

Ventilation Calculations													
Unit Identification	Space Classification	Floor Area (SF)	People per 1000 SF	Total People	OA CFM per Person	OA CFM per SF	Zone Air Dist. Eff.	OA Required CFM	OA Design CFM	Exhaust CFM per SF	Exhaust CFM Required	Exhaust CFM Design	Remarks
AHU-1, AHU-2, AHU-3	Dining	1525	70	80	7.5	0.18	1.0	875	1140	-	-	-	1,2
	Bar	112	100	6	7.5	0.18	1.0	66	1140	-	-	-	1,2
	Office	72	5	1	5	0.06	1.0	10	1140	-	-	-	1
	Storage	20	NA	NA	NA	0.12	1.0	3	1140	-	-	-	1
	Corridor	164	NA	NA	NA	0.06	1.0	10	1140	-	-	-	1
KEF-1	Kitchen	724	-	-	-	-	-	-	-	0.7	507	4000	1

- Per 2018 NC Mechanical Code, Table 403.3.1.1.
- Total people is based upon occupancy values provided by architect/tenant.

Mechanical Notes and Specifications	
<p>General Requirements:</p> <ol style="list-style-type: none"> The heating and air conditioning contractor (the contractor) shall provide all specified and miscellaneous material and labor as required for a complete and operating system as described by these plans and specifications. All equipment and materials shall be installed in accordance with all local, state, and national codes and recommendations of the manufacturers. If there is a conflict in the above requirements, the more stringent shall be used. The contractor shall obtain and pay for all permits, fees, and inspections necessary to complete their work under this contract. Prior to bidding, the contractor shall visit the site to familiarize themselves with existing conditions and resolve any conflicts between existing conditions and these plans with the engineer. All ductwork and equipment shown on these drawings is strictly diagrammatic. All ductwork sizes shown are free area sizes. It shall be the responsibility of the contractor to ensure that items furnished under this contract will fit in the space available. The contractor shall make necessary field measurements to ascertain space requirements, including those for connections, and shall provide such sizes and shapes of equipment that are the true intent and meaning of these drawings and specifications. Any conflicts shall be resolved with the engineer. Prior to construction, the contractor shall coordinate their work with all other trades. All drawings indicate the general arrangement desired. The exact locations and details of construction may be such that variances are required. The drawings do not show all bends, offsets, and fittings that may be required for the complete execution of this contract. Such variances and contingencies shall be allowed for in the contractor's bid and shall be accomplished without additional cost to the owner. Prior to ordering equipment, the contractor shall prepare coordination drawings showing how their equipment is to be located in the space indicated. This drawing shall show the new and existing work of all other trades. The contractor shall contact the other contractors involved for dimensions, locations, and required clearances of the equipment they intend to provide for this job. The aforementioned coordination drawings shall be submitted to the engineer for approval. Do not scale these drawings. Refer to the architectural plans for dimensions. All equipment shall be located and installed to provide maximum space for maintenance and service. All materials used shall be new and free of defects. Where trade names are mentioned, they are given as an equivalent where applicable. Other makes may be used if approved in writing by the engineer. Provide a complete list of materials and equipment proposed for use in this contract to the engineer within ten days following the award of contract. If such list is not submitted, the contractor shall supply the materials and equipment specified or as directed by the engineer. The contractor shall provide digital copies of submittals to the engineer for review and approval prior to ordering equipment. Workmanship shall be first-class and performed by experienced and skilled craftsmen. Coordinate exact location of all diffusers/grilles with lights, sprinkler heads, and other ceiling mounted devices. See the reflected ceiling plan. Upon completion of the work, a certified test and balance shall be performed in accordance with "AABC" requirements. Furnish a final copy of all testing, adjusting, and balancing reports as a part of the operating and maintenance manuals. Indicate deficiencies preventing proper testing, adjusting, and balancing of systems and equipment to achieve specified performance. Adjust air handling systems to within plus or minus 10 percent of design. Adjust total air to all air outlets and inlets to within plus 10 percent and minus 5 percent of design to space. Adjust individual outlets and inlets in space to within plus or minus 10 percent of design. Final air balance of space outside air intake versus exhaust when all air handling units, fans, and hoods are operating simultaneously shall be zero to plus 10% of "Air Balance" calculation in order to provide positive pressurization of space. Adjust air handling and distribution systems to obtain required or design supply, return, and exhaust air quantities. Measure air quantities at air inlets and outlets. Vary total system air quantities by adjustment of fan speeds. Provide sheave drive changes to vary fan speed if required. Vary branch air quantities by damper regulation. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across fan. Make allowances for 50 percent loading of filters. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions. At modulating damper locations, take measurements and balance at extreme conditions. As applicable, the contractor shall verify the operation of all existing mechanical equipment in the area of work. All measurements shall be recorded necessary to ascertain the proper operation of the equipment including, but not limited to, amperage, gpm flow, inlet and outlet temperatures, airflow, and inlet and outlet static pressures. Any deficiency in the rated output of the equipment shall be reported to the engineer. In any case, said report shall be submitted to the engineer upon request. All equipment shall be provided with permanent labels for identification. All pipe shall be labeled to indicate pipe function and direction of flow. Provide valve tags for all valves. Coordinate nomenclature and numbering with owner prior to installation. The contractor shall furnish a bound set of operating and maintenance instructions for all equipment to the owner upon completion of project. The contractor shall, at the completion of the work, clean, polish, and/or wash all exposed items of materials, equipment, and fixtures in their contract to leave such items bright and clean. The contractor shall keep the premises clear of debris from their work during construction and leave the area and building clean at completion of the contract. Mechanical and electrical equipment shall operate without objectionable noise or vibration, as determined by the engineer. If such objectionable noise or vibration should be produced and transmitted to occupied portions of the building, the contractor shall make the necessary changes to correct the noise or vibration without additional cost to the owner. The contractor shall provide a complete 1-year warranty on all labor and materials under this contract. Refrigeration compressors provided under this contract shall carry the manufacturer's published 5-year non-prorated warranty. The electrical contractor shall be responsible for all power connections to the equipment provided under this contract. The mechanical contractor shall be responsible for all control wiring for their equipment. Outside air intakes shall be located a minimum of 10 feet from all exhaust discharge and plumbing vents. Replace all filters just prior to acceptance by the owner. Contractors and sub-contractors shall carefully review the construction documents. Information regarding the complete work is dispersed throughout the document set and cannot be accurately determined without reference to the complete document sets. Route refrigerant lines from outdoor condensing units in the most direct path to the air handler. Insulate with foam insulation. Provide long line refrigeration kit as required. Provide an auxiliary drain pan for any air conditioning equipment. Provide the auxiliary drain pan with a float switch that stops the fan upon accumulation of condensate in the pan. Locate all equipment above the ceiling so that adequate slope is provided for all drain lines. If a condensate pump is specified, extend the auxiliary drain pan under the condensate pump. Condensate drain lines in return air plenums shall be made of type "K" copper pipe. Insulate drain lines to prevent sweating. Route condensate drains as directed on plans. 	<p>Materials and Equipment:</p> <p>Ductwork:</p> <ul style="list-style-type: none"> All sheet metal ductwork, unless otherwise specified, shall be constructed of galvanized steel sheets in accordance with SMACNA gages and standards. Duct shall be constructed for 1" static pressure and sealed to SMACNA Classification "B". Insulate all ductwork, unless otherwise noted, with foil-faced 1 psf density fiberglass duct wrap. Insulation R-value shall be per the 2018 NC Energy Conservation Code. For packaged equipment, line the supply and return duct to five feet beyond first elbow downstream of the discharge and intake of the unit. Duct liner shall be 1" thick, 1.5 pound density acoustical liner. <p>Flexible Duct:</p> <ul style="list-style-type: none"> Shall be insulated, sound attenuating, low velocity type, and shall comply with NFPA 90A and 90B. Flexible duct shall bear the UL Class 1 air duct label as tested under UL 181. Flexible duct shall be factory-formed, composed of spiral wound corrosion resistant wire bonded to an inner fabric liner. Duct shall be factory insulated with a foil vapor barrier jacket. Insulation R-value shall be per 2018 NC Energy Conservation Code. The installation of flex duct shall conform to the requirements of Chapter 3 of the SMACNA HVAC Duct Construction Standards, (latest edition). Bends in flexible duct shall not be less than two duct diameters centerline radius and bends shall not begin within three inches of a sheet metal connection. Duct shall not be compressed. Support duct from the structure at intervals not to exceed ten feet. Maximum permissible sag is 1/2 inch per foot of spacing between supports. Hanger or saddle material in contact with the duct shall be wide enough so that it does not reduce the internal diameter of the duct when the supported section rests on the support and in no case shall be less than 1" wide. <p>Duct Elbows:</p> <ul style="list-style-type: none"> Use full-radius elbows or square bends with turning vanes. <p>System Balancing:</p> <ul style="list-style-type: none"> Provide locking quadrant type manual volume damper at each flexible duct runout. Provide splitter dampers at supply tees and extractors at all supply air branches. Provide balancing dampers in all ducts where required for system balancing as shown or as required. <p>Air Distribution:</p> <ul style="list-style-type: none"> Provide all grilles, registers, and diffusers per the schedule on the drawings. Provide support from the structure for each diffuser and damper installed in a lay-in ceiling. Linear slot diffusers shall be constructed so that each slot may be independently configured to insure a full 180° air control pattern. The contractor shall coordinate finish styles and colors with the architect prior to ordering equipment. The backs of all air distribution shall be insulated from unconditioned space. <p>Fire Dampers:</p> <ul style="list-style-type: none"> The contractor shall provide fire dampers at all duct penetrations of rated walls as indicated on the drawings or where required by the authority having jurisdiction. Fire dampers shall be UL labeled, Style "B" curtain type, and dynamically rated with integral factory sleeve. Blades shall be located out of the airstream for minimum airflow restriction. Installation shall be in accordance with the SMACNA Fire, Smoke and Radiation Damper Installation Guide for HVAC, (latest edition). Provide suitable access door for testing and servicing damper mechanism. Prior to completion of job, the contractor shall test each damper for proper operation and make adjustments as necessary. <p>Flexible Duct Connections:</p> <ul style="list-style-type: none"> Furnish and install flexible duct connectors on supply and return connections of all air handling units. <p>Escutcheons:</p> <ul style="list-style-type: none"> Furnish and install escutcheons in all places where piping or mechanical equipment penetrates a finished wall or ceiling in an exposed location. <p>Smoke Detectors:</p> <ul style="list-style-type: none"> The Mechanical Contractor shall provide smoke detectors per the 2018 NC Mechanical Code, Section 606.2.1. Smoke detectors shall be UL listed for duct installation and be located in the return airstream to shut down the supply air fan upon activation. The system shall be wired so that the fan immediately shuts down upon a signal from the detector and bypasses any built-in time delays. The mechanical contractor shall furnish, install, and wire all smoke detectors per the manufacturer's recommendations. The smoke detectors shall be capable of interconnectability for multi-fan shut down and shall be wired so that activation of any detector will shut down all supply air fans on the project. Each detector shall be provided with a visible and audible signal located to indicate general location of smoke origins per the NC Mechanical Code, Section 606. Each detector shall also be provided with a trouble signal and shall be labeled. <p>Access Panels:</p> <ul style="list-style-type: none"> The Mechanical Contractor shall provide access panels as required for access to valves, dampers, controls, or any other item installed under this contract where such item is concealed behind construction which renders the item inaccessible for service or adjustment. Said access panels or doors shall be fire rated as necessary to maintain the integrity of the construction wherein the panel or door is installed. <p>HVAC Equipment:</p> <ul style="list-style-type: none"> All equipment shall bear the UL, CSA, met or other accredited testing laboratory label where appropriate. All equipment shall conform to the type, size, rating, and performance of that listed on the drawings under this contract. Submit shop drawings per the specifications. <p>Control Wiring:</p> <ul style="list-style-type: none"> All control wiring shall be run in a metallic raceway. Raceway shall be routed parallel and perpendicular with the building structure. The metallic raceway may be omitted where plenum-rated cable is installed above an accessible ceiling within the building envelope. There shall be no splices in the control system wiring other than at terminal blocks. Wire nuts and crimp splices are not permitted. <p>Gas Piping:</p> <ul style="list-style-type: none"> All gas piping shall be installed by the mechanical contractor. Gas pipe shall be Schedule 40 black steel, provide all valves, fittings, and controls as required by local, state, and national codes or by manufacturer's written recommendations for a complete and operational system. <p>Refrigerant Piping:</p> <ul style="list-style-type: none"> All refrigerant piping shall be copper, sized per HVAC equipment manufacturer's recommendations, all piping shall be insulated per 2018 NC Energy Conservation Code. All insulated piping exposed to weather shall be coated with Armalex "WVB" finish or equivalent. Piping installed subject to being damaged shall be provided with UV-resistant PVC jacket.

