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0818

DEC. 9, 2008

DESDEV

VOLUME 2
OF 2 VOLUMES

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY
USTAR BUILDING #2

350 EAST GRAND AVE.
LOGAN, UTAH

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THIS IS A (2) TWO VOLUME DRAWING SET. SEE VOLUME 1 FOR CIVIL, LANDSCAPE, STRUCTURAL, ARCHITECTURAL, LABORATORY DRAWINGS

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PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
350 EAST GRAND AVE.
LOGAN, UTAH

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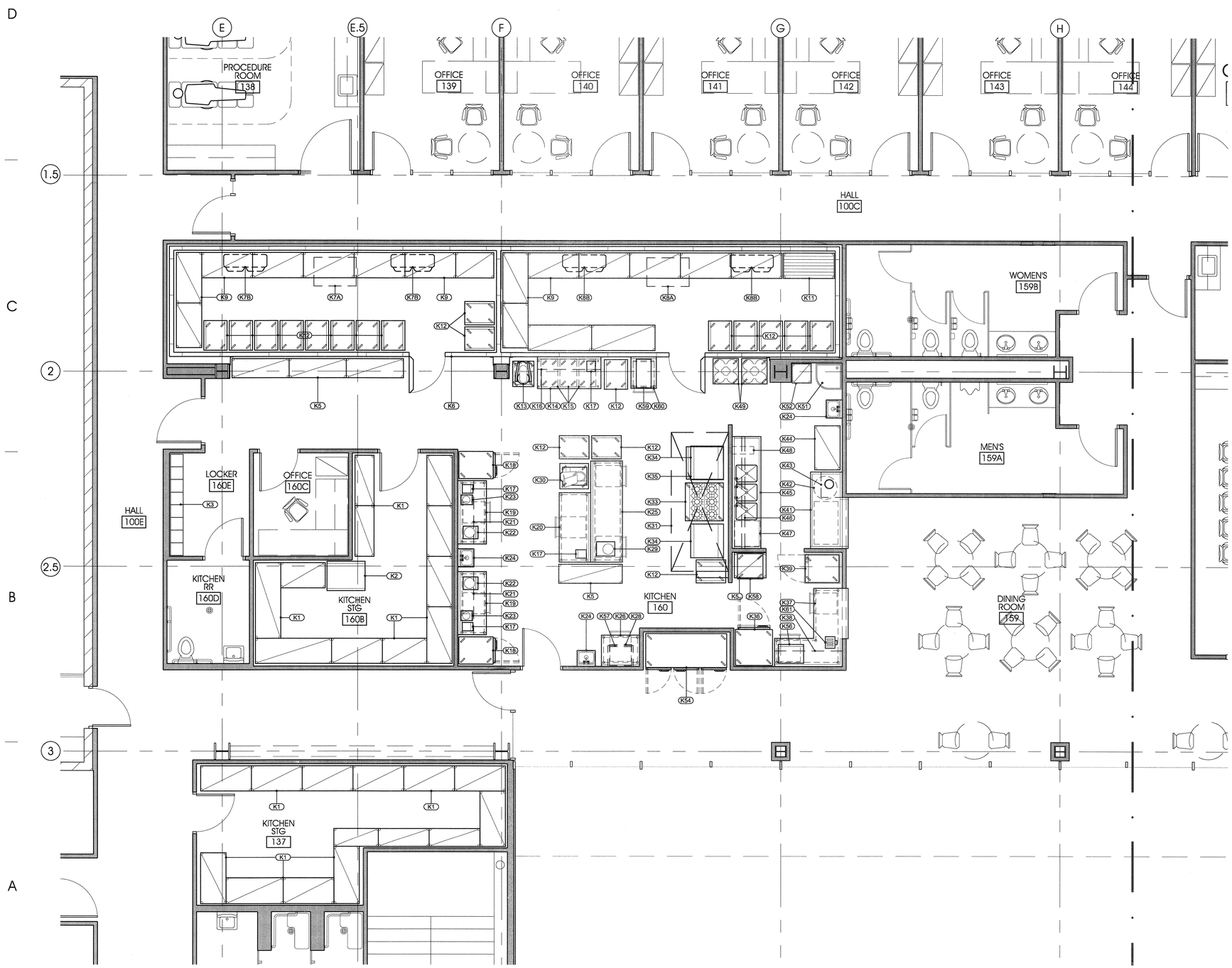


