounted inside fan housing, factory wired through an internal aluminum conduit. Bird screens shall be removable, 1/2-inch mesh, aluminum or brass wire. Dampers shall be counterbalanced, parallel-blade, backdraft dampers mounted in curb base; factory set to close when fan stops or motorized dampers with parallel-blade dampers mounted in curb base with electric actuator; wired to close when fan stops. Roof curbs shall be galvanized steel; mitered and welded corners; 1-1/2-inch- thick, rigid, fiberglass insulation adhered to inside walls; and 1-1/2-inch wood nailer. Size as required to suit roof opening and fan base.
15. **Grilles, Registers and Diffusers:** Ceiling Diffusers shall be constructed of steel with a white baked enamel finish. Diffusers shall be plaque face style designed for T-bar mounting with an adjustable pattern. Diffusers shall be provided with a combination damper and equalizing grid. See schedule for sizes and capacities. Fixed face grilles shall be constructed of Steel with a white baked enamel finish. Grilles shall have 1 inch frames with fixed 45 degree curved blades at ¾" on center. See schedule for sizes and capacities.
16. **Installation:** All work and materials shall be in accordance with the applicable sections of the N.C. Building Code and local codes and ordinances. Equipment and materials shall be installed in compliance with manufacturer's installation recommendations and acceptable industry standards. The mechanical contractor is responsible for verifying existing conditions and dimensions before beginning work. Perform all work in a neat workman-like manner and in accordance with industry standards.

MECHANICAL LEGEND

Supply Diffuser (Type X, YYY CFM)	
Return Grille (Type X)	
Rectangular Duct X" Wide, Y" Deep (Inside Clear Dimension)	XxY
Round duct X" Diameter (Inside Clear Dimension)	X"ø
Duct Transition: Rectangular To Rectangular	XxY / XXxYY
Duct Branch Tap: Round Spin-In Damper	XxY
Connect to Existing System	
Thermostat - Mount 48" AFF	T
Fire Damper - FD	

2018 APPENDIX B BUILDING CODE SUMMARY:

MECHANICAL SYSTEMS, SERVICE SYSTEMS AND EQUIPMENT

Method of Compliance
[X] Prescriptive [ ] Energy Cost Budget

Thermal Zone **4**
Winter Dry Bulb: **16°F**
Summer Dry Bulb: **85°F**

Interior Design Conditions
Winter Dry Bulb: **68°F**
Summer Dry Bulb: **75°F**
Relative Humidity: **50%**

Building Heating Load: **21 mbh**

Building Cooling Load: **29 mbh**

Mechanical Spacing Conditioning System
Unitary
description of unit: **Existing Gas Furnace Split System**
heating efficiency: **See Schedules**
cooling efficiency: **See Schedules**
heat output of unit: **See Schedules**
cooling output of unit: **See Schedules**
Boiler
total boiler output. If oversized, state reason. **n/a**
Chiller
total chiller capacity. If oversized, state reason. **n/a**

List equipment efficiencies: **See Schedules**

Equipment schedules with motors (mechanical systems)
motor horsepower: **- see schedules**
number of phases: **- see schedules**
minimum efficiency: **- manufacturer's standard meeting ASHRAE 90.1**
motor type: **- manufacturer's standard**
# of poles: **- manufacturer's standard**

EXHAUST FAN SCHEDULE

tag	EF1	EF2	EF3	EF4
serves	PREP.	CHEM. STOR.	NOT USED	SCIENCE LAB
manufacturer (or equal)	Greenheck	Greenheck		Greenheck
model	SP-A190	SP-A90		CUE-070
type	ceiling	ceiling		roof upblast
drive	direct	direct		direct
rpm	1400	870	4	2500
airflow (cfm)	186	80		1000
esp (inches H2O)	0.25	0.25		0.25
max. sones	2.0	0.4		na
control	Switch	Switch		Emergency exhaust. Controlled by Utility Controller.
voltage	120V/1Ø	120V/1Ø		120V/1Ø
power (watts)	49.2	15.0		1/2 hp
weight (lbs)	17	12		75
applicable notes	1,3	1,3		1,2

1. Provide unit mounted disconnect and backdraft damper.
2. Wall switches by E.C.
3. Provide Greenheck Model RJ pitched roof cap with insect screen. (6x9). Fan shall run continuously (24/7). 4
4. Provide speed controller, spark proof fan wheel, and Hi-Pro Polyester coating on all airstream surfaces. Fan shall run continuously.