Air Balance				
Equipment Mark	Supply	Exhaust	Net	Remarks
KH-1	3200	4000	-800	1
EF-1	0	70	-70	1
EF-2	0	70	-70	1
AHU-1	490	0	+490	1
AHU-2	395	0	+395	1
AHU-3	255	0	+255	1
Total	4340	4140	+200	

- Refer to "Mechanical Notes and Specifications" for air balancing tolerances.

Rooftop Equipment Structural Notes:

- The Structural Engineer shall be responsible for verifying that existing building structure can accommodate the weight of the new and existing rooftop equipment. The Mechanical Contractor shall be responsible for providing a dimensioned equipment location plan along with final weights to the General Contractor. All coordination and verification shall take place prior to ordering equipment. Refer to the structural drawings for exact unit locations and bracing. All bracing and structural support shall be provided by the General Contractor.

Additional Efficiency Compliance:

This project is complying with Section C406 of the 2018 NC Energy Conservation Code under the provisions of Section C406.1, Option 2. The remaining provisions are therefore not required and have not been included in this design.

Statement of System Commissioning:

An onsite system installation compliance review shall be conducted by a registered design professional prior to final inspection and issuance of the Certificate of Occupancy. The mechanical contractor shall make appropriate personnel available during the design professional's onsite inspection to assist with review, as well as additional equipment and controls testing. The contractor shall schedule the onsite inspection with the design professional a minimum of one week prior to the visit. At the time of the visit the mechanical contractor shall provide the following for review by the local AHJ and design professional:

- Completed test and balance report.
- Copy of all operation and maintenance manuals.
- Documentation that the equipment installer has followed the manufacturer's recommendations for startup and testing of all equipment.

Mechanical Systems and Equipment:

Method of Compliance:	Prescriptive
Climate Zone:	4A
Exterior Design Conditions:	
Winter Dry Bulb:	16°F
Summer Dry Bulb:	93°F
Interior Design Conditions:	
Winter Dry Bulb:	70°F
Summer Dry Bulb:	75°F
Relative Humidity:	50%
Calculated Space Loads:	
Heating Load:	70,200 BTUH
Cooling Load:	164,000 BTUH
Space Conditioning System:	
Unitary:	The space is served by three new split-system heat pumps with auxiliary electric heat for conditioning and space ventilation.
Boiler:	Not applicable to this project.
Chiller:	Not applicable to this project.
Equipment Efficiencies:	
Refer to mechanical schedules within drawings for efficiencies.	
Equipment Schedules with Motors:	
Multi-speed motors are used on this project and are included in the efficiency rating of the equipment. See drawings for efficiencies.	
Designer Statement:	
To the best of my knowledge and belief, the design of this project complies with the mechanical system and equipment requirements of the 2018 NC Mechanical Code.	

Marks	
AHU	Air Handling Unit
EF	Exhaust Fan
FF	Air Curtain Fly Fan
GWH	Gas Water Heater
H	Heat Pump
KEF	Kitchen Exhaust Fan
KH	Kitchen Hood
KSF	Kitchen Supply Fan
V	Gravity Ventilator

HVAC Sequence of Operation:

- The mechanical contractor shall provide a training session with the owner prior to the completion of the project. The contractor shall discuss the general operation of the system, location of all control devices, and necessary routine maintenance. The sequence of operation shall be discussed in depth.
- The split-system heat pumps, AHU/HP-1, AHU/HP-2, and AHU/HP-3 shall be controlled by individual wall-mounted thermostats with remote sensors. The systems shall stage on cooling and heating as required to satisfy the space temperature setpoint.
- Kitchen Hood #1 shall be interlocked with KEF-1, KSF-1, and the supply fan for AHU-1, AHU-2, & AHU-3, and operated by a hood mounted switch.

Kitchen Hood Notes:

- All work associated with the kitchen exhaust hoods shall be the responsibility of the Mechanical Contractor.
- Kitchen hood and grease duct shall comply with NFPA 96, NC State Building Codes and the local authority having jurisdiction. Kitchen hoods shall be tested in accordance with UL 710 and listed, labeled, and installed per Section 506 of the 2018 NC Mechanical Code.
- All grease duct shall be 16 gage welded steel or 18 gage stainless steel and shall be made liquid tight.
- Slope grease duct at 1/4" per foot towards the hood or towards an approved grease reservoir. Where horizontal ducts exceed 75 feet in length, the slope shall not be less than 1" per foot.
- Grease duct velocity shall not be less than 500 fpm.
- Maintain minimum of 18" clearance between a Type 1 hood and combustible materials. Clearances may be reduced if all requirements of Section 507.9 of the 2018 NC Mechanical Code are met.
- Maintain a minimum of 18" clearance between grease duct and combustible materials. Clearances may be reduced if grease duct is provided with a listed, rated enclosure installed in accordance with Section 304.1 of the 2018 NC Mechanical Code. Rated enclosure material shall be "3M Fire Barrier Duct Wrap 0.154" listed and approved for 2 hour fire resistance or equivalent. Install wrap per manufacturer's instructions. See detail. As an alternate, UL listed pre-manufactured round double-wall grease duct with 0" clearance, may be utilized.
- Provide cleanouts at each change in direction not accessible from the duct inlet or the discharge. Provide cleanouts at a minimum of every 20'.
- Grease ducts shall be constructed of metal of equal or greater thickness than that of the ducts, provided with a substantial method of latching to make them grease-tight. Cleanouts shall be designed so that they may be opened without tools and shall be labeled "Access Panel - Do Not Obstruct".
- Ductwork shall be supported per SMACNA Standards and at every change in direction. Supports shall not penetrate ductwork or plenum.
- If rated enclosure is required, provide rated access doors equal in fire resistance to that of the enclosure to gain access to the cleanouts.
- Exhaust fans shall discharge a minimum of 40 inches above the roof and 10 feet from any intake.
- Fire suppression system shall have an Automon release assembly which activates extinguishing system, shuts down heating/cooling equipment, and fuel supplies to equipment under the hood.
- Provide remote manual pull station for fire suppression system. Installation and location of pull station shall comply with all requirements of Section 509.1 of the 2018 NC Mechanical Code and the local authority having jurisdiction.
- A performance test shall be conducted upon completion and before final approval of the kitchen hood ventilation system. The test shall verify the rate of airflow and proper operation and shall be conducted in accordance with Section 507.16.1 of the 2018 NC Mechanical Code and the local authority having jurisdiction.

General Notes:

- The contractor shall comply with all requirements of the 2018 NC Mechanical Code with regards to all mechanical work.
- The Mechanical Contractor shall coordinate the installation of all equipment, piping, and ductwork under this contract with the building structure. Contractor shall make adjustments where necessary without additional cost to owner.
- Coordinate all supply, return, and exhaust grille locations with architectural reflected ceiling plan.
- Where ducts and/or equipment are shown crossing, the larger duct or equipment shall take precedence. The contractor must provide transitions so that the smaller of the ducts is routed up and over the top of larger ducts. Ducts that are required to be sloped at a given rate take precedence over all others.
- All roof mounted equipment shall be located a minimum of 6 feet from the roof edge. Coordinate all roof work with owner prior to construction.
- Verify that all new thermostat locations are acceptable to owner/tenant prior to construction.
- Insulate all new supply air ductwork with exterior duct wrap.
- The existing building is less than 16'-0" in height. No permanent means of roof access is required.

Roof Ventilator Schedule										
Mark	Manufacturer	Model	Size	Service	Airflow (CFM)	Throat Area (Sq. Ft.)	Max. P.D. (in. W.G.)	Damper Type	Weight (LBS)	Remarks
V-1	Loren Cook	PR	8	Exhaust	140	0.394	0.1	None	30	1
V-2	Loren Cook	PR	12	Intake	490	0.852	0.1	Barometric	40	1,2
V-3	Loren Cook	PR	12	Intake	395	0.852	0.1	Barometric	40	1,2
V-4	Loren Cook	PR	8	Intake	255	0.394	0.1	Barometric	30	1,2

- Ventilator shall be spun aluminum construction. Provide with roof curb and birdscreen.
- Provide barometric damper with counterbalance.

Air Distribution Schedule							
Mark	Manufacturer	Model	Description	Panel Size	Type	Neck Size	Remarks
SA1	Titus	TMS	Steel, High Performance, Full Face, Stamped Square, 4-Way	24x24	Lay-in	6"Ø	1,5
SA2	Titus	TMS	Steel, High Performance, Full Face, Stamped Square, 4-Way	24x24	Lay-in	8"Ø	1,5
SB1	Titus	TMS-AA	Aluminum, High Performance, Full Face, Stamped Square, 4-Way	24x24	Lay-in	6"Ø	1,5
SB2	Titus	TMS-AA	Aluminum, High Performance, Full Face, Stamped Square, 4-Way	24x24	Lay-in	8"Ø	1,5
SC1	Titus	PAR-AA	Aluminum, Perforated, Duct Collar, No Deflectors	24x24	Lay-in	10"Ø	1,5
SD1	Titus	ML-39	Linear Slot, Accessory Insulated Plenum, Ice Tong Controller, 2 - 1" Slots	24" Long	Surface Mount	8"Ø	1,3
SE1	Titus	300RS	Steel, Double Deflection, Short Front Blades, 3/4" Blade Spacing	NA	Duct Mount	14x6	1,4
RA1	Titus	PAR	Steel, Perforated, Duct Collar	24x24	Lay-in	10"Ø	1,5
RA2	Titus	PAR	Steel, Perforated, Duct Collar	24x24	Lay-in	14"Ø	1,5
RB1	Titus	PAR-AA	Aluminum, Perforated, Duct Collar	24x24	Lay-in	14"Ø	1,5
RC1	Titus	350RL	Steel, 35° Deflection, 3/4" Blade Spacing, Parallel to Long Dimension	NA	Surface Mount	30x16	1,2,4

- Verify all ceiling and wall types with architectural plans. Coordinate color with Architect.
- Provide with square-to-round transition as required.
- Provide with concealed mounting frame and flanged end caps.
- All wall or duct mounted diffusers/grilles shall be painted to match surrounding surface. Coordinate painting with General Contractor.
- Provide diffuser/grille with foil faced back pan insulation.