TRUE n PLAN n

4' 0' 4'

scale = 1/4" = 1'-0"

FIRST LEVEL FOOD SERVICE EQUIPMENT PLAN

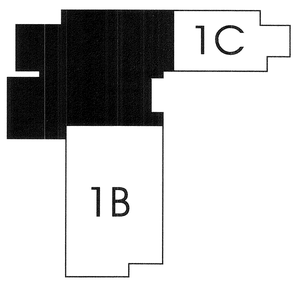
FS1 / FS101

SCHEDULE: FOOD SERVICE EQUIPMENT

ITEM	QTY	UNIT	DESCRIPTION
#K-1	1	LOT	DRY STORAGE SHELVING: PARTIALLY EXISTING BY THE OWNER (12)
#K-2	1	EACH	CAN RACK: EXISTING BY THE OWNER
#K-3	1	LOT	LOCKERS: PROVIDED BY OTHER SECTION
#K-4	-	-	SPARE NUMBER
#K-5	1	LOT	KITCHEN SHELVING: PARTIALLY EXISTING BY THE OWNER
#K-6	1	EACH	WALK-IN COOLER/FREEZER BOX
#K-7A	1	SYS	FREEZER REFRIGERATION SYSTEM: REMOTE CONDENSER
#K-7B	2	EACH	FREEZER REFRIGERATION SYSTEM: BLOWER COILS
#K-8A	1	SYS	COOLER REFRIGERATION SYSTEM: REMOTE CONDENSER
#K-8B	2	EACH	COOLER REFRIGERATION SYSTEM: BLOWER COILS
#K-9	1	LOT	WALK-IN SHELVING: PARTIALLY EXISTING BY OWNER
#K-10	-	-	SPARE NUMBER
#K-11	1	LOT	WALK-IN DUNNAGE RACK: PARTIALLY EXISTING BY OWNER (1)
#K-12	19	EACH	SPEED RACK: MOBILE: PARTIALLY EXISTING BY OWNER (11)
#K-13	1	EACH	20 QUART MIXER WITH STAND: EXISTING BY THE OWNER
#K-14	1	EACH	BAKERY WORK TABLE: EXISTING BY THE OWNER
#K-15	3	EACH	INGREDIENT BINS: MOBILE. EXISTING BY THE OWNER
#K-16	1	EACH	STAINLESS STEEL SHELF: MOUNT TO BAKERY TABLE
#K-17	4	EACH	SCALE: EXISTING BY THE OWNER
#K-18	2	EACH	REACH-IN REFRIGERATOR: SINGLE SECTION
#K-19	2	EACH	STAINLESS STEEL WORK TABLE: 5'-0"W. ONE EXISTING BY THE OWNER
#K-20	1	EACH	STAINLESS STEEL WORK TABLE: 6'-0"W
#K-21	2	EACH	STAINLESS STEEL WALL SHELF
#K-22	2	EACH	INDUCTION COOK TOP: ONE EXISTING BY THE OWNER
#K-23	2	EACH	BLENDER: ONE EXISTING BY THE OWNER
#K-24	3	EACH	WALL MOUNT HAND SINK
#K-25	-	-	SPARE NUMBER
#K-26	1	EACH	STAINLESS STEEL WORK TABLE: EXISTING BY THE OWNER
#K-27	-	-	SPARE NUMBER
#K-28	1	EACH	MICROWAVE OVEN: EXISTING BY THE OWNER
#K-29	1	EACH	FOOD PROCESSER: EXISTING BY THE OWNER
#K-30	1	EACH	SLICER W/ STAND: EXISTING BY THE OWNER
#K-31	1	EACH	STAINLESS STEEL EXHAUST HOOD: TYPE I
#K-32	1	SYS	FIRE PROTECTION SYSTEM
#K-33	1	EACH	SIX BURNER RANGE: WITH STANDARD OVEN
#K-34	2	EACH	COMBI-OVEN: HALF PAN. EXISTING BY OWNER
#K-35	1	EACH	BLAST CHILLER: EXISTING BY THE OWNER
#K-36	1	EACH	ROLL-IN REFRIGERATOR: ONE SECTION. EXISTING BY OWNER
#K-37	1	EACH	STAINLESS STEEL SERVING COUNTER
#K-38	1	EACH	STAINLESS STEEL WALL SHELF
#K-39	1	EACH	HOT FOOD WARMING CABINET: MOBILE. EXISTING BY OWNER
#K-40	-	-	SPARE NUMBER
#K-41	1	EACH	STAINLESS STEEL DISH DROP TABLE
#K-42	1	EACH	TRASH CONTAINER: EXISTING BY OWNER
#K-43	1	EACH	STAINLESS STEEL DISH RACK SHELF: 24"W
#K-44	1	LOT	DISH ROOM SHELVING
#K-45	1	EACH	STAINLESS STEEL POT SINK
#K-46	1	EACH	STAINLESS STEEL WALL SHELF/POT RACK: EXISTING BY OWNER
#K-47	1	EACH	UNDER COUNTER DISHWASHER
#K-48	1	EACH	HOSE REEL
#K-49	2	EACH	DISH DOLLIES
#K-50	1	-	SPARE NUMBER
#K-51	1	EACH	MOP SINK: PROVIDED BY PLUMBING SECTION
#K-52	1	EACH	JANITOR SHELVING
#K-53	1	LOT	STAINLESS STEEL CORNER GUARDS
#K-54	1	EACH	REACH-IN REFRIGERATOR: THREE SECTION. EXISTING BY THE OWNER
#K-55	-	-	SPARE NUMBER
#K-56	1	EACH	ICE AND WATER MAKER/DISPENSER
#K-57	1	EACH	STAINLESS STEEL MICROWAVE SHELF: EXISTING BY THE OWNER
#K-58	1	EACH	GLASS RACK: EXISTING BY THE OWNER
#K-59	1	EACH	TRAY LIDDER: EXISTING BY THE OWNER
#K-60	1	EACH	STAINLESS STEEL WORK TABLE
#K-61	1	EACH	TOASTER: EXISTING BY THE OWNER

