

# SCHEMATIC DESIGN REPORT

OREGON STATE UNIVERSITY

GILBERT HALL ADDITION  
ROOM 209 RENOVATION

OSU PROJECT #1357-12



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# GILBERT HALL ADDITION – ROOM 209 RENOVATION

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# GILBERT HALL ADDITION – ROOM 209 RENOVATION SCHEMATIC DESIGN REPORT



SYSTEMS WEST ENGINEERS, INC.

Systems West Engineers was retained by Oregon State University to provide schematic design for proposed upgrades at the Gilbert Hall Addition. Following is a summary of mechanical and electrical system upgrades proposed for the renovation of chemistry teaching laboratory 209 in the Gilbert Hall Addition. The purpose of this narrative is to document project design requirements, define the scope of work for proposed system upgrades, and to provide budget construction cost estimates.

## 1.0 PROJECT DESCRIPTION

Oregon State University is interested in upgrading mechanical and electrical systems for the Gilbert Hall Addition and specifically for chemistry teaching laboratory 209. Existing laboratory systems are not well suited to support the current teaching functions of laboratory 209, which limits laboratory use and effectiveness. Additionally, a majority of the building is not air-conditioned. Major laboratory deficiencies are summarized below:

*Laboratory Space Temperature:* Air-conditioning is not provided for the four teaching laboratories in the Gilbert Addition. Space temperatures become excessive during summer months often exceeding 90°F. On some occasions classes are cancelled due to high laboratory space temperature.

*Fume Hood Capacity:* Educational functions include extensive use of laboratory fume hoods. Each eight foot fume hood can support the activities of three students. Laboratory 209 has six eight foot fume hoods and a four foot ADA fume hood, which can provide workspace for one student. Laboratory 209 has a total of 19 student workstations. This condition establishes the maximum student teaching capacity of the laboratory. Increasing the number of fume hoods and the associated student teaching capacity is a primary objective of this project.

*Laboratory Light Levels:* Interior lighting fixtures were not originally installed in the vicinity of the fume hoods. Accordingly, lighting level in front of the fume hoods are well below recommended levels.

*Laboratory Water/Gas Services:* Laboratory water and gas services were not provided or configured to support current educational functions.



## 1.1 Project Requirements

The University has established the following specific project objectives:

*Laboratory 209 Upgrades:* Perform selected renovation work for laboratory 209 and adjacent support spaces including equipment room 212 and laboratory room 220 to support teaching activities. Proposed mechanical and electrical upgrades include the following:

- Add Fume Hoods: New fume hoods will be installed to increase student teaching capacity in laboratory 209. Two levels of upgrades are presented for consideration to accommodate available project funding.
  - Laboratory Upgrade Option 1: Add four new eight foot fume hoods along east wall for a total of eleven fume hoods.
  - Laboratory Upgrade Option 2: Add four new eight foot fume hoods along east wall along with two eight foot and two six foot fume hoods along south wall for a total of fourteen fume hoods.
- Variable Air Volume Conversion: Convert existing laboratory supply air and exhaust air systems from constant volume to variable volume.
- Laboratory Air-Conditioning: Provide space cooling for the laboratory to maintain suitable space temperature for educational use.
- Laboratory Services: Provide mechanical and electrical services including laboratory water, gas, vacuum; power outlets; and data communications for current laboratory use.
- Laboratory Equipment Exhaust: Provide exhaust air connections for gas chromatography units in room 212.
- Plumbing Fixtures and Equipment: Cup sinks and faucets will be provided with new fume hoods to support laboratory use. The condition and capacity of central service equipment including the vacuum system will be reviewed to confirm capability to supporting laboratory requirements.
- Laboratory Lighting: Lighting upgrades will be performed to improve illumination levels in the vicinity of the fume hoods.

*Chilled Water System Expansion:* Upgrade building chilled water cooling system to provide air-conditioning for laboratory 209. Upgrades will be performed with provisions for future expansion to provide cooling for the entire building.

## **2.0 GENERAL PROJECT REQUIREMENTS**

### **2.1 State Building Codes**

The following building codes are adopted by the State of Oregon, and are collectively referred to as the “Code.”

- Oregon Structural Specialty Code
- Oregon Plumbing Specialty Code
- Oregon Mechanical Specialty Code
- Oregon Energy Efficiency Specialty Code
- Oregon Electric Code
- Oregon Fire Code

Standards & Guidelines: The design of building systems will conform to the most recent version of the following standards:

- OSU Construction Standards

### 3.0 CHEMISTRY LABORATORY 209

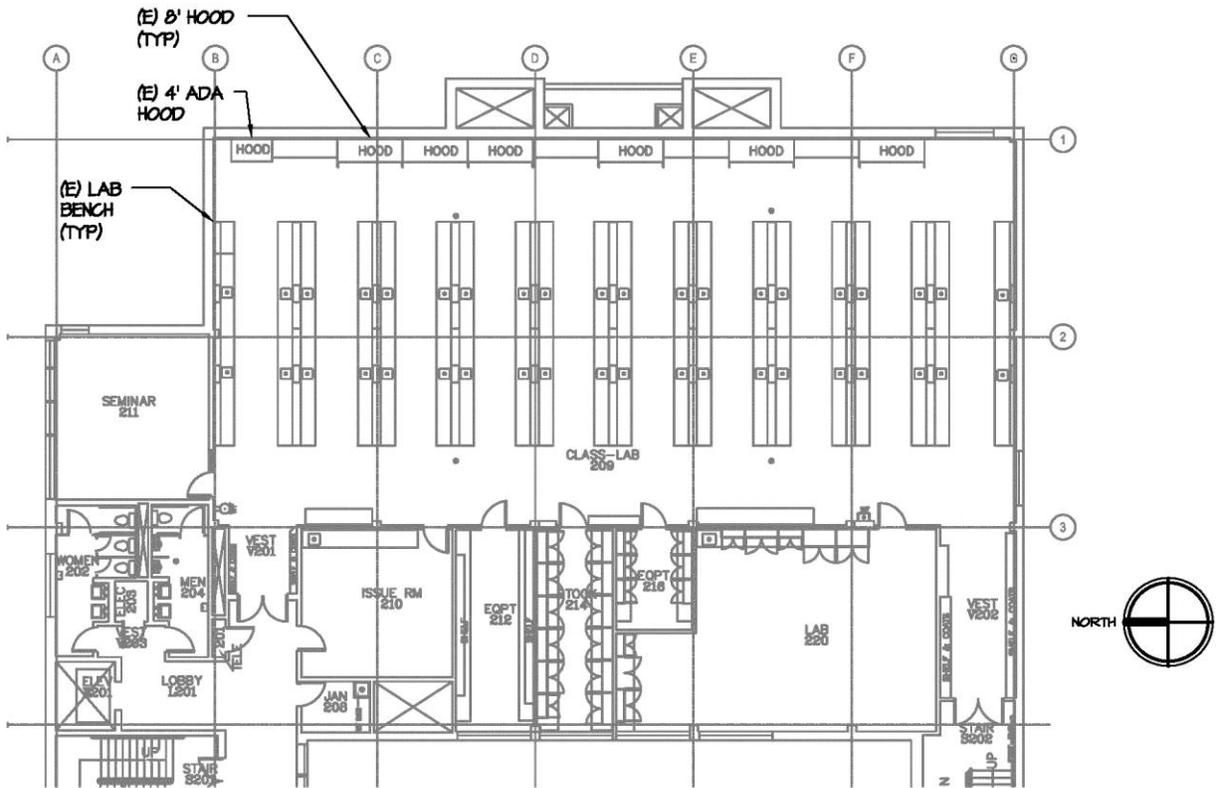
#### 3.1 Existing Conditions

The Gilbert Addition was originally constructed in 1981 and has five floors with a total floor area of 42,240 square feet. The addition includes four large teaching laboratories. Teaching laboratory 209 is a 4,800 square foot laboratory located on the second floor. The lab is currently served by six eight foot constant volume fume hoods and one four foot constant volume fume hood that is ADA accessible. Each eight foot fume hood can support the activities of three students, and the four foot fume hood can support a single student. The laboratory has a total of 19 student fume hood workstations. The laboratory also has eleven laboratory benches. The benches provide student work space on both sides of the bench, except for the benches located at the north and south wall of the laboratory. There is no cooling provided for Lab 209. A floor plan of the existing laboratory space is included as Figure 1 on page 4.

*Notable Conditions:* Existing laboratory bench tops are Transite, which is an asbestos containing material.

Room 209  
Typical Laboratory Bench





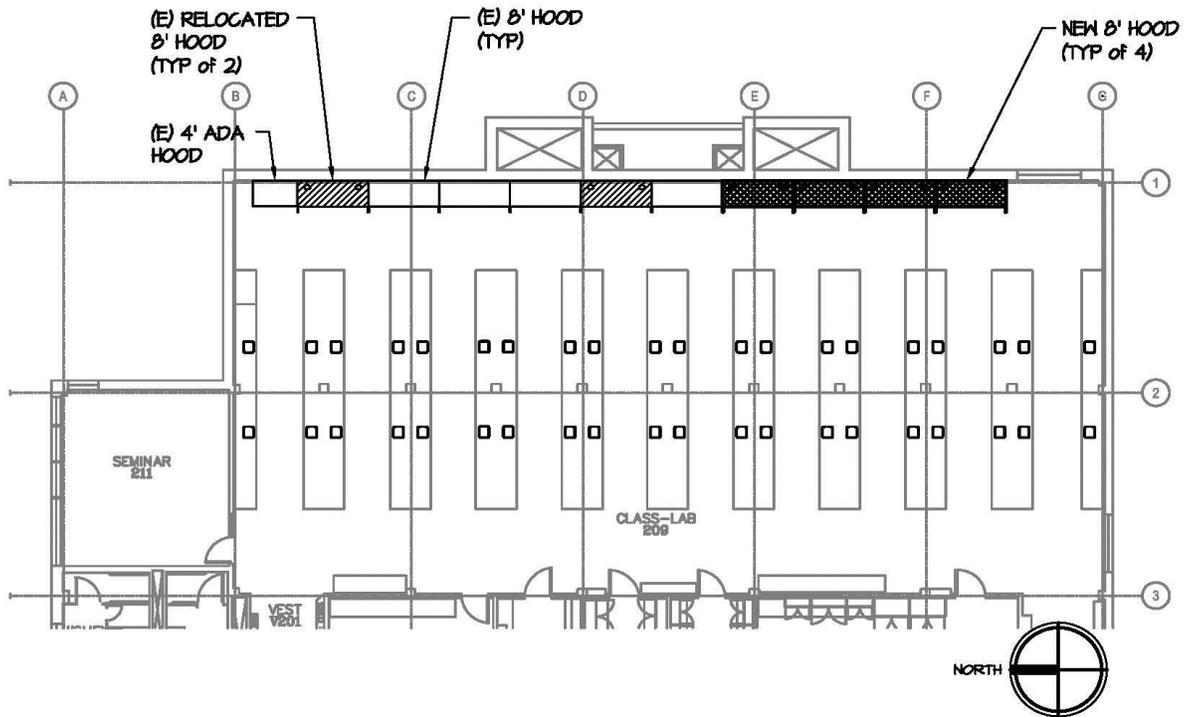
**FIGURE 1  
EXISTING LABORATORY FLOOR PLAN**

### 3.2 Proposed Upgrade - Option 1

Following is a description of proposed architectural and laboratory equipment upgrades:

*Fume Hoods:* Four new laboratory fume hoods will be provided along the east wall of the laboratory. Due to space limitations, new hoods cannot be installed in the existing opening between hoods. Therefore, two of the existing fume hoods will be relocated into the openings creating clear space to the south for new fume hoods and base cabinets. A proposed floor plan for the Option 1 is shown as Figure 2 on page 6. The scope of work will generally include the following:

- Relocate two existing eight foot fume hoods, base cabinets and countertop as shown in Figure 2. Remove base cabinets and countertops at new hood location.
- Provide four new eight foot fume hoods, base cabinets, and countertops to the south of the existing hoods as shown on Figure 2. New hoods will conform to OSU Design Requirements. The basis of design used for this evaluation is Labconco Model Protector XL. Product information for the proposed fume hood is included in Appendix A.
- Existing fume hood suppression systems will be retained, and new fume hoods will not be equipped with stand-alone fire suppression systems.



**FIGURE 2  
LABORATORY FLOOR PLAN – OPTION 1**

### 3.3 Proposed Upgrade - Option 2

Following is a description of proposed architectural and laboratory equipment upgrades:

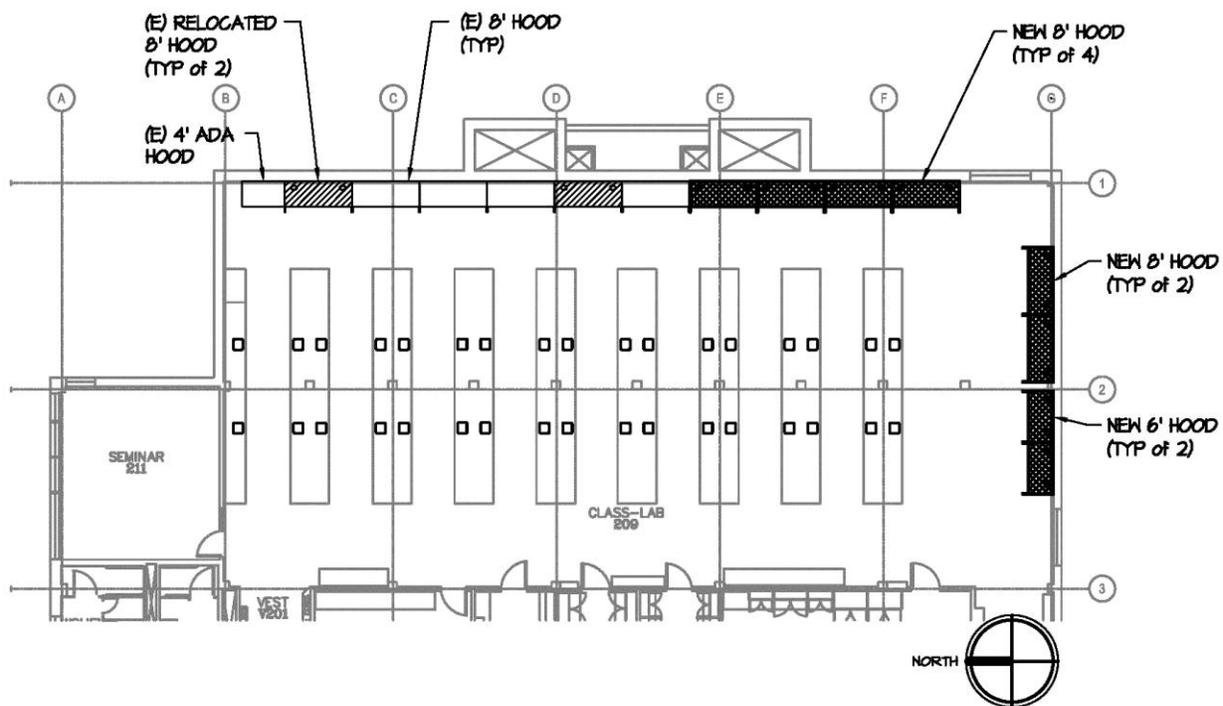
*Fume Hoods:* Provide the work described in Option 1 above along with the work described below.

Four new laboratory fume hoods will be provided along the south wall of the laboratory. A proposed floor plan for the Option 2 is shown as Figure 3 on page 7. The scope of work will generally include the following:

- Provide four new fume hoods, base cabinets, and countertops to the south wall as shown on Figure 3. New hoods will include two eight foot models and two six foot models. New hoods will conform to OSU Design Requirements. The basis of design used for this evaluation is Labconco Model Protector XL. Product information for the proposed fume hood is included in Appendix A.

*Laboratory Bench Tops and Sinks:* Installation of the additional fume hoods on the south wall will require removal of two rows of laboratory casework including the southernmost wall mounted unit and the next adjacent row. A proposed floor plan for the Option 2 is shown as Figure 3 on page 7. The scope of work will generally include the following:

- Remove two rows of laboratory casework including base cabinets, countertops, shelving, and related items.
- Patch and repair walls and flooring where casework is removed.



**FIGURE 3**  
**LABORATORY FLOOR PLAN – OPTION 2**

## **4.0 FIRE SUPPRESSION**

### **4.1 Existing Conditions**

Following is a description of existing systems, equipment, and notable conditions:

*Fire Sprinkler System:* A wet-pipe fire sprinkler system provides coverage of the entire building. The existing sprinkler heads appear to be standard response type. Quick response sprinkler heads are required under the current fire code and NFPA guidelines.

*Fume Hood Fire Suppression:* The existing fume hoods are equipped with dry chemical fire extinguishers.

### **4.2 Design Requirements**

*Standards & Guidelines:* The design will conform to the most recent version of the following industry standards and design guidelines:

- NFPA 13: Standard for the Installation of Sprinkler Systems

### **4.3 Proposed System Upgrades**

*Fire Sprinkler System:* The existing wet-pipe fire sprinkler system will provide coverage for remodeled spaces. Existing piping systems will be modified and extended as required. Sprinkler heads will be replaced where necessary.

*Fume Hood Fire Suppression:* Existing fume hood suppression systems will be retained. New fume hoods will not be equipped with stand-alone fire suppression systems.

## 5.0 PLUMBING

### 5.1 Existing Conditions

Following is a description of existing systems, equipment, and notable conditions:

*Plumbing Fixtures:* Room 209 is equipped with a number of existing workbench sinks and fume hood cup sinks. The fixtures are described in more detail below.

- The workbench sinks are under-mount, with two sinks in each of the benches at the north and south walls of the room, and four sinks in remaining workbenches for a total of 40 sinks. Submittal records indicate that the sinks are constructed of epoxy. Each sink is equipped with two cold-water-only faucets with a gooseneck vacuum breaker spout, hose fitting end, and an aspirator. Each sink is also equipped with a single hot and cold water faucet with a gooseneck vacuum breaker spout and a barbed fitting end. The faucets are side-mounted on a vertical support built into the turret shelf feature of the workbenches.
- Fume hood cup sinks are constructed of resin. There is a single cup sink in the existing four foot fume hood, and two cup sinks in each of the eight foot fume hoods, for a total of thirteen cup sinks. Each cup sink is equipped with a single cold-water-only faucet with a gooseneck vacuum breaker spout, barbed fitting end, and an aspirator.

*Emergency Showers & Drench Hoses:* Emergency fixtures in room 209 are supplied with potable cold water, and do not have tempered water supply. The room is equipped with four emergency showers, two of which are between the benches and fume hoods, and two of which are between the benches and the equipment room. The emergency showers are located above floor drains, as required by current OSU design standards. Drench hoses are located at sinks, with one drench hose for each side of a counter, for a total of twenty. The drench hoses are not located near floor drains. The laboratory is not equipped with emergency eyewash stations, and the existing drench hoses do not appear to be designed for dual function eyewash/drench hose use. A plan showing emergency fixture locations is included in Appendix B.

*Sanitary Waste & Vent:* The existing workbench sinks and fume hood cup sinks are generally connected to borosilicate glass acid waste and vent piping through stainless steel tailpiece fittings. The glass acid waste piping is highly resistant to most acids, and the piping and fittings appear to be in good condition.

*Laboratory Water & Gas:* Laboratory gases and vacuum are provided at lab benches and fume hoods. A plan showing service valve locations is included in Appendix B. The services are described separately below.

- *Laboratory Natural Gas:* Natural gas is supplied to needle valve fittings with barbed end connections at lab benches and fume hoods. Lab benches at the north and south walls and fume hoods have a single-sided gas valve, lab benches in the center of the room have double-headed gas valves. Each fume hood is equipped with two single-ended natural gas valves, one on either side of the hood, with the exception of the four foot hood, which has a single natural gas valve. The existing natural gas piping is generally black steel.

University staff stated that natural gas is not used and is not desired in the laboratory that is used for Organic Chemistry.

- **Laboratory Compressed Air:** Laboratory compressed air is supplied to needle valve fittings with barbed end connections at fume hoods. Each fume hood is equipped with two single-ended compressed air valves, one on either side of the hood. The existing compressed air piping is generally copper.
- **Laboratory Vacuum:** Laboratory vacuum service is provided through needle valve fittings with barbed end connections at lab benches. Lab benches at the north and south walls have a single-sided valve, lab benches in the center of the room have double-headed valves. The room is currently equipped with a total of 120 vacuum inlets. The existing vacuum piping is generally copper.