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2/4/2020

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828-255-4327 Project 19119

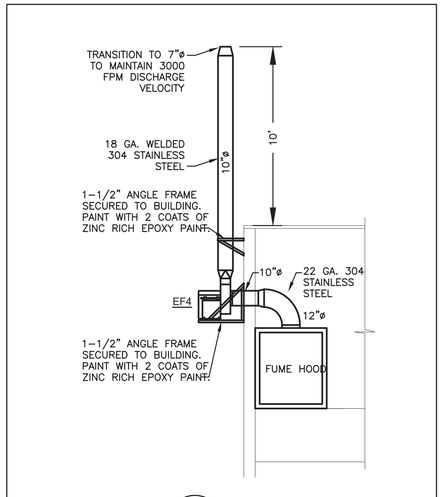
CHHS SCIENCE LAB RENOVATION

4 ADDENDUM 2020-2-4

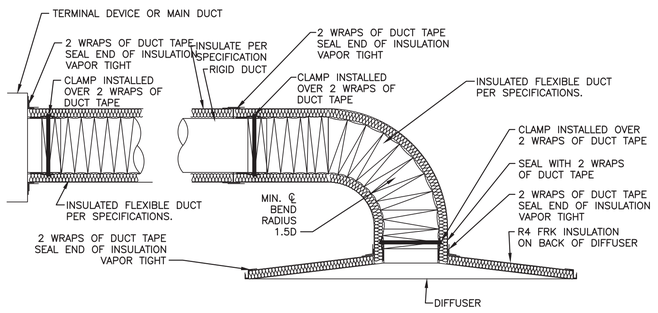
Project Number: 19017
Checked: TW
Drawn: -
Date: 1/7/2020
1/24/2020
2/4/2020