KEY PLAN

*FOR SHEET AE101 ONLY.



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UTAH STATE UNIVERSITY

USTAR BUILDING #2
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SHEET NAME:

FIRST LEVEL FOOD SERVICE EQUIPMENT PLAN

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FS101

OWNERS PROJECT REQUIREMENTS

Design Development Phase
December 9, 2008

Refer also to the functional and technical criteria

CODES

- International Building Code, 2006
- International Mechanical Code, 2006
- International Plumbing Code, 2006
- International Fire Code, 2006
- International Energy Conservation Code, 2006
- NFPA 13
- Utah State Boiler Code

STANDARDS

- Utah Division of Facilities and Construction Management Design Criteria
- Utah State University Architect & Engineer Manual
- Utah State University Planning & Design for High Performance Facilities
- American Industrial Hygiene Association (AIHA). ANSI/AIHA Z9.5 *National Standard for Laboratory Ventilation.*
- American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc. (ASHRAE). Laboratory Design Guide
- ASHRAE Fundamentals Handbook, HVAC Applications Handbook, Systems and Equipment Handbook.
- Centers for Disease Control (CDC) and National Institute of Health (NIH). *Biosafety in Microbiological and Biomedical Laboratories, Fifth Edition.*
- National Fire Protection Association (NFPA). *NFPA 15 Fire Protection for Laboratories Using Chemicals.*

ENVIRONMENTAL AND SUSTAINABILITY GOALS

DFCM HIGH PERFORMANCE BUILDING REQUIREMENTS

This facility will conform with the DFCM High Performance Building Rating System.

Basic Requirements:

Fundamental Building Systems Commissioning. DFCM will engage a Commissioning Agent that is not an individual directly responsible for project design or employed by one of the designers. Commissioning Agent shall ensure that fundamental building components are installed and calibrated to operate as intended.

Life Cycle Cost Analysis. Designers shall use life-cycle cost analysis in making decisions about their investments in products, services, construction, and other projects to lower the State Government's costs and to reduce energy and water consumption.

CFC Reduction in HVAC and Refrigeration Equipment. Designer shall select HVAC and refrigeration equipment without chlorofluorocarbons (CFC) based refrigerants.

Ventilation Systems. Designer shall provide mechanical ventilation system according to ASHRAE Standard 62. Mechanical ventilation system shall have the capability to operate continuously during occupancy and designed not to be easily shut-down or otherwise defeated, such as blocked registers.

Drainage Systems. Designer shall design surface grades, storm drainage system, HVAC system, and other systems to avoid accumulation of standing water around and in the building.