A central vacuum pump is located in the first floor mechanical room. A network of distribution piping connects the vacuum pump to fixtures throughout the building. The vacuum pump is a Busch model 160-118 simplex vacuum compressor, installed in 1981, with a rated capacity of 117 scfm at 15 in HG. The vacuum compressor is thirty years old and is at the end of expected service life. Assuming 1 scfm per vacuum inlet with 60% diversity (meaning that only 40% of the vacuum inlets are expected to be in simultaneous use) we have a total room use of 48 scfm. Given that there are labs in the basement, third, and fourth floors with similar use, and that there is intent to increase the future use and student density of the space, it appears that the existing vacuum compressor may be undersized for future use. Additionally, the unit does not conform to OSU Construction Standards that requires duplex vacuum pumps instead of simplex pumps.

The existing vacuum pump will be reused under this project. However, the University should consider future replacement of the existing vacuum pump.

## 5.2 Proposed System Upgrades - Option 1

Following is a description of proposed systems, equipment, and controls:

*Plumbing Fixtures:* Existing sinks will be reused where possible, and a number of new cup sinks and safety equipment will be added as described below.

- Existing fume hood cup sinks will be reused and reconnected to existing services. New fume hoods will be equipped with two cup sinks and faucets each, similar to the existing hood arrangements. Product data for the proposed fume hoods is included in Appendix A.

Where new cold or hot water piping is required, type L copper with wrought copper fittings will be used.

*Sanitary Waste & Vent:* The existing borosilicate glass acid waste and vent piping will be reused where possible. New acid waste and vent piping, including connections to the existing piping, will be Fuseal polypropylene electrofusion piping in accordance with OSU standards.

*Laboratory Water & Gas:* Laboratory gas and vacuum service will change. Laboratory compressed air and natural gas are not necessary for the future functions of the space and will be removed from the existing fume hoods. Laboratory nitrogen will be provided to new and existing

fume hoods. A plan showing proposed service valve locations is included in Appendix B. The services are described separately below.

- Natural Gas: Natural gas is not required in the laboratory and all existing fume hood piping and fittings will be removed and capped at the nearest active main.
- Compressed Air: Compressed air is not required in existing fume hoods. Existing compressed air piping and fittings will be removed and capped at the nearest active main.
- Vacuum: Laboratory vacuum will be provided through needle valve fittings with barbed end connections at fume hoods. Existing vacuum fittings, valves, and piping will be reused where possible. New vacuum piping will be type L hard drawn copper with wrought copper fittings and soldered connections per OSU standards.
- Nitrogen: Nitrogen will be supplied to needle valve fittings with barbed end connections at new and existing fume hoods by a cylinder manifold. Compressed nitrogen cylinders will be connected to the manifold to serve nitrogen needs for the space. The quantity of compressed nitrogen will not exceed the maximum allowable quantity for the space. Each fume hood will be equipped with two single-ended nitrogen valves, one on either side of the hood. Nitrogen piping will be ASTM 280 ACR type L hard drawn copper with wrought copper fittings and 15% silphos silver soldered connections per OSU standards. Existing piping from other services will not be reused for Nitrogen gas piping.

### **5.3 Proposed Upgrade - Option 2**

Proposed upgrades in Option 2 are identical to upgrades in Option 1, with the exception that four additional new fume hoods will be provided, and the two southernmost lab benches will be removed to provide space for the additional hoods. A plan showing proposed service valve locations is included in Appendix B.

## 6.0 HEATING, VENTILATING, AND AIR-CONDITIONING

### 6.1 Existing Conditions

Following is a description of existing heating, ventilating and air-conditioning systems in Gilbert Addition along with notable conditions observed during on-site field survey.

*Heating Water:* Hydronic heating water is generated by a steam-to-water heat exchanger located in mechanical room 106. Steam is provided to the building from the campus utility steam distribution system. Heating water is circulated to the building for space heating by pumps HP-1A and HP-1B. Heating water piping is configured in a reverse return system arrangement.

*Air Distribution Systems:* Seven air handlers serve Gilbert Hall Addition. ASU-1, ASU-2, and ASU-3 are located in mechanical room 106. ASU-4, ASU-5, ASU-6, and ASU-7 are located in Penthouse 504.

- ASU-1, ASU-2, ASU-3, and ASU-4 are 100% outside make-up air units that provide heating and ventilation for teaching laboratories. Each unit consists of the following components: pre-filters, final bag filters, face and bypass damper, heating coil, and supply fan.
- ASU-5 is a variable air volume air handler that provides heating, cooling and ventilation for the ancillary area including all rooms, except for teaching laboratories and the clean room 420A. The unit consists of the following components: return fan, economizer dampers, pre-filters, heating coil, and supply fan with inlet vane dampers. Space temperature is controlled by variable volume reheat terminal units.
- ASU-6 is a variable air volume air handler that provides make-up air for the fume hoods in the ancillary area and general exhaust for non-lab spaces. The unit consists of the following components: economizer damper, pre-filters, face and bypass dampers, heating coil, supply fan with inlet vane dampers, and discharge plenum with bypass damper. Space temperature is controlled by variable volume reheat terminal units.
- ASU-7 is a 100% outside make-up air unit that provides heating and ventilation for clean room 420A.

<b>Air Handler</b>	<b>Area Served</b>	<b>Airflow (cfm)</b>
ASU-1	Teaching Lab 09	13,175
ASU-2	Teaching Lab 209	9,140
ASU-3	Teaching Lab 309	11,275
ASU-4	Teaching Lab 409	11,750
ASU-5	Ancillary Area	25,340
ASU-6	Ancillary Area fume hood make-up air	9,050
ASU-7	Clean Room 420A	1,800

*Laboratory 209:* Air handler ASU-2 provides make-up air for teaching laboratory 209. The air handler is located in first floor mechanical room 106. Supply air is provided to ten general supply air grilles and to fume hood integral auxiliary air chambers located above hood stash openings. Two hot water reheat coils are installed in supply ductwork to the ten general supply air diffusers to maintain the space temperature setpoint. Supply air for hood make-up is not heated.

Two cabinet unit heaters provide supplemental heating for laboratory 209. The unit heaters have a self-contained supply fan and recirculate air within the laboratory space.

A constant volume utility fan provides exhaust for laboratory fume hoods. All laboratory exhaust air from laboratory 209 flows through the existing hoods. Fume hood exhaust outlets connect to two ductwork manifolds that are routed up a vertical shaft to exhaust fan FEF-2 located in the penthouse. The exhaust fan discharges up through the penthouse room and terminates approximately four feet above Penthouse 504 roof level.



Laboratory 209  
Fume Hood Duct Connections



Penthouse Roof  
FEF-2 Exhaust Outlet

*Building Automation System:* HVAC equipment is controlled by a pneumatic/electric control system.

## 6.2 Design Requirements

*Standards & Guidelines:* The design of building systems will conform to the most recent version of the following industry standards:

- SMACNA, Ductwork Construction Standards

*Outdoor Design Conditions:* The following ambient outdoor conditions will be used as a basis of design.

Design Conditions	Criteria	Values
Project Site		Corvallis, Oregon
Site Elevation	Above sea level	250
<b>General Building Design Criteria</b>		
Winter Heating	Mean of extreme annual dry bulb	17.7°F
Summer Cooling	0.04% dry bulb / mean coincident wet bulb	92°F / 66°F

*Indoor Design Conditions:* The following indoor environmental conditions will be used as a basis of design.

Room Type	Occupants (P/1000 sf)	Lights (W/sf)	Equipment (W/sf)	Htg Setpoint (°F)	Clg Setpoint (°F)
Classroom / Laboratory	50	1.0	5.0	70	74
Lobby / Corridor	0	1.0	0.0	70	74
Storage	0	1.0	0.0	70	74
<b>General Design Requirements</b>					
Design Occupant Load		250 Btu/hr sensible, 200 Btu/hr latent			
Humidity Setpoints		No humidity control			

*Outside Air Ventilation:* HVAC systems will be designed to meet or exceed outside air ventilation rates required by Code.

*Process Exhaust:* Spaces that have process equipment or critical functions will be provided with specialized exhaust systems as required to support program function. The following equipment will be provided with process exhaust systems:

- Laboratory Fume Hoods
- Snorkel bench-top exhaust outlet for gas chromatographs in room 212.

*Space Pressurization:* Rooms having critical requirements for containment of airborne contaminants will be provided with automatic controls to maintain a constant pressure relationship to adjacent rooms. The following spaces have critical room pressurization requirements:

- Chemistry Laboratory: Negative

*System Reliability and Safety:* No redundancy will be provided for laboratory HVAC systems. All equipment will be connected to normal utility power.

*Air Filtration:* Air distribution systems will have equipment with air filtration as described below:

- Laboratory Air Distribution System: System supplying air to chemistry laboratory will have pre-filter with a filtration efficiency of MERV 8 and a final filter with an efficiency of MERV 14.

*Acoustical Performance:* HVAC systems will be designed to achieve ambient sound levels that are suitable for the intended use of the spaces. Ambient sound levels listed in ASHRAE 2007 Handbook Applications 47.34 Table 42 will be used as the Basis of Design. For the chemistry laboratory, the ambient sound level will be in the range of RC-35 to RC-45.

### 6.3 Proposed Upgrade - Option 1

Following is a description of proposed systems, equipment, and controls. A schematic diagram showing proposed system configuration is included in Appendix B.

*Heating Water:* Provide piping connections to new equipment:

- Connections to existing cabinet unit heaters, booster coils, and ASU-2 heating coil will be removed.
- New hot water coil connections will be provided to the heating coil in ASU-2 and three laboratory 209 reheat coils.
- Heating loads for new equipment is not significantly different than existing heating loads. Therefore, existing system equipment, pumps and distribution piping will not be modified.

*Air Distribution System:* Upgrade supply air distribution system for laboratory as described below:

- Remove ASU-2 and provide a new air handling unit. The existing air handler is of marginal quality and is not well suited for installation of a new cooling coil. The new air handling unit will consist of a pre-filter, final filter, hot water heating coil, chilled water cooling coil, and supply fan. A variable speed drive will be installed to modulate supply fan speed. The air handler will have a capacity of 10,515 cfm.
- Remove CUH-1, booster heating coils, and supply ductwork in laboratory 209.
- Provide supply air distribution ductwork from existing main ductwork in the mechanical shaft. The laboratory will have three temperature control zones with associated airflow control valves and reheat coils. Supply air ductwork from the first floor mechanical room to the second floor will be reused.

*Air Exhaust:* Upgrade laboratory exhaust system as described below:

- Refurbish and reuse exhaust fan FEF-2. Work will consist of motor, bearing, and belt replacement. A variable frequency drive will be provided to modulate airflow. The refurbish assembly will be tested and balanced to minimize vibration. FEF-2 will have a capacity of 11,015 cfm.
- Extend exhaust outlet on roof to terminate fourteen feet above penthouse roof in accordance with OSU design construction standards. Connect new exhaust mains to existing mains in mechanical chase.
- Modify existing fume hoods for variable volume operation. This will include removing the make-up air assembly installed on the front of each hood and providing a blank-off plate to cover a majority of the bypass louver. The blank-off plate will be installed on the backside of the louver and not be visible to occupants in the classroom.
- Remove exhaust ductwork in Lab 209 and provide ductwork to existing and new fume hoods, snorkel hoods in room 209 and 212 and general exhaust inlets. Airflow control valves will be provided for each fume hood, snorkel hoods, and general exhaust. Exhaust ductwork from the penthouse mechanical room to the second floor will be reused.

*Building Automation Systems:* New HVAC equipment and systems will be controlled by two electronic digital control systems. Air handler ASU-2 and associated reheat coils will be control by an HVAC control system. OSU Design Criteria requires that this system be either Siemens Apogee, Johnson Control Metesys, or Alerton. Laboratory space pressure may be controlled by an independent space pressure control system such as Phoenix.

#### **6.4 Proposed Upgrade - Option 2**

Proposed upgrades in Option 2 are identical to upgrades in Option 1, except that four additional new fume hoods will be provided on the south wall of the laboratory. A schematic diagram showing proposed system configuration is included in Appendix B.

## 7.0 CHILLED WATER SYSTEM

### 7.1 Existing Conditions

*Chilled Water:* Hydronic chilled water is generated by an air cooled chiller located on the roof. Chilled water is circulated to cooling coils by CP-1A and CP-1B. The chilled water is routed down the mechanical chase located in Penthouse 504. Cooling is only provided to a small number of spaces. A list of existing cooling coils is included in the table below.

TABLE 2		COOLING COIL SUMMARY
Cooling Coil	Area Served	Cooling Capacity (Btu/hr)
CC-1	Room 220	87.6
CC-2	Room 313	87.6
CC-3	Room 314	72.5
CC-4	Room 318	87.6
CC-5	Room 416	87.6
CC-6	Room 421	28.0

### 7.2 Proposed Upgrade - Option 1

Following is a description of proposed systems, equipment, and controls. A schematic diagram showing proposed system configuration is included in Appendix B.

- Remove the existing air cooled chiller.
- Provide new air-cooled chiller in vicinity of the existing chiller. The chiller will be modular in design with an installed capacity of 120 ton that will be expandable to 180 ton if future cooling upgrades are performed. Chiller installation will include structural support curb.
- New chilled water circulation pump
- Existing chilled water distribution mains will be installed to accommodate increase chilled water flow. The new mains will be sized for the maximum future chilled water system capacity.
- Connect new distribution piping to six existing cooling coils and to ASU-2
- A new building automaton system will be provided to control new system and systems.

### 7.3 Proposed Upgrade - Option 2

Proposed upgrades in Option 2 are identical to upgrades in Option 1

## **8.0 ELECTRICAL SYSTEM**

### **8.1 Existing Conditions**

Following is a description of existing systems, equipment, and notable conditions:

*Building Electrical Service:* The building is currently connected to the Campus 4160 volt primary system. A 4160 – 208Y/120 volt 3-phase transformer is located in the electrical room and provides normal power to the building. The transformer is rated at 500 kVa and serves a 1600 amp switchboard. The switchboard also feeds an 800 amp sub distribution panel.

*Emergency / Stand-by Power:* The building does not have a back-up power source.

*Power Distribution:* There are branch circuit panelboards located on each floor and motor control centers MDP-1 in the first floor mechanical room and in MDP-2 the penthouse mechanical room. Panelboards generally have capacity for the addition of new circuits.

*Lighting and Lighting Controls:* Lighting in the laboratory 209 is generally good with appropriate lighting levels at work areas, except for the areas immediately in front of the existing fume hoods. Lighting levels in front of the fume hoods is below recommended levels.

### **8.2 Proposed Upgrade - Option 1**

Following is a description of proposed systems and equipment:

- The existing 400 amp switch and feeder to the existing chiller will be replaced with a 600 amp switch and feeder. The existing chiller feeder from the 800 amp sub-distribution panel of the main distribution panel is not large enough to service the proposed chiller.
- Upgrade MCC-MDP-2 to provide capacity for new chilled water pumps and enlarged FEF-2 fan motors. Replace the fuses serving the motor control center, and the feeder will be replaced with 400 amp rated wiring. The existing pumps are fed from MCC-MDP-2.
- Electrical connections for chilled water pump and EFE-2 motor.
- Electrical connection for ASU-2 fan motor. ASU-2 is currently fed from MCC-MDP-1. The addition of a larger fan motor will not require modifications to the MDP-1 or feeder.
- Electrical connections for new and relocated fume hoods.
- The circuit capacity for countertop receptacles will be doubled to prevent overloading power circuits.
- Electrical circuits and receptacles in adjacent rooms 212 and 220.
- Provide new lighting in aisle way immediately in front of the existing fume hoods.

### **8.3 Proposed Upgrade - Option 2**

Proposed upgrades in Option 2 include all of the work described above for Option 1 along with the following additional work:

- Work required for the additional hoods would include demolition of some receptacles and circuitry.

## 9.0 CONSTRUCTION COST ESTIMATES

Following is a summary of estimated direct construction costs for implementing the work previously described.

Costs shown include direct construction only. Costs do not include consulting fees, owner's administration cost, and change order contingencies. Costs are based on a single construction package. Costs will be higher if the work is separated into multiple construction packages.

<b>TABLE 3 DIRECT CONSTRUCTION COST SUMMARY</b>	
<b>Proposed Upgrades</b>	<b>Estimated Direct Construction Cost</b>
<b>LABORATORY UPGRADE OPTION - 1</b>	
Architectural	\$ 4,400
Fire Protection	15,000
Plumbing	52,000
Heating, Ventilation, Air-Conditioning	570,000
Chilled Water System	320,000
Electrical	210,000
<b>TOTAL CONSTRUCTION COST</b>	<b>\$1,171,400</b>
<b>LABORATORY UPGRADE OPTION – 2</b>	
Architectural	\$ 12,500
Fire Protection	15,000
Plumbing	65,000
Heating, Ventilation, Air-Conditioning	700,000
Chilled Water System	320,000
Electrical	230,000
<b>TOTAL CONSTRUCTION COST</b>	<b>\$1,342,500</b>

## 10.0 BUDGETING ESTIMATES

Following are budget amounts for providing air conditioning and VAV laboratory air control conversions for the basement, third, and fourth floors. If more than two floors are upgraded, the cost shown for a chiller upgrade would need to be included.

Costs shown include direct construction only. Costs do not include consulting fees, Owner's administration cost, and change order contingencies.

<b>TABLE 4</b>		<b>BUDGETARY COST SUMMARY</b>	
<b>Proposed Upgrades</b>		<b>Estimated Direct Construction Cost</b>	
<b>First Floor A/C &amp; VAV Conversion</b>		\$	460,000
<b>Third Floor A/C &amp; VAV Conversion</b>			394,000
<b>Fourth Floor A/C &amp; VAV Conversion</b>			411,000
<b>Chiller Upgrades</b>			185,000
<b>TOTAL CONSTRUCTION COST</b>			<b>\$1,450,000</b>

# APPENDIX A PRODUCT INFORMATION

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*8' Protector XL Benchtop Laboratory Hood 9700103 is shown with SpillStopper Work Surface 9848800, Protector Acid Storage Cabinet 9901000 and Protector Solvent Storage Cabinet 9902000.*



Requires  
Ductwork and  
Blower



# Protector<sup>®</sup> XL™ Benchtop Laboratory Hoods

## Features & Benefits

Protector XL Benchtop Laboratory Hoods have chemical-resistant panel liners that offer superior design flexibility. They are supplied

in widths from 4 to 16 feet and three depths to meet a variety of installation and application requirements.

**Front and side panels may be easily removed** for lamp replacement and access to electrical supply connections.

**ETL-listed.** Hoods carry the ETL mark signifying that they are certified to UL Standard 3101-1/61010-1, UL 1805 and CAN/CSA C22.2 No. 1010.1.

**Large sash openings** offer superior viewing. Benchtop hoods feature 28" opening heights and 32.15" viewing heights.

**Vertical-rising tempered safety glass sash** is anti-racking for smooth operation. When fully open, the sash does not extend above the hood.

**Interior working dimensions** are offered in standard and larger depths. Working depths include 24", 30", and 36".

**Fluorescent lighting illuminates the interior.** The high-efficiency, instant start, T8 fluorescent lights are located outside the hood interior for corrosion-resistance and easy replacement. Contact Labconco for ordering information on explosion-proof lighting.

**Service access panels** allow easy accessibility to plumbing from the front and inside of the hood.

**Chemical-resistant, fiberglass-reinforced composite panel liner** surpasses all national codes for flame spread and has a bright white surface for excellent light reflectivity.

**Pre-wired electrical components.** Fluorescent lights and switches are factory-wired to the hood's single point junction box. One electrical duplex receptacle is factory-wired on fixtured models. Each hood is factory-prepared for up to four electrical duplexes and an airflow monitor.

**Durable and attractive exterior** is glacier white, dry powder epoxy-coated steel.

**By-pass airflow design** ensures relatively stable face velocities. Contact Labconco for ordering information on by-pass blocks.

**Performance tested to ASHRAE 110-1995.**

**Color-coded service fixtures for gas, air, water, vacuum and other services have remote controls** for use regardless of the sash position. Two service fixtures are pre-plumbed on fixtured models. Each hood is factory prepared for up to eight service fixtures (four on each side).