MECHANICAL NOTES & SCHEDULES

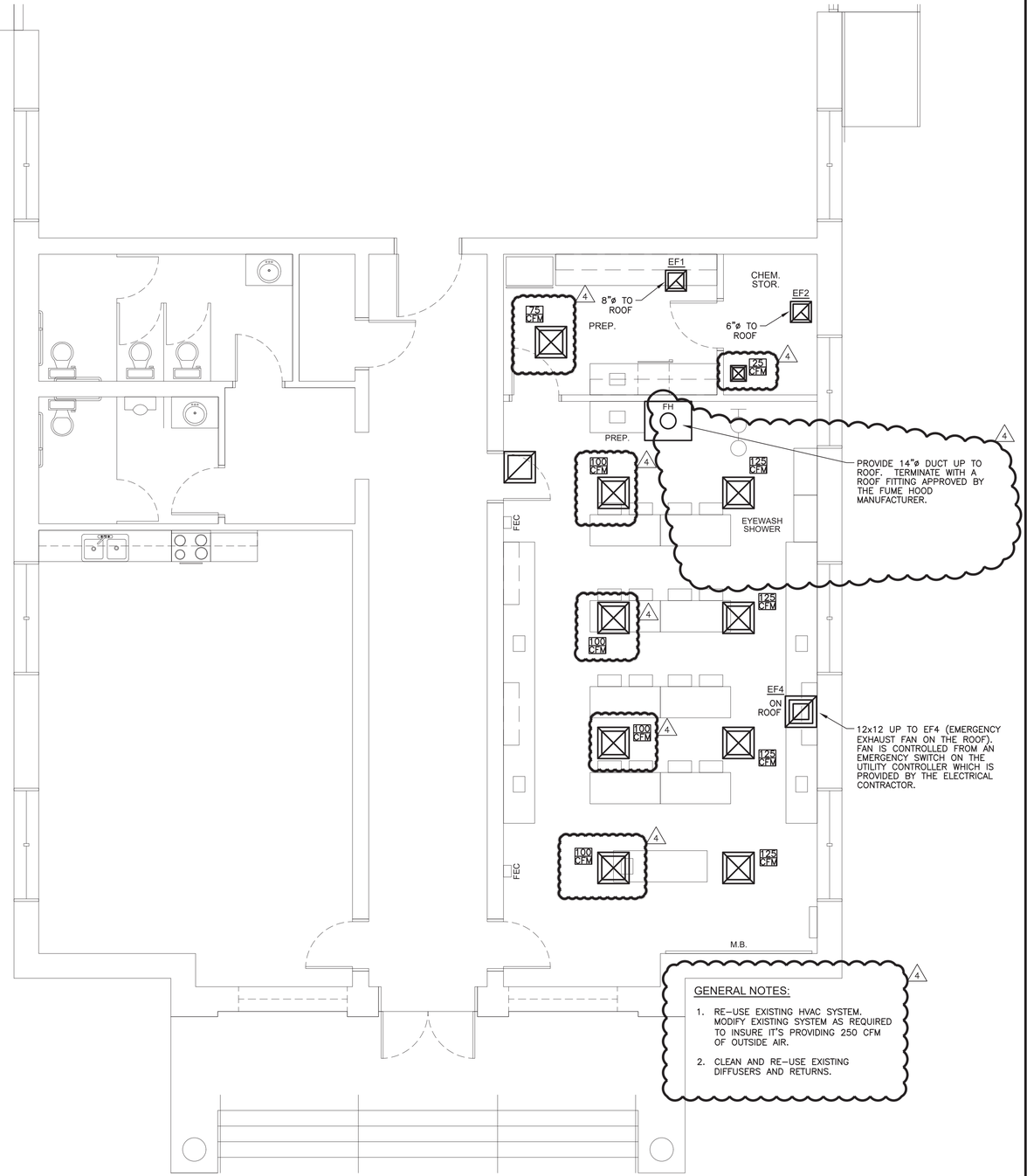
M1



3/M2 FUME HOOD DETAIL
SCALE: NO SCALE



2/M2 FLEXIBLE DUCT CONNECTION DETAIL
SCALE: NO SCALE



1/M2 MECHANICAL PLAN
SCALE: 1/4" = 1'-0"

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MECHANICAL PLAN

M2

LOCATION: EXISTING
MANUFACT.: EXISTING
MODEL: EXISTING
MOUNTING: SURFACE

PANEL: **MLO**
FED FROM: EXISTING

VOLTS		Ph	W
208	120	3	4

FULLY RATED
EXISTING

CONN VA	#	LOAD	Ph	N	G	C	BKR	A	B	C	BKR	Ph	N	G	C	LOAD	#	CONN VA
540	1	(EX)HALL REC	-	-	-	-	20				20	-	-	-	-	(EX)LIGHTS	2	750
540	3	(EX)HALL REC	-	-	-	-	20				20	-	-	-	-	(EX)CAN LTS	4	250
540	5	(EX)HALL REC	-	-	-	-	20				20	-	-	-	-	(EX)MTG LTS	6	500
125	7	(EX)HALL REC/LTS	-	-	-	-	20				20	-	-	-	-	(EX)MTG LTS	8	500
790	9	(EX)KIT REC/LTS	-	-	-	-	20				20	-	-	-	-	(EX)MTG REC	10	1080
900	11	(EX)DISHWASHER	-	-	-	-	20				20	-	-	-	-	(EX)MTG REC	12	1080
330	13	(EX)BATHRM	-	-	-	-	20				20	-	-	-	-	(EX)KIT REC	14	540
540	15	(EX)KIT REC	-	-	-	-	20				20	-	-	-	-	(EX)KIT REC	16	540
540	17	(EX)KIT REC	-	-	-	-	20				20	-	-	-	-	(EX)KIT REC	18	540
1200	19	(EX)MICROWAVE	-	-	-	-	20				20	-	-	-	-	(EX)KIT REC	20	540
360	21	REC	12	12	12	1/2	20				20	-	-	-	-	(EX)FLOOR REC	22	360
360	23	REC	12	12	12	1/2	20				20	-	-	-	-	(EX)FLOOR REC	24	360
360	25	REC	12	12	12	1/2	20				20	12	12	12	1/2	REC	26	180
360	27	REC	12	12	12	1/2	20				20	12	12	12	1/2	EF4	28	900
360	29	REC	12	12	12	1/2	20				20	12	12	12	1/2	EF3	30	1200
1620	31	REC	12	12	12	1/2	20				20	12	12	12	1/2	EF1&2	32	250
1440	33	REC	12	12	12	1/2	20				20	12	12	12	1/2	SERVICE REC	34	180
360	35	REC	12	12	12	1/2	20				20	12	12	12	1/2	IGWH	36	150
900	37	REC	12	12	12	1/2	20										38	0
720	39	REC	12	12	12	1/2	20										40	0
1080	41	REC	12	12	12	1/2	20										42	0