Mold Prevention during Construction. Contractor shall ensure porous type building materials, insulation, and fabric, is kept dry to prevent the growth of mold and bacteria. Materials that have been affected by mold shall be abated or replaced. Building insulation that is damp or wet for 72 hours shall be replaced.

Filtration Media Replacement before Occupancy. Contractor shall ensure that filtration media is replaced before occupancy.

Thermal Comfort. Designer shall ensure that thermal comfort requirements are according to ASHRAE Standard 55. Exceptions:

Winter humidification is not (normally) required;
Summer dehumidification is not (normally) required; and
Upper temperature limit in natural ventilated buildings is not required.

Energy Efficiency Requirements:

Energy Performance. Provide an integrated system of components to reduce source energy use from what is required by ASHRAE Standard 90.1.

Sustainability Credits:

Provide a minimum of 20 Sustainability Credits. These items include Daylighting, Energy, renewable Energy, Indoor Air Quality, Commissioning and Training, Acoustics, Sustainable materials, Waste Reduction, Water Reduction, Performance Measurement and Verification and Innovation in Design.

LEED REQUIREMENTS

The project will achieve USGBC LEED Gold Certification.

EQUIPMENT AND SYSTEM EXPECTATIONS

General: Mechanical systems incorporating centralized equipment are preferred over unitary type equipment. The majority of the maintenance can be performed in the mechanical equipment rooms. Central maintenance personnel would prefer not to have to enter animal rooms, containment rooms or special labs to perform maintenance. Central systems provide more flexibility to accommodate future changes.

Flexibility for future changes: The building mechanical systems must be able to accommodate future changes. Lab facilities of this type experience dramatic changes over the life of the building.

DESIGN PARAMETERS

1. Temperature:

	Winter	Summer
Outdoor Temperature	-20° F	96° DB/62° MCWB 66° WB/85° MCDB
Indoor Temperature - Typical Labs	72° F	72° F
Indoor Temperature - Animal Rooms	64° F Min	85° F Max

2. Chemical Fume Hood Exhaust - Low Flow Hoods

Occupied Mode Face Velocity - 80 feet/minute

Unoccupied Mode Face Velocity - 60 feet/minute

Use of proximity sensors to reduce air flow when hood is not in use.

DESIGN PARAMETERS cont.

3. Air Change Rates

Typical Lab Space, Occupied Mode - 4 ACH (Air Changes per Hour) min.

Typical Lab Space, Unoccupied Mode - None

Vivarium - 10 ACH min. 20 ACH max.

4. Air Handler Pressure Drop/Velocity - 4" W.G..400 ft/min

5. Duct Pressure Drop/Velocity - 2.2" W.G./2500 ft/min

6. Heat Recovery:
Provide heat recovery from general lab exhaust.
Provide heat recovery from fume hood exhaust.

7. Laboratory plug load design
For preliminary design purposes use 10 watts/square foot
Final loads to be determined during design process.

8. Means to reduce cooling air flow in rooms with high plug loads will be Fan Coil Units

9. Humidification Requirements
Typical Laboratories
Summer 50% RH Max.
Winter NA

Vivarium
Summer 60% RH Max.
Winter 40% RH Min.

Point of use humidifiers will be provided in select rooms for individual humidification fine tuning and control.

10. Acoustic Design: The HVAC-related background noise shall comply with ASHRAE Handbook HVAC Applications 2007:

SPACE	RC(N)
Laboratories (with fume hoods)	
Testing/Research with telephone use and Speech communication	40 to 50
Group Teaching	35 to 45
Offices	25 to 35
Conference Rooms	25 to 35

HEAT SOURCE

The heat source will be high efficiency condensing gas fired hot water boilers. There will be a minimum of four boilers for redundancy. Each boiler will be sized for 25% of the load. The boilers will have capacity to heat the building if the heat recovery system fails. Consideration shall be given to a low temperature (130ºF) hot water system with all high efficiency condensing boilers.

A central heat pump system should also be considered, in lieu of gas fired boilers. This would include a minimum of two heat recovery chillers and a ground-coupled well water system.

COOLING SOURCE

The cooling source will be a minimum of two water cooled chillers for redundancy. Each chiller will be sized for 50% of the load. The chillers will have capacity to cool the building if the heat recovery system fails. At least one chiller shall be the variable flow type for improved efficiency. There will be a cooling tower for each chiller.