**Ergonomic air foil** allows air to sweep the work surface for maximum containment. Benchtop models feature patented\* Clean-Sweep™ airflow openings that pull inflow air from under the air foil so that clean air continually flows over the air foil creating a constant barrier of protection from contaminants.

**Pre-set baffle** provides a uniform face velocity pattern across the sash opening of the hood. Contact Labconco for ordering information on adjustable baffles.



\*U.S. Patent No. 6,461,233



## Protector<sup>®</sup> XL<sup>™</sup> Benchtop Laboratory Hoods



Requires Ductwork and Blower



8' Protector XL Benchtop Laboratory Hood 9700103 is shown with SpillStopper Work Surface 9848800, Protector Acid Storage Cabinet 9901000 and Protector Solvent Storage Cabinet 9902000. Blower, ductwork, work surface and base cabinets must be ordered separately.

### All models require (not included):

- **Remote Blower.** See back pocket.
- **Ductwork.** See back pocket.
- **Work Surface.** See page 100-104.
- **Base Cabinet or Stand.** See pages 106-116.

### Optional accessories for on-site installation include:

- **Service Fixture Kits.** See page 117.
- **Electrical Duplex Kits.** See page 118.
- **Guardian Airflow Monitor Kits.** See page 118.
- **Ceiling Enclosure and Rear Finish Panel Kits.** See pages 119-120.
- **Distillation Grid Kits.** See page 120.
- **Auxiliary-Air Kits.** See page 120.
- **Sash Stop Kits.** See page 121.
- **Snuffer Fire Extinguishers.** See page 121.

Contact Labconco at **800-821-5525** or **816-333-8811** for ordering information on adjustable baffles, explosion-proof lighting, tissue screens and other sash configurations and for blower sizing assistance.

### All models feature:

- By-pass airflow design.
- Ergonomic air foil with aerodynamic Clean-Sweep\* airflow openings.
- Glacier white, dry powder epoxy-coated steel exterior.
- Chemical-resistant molded composite panel liner and pre-set baffle(s) with flame spread less than 25 per ASTM E-84.
- 3/16" thick tempered safety glass vertical-rising sash(es) with epoxy-coated aluminum sash handle(s). Sash does not extend above the hood when fully open.
- Removable front and side panels and front and interior service access panels for access to plumbing and electrical wiring.
- Pre-wired T8 fluorescent lighting, light and blower switches for 115 volt, 60 Hz operation.
- Epoxy-coated stainless steel, 12.81" ID exhaust connection(s).

### All models conform to the following regulations and standards:

- SEFA 1-2006
- NFPA 45-2004
- ASTM E84-09C
- ASHRAE 110-95
- ANSI Z9.5-2003
- UL 3101-1/61010-1
- CAN/CSA C22.2 No. 1010.1
- UL 1805

### Fixed models feature:

- Two pre-plumbed service fixtures with forged brass valves, lower right side with brass tubing for gas and lower left side with copper tubing for cold water. Components for converting either or both fixtures to air and vacuum are provided. **Inlet tubing is not provided.**
- One pre-wired 115 volt, 20 amp electrical duplex receptacle on lower right side.

### With Sash Full Open (28")

Nominal Width	Total Exhaust CFM and Static Pressure			
	100 fpm	S.P.	80 fpm	S.P.
4 Feet	730	0.16"	590	0.11"
5 Feet	960	0.24"	770	0.15"
6 Feet	1180	0.28"	940	0.18"
8 Feet	1660	0.19"	1330	0.12"
10 Feet	2130	0.28"	1700	0.18"
12 Feet	2600	0.39"	2080	0.25"
16 Feet	3550	0.23"	2840	0.15"

### With Sash 60% Open (18")\*\*

Nominal Width	Total Exhaust CFM and Static Pressure					
	100 fpm	S.P.	80 fpm	S.P.	60 fpm	S.P.
4 Feet	470	0.07"	380	0.05"	280	0.03"
5 Feet	610	0.11"	490	0.08"	370	0.04"
6 Feet	750	0.14"	600	0.09"	450	0.05"
8 Feet	1060	0.08"	850	0.06"	640	0.03"
10 Feet	1370	0.12"	1100	0.08"	820	0.05"
12 Feet	1670	0.16"	1340	0.11"	1000	0.06"
16 Feet	2290	0.10"	1830	0.07"	1380	0.04"

### Exclusive Feature

Heights of switches, electrical receptacle and service fixtures meet requirements of ADA.

\*U.S. Patent No. 6,461,233

\*\*Sash stop required

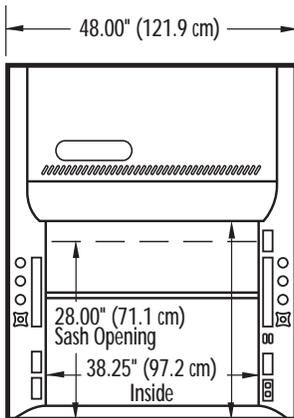


## Ordering Information

4', 5' and 6' Protector® XL™ Benchtop Laboratory Hoods

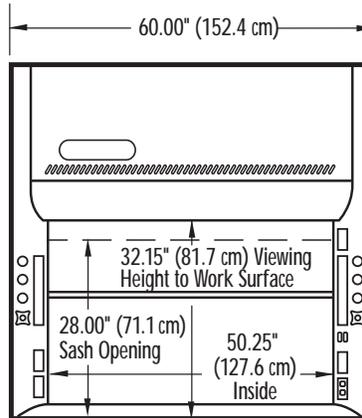
Nominal Width	Catalog Number	Exterior Depth (A) inches/cm	Interior Depth (B) inches/cm	12.81" (32.5 cm) ID Exhaust Collar	Sash	Fluorescent Lamps	Service Fixtures	Electrical Duplex	Shipping Weight lbs./kg
4 Feet	<b>9750400</b>	39.20/99.6	30.00/76.2	1	1	2 ea. 25 watt	None	None	415/188
	<b>9750401</b>	39.20/99.6	30.00/76.2	1	1	2 ea. 25 watt	2	1	425/193
	<b>9750402</b>	45.20/114.8	36.00/91.4	1	1	2 ea. 25 watt	None	None	460/209
	<b>9750403</b>	45.20/114.8	36.00/91.4	1	1	2 ea. 25 watt	2	1	470/213
	<b>9750404</b>	33.20/84.3	24.00/61.0	1	1	2 ea. 25 watt	None	None	375/170
	<b>9750405</b>	33.20/84.3	24.00/61.0	1	1	2 ea. 25 watt	2	1	380/172
5 Feet	<b>9750500</b>	39.20/99.6	30.00/76.2	1	1	2 ea. 32 watt	None	None	490/222
	<b>9750501</b>	39.20/99.6	30.00/76.2	1	1	2 ea. 32 watt	2	1	500/227
	<b>9750502</b>	45.20/114.8	36.00/91.4	1	1	2 ea. 32 watt	None	None	535/243
	<b>9750503</b>	45.20/114.8	36.00/91.4	1	1	2 ea. 32 watt	2	1	545/247
	<b>9750504</b>	33.20/84.3	24.00/61.0	1	1	2 ea. 32 watt	None	None	450/204
	<b>9750505</b>	33.20/84.3	24.00/61.0	1	1	2 ea. 32 watt	2	1	460/209
6 Feet	<b>9750600</b>	39.20/99.6	30.00/76.2	1	1	2 ea. 32 watt	None	None	565/256
	<b>9750601</b>	39.20/99.6	30.00/76.2	1	1	2 ea. 32 watt	2	1	575/261
	<b>9750602</b>	45.20/114.8	36.00/91.4	1	1	2 ea. 32 watt	None	None	610/277
	<b>9750603</b>	45.20/114.8	36.00/91.4	1	1	2 ea. 32 watt	2	1	620/281
	<b>9750604</b>	33.20/84.3	24.00/61.0	1	1	2 ea. 32 watt	None	None	525/238
	<b>9750605</b>	33.20/84.3	24.00/61.0	1	1	2 ea. 32 watt	2	1	535/243

### 4 Feet 97504 Series

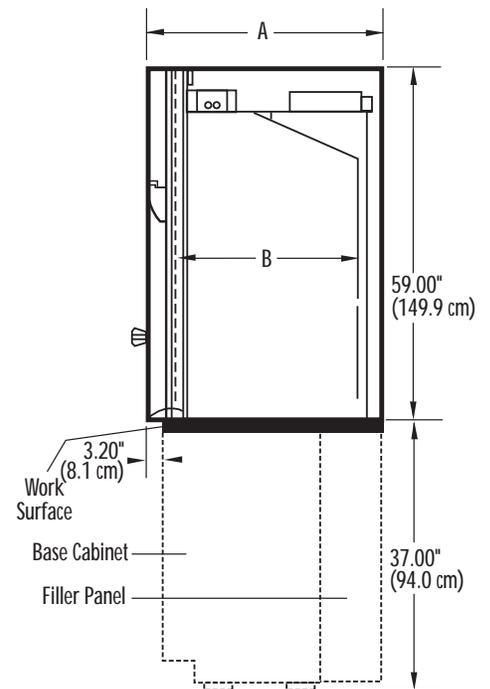
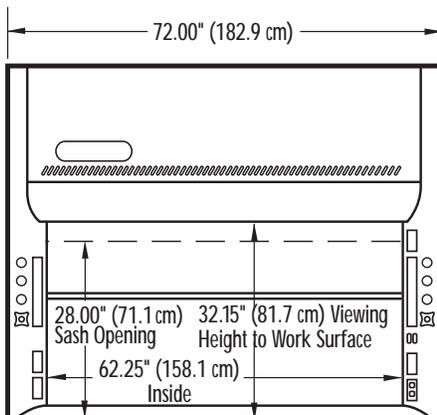


32.15" (81.7 cm) Viewing Height to Work Surface

### 5 Feet 97505 Series



### 6 Feet 97506 Series



**Side View / All Models**  
(Shown with accessory work surface and base cabinet available for all hood widths. Height can vary.)

See additional dimensional data on page 37.

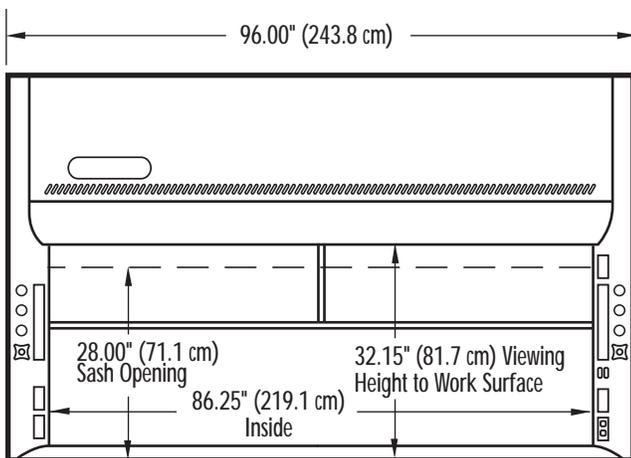


## Ordering Information

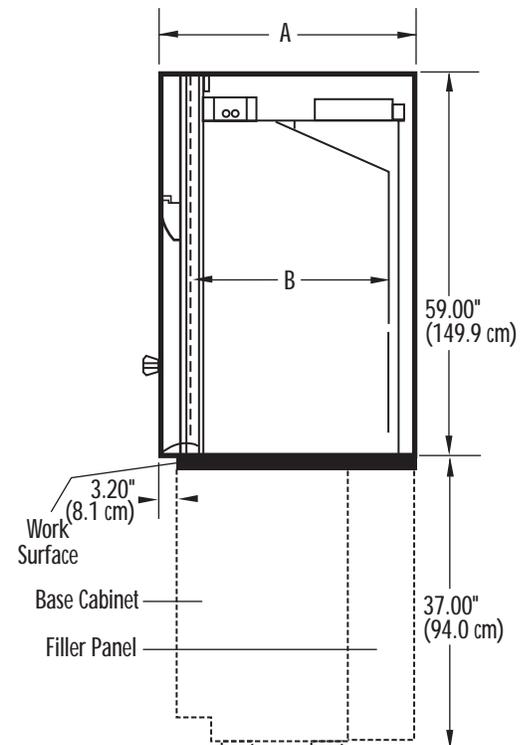
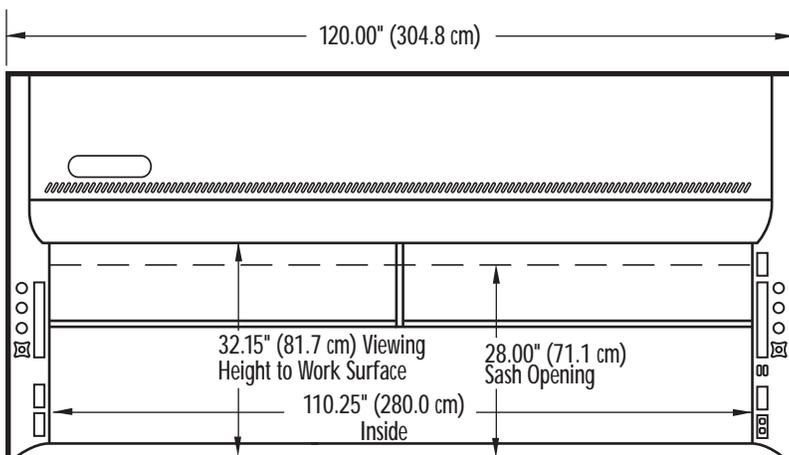
*8' and 10' Protector® XL™ Benchtop Laboratory Hoods*

Nominal Width	Catalog Number	Exterior Depth (A) inches/cm	Interior Depth (B) inches/cm	12.81" (32.5 cm) ID Exhaust Collars	Sashes	Fluorescent Lamps	Fixtures Fixtures	Electrical Duplex	Shipping Weight lbs./kg
8 Feet	<b>9700100</b>	39.20/99.6	30.00/76.2	2	2	4 ea. 25 watt	None	None	715/324
	<b>9700101</b>	39.20/99.6	30.00/76.2	2	2	4 ea. 25 watt	2	1	725/329
	<b>9700102</b>	45.20/114.8	36.00/91.4	2	2	4 ea. 25 watt	None	None	760/345
	<b>9700103</b>	45.20/114.8	36.00/91.4	2	2	4 ea. 25 watt	2	1	770/349
	<b>9700104</b>	33.20/84.3	24.00/61.0	2	2	4 ea. 25 watt	None	None	675/306
<b>9700105</b>	33.20/84.3	24.00/61.0	2	2	4 ea. 25 watt	2	1	685/311	
10 Feet	<b>9700200</b>	39.20/99.6	30.00/76.2	2	2	4 ea. 32 watt	None	None	895/403
	<b>9700201</b>	39.20/99.6	30.00/76.2	2	2	4 ea. 32 watt	2	1	905/411
	<b>9700202</b>	45.20/114.8	36.00/91.4	2	2	4 ea. 32 watt	None	None	945/529
	<b>9700203</b>	45.20/114.8	36.00/91.4	2	2	4 ea. 32 watt	2	1	955/433
	<b>9700204</b>	33.20/84.3	24.00/61.0	2	2	4 ea. 32 watt	None	None	855/388
	<b>9700205</b>	33.20/84.3	24.00/61.0	2	2	4 ea. 32 watt	2	1	865/392

### 8 Feet 97001 Series



### 10 Feet 97002 Series



**Side View / All Models**  
*(Shown with accessory work surface and base cabinet available for all hood widths. Height can vary.)*

See additional dimensional data on page 38.

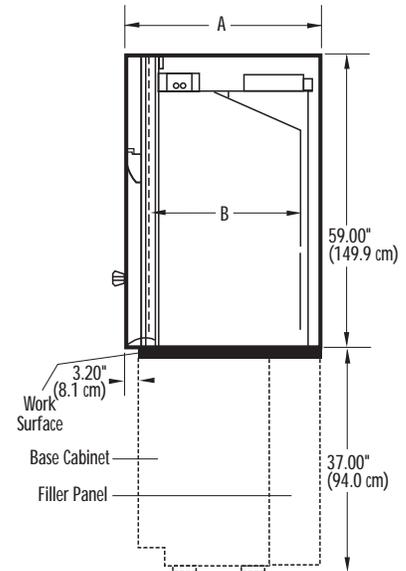
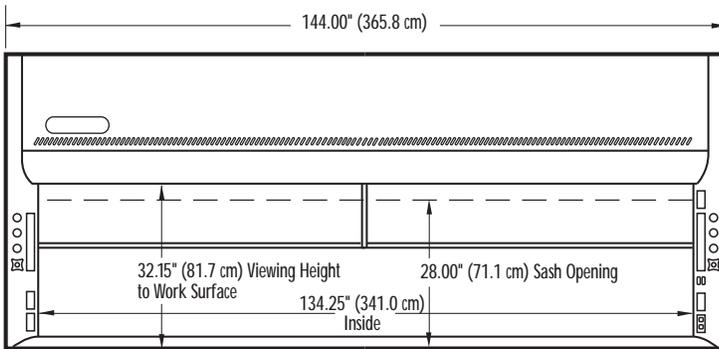


## Ordering Information

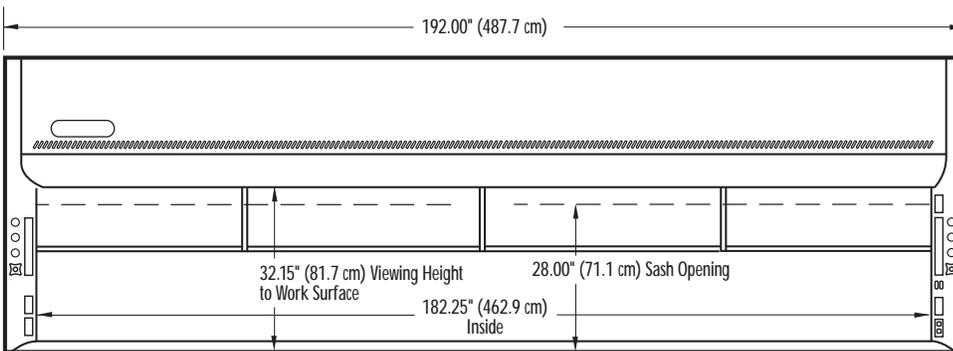
### 12' and 16' Protector® XL™ Benchtop Laboratory Hoods

Nominal Width	Catalog Number	Exterior Depth (A) inches/cm	Interior Depth (B) inches/cm	12.81" (32.5 cm) ID Exhaust Collars	Sashes	Fluorescent Lamps	Fixtures	Electrical Duplex	Shipping Weight lbs./kg
12 Feet	<b>9700300</b>	39.20/99.6	30.00/76.2	2	2	4 ea. 32 watt	None	None	1200/544
	<b>9700301</b>	39.20/99.6	30.00/76.2	2	2	4 ea. 32 watt	2	1	1210/549
	<b>9700302</b>	45.20/114.8	36.00/91.4	2	2	4 ea. 32 watt	None	None	1260/572
	<b>9700303</b>	45.20/114.8	36.00/91.4	2	2	4 ea. 32 watt	2	1	1270/576
	<b>9700304</b>	33.20/84.3	24.00/61.0	2	2	4 ea. 32 watt	None	None	1140/497
	<b>9700305</b>	33.20/84.3	24.00/61.0	2	2	4 ea. 32 watt	2	1	1150/522
16 Feet	<b>9700400</b>	39.20/99.6	30.00/76.2	4	4	8 ea. 25 watt	None	None	1600/726
	<b>9700401</b>	39.20/99.6	30.00/76.2	4	4	8 ea. 25 watt	2	1	1610/730
	<b>9700402</b>	45.20/114.8	36.00/91.4	4	4	8 ea. 25 watt	None	None	1680/762
	<b>9700403</b>	45.20/114.8	36.00/91.4	4	4	8 ea. 25 watt	2	1	1690/767
	<b>9700404</b>	33.20/84.3	24.00/61.0	4	4	8 ea. 25 watt	None	None	1520/689
	<b>9700405</b>	33.20/84.3	24.00/61.0	4	4	8 ea. 25 watt	2	1	1530/694

#### 12 Feet 97003 Series



#### 16 Feet 97004 Series



**Side View / All Models**  
(Shown with accessory work surface and base cabinet available for all hood widths. Height can vary.)

See additional dimensional data on page 38.