42	SUBTOTAL AMPS Ph A	
40	SUBTOTAL AMPS Ph B	
35	SUBTOTAL AMPS Ph C	

MAIN BREAKER:		AMPS
MAIN LUGS:	225	AMPS (MIN)
BUS AMPACITY:	225	AMPS (MIN)

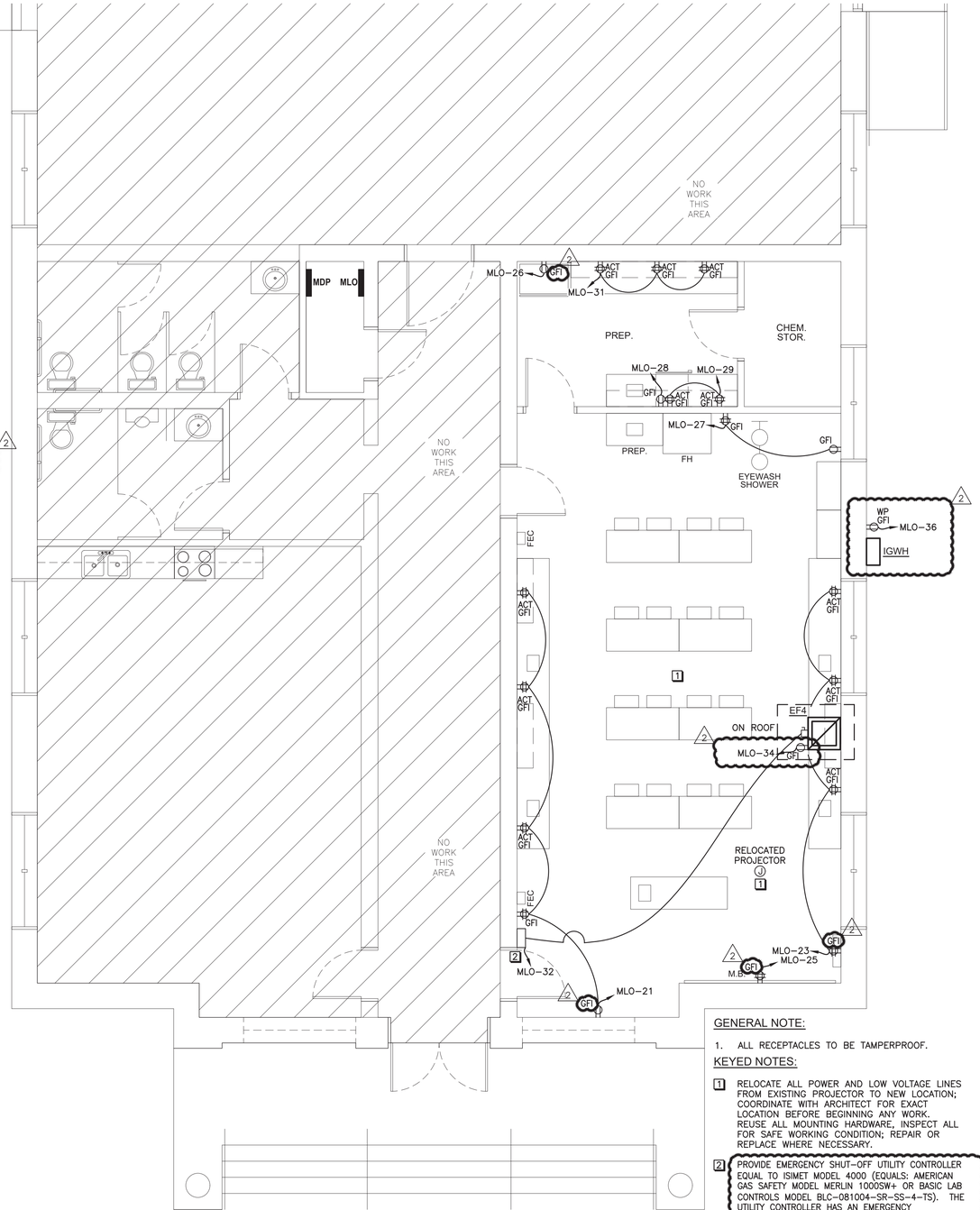
SUBTOTAL AMPS Ph A	23
SUBTOTAL AMPS Ph B	28
SUBTOTAL AMPS Ph C	32