Heat recovery chillers should also be considered, in lieu of the standard chillers. This system would include a ground-coupled well water system.

VENTILATION

Ventilation will be provided in compliance with the 2006 IMC.

Classrooms - 15 CFM/person
Office Space - 20 CFM/person
Typical Lab - 100% Outside Air
Vivarium - 100% Outside Air

STEAM SYSTEM

A central high pressure (100 psi) steam system will be provided to serve sterilizers, cage washers, animal room washdown and the Vivarium humidification. Provide two gas fired boilers for redundancy each sized for 50% of the load.

A clean steam system is required for the autoclaves and the humidifiers. Normal (dirty) steam damages the animal cages and is not recommended for humidification. A single dirty steam-to-clean steam generator will be required with dirty steam as backup.

HEATING HOT WATER PIPING SYSTEM

Primary standby pumps each sized at 100% flow. Variable flow, VFD's on each pump.

CHILLED WATER PIPING SYSTEM

Chilled water supply temperature - 42º F
Chilled water return temperature - 55º F
Primary - Standby pumps, each sized at 100% flow. VFD's on each pump.

HVAC SYSTEMS

Typical Laboratories:

General - The design of the HVAC system for a laboratory should maintain a safe working environment for the users. All laboratory areas shall be served by 100% outside air systems.

Rooms should be maintained at a negative pressure with respect to adjacent areas. High air discharge velocities should be avoided (not more than 50 feet per minute) in the immediate vicinity of the fume hood. Fume hood face velocity should be maintained at 80 fpm all sash positions in the occupied mode. The system design shall be based on 80 feet per minute hood face velocity when the fume hood sash is opened to a height of 18 inches. Fume hood shall be equipped with a motion sensor which will reduce face velocity to 60 FPM when the area around the hood is unoccupied.

The HVAC system should have features that enable control of supply and exhaust air flow, laboratory pressurization control, hood face velocity and hood air flow, energy consumption, and room temperature.

Laboratories will be provided with variable volume fume hoods, variable volume supply air and variable volume general exhaust air. Room supply and exhaust air will be controlled through air terminal devices utilizing a volumetric control.

Vivarium:

General - The design of the HVAC system will maintain a stable environment for the animals and safety and comfort for animals and personnel.

The HVAC system for the Vivarium will be similar to the Typical Laboratories. The Vivarium systems will be 100% outside air. Rooms will be designed such that they can be positive pressure or negative pressure.

The HVAC system will have features that enable control of supply and exhaust air flow, room pressurization control (positive or negative), energy consumption, room temperature, and room humidity.

The ventilated cage racks will require individual supply air and exhaust air control with filters.

HVAC redundancy is required. The HVAC system will have redundant supply fans and exhaust fans which will provide operation of the facility at a reduced level in the event of a fan failure. HVAC equipment serving the Vivarium will be on emergency power. This includes chiller, cooling tower, boiler, pumps, supply fans, exhaust fans and controls.

BIOSAFETY LEVEL 3 LABS

The ventilation system shall be 100% outside air. The ABSL3 and ABSL3 Enhanced Lab shall be negative pressure in relationship to adjacent spaces. There will be audible and visual alarms to notify personnel on loss of pressure control. Gastight dampers will be provided in the supply and exhaust ductwork to allow for decontamination of the ABSL3 Lab and ABSL3 Enhanced Lab. The ductwork up to the gastight dampers will be gastight stainless steel.

AIR HANDLERS

The supply air handlers will be located indoors to accommodate servicing and piping and to avoid freezing problems. The exhaust air handlers may be located outdoors. The air handlers will have multiple fans for redundancy.

OUTSIDE AIR INTAKES AND EXHAUST AIR DISCHARGE

A wind study will be conducted on the building to show that short circuiting does not occur.

Air intakes shall be positioned to avoid short-circuiting of exhaust air back into the building. Exhaust from laboratories must be discharged to the atmosphere through stacks at the top of the building with a minimum velocity of 3000 fpm. If variable volume systems are employed for supply and exhaust, then design provision must be made to assure that the 3000 fpm exhaust velocity is maintained at all times at all conditions. The minimum velocity may be reduced, as validated by the wind study.