*8' Protector XL Floor-Mounted Laboratory Hood 9700805.  
Inset: 6' Protector XL Floor-Mounted Laboratory Hood 9860601.*



Requires  
Ductwork and  
Blower



# Protector<sup>®</sup> XL<sup>™</sup> Floor-Mounted Laboratory Hoods

## Features & Benefits

Protector XL Floor-Mounted Laboratory Hoods accommodate laboratory procedures that require over-sized equipment or maximum work area. Users with applications requiring distillation racks, extraction apparatus or large drums and carboys benefit

from the increased height these hoods provide. Protector XL Floor-Mounted Laboratory Hoods are supplied in three depths and several widths up to 16 feet. Depending on the model, these hoods have vertical-rising or horizontal-sliding sashes.

**Front and side panels may be easily removed** for lamp replacement and access to electrical supply connections.

**ETL-listed.** Hoods carry the ETL mark signifying that they are certified to UL 3101-1/61010-1, UL 1805 and CAN/CSA C22.2 No. 1010.1.

**Durable and attractive exterior** is glacier white, dry powder epoxy-coated steel.

**Tempered safety glass sashes** are anti-racking for smooth operation. Hoods feature either vertical-rising or horizontal-sliding sashes depending on hood model. When fully open, vertical-rising sashes do not extend above the hood.

**Adjustable baffles** provide a uniform face velocity pattern across the sash opening of the hood.

**Fluorescent lighting illuminates the interior.** The high-efficiency, instant start, T8 fluorescent lights are located outside the hood interior for corrosion-resistance and easy replacement. Contact Labconco for ordering information on explosion-proof lighting.

**Large sash openings** offer superior viewing. Hoods have 68.15" viewing heights.

**Pre-wired electrical components.** Fluorescent lights and switches are factory-wired to the hood's single point junction box. One electrical duplex receptacle is factory-wired on fixtured models. Each hood is factory-prepared for up to four electrical duplexes and an airflow monitor.

**Interior working dimensions** are offered in standard and larger depths. Working depths include 30", 36" and 48".

**Performance tested to ASHRAE 110-1995.**

**By-pass airflow design** ensures relatively stable face velocities.



**Color-coded service fixtures for gas, air, water, vacuum and other services have remote controls** for use regardless of the sash position. Two service fixtures are pre-plumbed on fixtured models. Each hood is factory prepared for up to eight service fixtures (four on each side).

**Service access panels** allow easy accessibility to plumbing from the front and inside of the hood.

**Chemical-resistant, fiberglass-reinforced composite panel liner** surpasses all national codes for flame spread and has a bright white surface for excellent light reflectivity.





## Protector® XL™ Floor-Mounted Laboratory Hoods



6' Protector XL Floor-Mounted Laboratory Hood 9860601. Blower and ductwork must be ordered separately.



Requires Ductwork and Blower



### Fixtured models feature:

- Two pre-plumbed service fixtures with forged brass valves, lower right side with brass tubing for gas and lower left side with copper tubing for cold water. Components for converting either or both fixtures to air and vacuum are provided. **Inlet tubing is not provided.**
- One pre-wired 115 volt, 20 amp electrical duplex receptacle on lower right side.

### All models require (not included):

- **Remote Blower.** See back pocket.
- **Ductwork.** See back pocket.

### Optional accessories for on-site installation include:

- **Service Fixture Kits.** See page 117.
- **Electrical Duplex Kits.** See page 118.
- **Guardian Airflow Monitor Kits.** See page 118.
- **Ceiling Enclosure and Rear Finish Panel Kits.** See pages 119-120.
- **Snuffer Fire Extinguishers.** See page 121.

Contact Labconco at **800-821-5525** or **816-333-8811** for ordering information on explosion-proof lighting, solid epoxy floors, tissue screens and distillation grids; and for blower sizing assistance.

Heights of switches, electrical receptacle and service fixtures meet requirements of ADA.

8' Protector XL Floor-Mounted Laboratory Hood 9700805. Blower and ductwork must be ordered separately.

### All models feature:

- By-pass airflow design.
- Glacier white, dry powder epoxy-coated steel exterior.
- Chemical-resistant, fiberglass-reinforced composite panel liner and adjustable upper and lower baffles with flame spread less than 25 per ASTM E-84.
- Removable front and side panels and exterior and interior service access panels for access to plumbing and electrical wiring.
- Pre-wired T8 fluorescent lighting, light and blower switches for 115 volt, 60 Hz operation.
- Shipped in multiple sections, top and bottom.
- Epoxy-coated stainless steel, 12.81" ID exhaust connection(s).

### 4', 5', 6' and 8' models feature:

- Two 3/16" thick tempered safety glass vertical-rising sashes framed with PVC (4', 5' and 6' models) or epoxy-coated aluminum (8' models). Sashes do not extend above the hood when fully open.

### 8', 10', 12' and 16' models feature:

- Four 3/16" thick tempered safety glass horizontal-sliding sashes with epoxy-coated aluminum frames and sash tracks.

### All models conform to the following regulations and standards:

- SEFA 1-2006
- NFPA 45-2004
- ASTM E84-09C
- ASHRAE 110-95
- ANSI Z9.5-2003
- UL 3101-1/61010-1
- CAN/CSA C22.2 No. 1010.1
- UL 1805



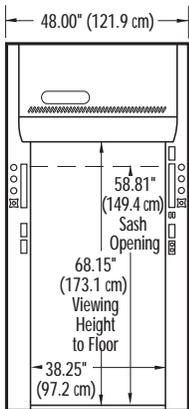
## Ordering Information

4', 5', 6' and 8' Protector<sup>®</sup> XL™ Floor-Mounted Laboratory Hoods with vertical-rising sashes

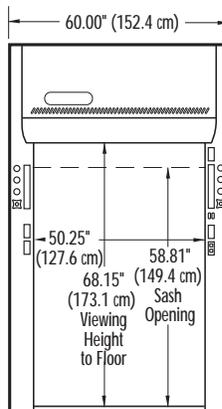
Nominal Width	Catalog Number	Exterior Depth (A) inches/cm	Interior Depth (B) inches/cm	12.81" (32.5 cm) ID Exhaust Collar(s)	Fluorescent Lamps	Service Fixtures	Electrical Duplex	Shipping Weight lbs./kg
4 Feet	<b>9860401</b>	39.20/99.6	30.00/76.2	1	2 ea. 25 watt	2	1	700/318
	<b>9860403</b>	45.20/114.8	36.00/91.4	1	2 ea. 25 watt	2	1	715/324
	<b>9860405</b>	57.20/145.3	48.00/121.9	1	2 ea. 25 watt	2	1	745/338
5 Feet	<b>9860501</b>	39.20/99.6	30.00/76.2	1	2 ea. 32 watt	2	1	815/370
	<b>9860503</b>	45.20/114.8	36.00/91.4	1	2 ea. 32 watt	2	1	830/376
	<b>9860505</b>	57.20/145.3	48.00/121.9	1	2 ea. 32 watt	2	1	860/390
6 Feet	<b>9860601</b>	39.20/99.6	30.00/76.2	1	2 ea. 32 watt	2	1	940/426
	<b>9860603</b>	45.20/114.8	36.00/91.4	1	2 ea. 32 watt	2	1	955/433
	<b>9860605</b>	57.20/145.3	48.00/121.9	1	2 ea. 32 watt	2	1	985/447
8 Feet	<b>9700807</b>	39.20/99.6	30.00/76.2	2	4 ea. 25 watt	2	1	1180/535
	<b>9700809</b>	45.20/114.8	36.00/91.4	2	4 ea. 25 watt	2	1	1195/542
	<b>9700811</b>	57.20/145.3	48.00/121.9	2	4 ea. 25 watt	2	1	1225/556

Nominal Width	Total Exhaust CFM and Static Pressure with sashes 50% open			
	100 fpm	S.P.	80 fpm	S.P.
4 Feet	680	0.16"	550	0.10"
5 Feet	900	0.24"	720	0.16"
6 Feet	1120	0.28"	900	0.18"
8 Feet	1560	0.19"	1250	0.12"

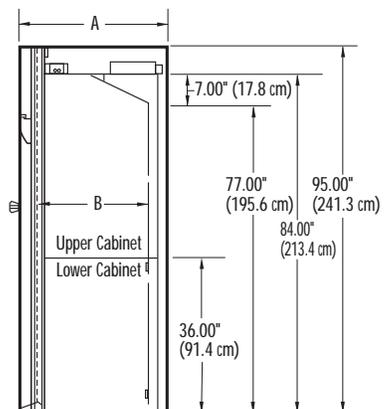
**4 Feet  
98604 Series**



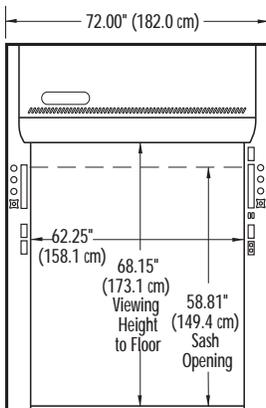
**5 Feet  
98605 Series**



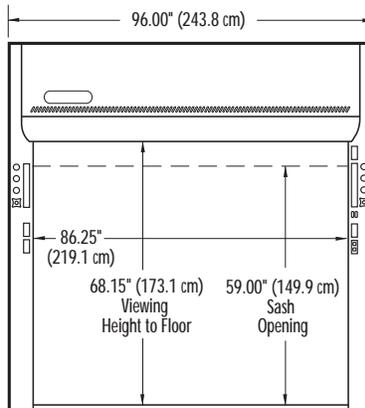
**Side View  
All models**



**6 Feet  
98606 Series**



**8 Feet  
97008 Series**



See additional dimensional data on page 39.



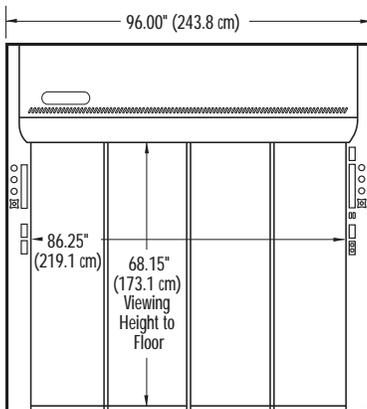
## Ordering Information

8', 10', 12' and 16' Protector<sup>®</sup> XL™ Floor-Mounted Laboratory Hoods with horizontal-sliding sashes

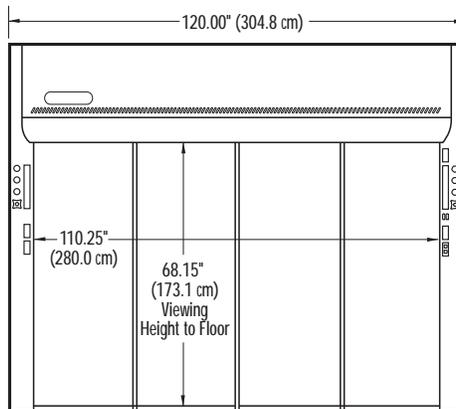
Nominal Width	Catalog Number	Exterior Depth (A) inches/cm	Interior Depth (B) inches/cm	12.81" (32.5 cm) ID Exhaust Collar(s)	Fluorescent Lamps	Service Fixtures	Electrical Duplex	Shipping Weight lbs./kg
8 Feet	<b>9700801</b>	39.20/99.6	30.00/76.2	2	4 ea. 25 watt	2	1	1130/513
	<b>9700803</b>	45.20/114.8	36.00/91.4	2	4 ea. 25 watt	2	1	1145/519
	<b>9700805</b>	57.20/145.3	48.00/121.9	2	4 ea. 25 watt	2	1	1175/533
10 Feet	<b>9700901</b>	39.20/99.6	30.00/76.2	2	4 ea. 32 watt	2	1	1375/624
	<b>9700903</b>	45.20/114.8	36.00/91.4	2	4 ea. 32 watt	2	1	1390/630
	<b>9700905</b>	57.20/145.3	48.00/121.9	2	4 ea. 32 watt	2	1	1420/644
12 Feet	<b>9701001</b>	39.20/99.6	30.00/76.2	2	4 ea. 32 watt	2	1	1645/733
	<b>9701003</b>	45.20/114.8	36.00/91.4	2	4 ea. 32 watt	2	1	1660/753
	<b>9701005</b>	57.20/145.3	48.00/121.9	2	4 ea. 32 watt	2	1	1690/767
16 Feet	<b>9716001</b>	39.20/99.6	30.00/76.2	4	8 ea. 25 watt	2	1	2085/946
	<b>9716003</b>	45.20/114.8	36.00/91.4	4	8 ea. 25 watt	2	1	2100/953
	<b>9716005</b>	57.20/145.3	48.00/121.9	4	8 ea. 25 watt	2	1	2130/966

Nominal Width	Sashes Open	Total Exhaust CFM and Static Pressure			
		100 fpm		80 fpm	
			S.P.		S.P.
8 Feet	2	2200	0.30"	1760	0.19"
10 Feet	1	1360	0.12"	1090	0.08"
12 Feet	1	1660	0.15"	1330	0.10"
16 Feet	1	2260	0.10"	—	—

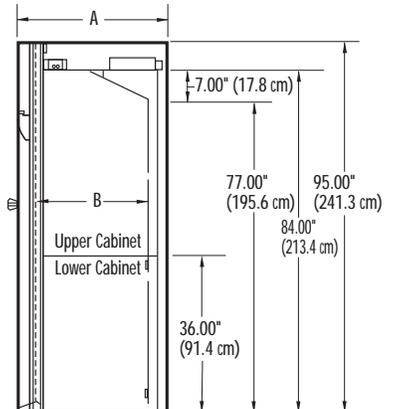
**8 Feet  
97008 Series**



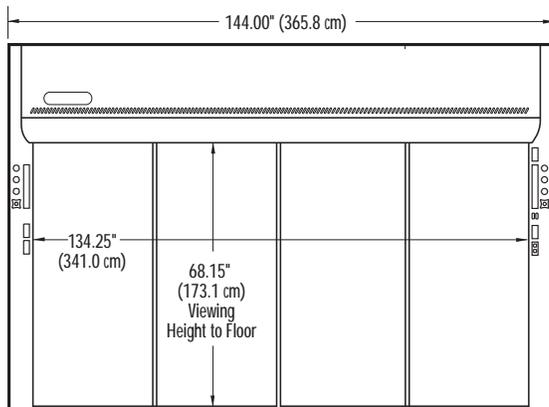
**10 Feet  
97009 Series**



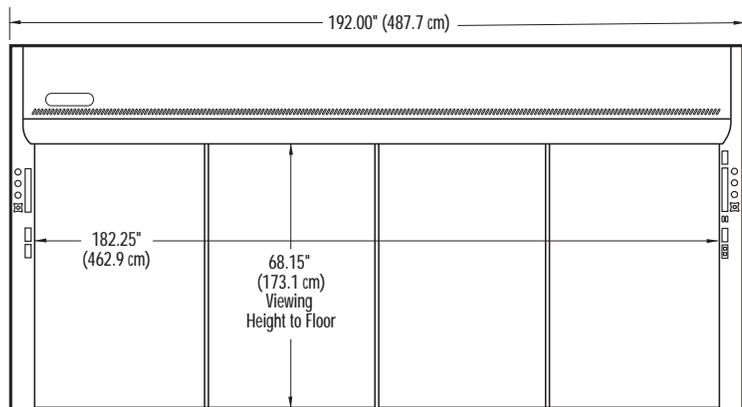
**Side View  
All models**



**12 Feet  
97010 Series**



**16 Feet  
97160 Series**

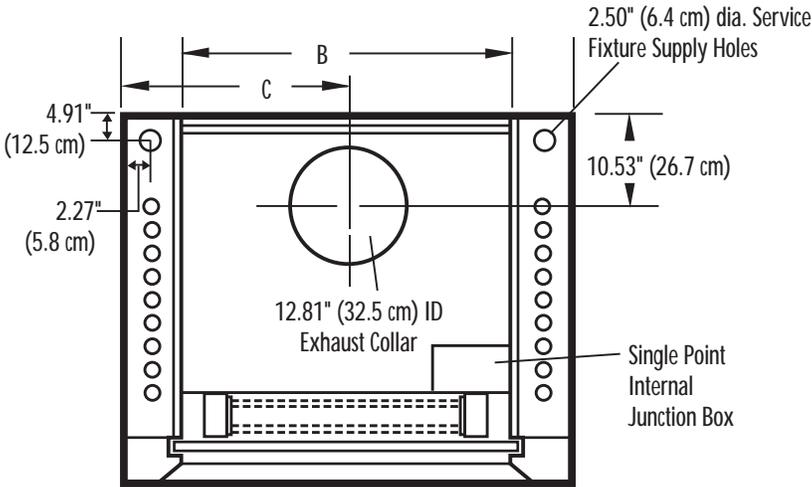


See additional dimensional data on page 40.



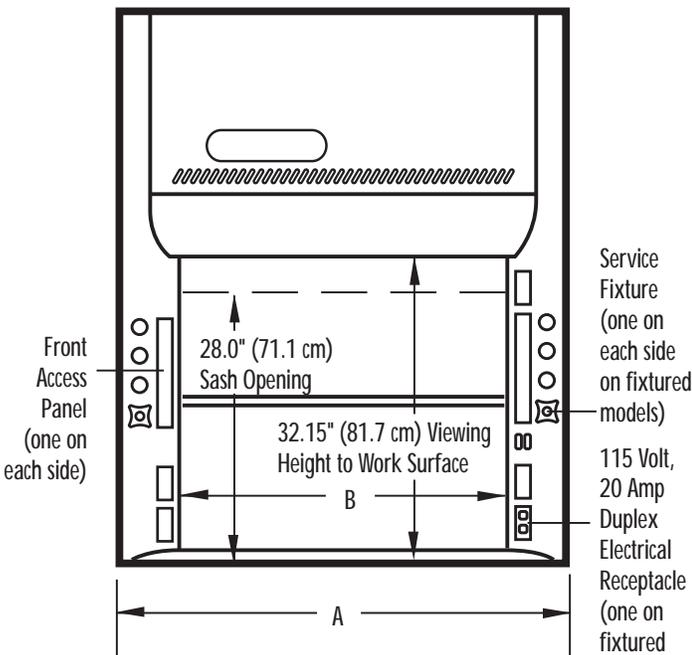
## Dimensional Data

4', 5' and 6' Protector<sup>®</sup>XL™ Benchtop Laboratory Hoods

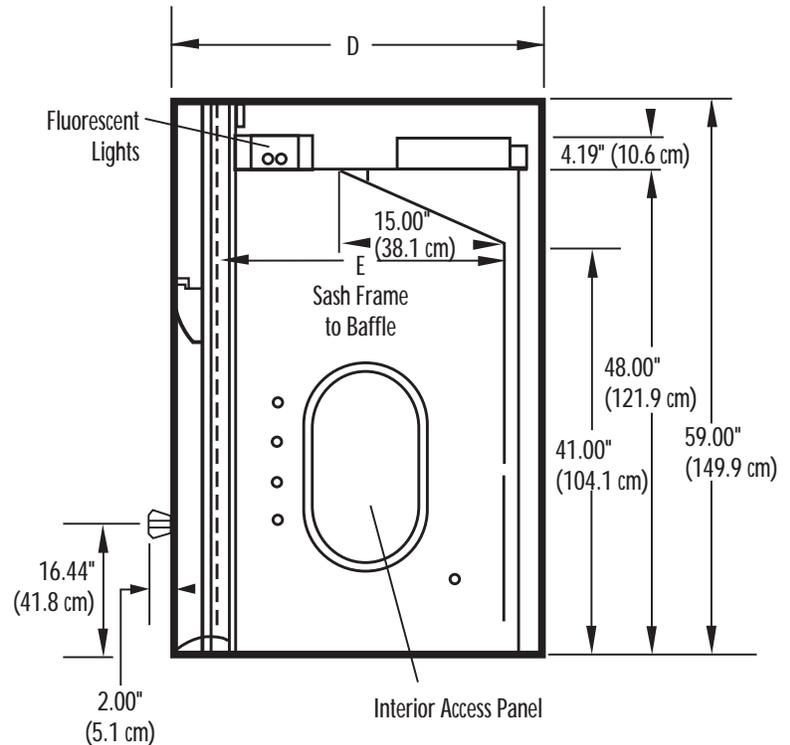


**TOP**

	A	B	C	D	E
<b>4' Hood</b>					
9750400	48.00"/	38.25"/	24.00"/	39.20"/	30.00"/
9750401	121.9 cm	97.2 cm	61.0 cm	99.6 cm	76.2 cm
9750402	48.00"/	38.25"/	24.00"/	45.20"/	36.00"/
9750403	121.9 cm	97.2 cm	61.0 cm	114.8 cm	91.4 cm
9750404	48.00"/	38.25"/	24.00"/	33.20"/	24.00"/
9750405	121.9 cm	97.2 cm	61.0 cm	84.3 cm	61.0 cm
<b>5' Hood</b>					
9750500	60.00"/	50.25"/	30.00"/	39.20"/	30.00"/
9750501	152.4 cm	127.6 cm	76.2 cm	99.6 cm	76.2 cm
9750502	60.00"/	50.25"/	30.00"/	45.20"/	36.00"/
9750503	152.4 cm	127.6 cm	76.2 cm	114.8 cm	91.4 cm
9750504	60.00"/	50.25"/	30.00"/	33.20"/	24.00"/
9750505	152.4 cm	127.6 cm	76.2 cm	84.3 cm	61.0 cm
<b>6' Hood</b>					
9750600	72.00"/	62.25"/	36.00"/	39.20"/	30.00"/
9750601	182.9 cm	158.1 cm	91.4 cm	99.6 cm	76.2 cm
9750602	72.00"/	62.25"/	36.00"/	45.20"/	36.00"/
9750603	182.9 cm	158.1 cm	91.4 cm	114.8 cm	91.4 cm
9750604	72.00"/	62.25"/	36.00"/	33.20"/	24.00"/
9750605	182.9 cm	158.1 cm	91.4 cm	84.3 cm	61.0 cm



**FRONT**



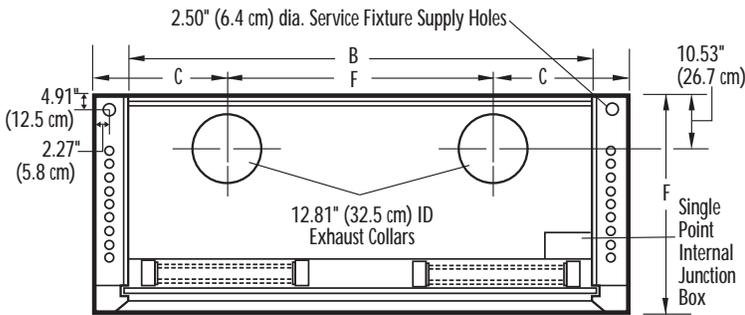
**SIDE**

Contact Labconco at 800-821-5525 or 816-333-8811 or visit [www.labconco.com](http://www.labconco.com) for detailed AutoCAD drawings.