Split System Heat Pump Schedule												
Mark	Manufacturer	Tonnage	Model	Cooling (MBH)	Heating (MBH)	Minimum SEER/SEER2	Minimum HSPF/HSPF2	Volt/Ph	MCA	MOCP	Weight (LBS)	Remarks
HP-1	Trane	5.0	4TWR4060N1	54.5	52.0	15.0/14.3	8.8/7.5	230/1	32.0	50	251	1,2,3,4,5
HP-2	Trane	4.0	4TWR4048N1	46.5	44.0	15.0/14.3	8.8/7.5	230/1	26.0	40	250	1,2,3,4,5
HP-3	Trane	4.0	4TWR4048N1	46.5	44.0	15.0/14.3	8.8/7.5	230/1	26.0	40	250	1,2,3,4,5

- Cooling capacity based on indoor entering air condition of 80°F dry bulb, 67°F wet bulb and outdoor air condition of 95°F dry bulb. Heating capacity based on indoor entering air condition of 70°F dry bulb and outdoor air condition of 47°F dry bulb.
- Standard unit features shall include filter drier, front seating service valves, internal pressure relief valve, internal thermal overload, suction line accumulator, high pressure switch, and loss of charge switch.
- Accessory unit features shall include: compressor start assist, crankcase heater, thermostatic expansion valve, and time delay relay.
- Provide unit with all accessories required for low ambient control to 0°F including evaporator freeze thermostat, isolation relay and low ambient pressure switch.
- Refrigerant lines shall be sized and approved by the equipment manufacturer based upon field measured piping lengths. Mechanical contractor shall provide lengths, bends, and routing to manufacturer for proper pipe sizing. Provide all of the manufacturer's recommended components. Piping shall be sized so that maximum capacity loss due to line length is 3%. All piping shall be hard copper pipe.

Split System Air Handling Unit Schedule													
Mark	Manufacturer	Model	SA (CFM)	OA (CFM)	ESP (in. W.G.)	Fan (HP)	Heat (KW)	Heat Stages	Volt/Ph	MCA	MOCP	Weight (LBS)	Remarks
AHU-1	Trane	TEMAADC60	1750	490	0.5	3/4	9.6	1	230/1	58.0	60	138	1,2,3,4
AHU-2	Trane	TEMAADC48	1400	395	0.5	3/4	9.6	1	230/1	58.0	60	138	1,2,3,4
AHU-3	Trane	TEMAADC48	1600	255	0.5	3/4	9.6	1	230/1	58.0	60	138	1,2,3,4

- Provide air handling unit with factory installed electric heater, filter rack, disconnect switch, and single point wiring connection.
- Provide unit with manufacturer's touchscreen display, 7-day programmable thermostat with dehumidification sequence and remote wireless temperature sensor to allow central location in back office for thermostat installation.
- Provide unit with auxiliary drain pan and float switch.
- Fan shall shut down upon smoke alarm. Mechanical contractor shall provide duct mounted smoke detector. Controls, including audible and visible alarms, shall be provided by the mechanical contractor.

Fan Schedule												
Mark	Manufacturer	Model	Service	Type	Airflow (CFM)	ESP (in. W.G.)	Motor Size	RPM	Drive	Volt/Ph	Weight (LBS)	Remarks
FF-1	Awoco	FM1509SA1	Kitchen Service Door	Air Curtain	1177	-	300 W	-	Direct	120/1	42	1,6
EF-1	Loren Cook	GC-146	Restroom	Ceiling Cabinet	70	0.25	35 W	900	Direct	120/1	12	2,3
EF-2	Loren Cook	GC-146	Restroom	Ceiling Cabinet	70	0.25	35 W	900	Direct	120/1	12	2,3
KEF-1	Accurex	XCUBE-180-15	KH-1: Exhaust	Refer to "Kitchen Hood Details" drawings for additional information								4,5
KSF-1	Accurex	SKSFB-112-H15-01	KH-1: Supply	Refer to "Kitchen Hood Details" drawings for additional information								4,5

- Fan to be controlled by magnetic-switch and necessary accessories of automatic On/Off operation when door is Open/Closed. Switch shall be furnished by Owner and installed by Mechanical Contractor. All power wiring by Electrical Contractor.
- Provide fan with fan speed controller, backdraft damper, polystyrene grille, and hanging isolator kit to support fan from structure.
- Fan to be controlled by wall switch provided by Electrical Contractor.
- Fan to be furnished by Kitchen Equipment Vendor and installed by Mechanical Contractor. See "Kitchen Hood Details" drawings for additional information and specifications.
- Fan shall be provided with manufacturer's roof curb suitable for use on existing standing seam metal roof.
- Fan to be furnished by Tenant/Owner and installed by Mechanical Contractor.

A Tenant Alteration for
HARVEY JOHNS STEAKHOUSE
1501 N. Raleigh Street, Suite G
Angler, NC

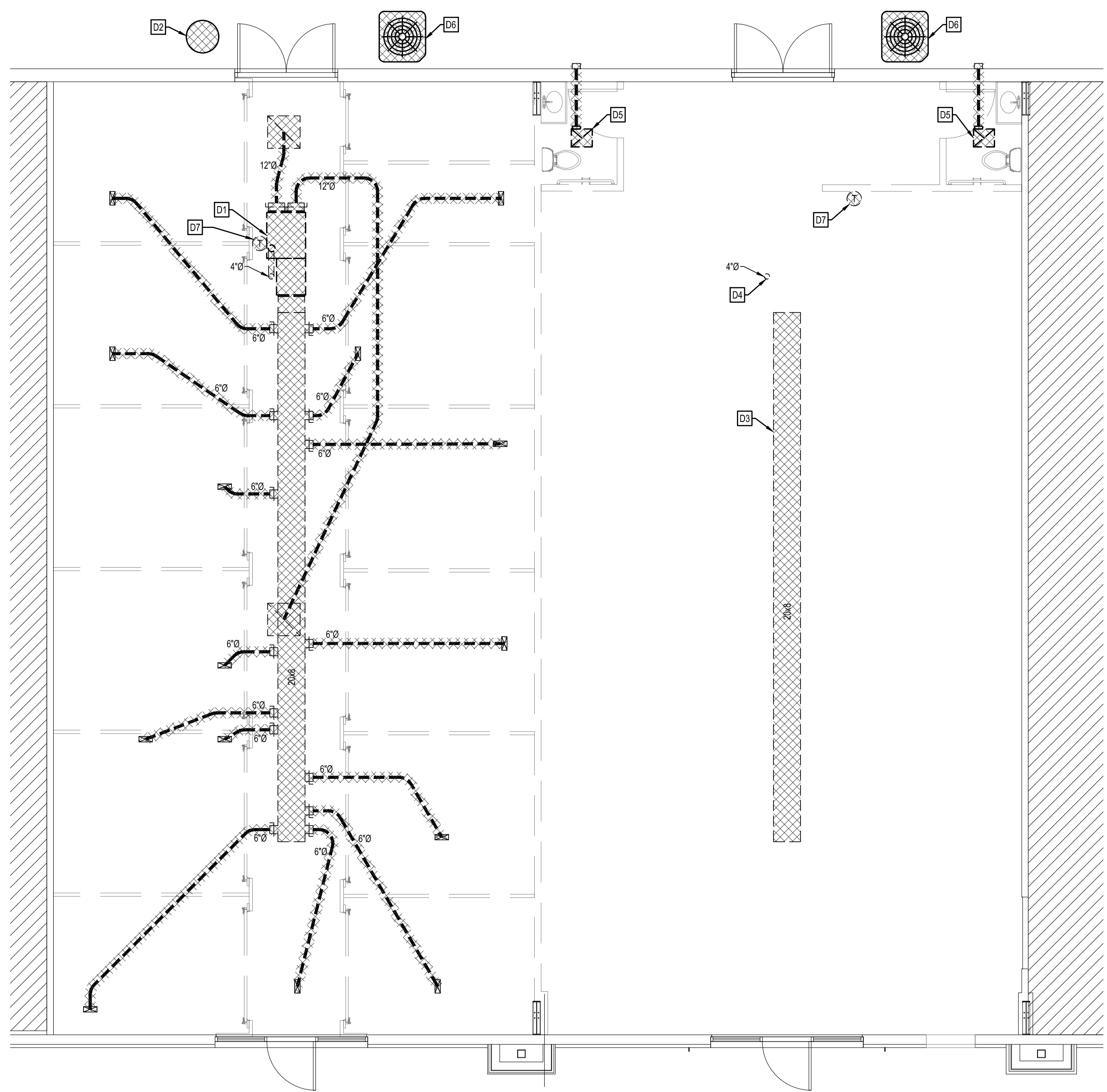
JOB #:
23HARVEYJOHNS

DWG BY:
CHK BY:
DATE: 07/28/23
REV NO DATE

FLOOR PLAN -
MECHANICAL
DEMOLITION

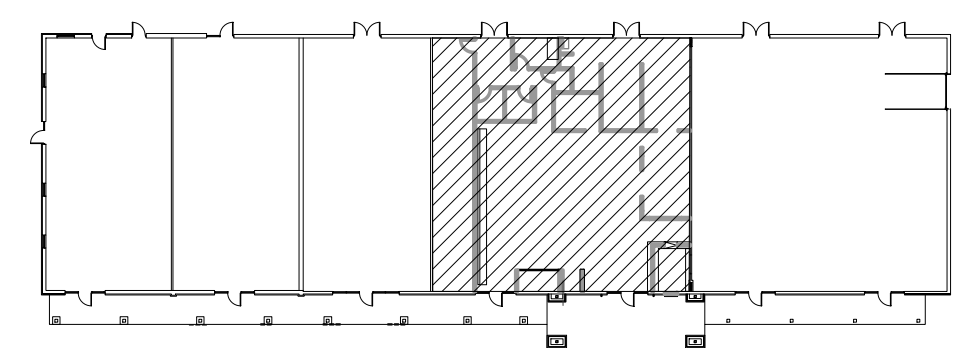
SHEET NUMBER

M-3



1 Floor Plan - Mechanical Demolition
Scale: 3/16" = 1' - 0"

- D4 Demolition Plan Notes:**
- Demolish gas furnace and all associated ductwork, diffusers, propane piping, and flue duct through roof. Coordinate patching of any remaining openings in walls/roof with the general contractor.
 - Coordinate removal of the propane tanks with the propane supplier.
 - Demolish abandoned ductwork.
 - Demolish flue duct through roof. Coordinate patching of remaining opening in roof with the general contractor.
 - Demolish ceiling mounted exhaust fan, duct, and wall cap. Coordinate patching of remaining opening in wall with the general contractor.
 - Demolish condensing unit.
 - Demolish thermostat.



2 Key Plan
Scale: None

Wall Ratings and Types Legend

See architectural sheets for more information on ratings and additional rated constructions including structure where applicable. Protect all rated constructions as required.