LOAD	CONNECTED	DF	DEMAND	
LIGHTING	2525	125	3156	
A/C	0	100	0	
HEATING	0	100	0	
NON-VENT MOTORS	0	100	0	
VENTILATION	2350	100	2350	
KITCHEN	2100	100	2100	
RECEPTACLES	16740	80	13370	
MISCELLANEOUS	150	100	150	
FUTURE	0	100	0	
TOTAL	23865		21126	(VA)
	66		59	(AMPS)

VA ph A	7835
VA ph B	8060
VA ph C	7970
TOTAL	**23.9 kVA**

NOTES

1. PANEL SHALL BE PROVIDED WITH A FULL NEUTRAL.
2. PANEL BUSSING MATERIAL SHALL BE CU.
3. PROVIDE A FULLY RATED GROUND BUS.
4. *BKR INDICATES GROUND FAULT TYPE CIRCUIT BREAKER.
5. ALL BRANCH CIRCUITS SHALL BE FED WITH COPPER CONDUCTORS.
6. SEE POWER RISER DIAGRAM FOR FEEDER AND CONDUIT SIZE.
7. PANEL SHALL BE SERVICE ENTRANCE RATED.
8. MDP SHALL BE DEAD FRONT.



GENERAL NOTE:

1. ALL RECEPTACLES TO BE TAMPERPROOF.

KEYED NOTES:

[1] RELOCATE ALL POWER AND LOW VOLTAGE LINES FROM EXISTING PROJECTOR TO NEW LOCATION; COORDINATE WITH ARCHITECT FOR EXACT LOCATION BEFORE BEGINNING ANY WORK. REUSE ALL MOUNTING HARDWARE, INSPECT ALL FOR SAFE WORKING CONDITION; REPAIR OR REPLACE WHERE NECESSARY.

[2] PROVIDE EMERGENCY SHUT-OFF UTILITY CONTROLLER EQUAL TO ISIMET MODEL 4000 (EQUALS: AMERICAN GAS SAFETY MODEL MERLIN 1000SW+ OR BASIC LAB CONTROLS MODEL BLC-QB1004-SR-SS-4-TS). THE UTILITY CONTROLLER HAS AN EMERGENCY "MUSHROOM-TYPE" SWITCH THAT SHUTS OFF THE GAS, COLD AND HOT WATER SOLENOID VALVES, INTERRUPTS ALL POWER NOT SERVING FUME HOODS, EXHAUST SYSTEMS OR LIGHTING, AND TURNS ON THE EMERGENCY EXHAUST FAN (EF4).

1 E3 POWER PLAN
SCALE: 1/4" = 1'-0"

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NORTH CAROLINA REGISTERED PROFESSIONAL SEAL 028953 ENGINEER TILDEN A. WHITE

1/23/2020

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CHHS SCIENCE LAB RENOVATION

2 ADDENDUM 2020-1-23

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POWER PLAN

E3