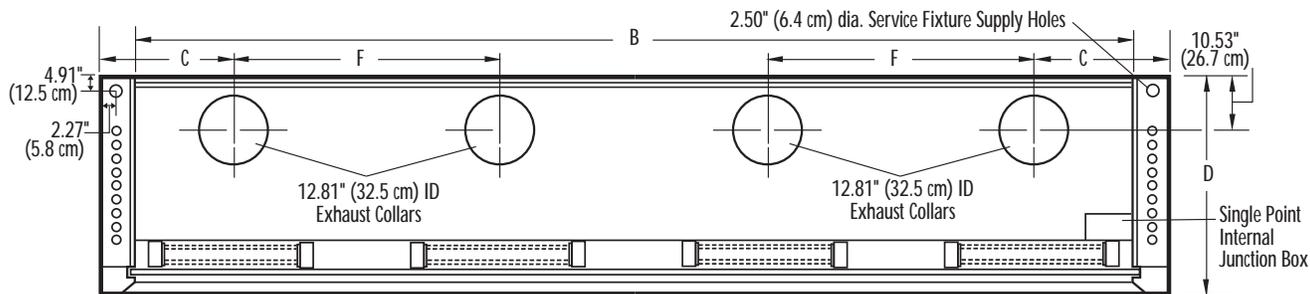


# Dimensional Data

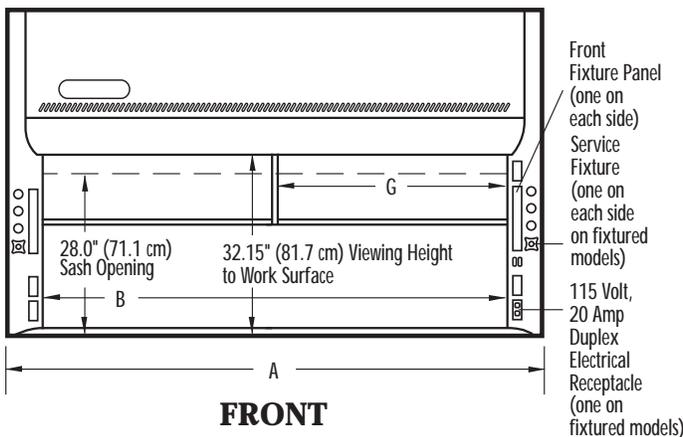
8', 10', 12' and 16' Protector<sup>®</sup> XL™ Benchtop Laboratory Hoods



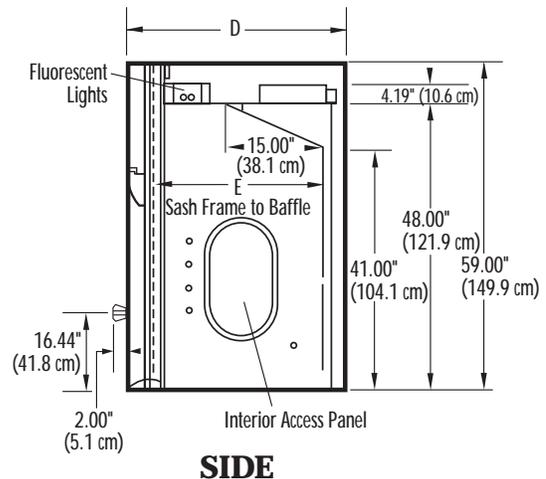
**TOP (8', 10', 12')**



**TOP (16')**



**FRONT**



**SIDE**

	A*	B*	C*	D*	E*	F*	G*
<b>8' Hood</b>							
<b>9700100, 9700101</b>	96.00 (243.8)	86.25 (219.1)	24.00 (61.0)	39.20 (99.6)	30.00 (76.2)	48.00 (121.9)	42.84 (108.8)
<b>9700102, 9700103</b>	96.00 (243.8)	86.25 (219.1)	24.00 (61.0)	45.20 (114.8)	36.00 (91.4)	48.00 (121.9)	42.84 (108.8)
<b>9700104, 9700105</b>	96.00 (243.8)	86.25 (219.1)	24.00 (61.0)	33.20 (84.3)	24.00 (61.0)	48.00 (121.9)	42.84 (108.8)
<b>10' Hood</b>							
<b>9700200, 9700201</b>	120.00 (304.8)	110.25 (280.0)	35.00 (88.9)	39.20 (99.6)	30.00 (76.2)	50.00 (127.0)	54.84 (139.3)
<b>9700202, 9700203</b>	120.00 (304.8)	110.25 (280.0)	35.00 (88.9)	45.20 (114.8)	36.00 (91.4)	50.00 (127.0)	54.84 (139.3)
<b>9700204, 9700205</b>	120.00 (304.8)	110.25 (280.0)	35.00 (88.9)	33.20 (84.3)	24.00 (61.0)	50.00 (127.0)	54.84 (139.3)
<b>12' Hood</b>							
<b>9700300, 9700301</b>	144.00 (365.8)	134.25 (341.0)	41.00 (104.1)	39.20 (99.6)	30.00 (76.2)	62.00 (157.5)	66.84 (169.8)
<b>9700302, 9700303</b>	144.00 (365.8)	134.25 (341.0)	41.00 (104.1)	45.20 (114.8)	36.00 (91.4)	62.00 (157.5)	66.84 (169.8)
<b>9700304, 9700305</b>	144.00 (365.8)	134.25 (341.0)	41.00 (104.1)	33.20 (84.3)	24.00 (61.0)	62.00 (157.5)	66.84 (169.8)
<b>16' Hood</b>							
<b>9700400, 9700401</b>	192.00 (487.7)	182.25 (462.9)	24.00 (61.0)	39.20 (99.6)	30.00 (76.2)	48.00' (121.9)	44.84 (113.9) End 46.00 (116.8) Center (Four Sashes)
<b>9700402, 9700403</b>	192.00 (487.7)	182.25 (462.9)	24.00 (61.0)	45.20 (114.8)	36.00 (91.4)	48.00' (121.9)	44.84 (113.9) End 46.00 (116.8) Center (Four Sashes)
<b>9700404, 9700405</b>	192.00 (487.7)	182.25 (462.9)	24.00 (61.0)	33.20 (84.3)	24.00 (61.0)	48.00' (121.9)	44.84 (113.9) End 46.00 (116.8) Center (Four Sashes)

\*Inches (centimeters)

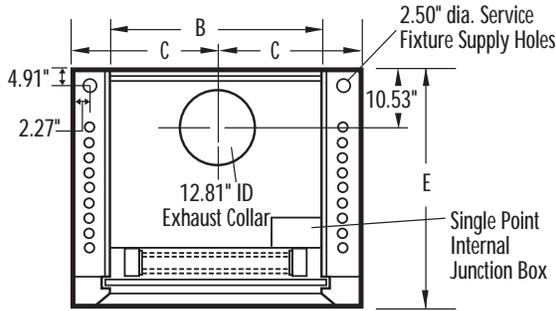
<sup>1</sup>Four Collars

Contact Labconco at 800-821-5525 or 816-333-8811 or visit [www.labconco.com](http://www.labconco.com) for detailed AutoCAD drawings.

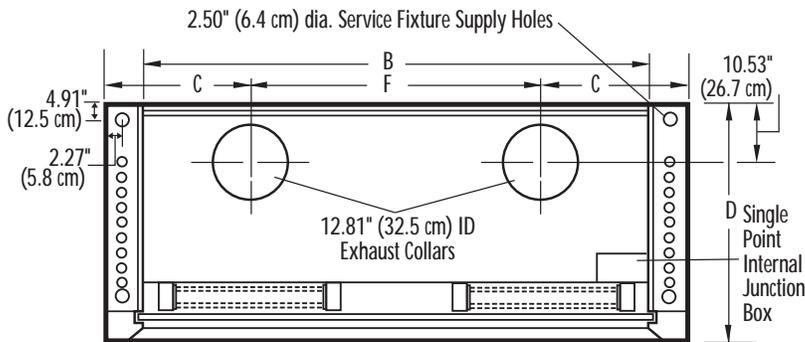


## Dimensional Data

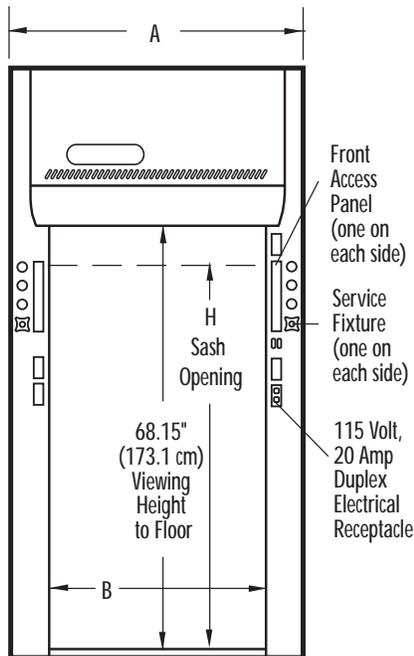
4', 5', 6' and 8' Protector<sup>®</sup> XL™ Floor-Mounted Laboratory Hoods with vertical-rising sashes



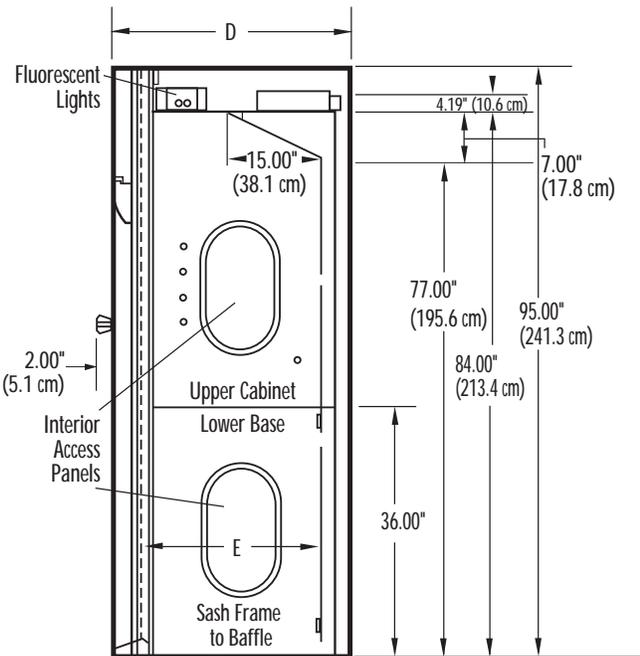
**TOP 4', 5', 6'**



**TOP (8')**



**FRONT**



**SIDE**

	A*	B*	C*	D*	E*	F*	H*
<b>4' Hood</b>							
<b>9860401</b>	48.00 (121.9)	38.25 (97.2)	24.00 (61.0)	39.20 (99.6)	30.00 (76.2)	—	58.81 (149.4)
<b>9860403</b>	48.00 (121.9)	38.25 (97.2)	24.00 (61.0)	45.20 (114.8)	36.00 (91.4)	—	58.81 (149.4)
<b>9860405</b>	48.00 (121.9)	38.25 (97.2)	24.00 (61.0)	57.20 (145.3)	48.00 (121.9)	—	58.81 (149.4)
<b>5' Hood</b>							
<b>9860501</b>	60.00 (152.4)	50.25 (127.6)	30.00 (76.2)	39.20 (99.6)	30.00 (76.2)	—	58.81 (149.4)
<b>9860503</b>	60.00 (152.4)	50.25 (127.6)	30.00 (76.2)	45.20 (114.8)	36.00 (91.4)	—	58.81 (149.4)
<b>9860505</b>	60.00 (152.4)	50.25 (127.6)	30.00 (76.2)	57.20 (145.3)	48.00 (121.9)	—	58.81 (149.4)
<b>6' Hood</b>							
<b>9860601</b>	72.00 (182.9)	62.25 (158.1)	36.00 (91.4)	39.20 (99.6)	30.00 (76.2)	—	58.81 (149.4)
<b>9860603</b>	72.00 (182.9)	62.25 (158.1)	36.00 (91.4)	45.20 (114.8)	36.00 (91.4)	—	58.81 (149.4)
<b>9860605</b>	72.00 (182.9)	62.25 (158.1)	36.00 (91.4)	57.20 (145.3)	48.00 (121.9)	—	58.81 (149.4)
<b>8' Hood</b>							
<b>9700807</b>	96.00 (243.8)	86.25 (219.1)	24.00 (61.0)	39.20 (99.6)	30.00 (76.2)	48.00 (121.9)	59.00 (149.9)
<b>9700809</b>	96.00 (243.8)	86.25 (219.1)	24.00 (61.0)	45.20 (114.8)	36.00 (91.4)	48.00 (121.9)	59.00 (149.9)
<b>9700811</b>	96.00 (243.8)	86.25 (219.1)	24.00 (61.0)	57.20 (145.3)	48.00 (121.9)	48.00 (121.9)	59.00 (149.9)

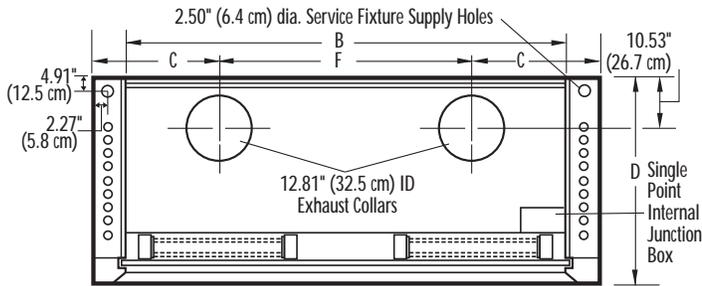
\*Inches (centimeters)

Contact Labconco at **800-821-5525** or **816-333-8811** or visit [www.labconco.com](http://www.labconco.com) for detailed AutoCAD drawings.

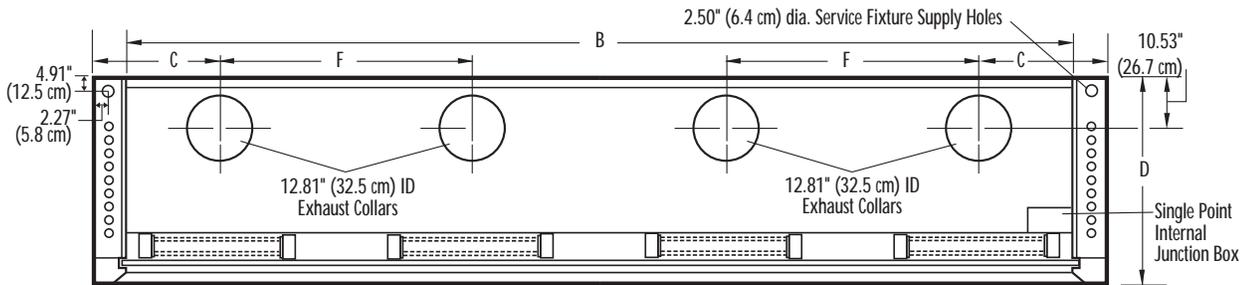


## Dimensional Data

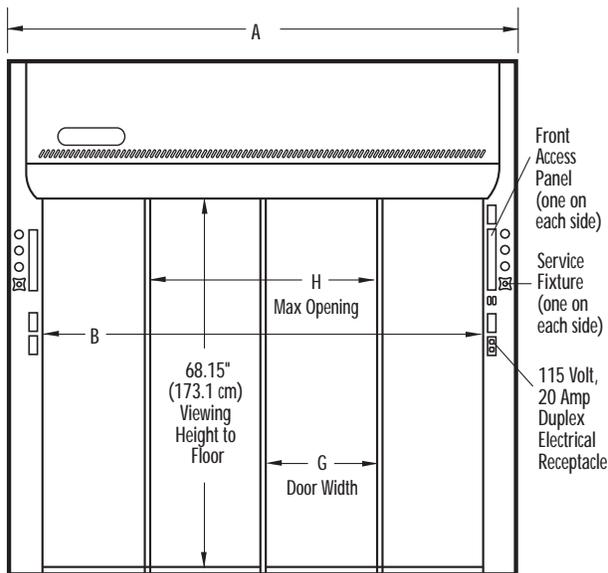
8', 10', 12' and 16' Protector® XL™ Floor-Mounted Laboratory Hoods with horizontal-sliding sashes



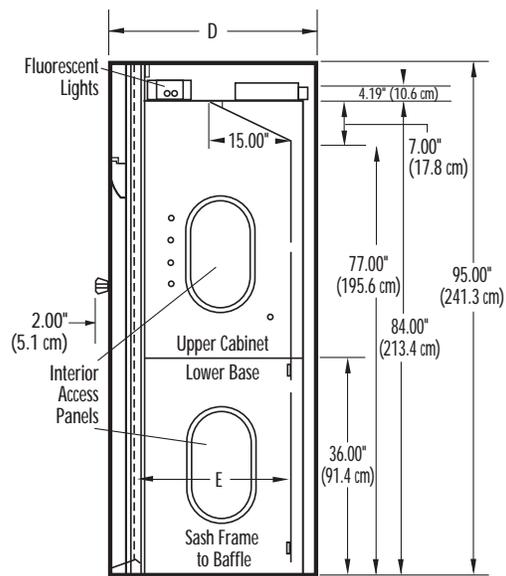
**TOP 8', 10', 12'**



**TOP (16')**



**FRONT**



**SIDE**

	A*	B*	C*	D*	E*	F*	G*	H*
<b>8' Hood</b>								
<b>9700801</b>	96.00 (243.8)	86.25 (219.1)	24.00 (61.0)	39.20 (99.6)	30.00 (76.2)	48.00 (121.9)	22.50 (57.2)	43.25 (109.9)
<b>9700803</b>	96.00 (243.8)	86.25 (219.1)	24.00 (61.0)	45.20 (114.8)	36.00 (91.4)	48.00 (121.9)	22.50 (57.2)	43.25 (109.9)
<b>9700805</b>	96.00 (243.8)	86.25 (219.1)	24.00 (61.0)	57.20 (145.3)	48.00 (121.9)	48.00 (121.9)	22.50 (57.2)	43.25 (109.9)
<b>10' Hood</b>								
<b>9700901</b>	120.00 (304.8)	110.25 (280.0)	35.00 (88.9)	39.20 (99.6)	30.00 (76.2)	50.00 (127.0)	28.50 (72.4)	55.25 (140.3)
<b>9700903</b>	120.00 (304.8)	110.25 (280.0)	35.00 (88.9)	45.20 (114.8)	36.00 (91.4)	50.00 (127.0)	28.50 (72.4)	55.25 (140.3)
<b>9700905</b>	120.00 (304.8)	110.25 (280.0)	35.00 (88.9)	57.20 (145.3)	48.00 (121.9)	50.00 (127.0)	28.50 (72.4)	55.25 (140.3)
<b>12' Hood</b>								
<b>9701001</b>	144.00 (365.8)	134.25 (341.0)	41.00 (104.1)	39.20 (99.6)	30.00 (76.2)	62.00 (157.5)	34.50 (87.6)	67.25 (170.8)
<b>9701003</b>	144.00 (365.8)	134.25 (341.0)	41.00 (104.1)	45.20 (114.8)	36.00 (91.4)	62.00 (157.5)	34.50 (87.6)	67.25 (170.8)
<b>9701005</b>	144.00 (365.8)	134.25 (341.0)	41.00 (104.1)	57.20 (145.3)	48.00 (121.9)	62.00 (157.5)	34.50 (87.6)	67.25 (170.8)
<b>16' Hood</b>								
<b>9716001</b>	192.00 (487.7)	182.25 (462.9)	24.00 (61.0)	39.20 (99.6)	30.00 (76.2)	48.00' (121.9)	46.50 (118.1)	91.25 (231.8)
<b>9716003</b>	192.00 (487.7)	182.25 (462.9)	24.00 (61.0)	45.20 (114.8)	36.00 (91.4)	48.00' (121.9)	46.50 (118.1)	91.25 (231.8)
<b>9716005</b>	192.00 (487.7)	182.25 (462.9)	24.00 (61.0)	57.20 (145.3)	48.00 (121.9)	48.00' (121.9)	46.50 (118.1)	91.25 (231.8)

\*Inches (centimeters)

'Four Collars

Contact Labconco at 800-821-5525 or 816-333-8811 or visit [www.labconco.com](http://www.labconco.com) for detailed AutoCAD drawings.