Existing Wall to Remain	_____
New Wall being Constructed	_____
One Hour Fire Barrier	-----
Existing Wall being Demolished	-----



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A Tenant Alteration for
HARVEY JOHNS STEAKHOUSE
1501 N. Raleigh Street, Suite G
Angier, NC

JOB #:
23HARVEYJOHNS

DWG BY:
CHK BY:
DATE: 07/28/23
REV NO DATE

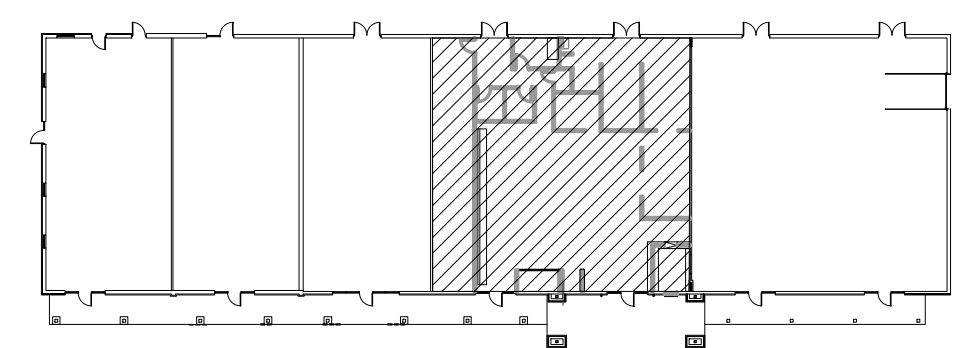
FLOOR &
ROOF PLAN -
MECHANICAL

SHEET NUMBER

M-4

- Roof Plan Notes:**
1. Install roof mounted kitchen exhaust fan per manufacturer's installation instructions and clearances. Maintain 6" from roof edge. Maintain 10' from all outside air intakes. Refer to "Kitchen Hood Details" sheets for additional information.
 2. Install roof mounted kitchen makeup air fan per manufacturer's installation instructions and clearances. Maintain 6" from roof edge. Maintain 10' from all exhaust and plumbing vent discharge locations. Refer to "Kitchen Hood Details" sheets for additional information.
 3. Install roof mounted intake ventilator per manufacturer's installation instructions and clearances. Maintain 10' from all exhaust and plumbing vent discharge locations. Refer to "Roof Mounted Ventilator Detail" for additional information.
 4. Install roof mounted exhaust ventilator per manufacturer's installation instructions and clearances. Maintain 10' from all outside air intake locations. Refer to "Roof Mounted Ventilator Detail" for additional information.

- Floor Plan Notes:**
1. Install air handling unit above ceiling per manufacturer's installation instructions and clearances. Provide return duct the same size as the unit connection. Unit shall be suspended from structure above. Gravity drain condensate to landscaping at rear of building. Refer to "Air Handling Unit Hanging Detail" for additional information.
 2. Manufacturer's recommended service clearances.
 3. Install ceiling mounted exhaust fan per manufacturer's installation instructions and clearances.
 4. Route common exhaust duct up to roof mounted gravity ventilator. Transition duct to ventilator connection as required.
 5. Route outside air duct with manual balancing damper from top of return duct up through roof, sized as indicated, to roof mounted gravity intake ventilator. Transition duct to ventilator connection as required.
 6. Install grille high in wall to the deck with louvers facing upward to prevent line of sight into duct. Coordinate painting of grille with General Contractor to match wall.
 7. Install heat pump on concrete housekeeping pad per manufacturer's installation instructions and clearances. Route refrigerant piping down exterior wall with vinyl/mineral shroud to prevent damage. Refer to "Heat Pump Mounting Detail" for additional information.
 8. Install air curtain above door per manufacturer's installation instructions and clearances. Adjacent door shall remain locked.
 9. Install adjustable thermostats for AHUs 1-3 within Office, coordinate the exact location with the general contractor. Align thermostats vertically on wall. Thermostats are to be connected to associated air handling unit temperature sensors.
 10. Install kitchen hood per manufacturer's installation instructions and clearances. Coordinate hanging of hood with General Contractor. Refer to "Kitchen Hood Details" sheets for additional information.
 11. Route grease duct up from exhaust collar on hood, sized as indicated, and connect to roof mounted fan. Transition to fan connection as required. All grease ducts shall be 16 gauge welded steel rectangular duct with two layers of fire wrap insulation. Refer to "Grease Duct Fabrication Detail" for additional information.
 12. Route kitchen hood makeup air supply duct down from roof mounted kitchen supply fan. Size duct as indicated and transition to fan connection as required.
 13. Route kitchen hood makeup air supply duct over hood connections as indicated. Provide duct tap with opposed blade balancing damper off bottom of duct, the same size as each hood connection. Balance airflows as indicated.
 14. Install wall mounted pull station for kitchen hood fire suppression system. Coordinate exact location with General Contractor and AHJ.
 15. Install duct tight to underside of structural purlins where duct penetrates wall. Both exposed ducts shall be installed at the same height. Continue duct level through dining room. All exposed duct and diffusers shall be painted by General Contractor. All duct mounted diffusers shall be provided with tapered tap and manual balancing damper.

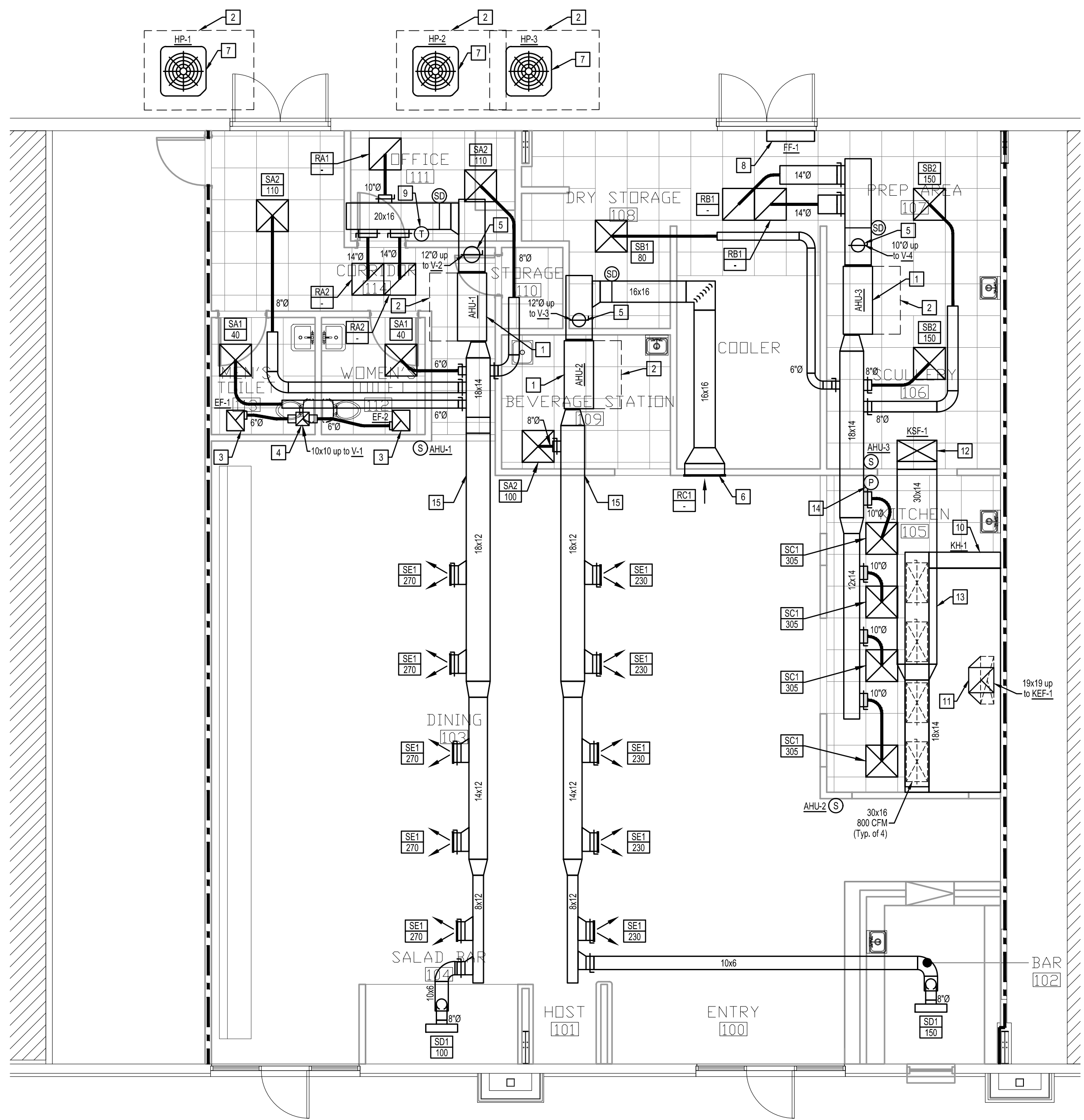


3 Key Plan
Scale: None

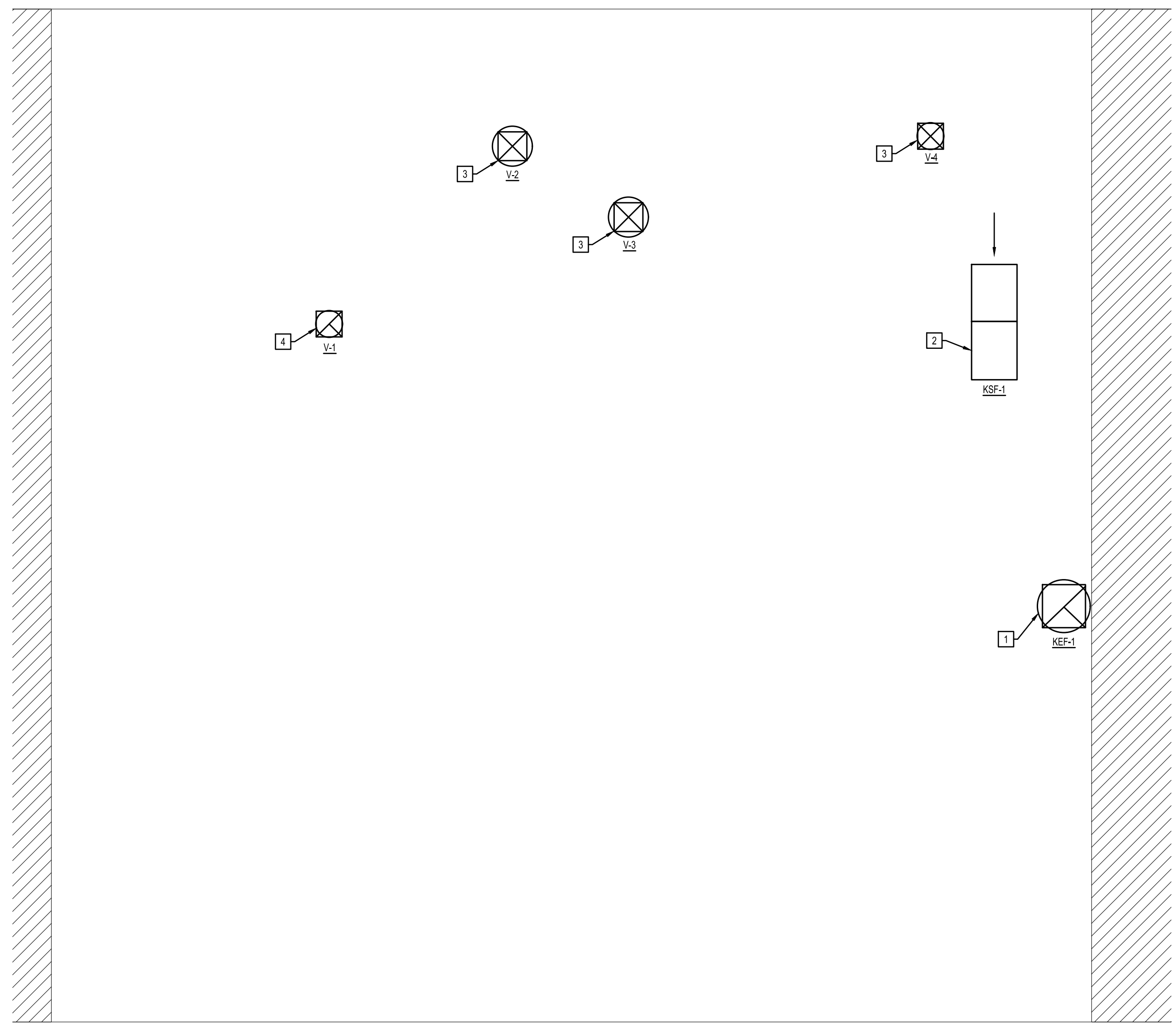
Wall Ratings and Types Legend

See architectural sheets for more information on ratings and additional rated constructions including structure where applicable. Protect all rated constructions as required.

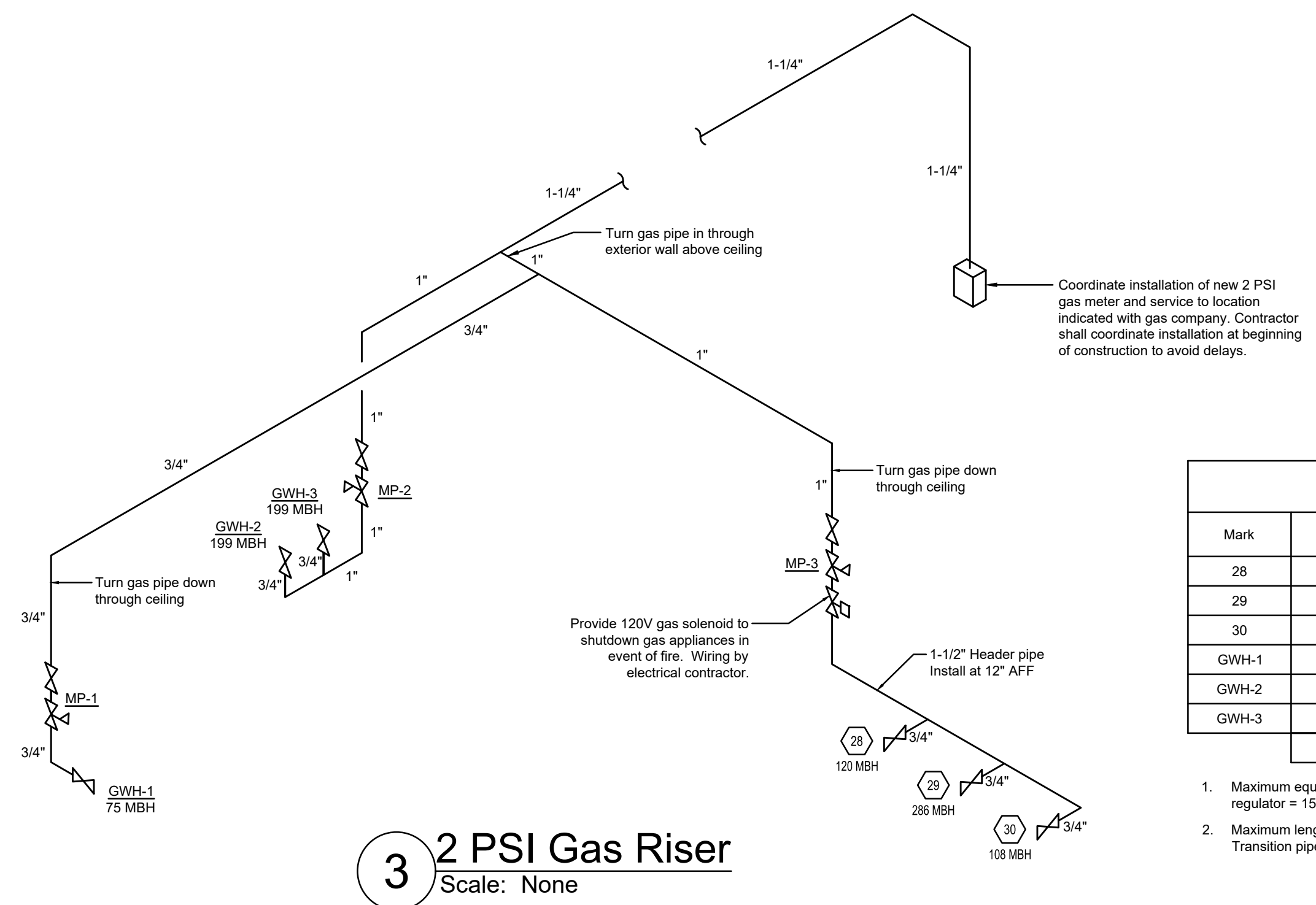
Existing Wall to Remain	—————
New Wall being Constructed	—————
One Hour Fire Barrier	- - - - -
Existing Wall being Demolished	—————



2 Floor Plan - Mechanical
Scale: 3/16" = 1' - 0"



1 Roof Plan - Mechanical
Scale: 3/16" = 1' - 0"



Mark	Equipment Type	BTUH Input	Remarks
28	Charbroiler	120,000	1,2
29	Range	286,000	1,2
30	Convection Oven	108,000	1,2
GWH-1	Water Heater	75,000	1,2
GWH-2	Water Heater	199,000	1,2
GWH-3	Water Heater	199,000	1,2
Total		987,000	

- Maximum equivalent length from the gas meter to the most remote MP regulator = 150'
- Maximum length from any MP regulator to the equipment served = 20'. Transition pipe to equipment inlet as required.

3 2 PSI Gas Riser
Scale: None

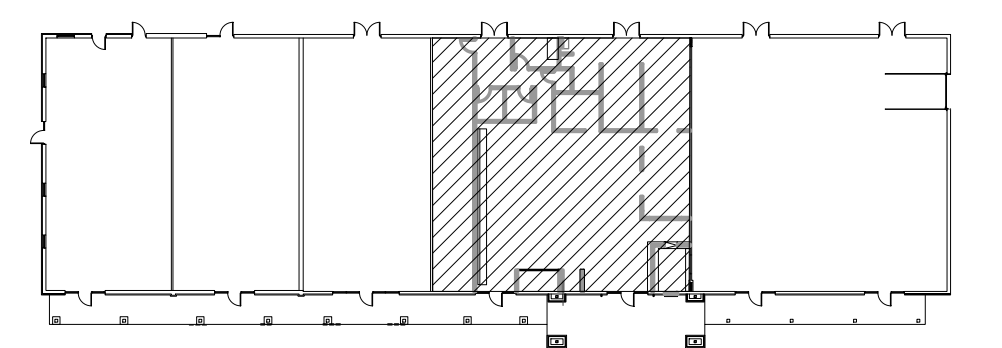
2 PSI Gas Service Notes:

Gas piping sizes upstream of medium pressure (MP) regulators are based on an initial pressure of 2 PSI, a pressure drop of 1 PSI, 0.6 specific gravity gas and Schedule 40 pipe. Sizes are based on Table 402.4(5) of the 2018 NC Fuel Gas Code. Gas piping sizes downstream of MP regulators are based on a low pressure system (< 2 psi), a pressure drop of 0.5" water column, 0.6 specific gravity gas and Schedule 40 pipe. Sizes are based on Table 402.4(2) of the 2018 NC Fuel Gas Code.

- All gas piping shall be installed per the requirements of the 2018 NC Fuel Gas Code and NFPA 54.
- Provide manual shutoff valve for each piece of gas equipment.
- Contractor shall verify gas requirements for each piece of equipment prior to installing gas piping. Confirm equipment with owner.
- Gas piping shall be Schedule 40 ASTM A53 or A120, T&C. Where exposed to weather, paint to prevent corrosion.
- Contractor to verify meter location and maximum line lengths prior to installation. If conditions vary from those shown on the drawings, contact engineer for line sizing.
- A listed shutoff valve shall be installed immediately ahead of each MP regulator.
- MP regulators must be installed and vented in accordance with Section 410 of the 2018 NC fuel gas code. Where MP regulators are specified to be installed indoors, vent limited devices shall be utilized to eliminate requirement for venting to outdoors.
- A test tee fitting shall be installed between the MP regulator and its upstream shutoff valve. A separate test tee fitting shall be installed not less than 10 pipe diameters downstream of the MP regulator outlet. Provide test tee fittings for all new and existing MP regulators.

Natural Gas Plan Notes:

- Coordinate installation of new 2 PSI gas meter and new gas service with gas company at beginning of construction. Route gas pipe up exterior wall and high along rear of building and turn in to building high above ceiling where indicated. Support pipe from wall as required. All exterior gas piping shall be painted to prevent corrosion. Refer to "2 PSI Gas Riser" for all pipe sizing and additional information.
- Continue gas pipe down through ceiling to water heater. Provide shut off valve and vent limiting medium pressure regulator in vertical portion of pipe just below ceiling. Provide shut off valve prior to connection of water heater. Combustion air and venting of water heater shall be provided by the plumbing contractor. Refer to "2 PSI Gas Riser" for all pipe sizing and additional information.
- Route gas pipe down exterior wall to water heaters mounted on wall. Provide shut off valve medium pressure regulator in vertical portion of pipe. Route pipe just below water heaters and provide shut off valve prior to connection of each water heater. Refer to "2 PSI Gas Riser" for all pipe sizing and additional information.
- Continue gas pipe down through ceiling to kitchen equipment below. Provide shut off valve, vent limiting medium pressure regulator, and electric gas solenoid in vertical portion of pipe just below ceiling. Gas solenoid shall shut off natural gas supply in the event the kitchen hood fire suppression system is activated. Continue gas pipe down wall and route pipe along wall behind kitchen equipment at 12" AFF. Support pipe from wall as required. Provide tap(s) and shutoff valve(s) for kitchen equipment as indicated. Coordinate exact locations of kitchen equipment with kitchen equipment vendor and General Contractor.