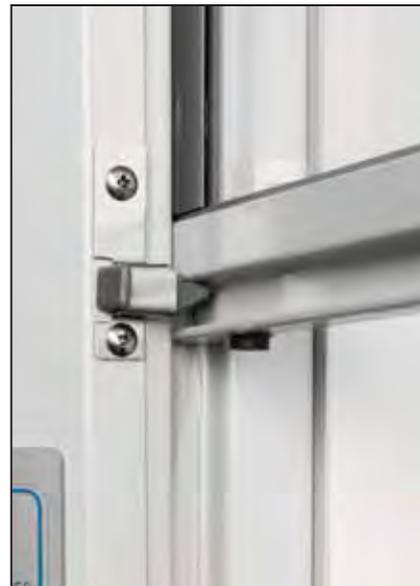


## Protector® XLE™ Laboratory Hoods



Requires  
Ductwork and  
Blower

The Protector XLE Laboratory Hood automatically closes to an 18" high sash opening for added safety and to help conserve energy.



The sash latch holds the sash in the 28" high position for loading. When the latch is released, the sash automatically returns to the 18" operating height position.



Openings on both ends of the air foil allow electrical cord pass through without disrupting airflow. Cords do not block airflow and are out of the way of the operator.



The ergonomic low-profile air foil provides a comfortable surface for arms resting on it and improves operator access to the hood's interior. Patented\* Clean-Sweep airflow openings significantly improve airflow.



The integral spill trough prevents spills on the work surface from leaking out the front of the hood. The air foil pivots up to provide access to the spill trough for cleaning.

\* U.S. Patent No. 6,461,233



# Protector<sup>®</sup> XLE<sup>™</sup> Laboratory Hoods



6' Protector XLE Laboratory Hood 9970600 is shown with SpillStopper Work Surface 9969600, Protector Standard Storage Cabinets 9900700 and 9900400 and Protector Solvent Storage Cabinet 9903100. Blower, ductwork, work surface and base cabinets must be ordered separately.



Requires Ductwork and Blower



### All models feature:

- By-pass airflow design.
- Ergonomic, low-profile air foil with aerodynamic Clean-Sweep\* airflow openings and ADA-compliant spill trough. The air foil pivots up for cleaning. The spill trough requires no cabinet overhang.
- Electrical cord pass through on both ends of air foil to keep cords out of the way.
- Glacier white, dry powder epoxy-coated steel exterior.
- Chemical-resistant molded composite panel liner and pre-set baffle(s) with flame spread less than 25 per ASTM E-84.
- 3/16" thick tempered safety glass vertical-rising sash with self-closing mechanism, counterbalance system and epoxy-coated aluminum sash handle. When raised, the sash automatically closes to an 18" high sash opening.
- Sash latch at 28" sash opening to hold sash in raised position during loading.
- 35" sash viewing height.
- Removable front and side panels and front and interior service access panels for access to plumbing and electrical wiring.

- Pre-wired T8 fluorescent lighting, light and blower switches for 115 volt, 60 Hz operation.
- Epoxy-coated stainless steel, 12.81" ID exhaust connection(s).

### All models conform to the following regulations and standards:

- SEFA 1-2006
- NFPA 45-2004
- ASTM E84-09C
- ASHRAE 110-95
- ANSI Z9.5-2003
- UL 3101-1/61010-1
- CAN/CSA C22.2 No. 1010.1
- UL 1805

### Fixtured models feature:

- Two pre-plumbed service fixtures with forged brass valves, lower right side with brass tubing for gas and lower left side with copper tubing for cold water. Components for converting either or both fixtures to air and vacuum are provided. **Inlet tubing is not provided.**
- One pre-wired 115 volt, 20 amp electrical duplex receptacle on lower right side.

### All models require (not included):

- **Remote Blower.** See back pocket.
- **Ductwork.** See back pocket.
- **Work Surface.** See page 100-104.
- **Base Cabinet or Stand.** See pages 105-116.

### Optional accessories for on-site installation include:

- **Service Fixture Kits.** See page 117.
- **Electrical Duplex Kits.** See page 118.
- **Guardian Airflow Monitor Kits.** See page 118.
- **Ceiling Enclosure and Rear Finish Panel Kits.** See page 119.
- **Distillation Grid Kits.** See page 120.
- **Snuffer Fire Extinguishers.** See page 121.

Contact Labconco at **800-821-5525** or **816-333-8811** for ordering information on other hood depths, adjustable baffles, explosion-proof lighting, tissue screens and other sash configurations and for blower sizing assistance.

Self-Closing Sash 60% Open (18")						
Nominal Width	Total Exhaust CFM and Static Pressure					
	100 fpm	S.P.	80 fpm	S.P.	60 fpm	S.P.
4 Feet	520	0.09"	420	0.06"	310	0.03"
5 Feet	690	0.12"	550	0.08"	410	0.04"
6 Feet	850	0.15"	680	0.10"	510	0.06"
7 Feet	1020	0.09"	820	0.06"	610	0.03"
8 Feet	1180	0.10"	940	0.06"	710	0.04"

Latched Sash Full Open (28")						
Nominal Width	Total Exhaust CFM and Static Pressure					
	100 fpm	S.P.	80 fpm	S.P.	60 fpm	S.P.
4 Feet	790	0.19"	630	0.12"	470	0.07"
5 Feet	1040	0.28"	830	0.18"	620	0.10"
6 Feet	1280	0.33"	1020	0.21"	770	0.12"
7 Feet	1590	0.19"	1220	0.12"	920	0.07"
8 Feet	1780	0.22"	1420	0.14"	1070	0.08"

Exclusive Feature

Heights of switches, electrical receptacle and service fixtures meet requirements of ADA.

\*U.S. Patent No. 6,461,233

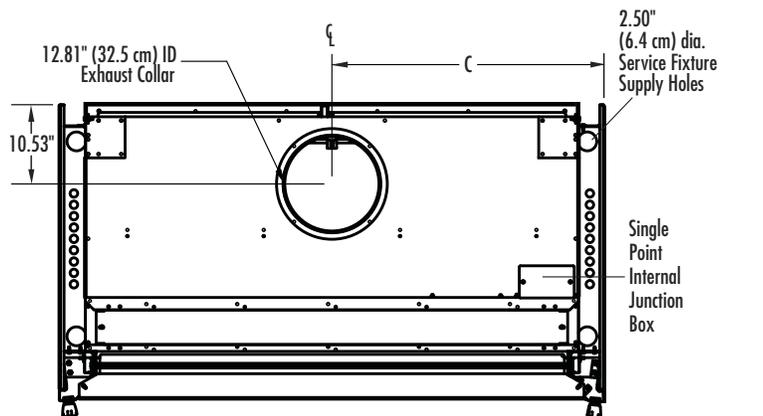


## Ordering Information & Dimensional Data

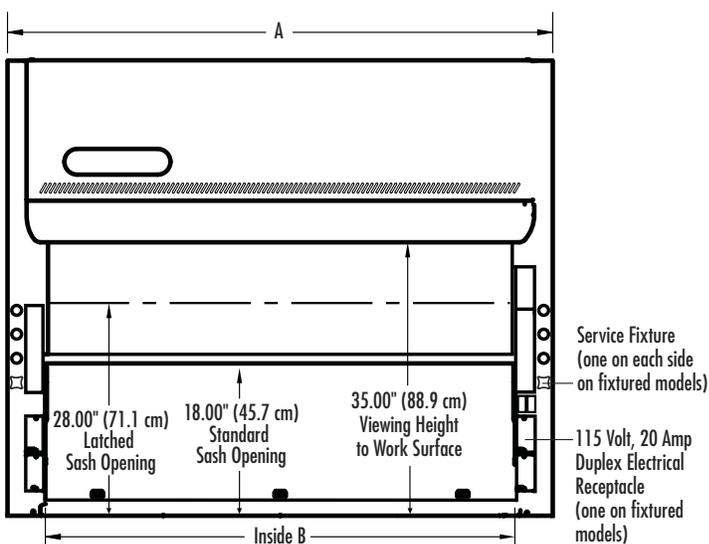
### Protector<sup>®</sup> XLE<sup>™</sup> Laboratory Hoods

Nominal Width	Catalog Number	Exterior Depth*	Interior Depth*	12.81" (32.5 cm) ID Exhaust Collar	Sash*	Fluorescent Lamps	Service Fixtures	Electrical Duplex	Shipping Weight lbs./kg
4 Feet	<b>9970400</b>	39.20" (99.6 cm)	30.00" (76.2 cm)	1	1	2 ea. 25 watt	None	None	400/181
	<b>9970401</b>	39.20" (99.6 cm)	30.00" (76.2 cm)	1	1	2 ea. 25 watt	2	1	430/195
5 Feet	<b>9970500</b>	39.20" (99.6 cm)	30.00" (76.2 cm)	1	1	2 ea. 32 watt	None	None	480/218
	<b>9970501</b>	39.20" (99.6 cm)	30.00" (76.2 cm)	1	1	2 ea. 32 watt	2	1	490/222
6 Feet	<b>9970600</b>	39.20" (99.6 cm)	30.00" (76.2 cm)	1	1	2 ea. 32 watt	None	None	545/247
	<b>9970601</b>	39.20" (99.6 cm)	30.00" (76.2 cm)	1	1	2 ea. 32 watt	2	1	555/252
7 Feet	<b>9970700</b>	39.20" (99.6 cm)	30.00" (76.2 cm)	2	1	2 ea. 32 watt	None	None	620/281
	<b>9970701</b>	39.20" (99.6 cm)	30.00" (76.2 cm)	2	1	2 ea. 32 watt	2	1	630/286
8 Feet	<b>9970800</b>	39.20" (99.6 cm)	30.00" (76.2 cm)	2	1	4 ea. 25 watt	None	None	695/315
	<b>9970801</b>	39.20" (99.6 cm)	30.00" (76.2 cm)	2	1	4 ea. 25 watt	2	1	705/320

\*Contact Labconco for Protector XLE Laboratory Hoods in other depths and with top-hung combination sashes.



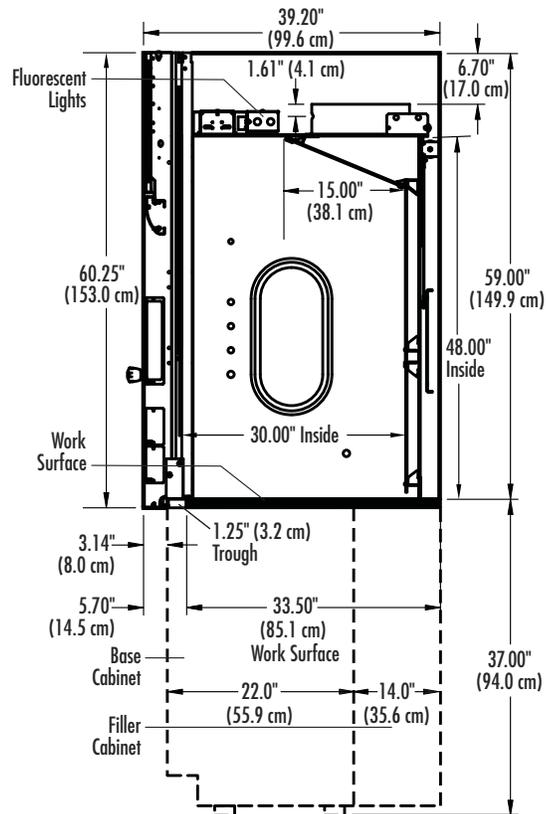
**TOP**



**FRONT**

	A	B	C
<b>4' Hood</b>	48.00" (121.9 cm)	38.25" (97.2 cm)	24.00" (61.0 cm)
<b>5' Hood</b>	60.00" (152.4 cm)	50.25" (127.6 cm)	30.00" (76.2 cm)
<b>6' Hood</b>	72.00" (182.9 cm)	62.25" (158.1 cm)	36.00" (91.4 cm)
<b>7' Hood</b>	84.00" (213.4 cm)	74.25" (188.6 cm)	21.00" (53.3 cm)*
<b>8' Hood</b>	96.00" (243.8 cm)	86.25" (219.1 cm)	24.00" (61.0 cm)*

\* 7' Hoods have two exhaust collars 21.00" both sides from center. 8' Hoods have two exhaust collars 24.00" both sides from center.



**SIDE**

**SIDE VIEW** (Shown with accessory work surface and base cabinet available for all hood widths. Height can vary.)



**T&S BRASS AND BRONZE WORKS, INC.**

2 Saddleback Cove / P.O. Box 1088  
Travelers Rest, SC 29690



REG. #A2601  
ISO #9001

Model No.

**BL-5709-08**

Item No.

Travelers Rest, SC: 800-476-4103 • Simi Valley, CA: 800-423-0150 • Fax: 864-834-3518 • www.tsbrass.com

This Space for Architect/Engineer Approval

Job Name \_\_\_\_\_ Date \_\_\_\_\_

Model Specified \_\_\_\_\_ Quantity \_\_\_\_\_

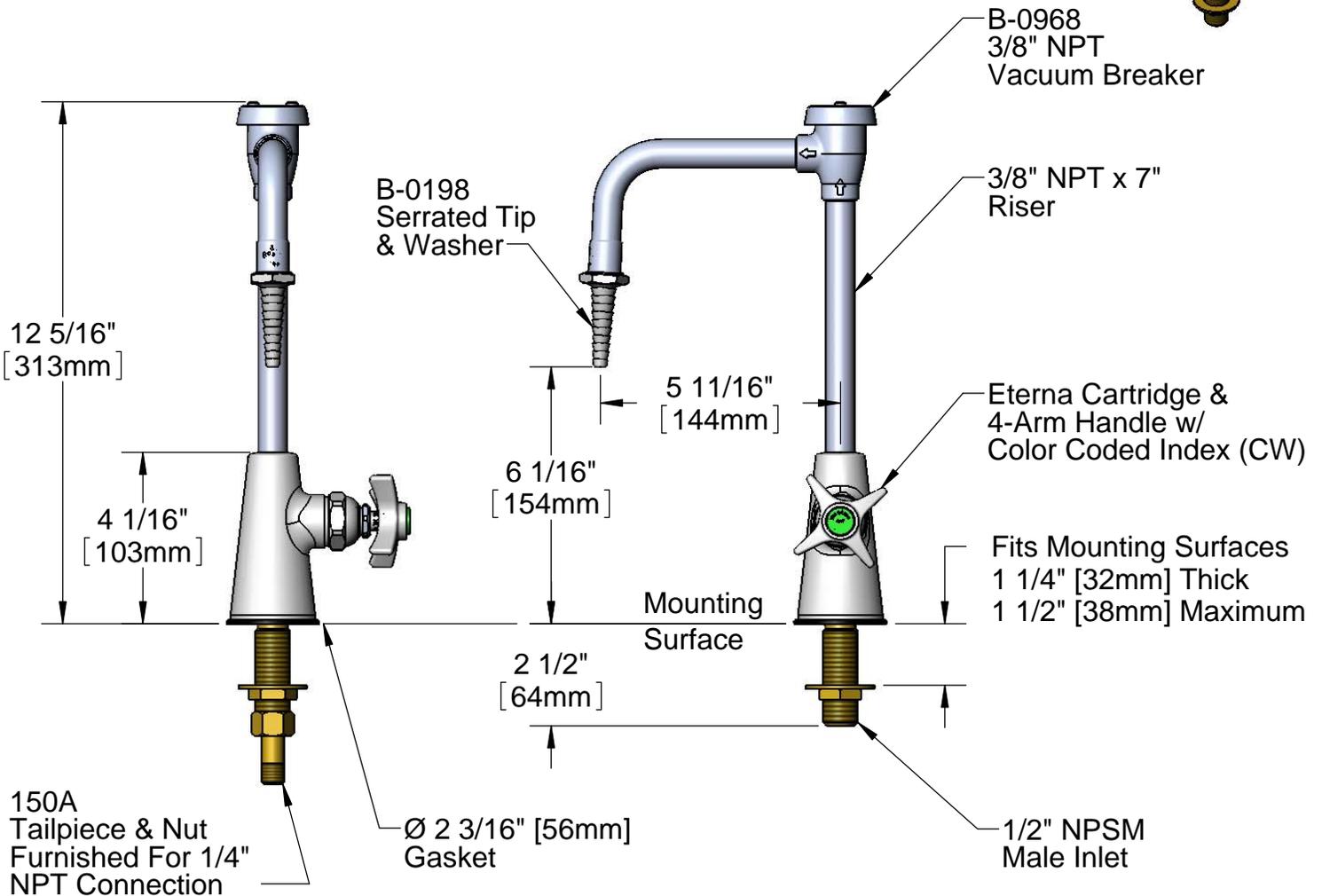
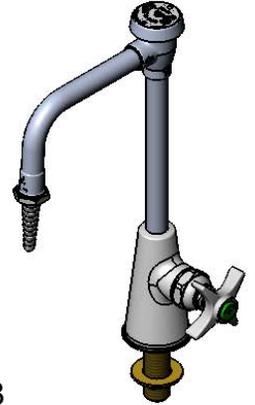
Customer/Wholesaler \_\_\_\_\_

Contractor \_\_\_\_\_

Architect/Engineer \_\_\_\_\_



**ADA Compliant**



Note: Rough-In Requirement  
Ø 1" [25mm] Mounting Hole

Product Specifications:  
Single Temperature Laboratory Faucet w/ Rigid Vacuum Breaker  
Nozzle, Serrated Tip Outlet & 1/2" NPSM Male Shank Inlet

Drawn <b>DHL</b>	Checked <b>DMH</b>	Approved <b>JHB</b>
Scale: <b>1:4</b>		Date: <b>08/24/11</b>