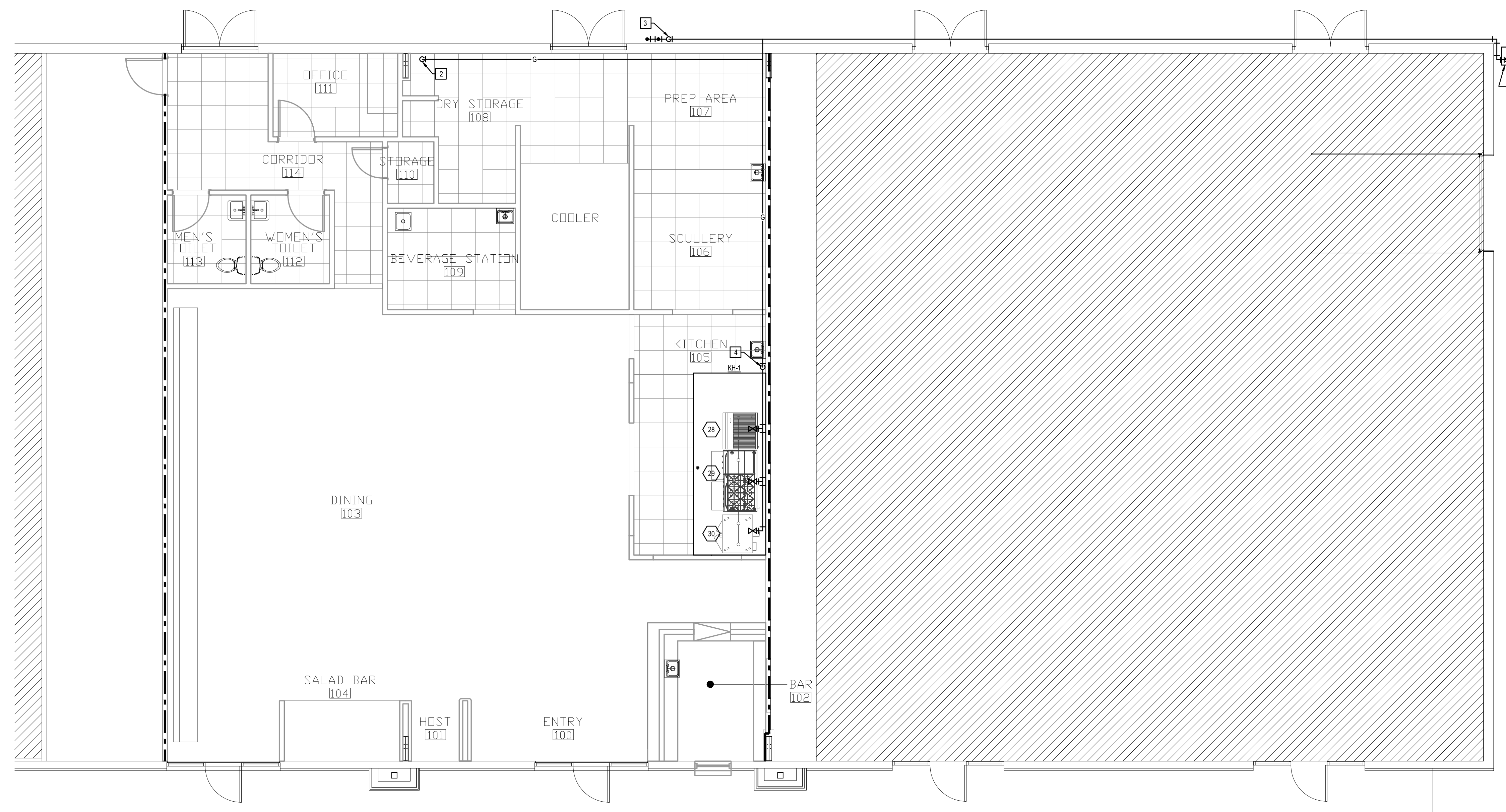


2 Key Plan
Scale: None

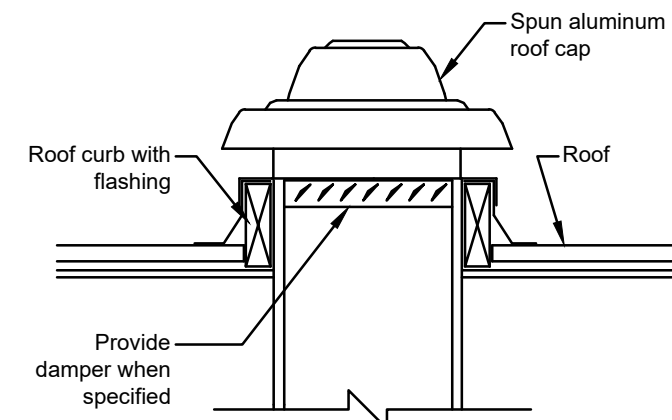
Wall Ratings and Types Legend

See architectural sheets for more information on ratings and additional rated constructions including structure where applicable. Protect all rated constructions as required.

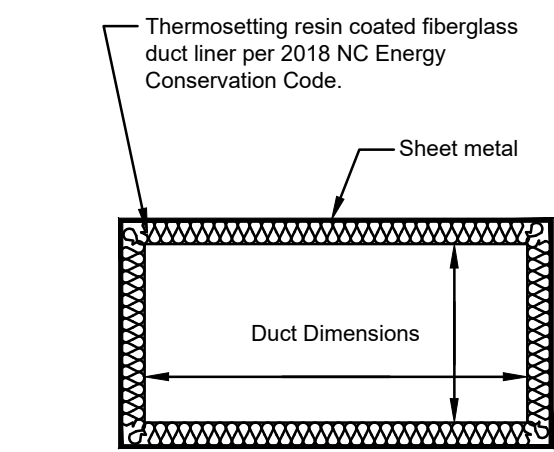
- Existing Wall to Remain
- New Wall being Constructed
- One Hour Fire Barrier
- Existing Wall being Demolished



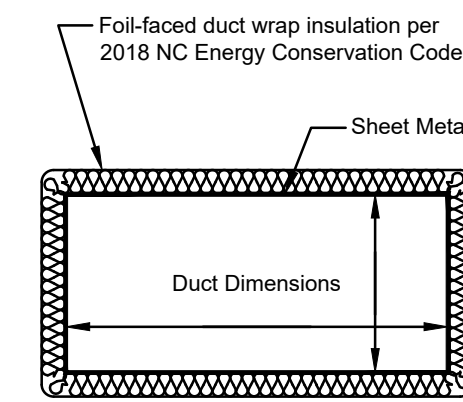
1 Natural Gas Floor Plan - Mechanical
Scale: 3/16" = 1' - 0"



1 Roof Mounted Ventilator Detail
Scale: None



3 Exposed Duct Fabrication Detail
Scale: None



6 Concealed Supply, Return, & Outside Air Duct Fabrication Detail
Scale: None

System No. W-L-1054

ANSI/UL1479 (ASTM E814)	CANULC S115
F Ratings — 1 and 2 Hr (See Items 1 and 3)	F Ratings — 1 and 2 Hr (See Items 1 and 3)
T Rating — 0 Hr	FT Rating — 0 Hr
L Rating (Without Movement) at Ambient — Less Than 1 CFM/sq ft	FH Ratings — 1 and 2 Hr (See Items 1 and 3)
L Rating (Without Movement) at 400°F — Less Than 1 CFM/sq ft	FTH Rating — 0 Hr
M Rating (Movement) — See Table 1	FTH Rating — 0 Hr
	L Rating at Ambient — Less Than 5.1 L/s/m ²
	L Rating at 204°C — Less Than 5.1 L/s/m ²

1. Wall Assembly — The 1 or 2 hr fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. Studs — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 2-1/2 in. (64 mm) wide and spaced max 24 in. (610 mm) OC. For M Rating, steel studs to be min 3-5/8 in. (92 mm) wide. When steel studs are used and the diam of opening exceeds the width of stud cavity, the opening shall be framed on all sides using lengths of steel stud installed between the vertical studs and screw-attached to the steel studs at each end. The framed opening in the wall shall be 4 to 6 in. (102 to 152 mm) wider and 4 to 6 in. (102 to 152 mm) higher than the diam of the penetrating item such that, when the penetrating item is installed in the opening, a 2 to 3 in. (51 to 76 mm) clearance is present between the penetrating item and the framing on all four sides.

B. Gypsum Board — 5/8 in. (16 mm) thick, 4 ft (122 cm) wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 32-1/4 in. (819 mm) for steel stud walls. Max diam of opening is 14-1/2 in. (368 mm) for wood stud walls. The F and FH Ratings of the firestop system are equal to the fire rating of the wall assembly. The M Rating is applicable only to 1 hr rated walls.

2. Through-Penetrants — One metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. The annular space shall be min 0 in. to max 2-1/4 in. (57 mm). Pipe may be installed with continuous point contact. Pipe, conduit or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:

A. Steel Pipe — Nom 30 in. (762 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
 B. Iron Pipe — Nom 30 in. (762 mm) diam (or smaller) cast or ductile iron pipe.
 C. Conduit — Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing or 6 in. (152 mm) diam steel conduit.
 D. Copper Tubing — Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing.
 E. Copper Pipe — Nom 6 in. (152 mm) diam (or smaller) regular (or heavier) copper pipe.

3. Fill, Void or Cavity Material — Sealant — Min 3/8 in. (16 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall. At the point or continuous contact locations between pipe and wall, a min 1/2 in. (13 mm) diam bead of fill material shall be applied at the pipe wall interface on both surfaces of wall.
 HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE MAX Intumescent Sealant

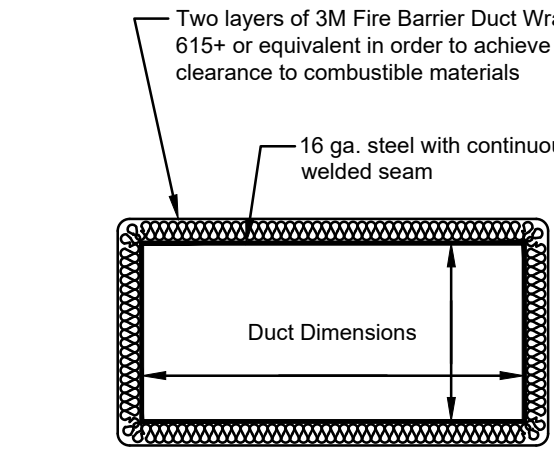
Movement Direction	Penetrant Item	Nominal Penetrant Diameter	Annular Space	Movement	Sealant Depth	F-Rating	L Rating with Movement
Y	2A, 2C*	2 in.	Max 2-1/4 in.	5%	5/8 in.	1 hr	N/A
Z	2A, 2C*	2 in.	2-1/4 in.	0.25 in.	5/8 in.	1 hr	N/A

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

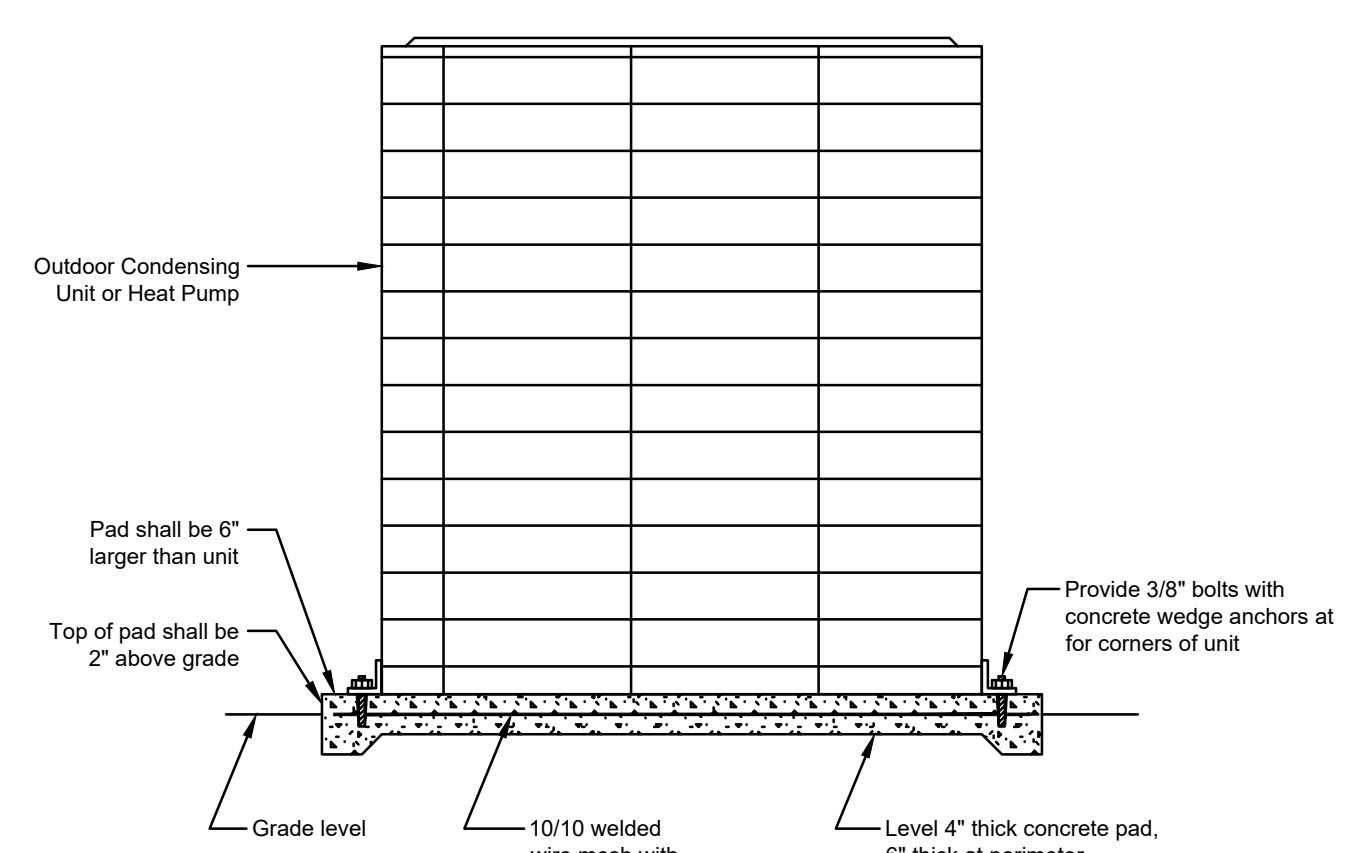
HILTI Firestop Systems

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. January 21, 2020

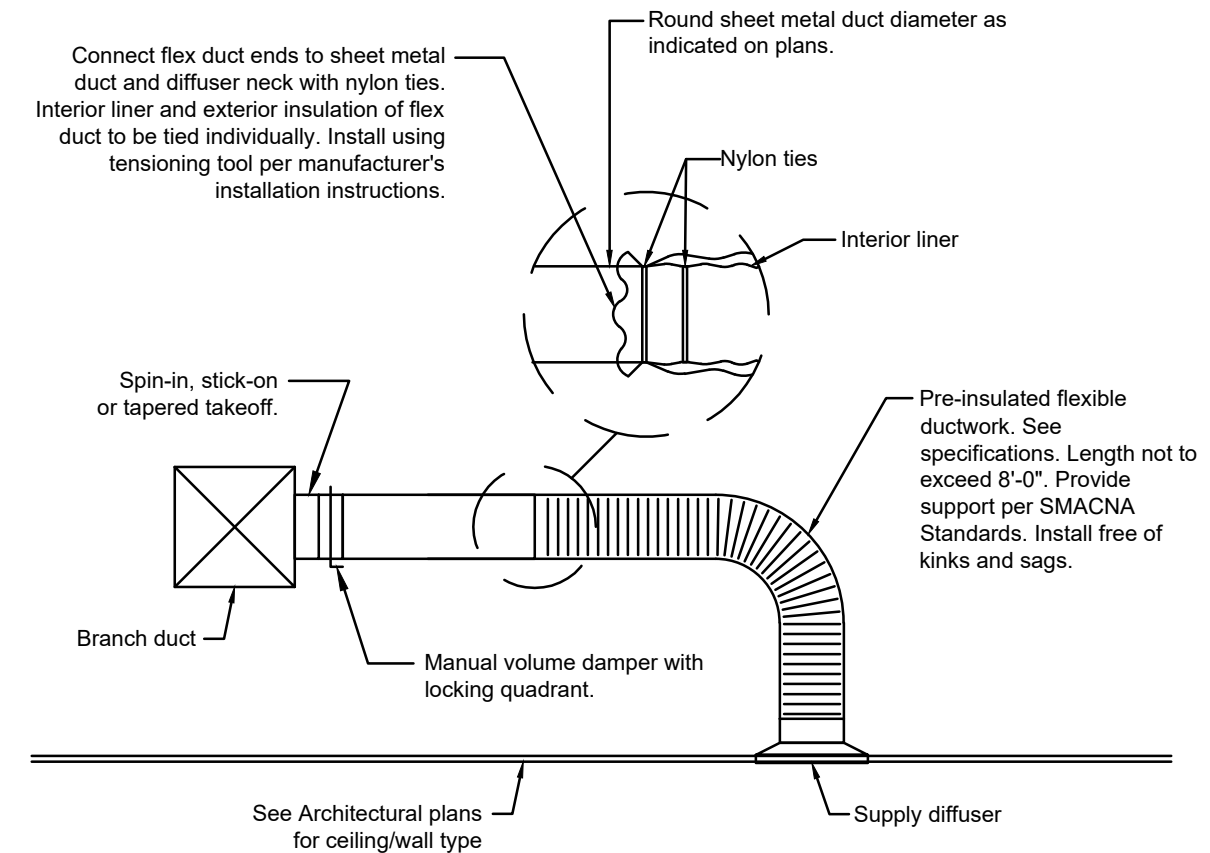
2 Gypsum Framed Walls 1 or 2 Hour Penetration Firestop Metallic Pipe, Conduit, or Tubing
Scale: None



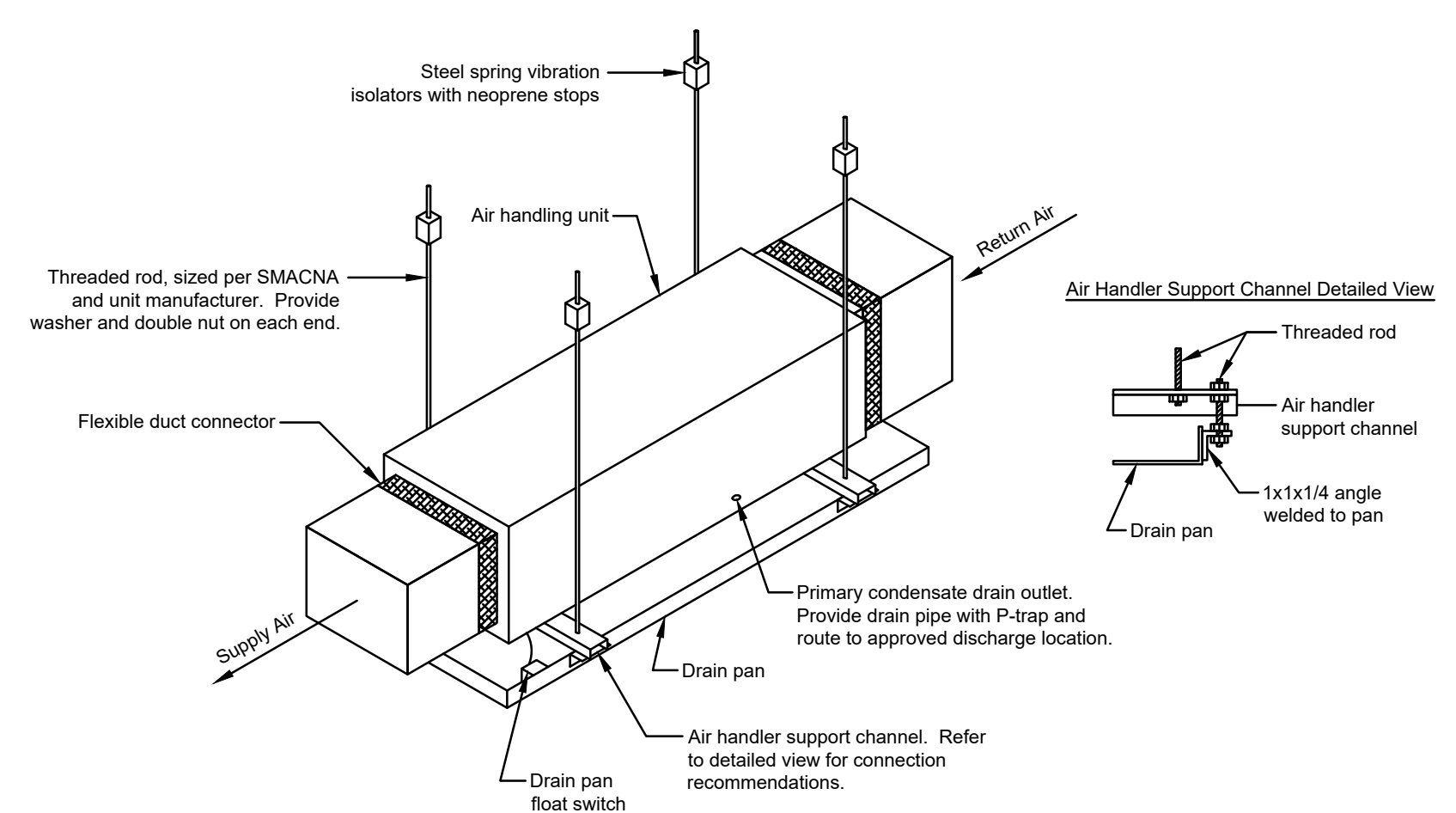
4 Grease Duct Fabrication Detail
Scale: None