# T&S BRASS AND BRONZE WORKS, INC.

2 Saddleback Cove / P.O. Box 1088  
Travelers Rest, SC 29690



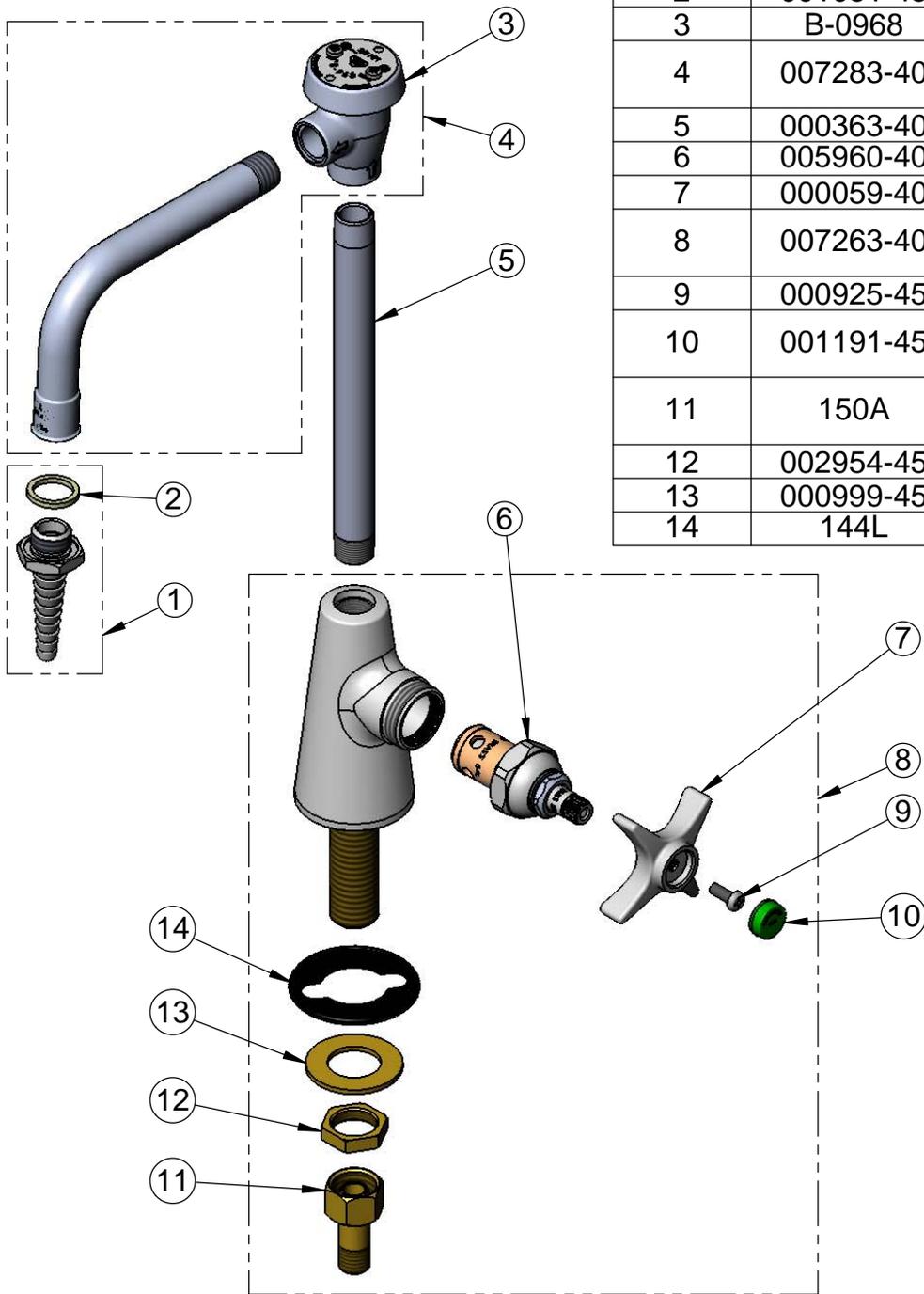
REG. #A2601  
ISO #9001

Model No.

**BL-5709-08**

Item No.

Travelers Rest, SC: 800-476-4103 • Simi Valley, CA: 800-423-0150 • Fax: 864-834-3518 • www.tsbrass.com



ITEM NO.	SALES NO.	DESCRIPTION
1	B-0198	Serrated Tip
2	001051-45	Washer
3	B-0968	Vacuum Breaker Asm, 3/8"
4	007283-40	Vacuum Breaker & Nozzle Assembly
5	000363-40	3/8" NPT x 7" Riser
6	005960-40	Eterna Cartridge - RTC
7	000059-40	4-Arm Lab Handle
8	007263-40	BL-5708-01 Base Faucet Assembly
9	000925-45	Lab Handle Screw
10	001191-45	Cap, Index, Green, Cold Water
11	150A	Tapered Tailpiece Assembly For 1/4" NPT Connection
12	002954-45	Shank Lock Nut
13	000999-45	Brass Lock Washer
14	144L	Gasket Polypropylene

Product Specifications:  
Single Temperature Laboratory Faucet w/ Rigid Vacuum Breaker Nozzle, Serrated Tip Outlet & 1/2" NPSM Male Shank Inlet

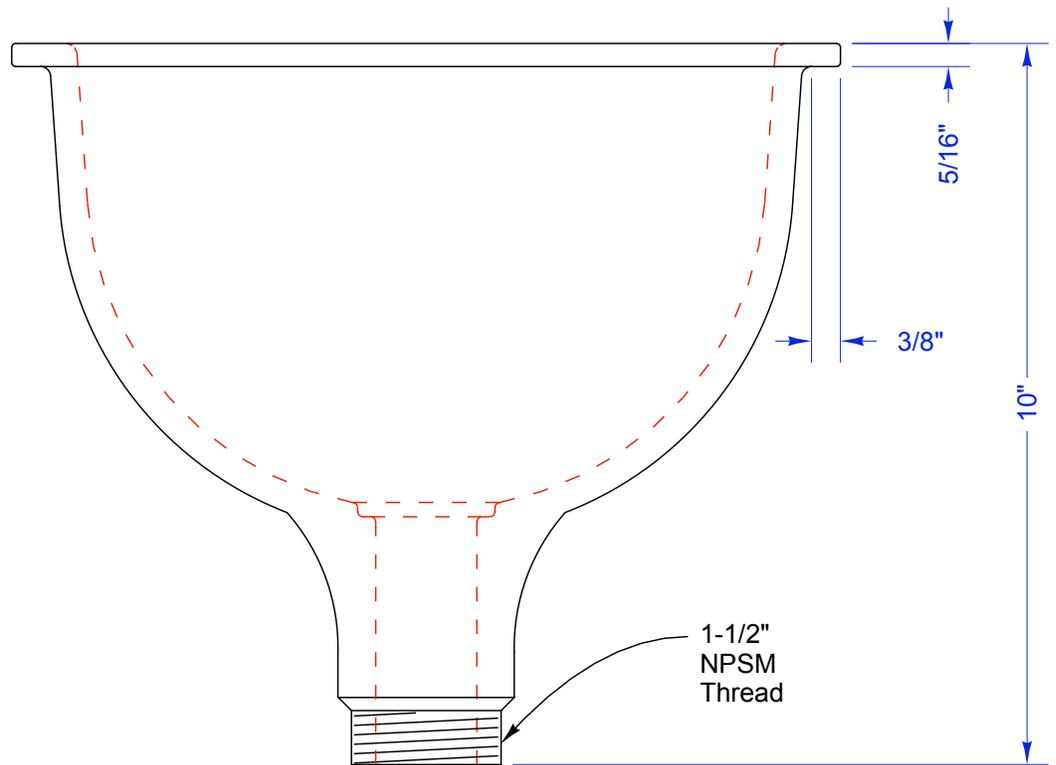
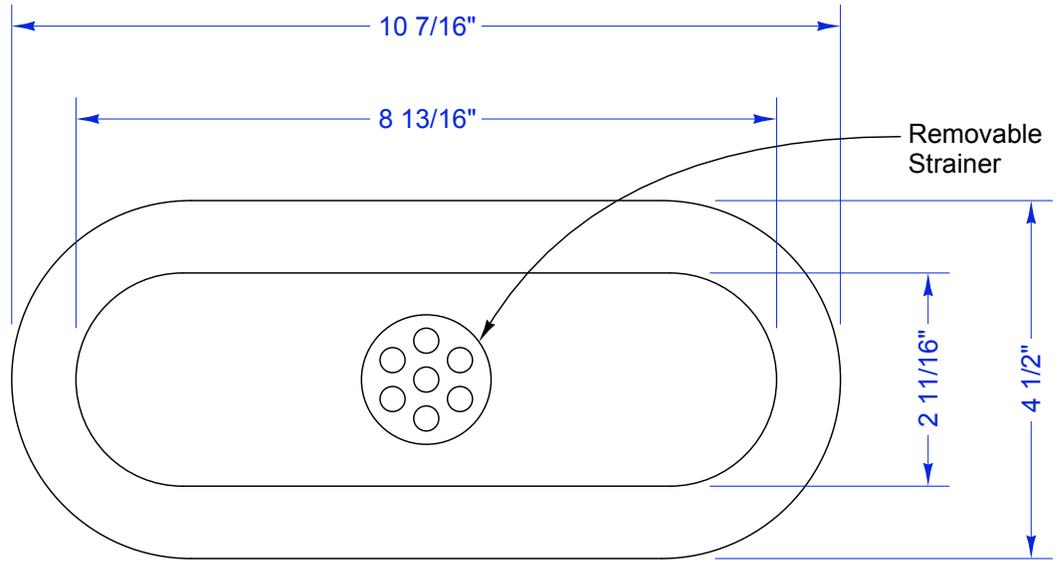
Drawn <b>DHL</b>	Checked <b>DMH</b>	Approved <b>JHB</b>
Scale: <b>NTS</b>		Date: <b>08/24/11</b>

TS12

Cupsink - 3" x 9"

Color:  Black Onyx  Alpine White  Gray  
 Forest Green  Steel Blue  Tan

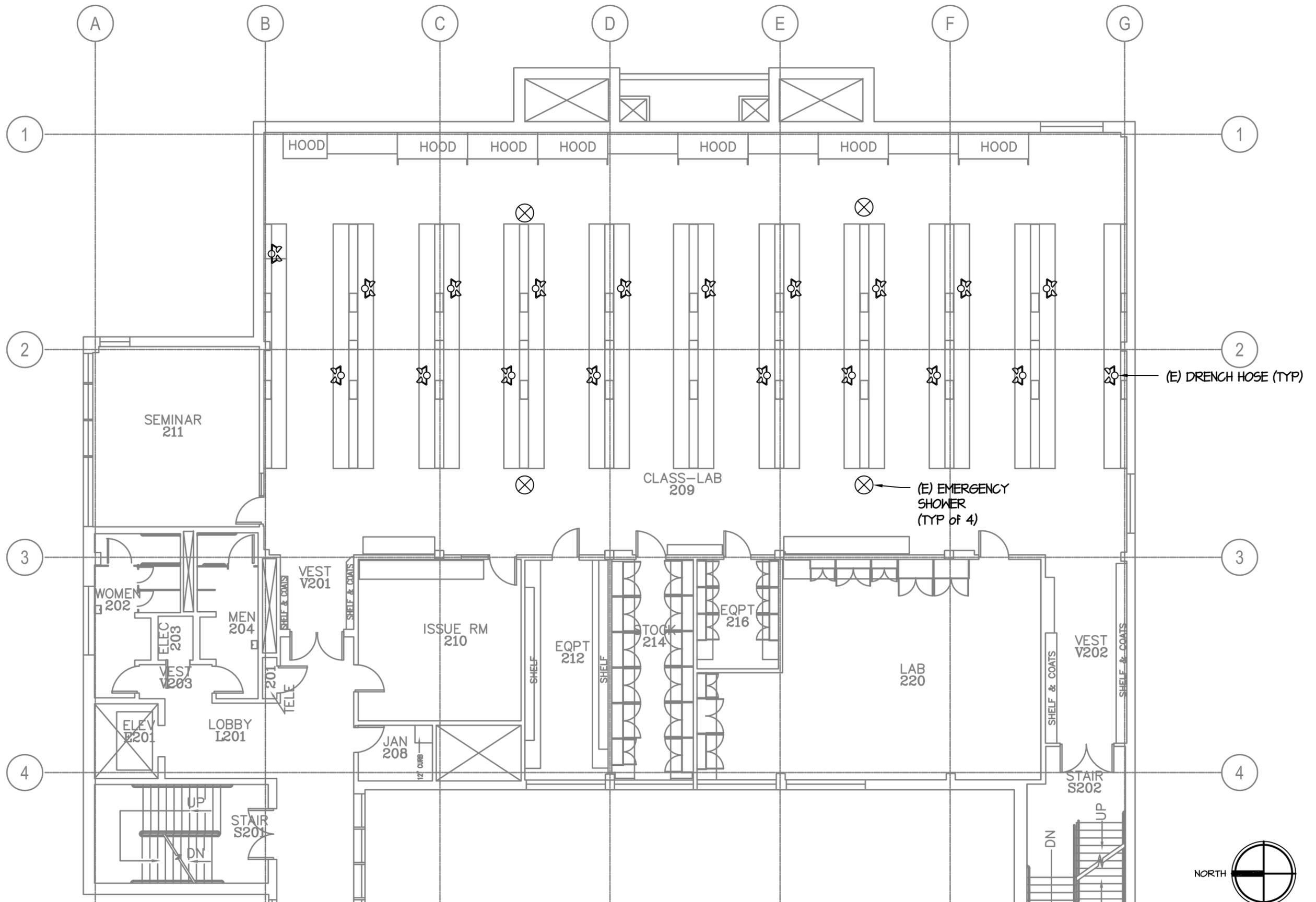
Manufacturer: Durcon  
Material: Epoxy Resin



# **APPENDIX B PLANS AND SCHEMATICS**

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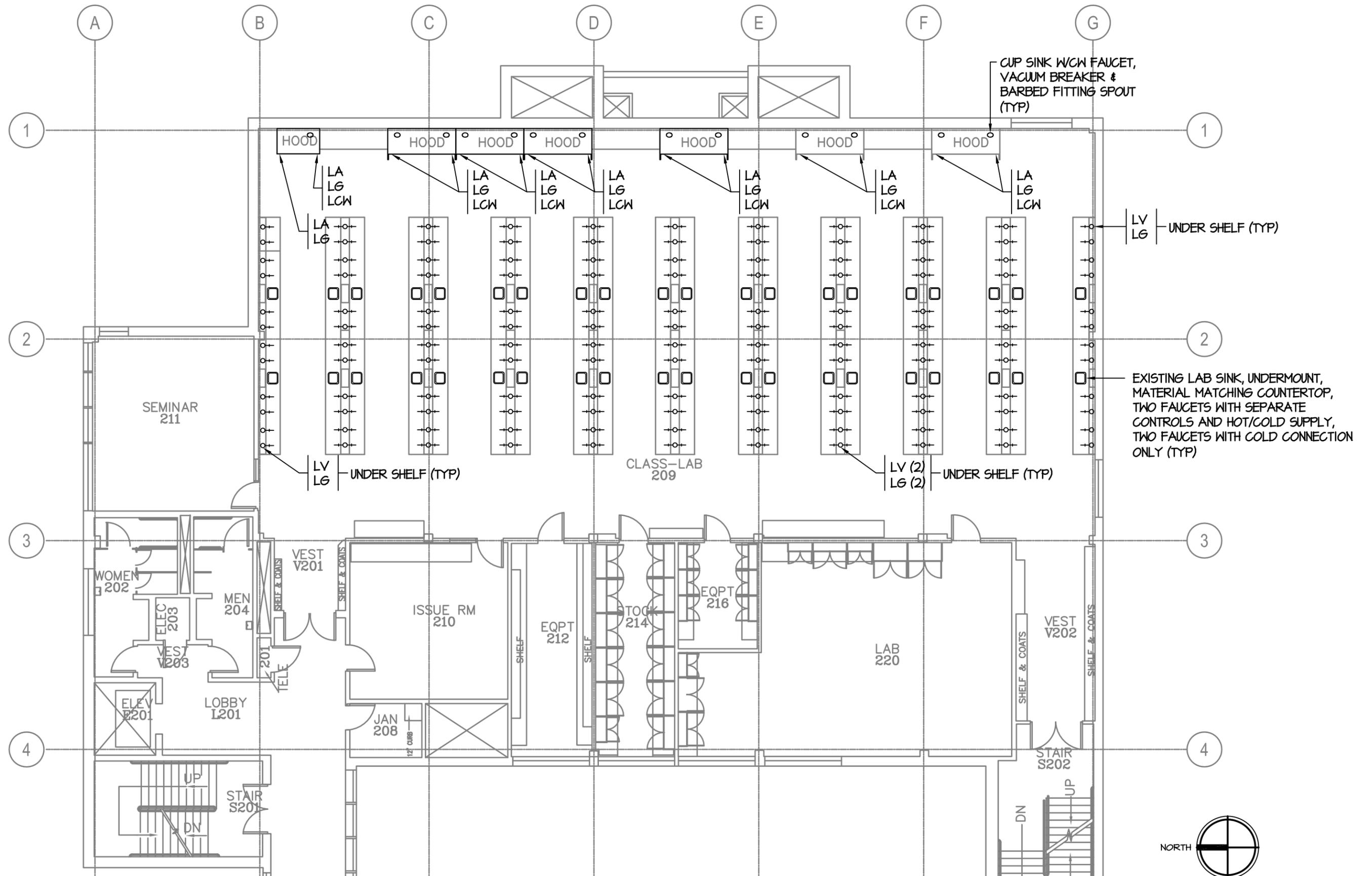




**SERVICE PLAN - EXISTING EMERGENCY FIXTURES**

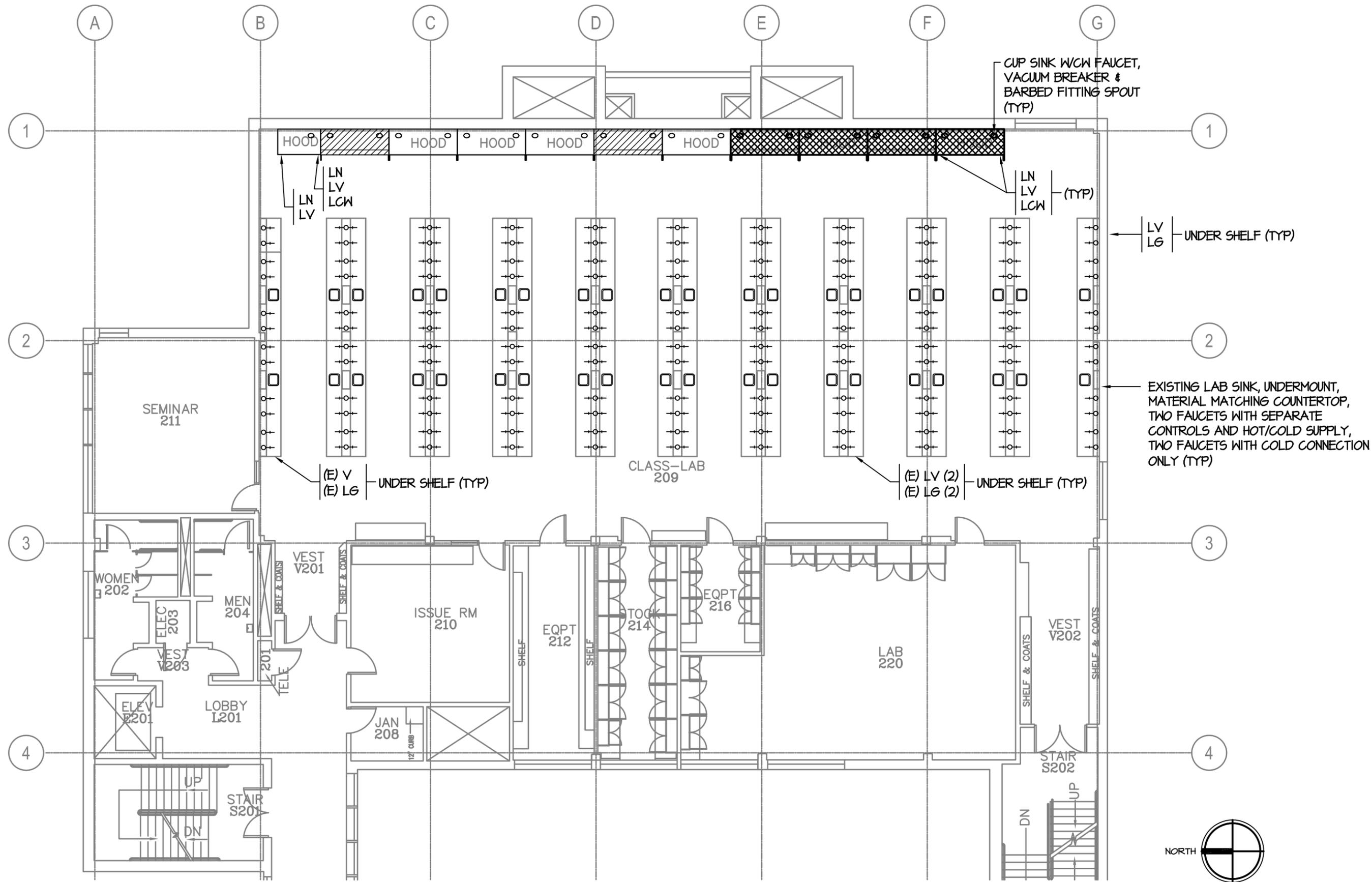
SCALE: 3/32" = 1'-0"