5 Heat Pump Mounting Detail
Scale: None



7 Flexible Duct Installation Detail
Scale: None



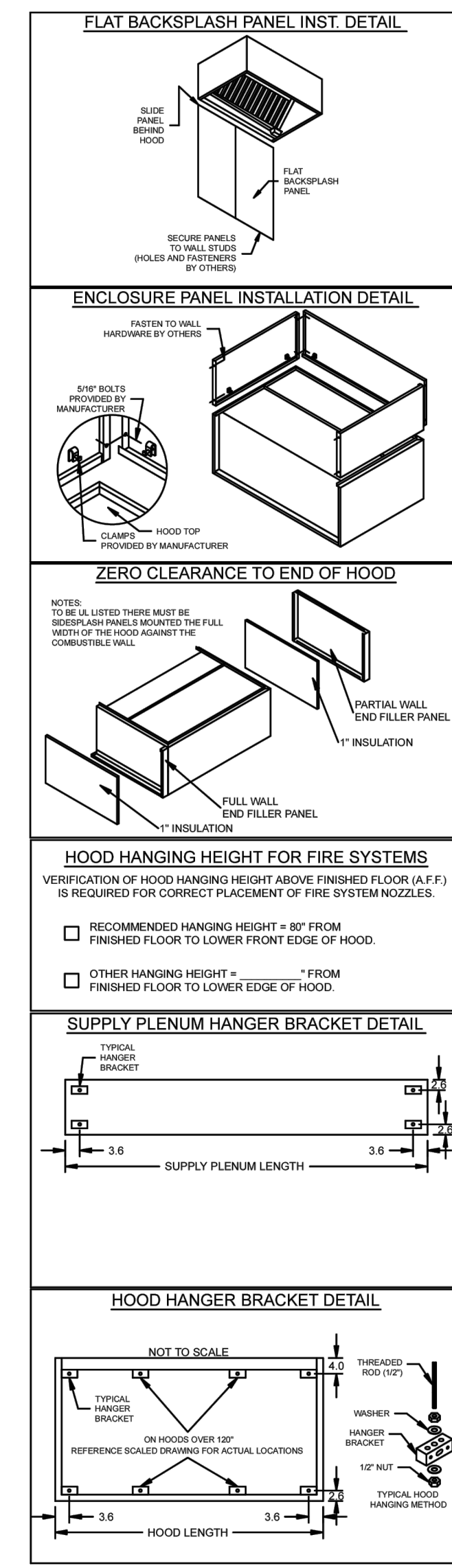
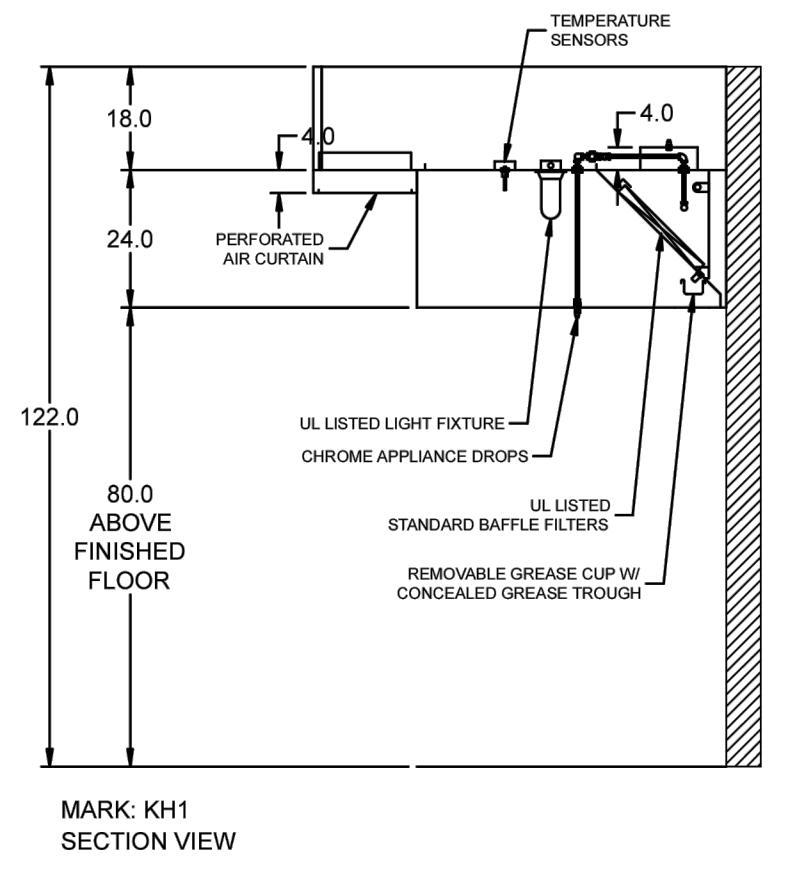
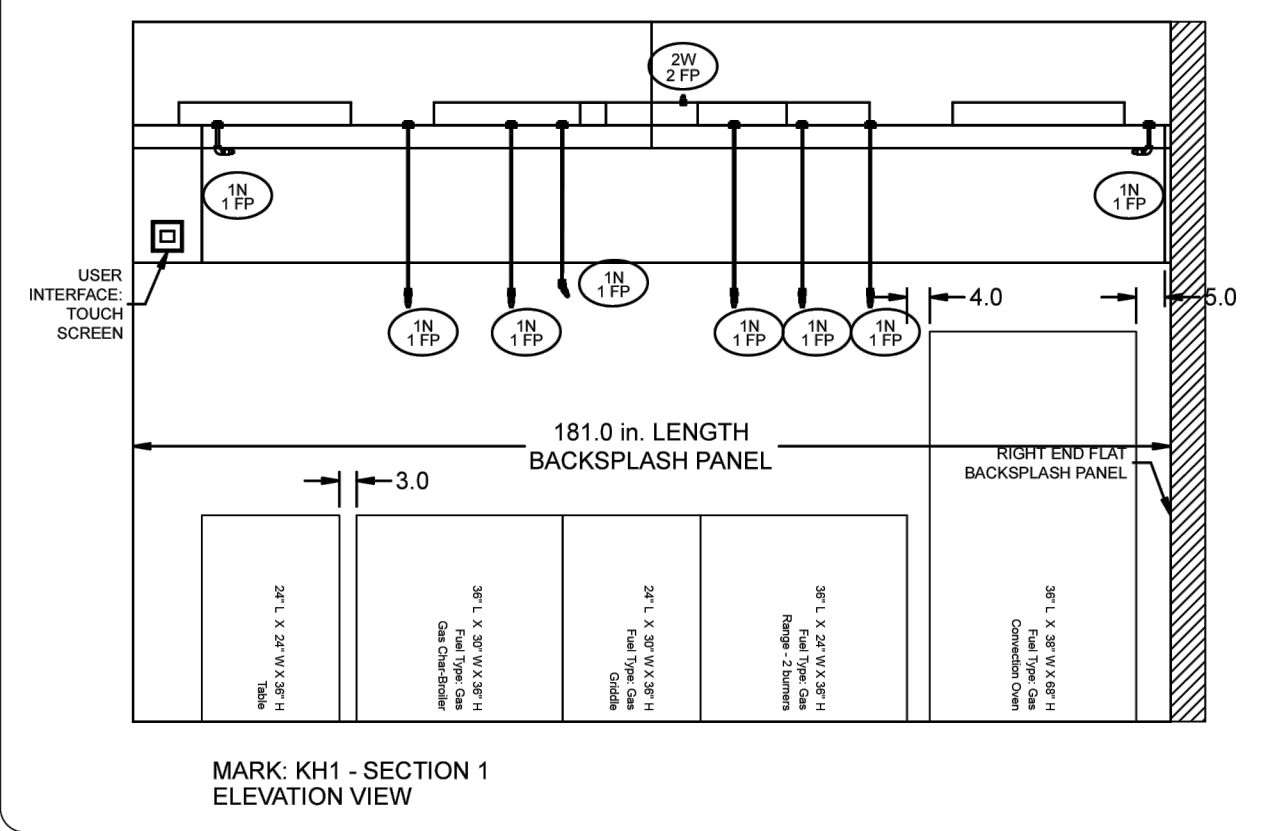
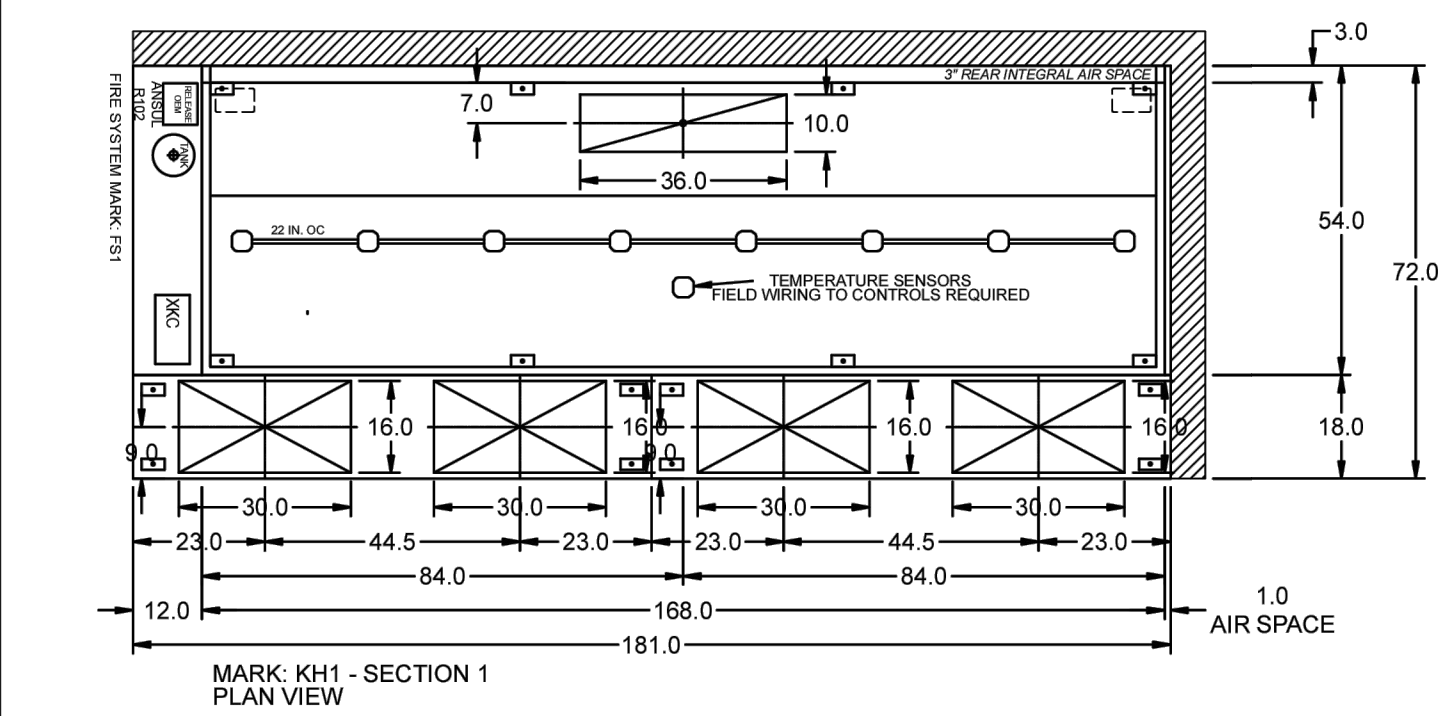
8 Air Handling Unit Hanging Detail
Scale: None

HOOD INFORMATION																
HOOD NO.	MARK	MODEL	HOOD DIMENSIONS (IN.)			HOOD CONSTR.	COOKING LOAD / DUTY RATING	TOTAL CFM	EXHAUST COLLAR(S)			MUA	AC CFM	WEIGHT LBS.	SECTION LOCATION	
			LENGTH	WIDTH	HEIGHT				WIDTH	LENGTH	DIA.					CFM
1	KH1	XBEW-168-S	168	54	24	430 SS WHERE EXPOSED	HEAVY	4000	10	36	4000	0.515	3200	394	22	SINGLE

HOOD INFORMATION															
HOOD NO.	MARK	LIGHTING DETAILS			GREASE FILTRATION DETAILS			UTILITY CABINET(S)							
		FIXTURE TYPE	BULB / LAMP INFO	QTY	FOOT CANDLES	TYPE / MODEL	MATERIAL	QTY	SIZE (IN.)	LOCATION	FIRE SYSTEM	CONTROLS			
1	KH1	INCANDESCENT (LOBE)	100W A19 (BULBS NOT INCL.)	8	53.81	BAFFLE	STAINLESS STEEL	2	8 1/2	20	LEFT	ANSUL R102	3	XKC	TOUCHSCREEN

SUPPLY PLENUM INFORMATION																		
HOOD NO.	MARK	POS.	TYPE	SIZE (IN.)			INSULATED	DAMPER(S)	LED LIGHT(S)	TOTAL CFM	TOTAL S.P.	COLLARS						
				L	W	H						TYPE	MOUNTING	QTY	W	L	DIA.	CFM
1	KH1	FRONT	ASP	90.5	18	4	NO	NO	1600	0.01	MUA	FACTORY	2	16	30	800	240	
1	KH1	FRONT	ASP	90.5	18	4	NO	YES	NO	1600	0.01	MUA	FACTORY	2	16	30	800	240

HOOD OPTIONS
 UL 710 LISTED W/ OUT EXHAUST FIRE DAMPER - UL #R25625
 BACK INTEGRAL AIR SPACE - 3 IN WIDE
 RIGHT NON-INTEGRAL AIR SPACE - 1 IN THICK - ZERO CLEARANCE
 18 IN HIGH CEILING ENCLOSURES - FRONT LEFT - FIELD INSTALLED
 FACTORY MOUNTED EXHAUST COLLAR(S)
 BACKSPASH 80.00 IN HIGH 181.00 IN LONG
 RIGHT SIDESPASH 80.00 IN HIGH 54.00 IN LONG
 PERFORMANCE ENHANCING LIP (PEL) TECHNOLOGY
 STANDING SEAM CONSTRUCTION FOR SUPERIOR STRENGTH



ACCUREX

PROJECT: 0222023
 HARVEY JOHN'S STEAKHOUSE
 MARK: KH1
 ACCUREX COASTAL CAROLINAS
 MIKE NOWAK
 MIKE.NOWAK@ACCUREX.COM
 (910) 956-7429

Scope Note:
 The Kitchen Equipment Supplier shall furnish the kitchen hoods, hood exhaust and supply fans, Ansul system, and controls. The mechanical contractor shall be responsible for installing all equipment and providing all connecting ductwork.

A Tenant Alteration for
HARVEY JOHN'S STEAKHOUSE
 1501 N. Raleigh Street, Suite G
 Angier, NC

JOB #:
 23HARVEYJOHNS

DWG BY:
 CHK BY:
 DATE: 07/28/23
 REV NO DATE

KITCHEN HOOD DETAILS

SHEET NUMBER

M-7

1 Kitchen Hood Details
 Scale: None