**SERVICE PLAN - EXISTING PLUMBING/LAB GASES**

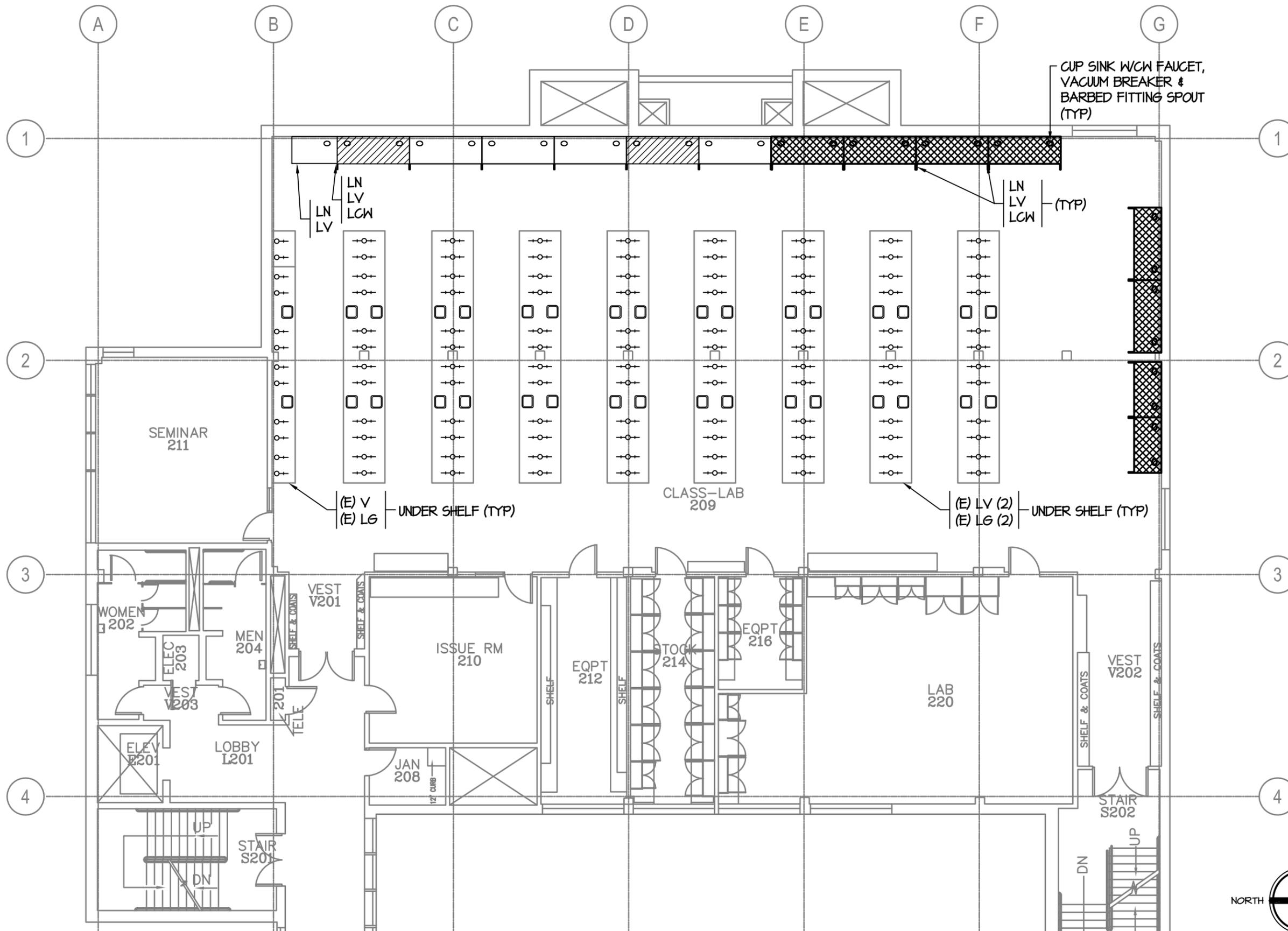
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**LAB SERVICE PLAN - OPTION 1**

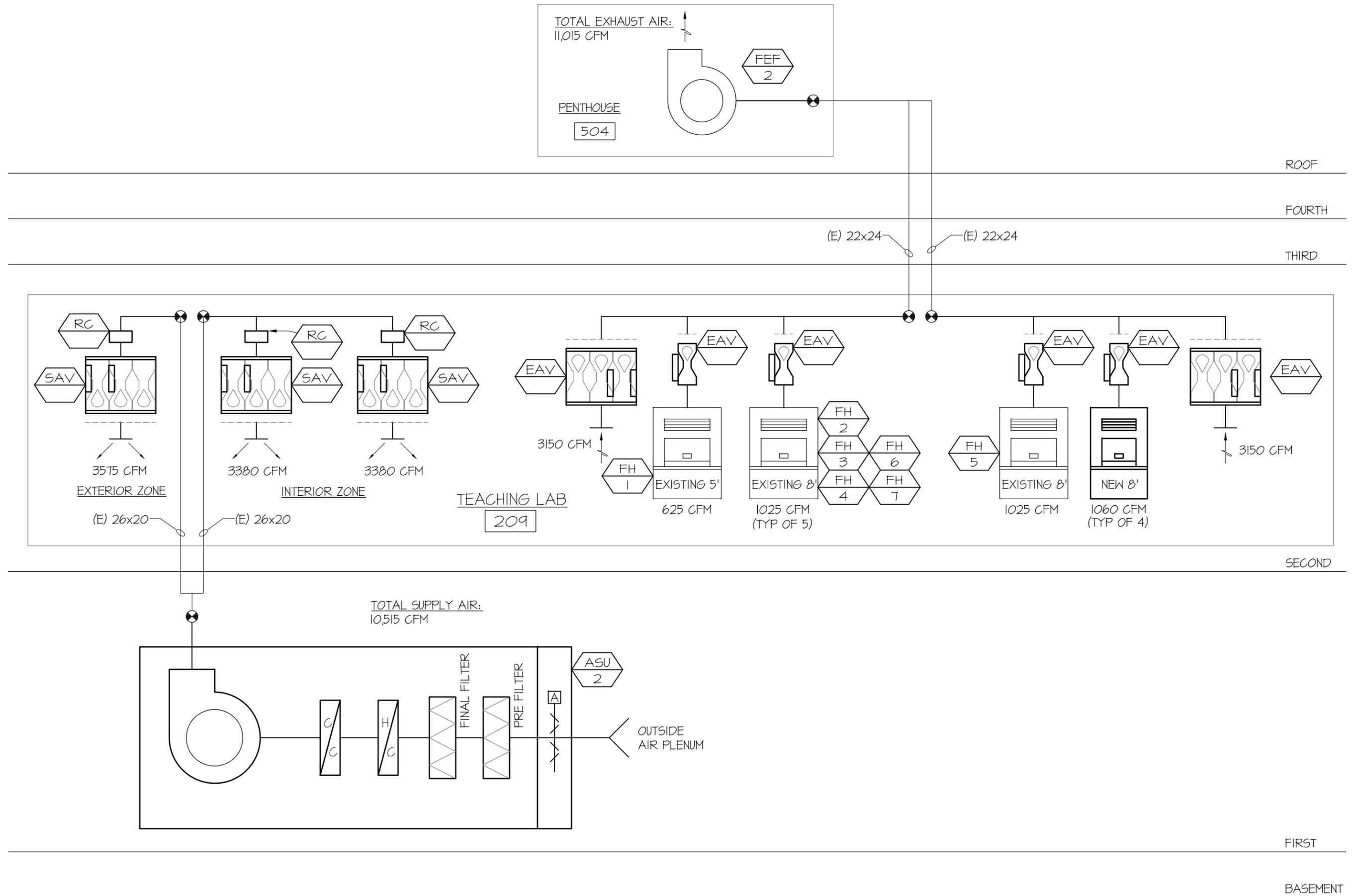
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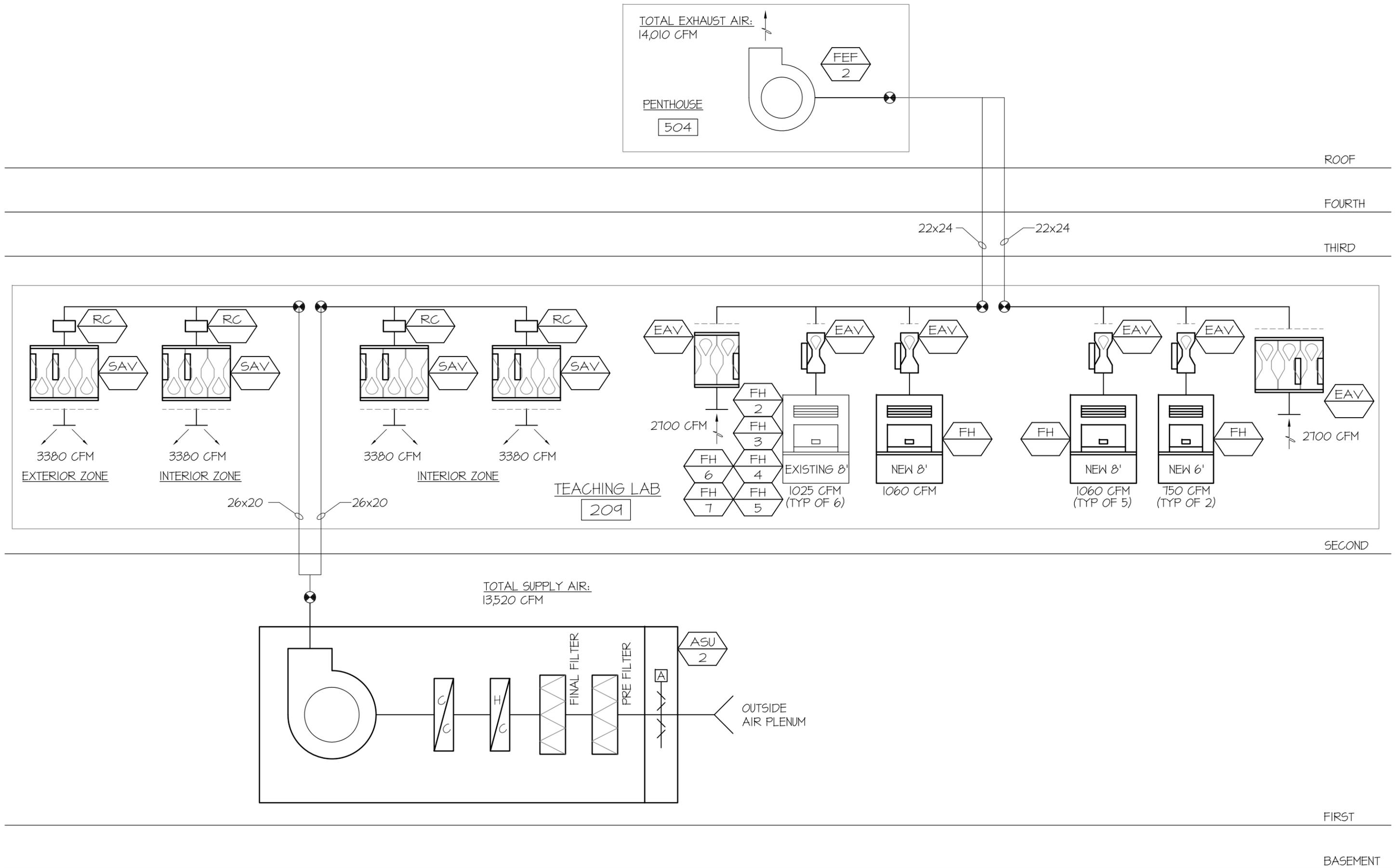
**LAB SERVICE PLAN - OPTION 2**

SCALE: 3/32" = 1'-0"



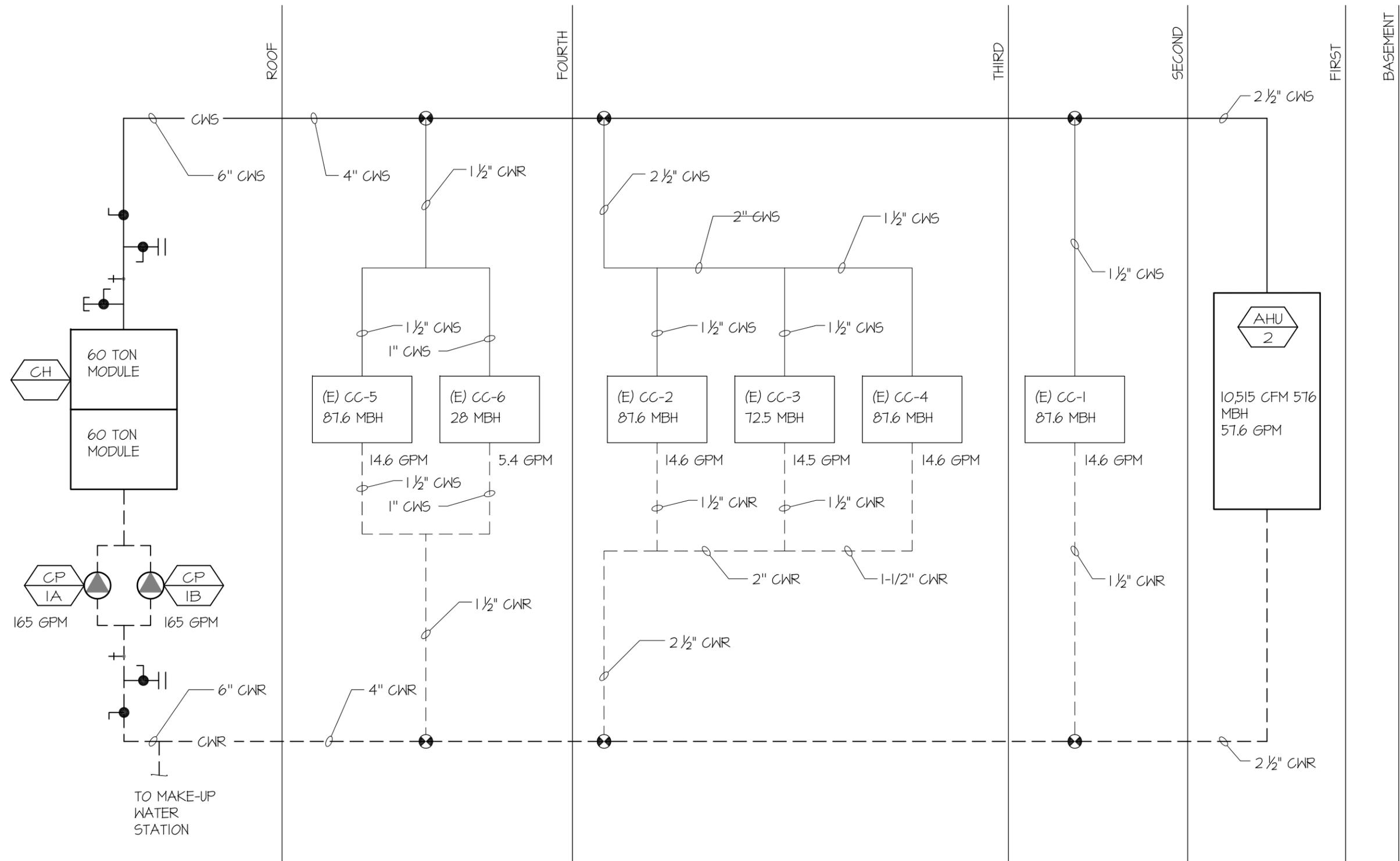
# AIR SUPPLY DIAGRAM: OPTION 1

NOT TO SCALE



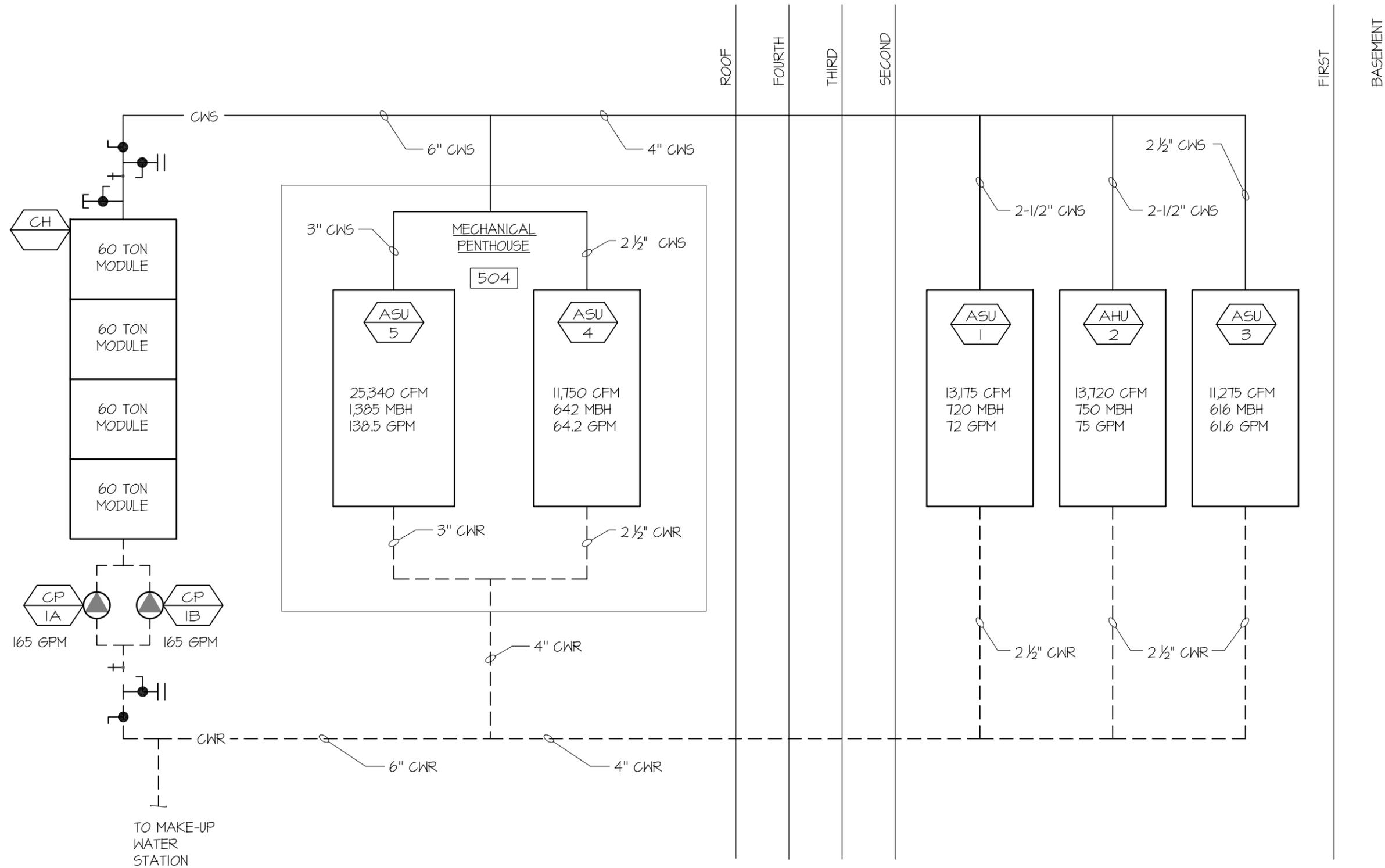
# AIR SUPPLY DIAGRAM: OPTION 2

NOT TO SCALE



# CHILLED WATER PIPING DIAGRAM: OPTION 1

NOT TO SCALE



# CHILLED WATER PIPING DIAGRAM: OPTION 2

NOT TO SCALE