EXHAUST AIR SYSTEM

There will be several sources of exhaust air: (1) General Lab Exhaust (Typical Labs and Vivarium) (2) Chemical Fume Hood Exhaust (3) Biological Safety Cabinet Exhaust (4) General Building Exhaust (Toilet Rooms, Photocopy areas, Janitor's closets, etc.). (5) Special Chemical Fume Hood Exhaust (Radioisotope hoods, Digester hoods).

The General Lab Exhaust, Chemical Fume Hood Exhaust and Biological Safety Cabinet Exhaust should connect to a central manifolded variable air volume (VAV) system. A central system provides redundancy, flexibility to add future hoods, diversity and heat recovery capability. Another advantage is that central exhaust systems reduce the noxious and hazardous substance levels through dilution. Manifolded exhaust system provide a higher plume due to the momentum associated with a higher mass flow.

General Building Exhaust will be ducted to separate exhaust fans to preclude contamination. Special Chemical Fume Hood Exhaust Hoods (Radioisotope, Digester) will be ducted to independent exhaust fans. The exhaust air from the tunnel washers is saturated with moisture and needs to be independently ducted.

AUTOMATIC TEMPERATURE CONTROL SYSTEM

The ATC system will be a Direct Digital Control (DDC) type. The system will be compatible with the USU Campus Control System. The approved ATC manufacturers/installers are Johnson Controls/Johnson Controls and TAC/Utah Controls.

PLUMBING

GENERAL

Properly designed plumbing systems are critical to the operation of the Lab facility. Due to the large number of piped utilities, the piping must be carefully organized and properly labeled. Safety of the personnel and the animals is a primary concern. Care must be taken to protect the water supplies to the building and the public sewer system which serves the building. Care must be taken to prevent the domestic water systems within the building from contamination. The plumbing system must be flexible to allow for future changes as the needs change.

REAGENT GRADE WATER SYSTEM

Two central reagent grade systems will be provided, one for the general labs and an independent system for the Vivarium. Pure water will be piped throughout the building. The pure water system will be capable of generating 18 Megaohm purity water. Pure water will be recirculated through a storage tank with ultraviolet light to keep the system free of bacteria. Point-of-use water stations will be provided where ultra pure water is required.

WATER SOFTENER

A duplex water softener will be provided. The domestic hot water, pure water, and steam make-up water will be softened.

ACID WASTE AND VENT SYSTEM

Provide a dedicated acid waste and vent system with automatic wastewater PH control systems with acid and caustic injection.

BIOLOGICAL EFFLUENT WASTE SYSTEM (ABSL3 AND ABSL3 ENHANCED SPACES

Provide a dedicated biological waste system. System will be piped to a steam heated decontamination unit.

LABORATORY VACUUM SYSTEM

Provide a central system with at least two vacuum pumps for redundancy.

LABORATORY AIR SYSTEM

Provide a central system with at least two compressors for redundancy.

MEDICAL AIR SYSTEM

Provide a central system to serve the operating suite with at least two compressors.

MEDICAL GASES

Central medical gas system will be provided for use in Surgery, Pre-Op and Post-Op Rooms. Medical gases include oxygen, vacuum carbon dioxide and air.

DOMESTIC HOT AND COLD WATER SYSTEMS

There will be two separate hot and cold water systems: (1) Potable hot and cold water (2) Industrial (Non-potable) hot and cold water, the Industrial hot and cold water will be piped to lab spaces. The Industrial water will be served by parallel reduced pressure backflow preventers.

WATER HEATERS

There will be separate Industrial and Potable water heaters. Two gas fired water heaters will be provided for the Industrial water system and two gas fired heaters for the Potable water.

FIRE SPRINKLING

Automatic wet-pipe sprinkler system with a Class I standpipe in two stairways. Piping will be standard weight black steel with mechanical couplings, threaded joints or welded joints. Comply with NFPA 13.

FUTURE EXPANSION

There are no plans for a future expansion of this building.

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PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

OWNER PROJECT REQUIREMENTS

REVISIONS

MARK	DATE	DESCRIPTION

ISSUE DATA

ISSUE DATE:	DEC. 9, 2008
ISSUE TYPE:	DESDEV
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DFCM PROJECT #	06292770
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ME001

USU USTAR

MECHANICAL BASIS OF DESIGN
Design Development Phase

Refer also to the "facility functional and test criteria"

December 9, 2008

HEATING/COOLING SOURCE ALTERNATIVES

Two Heating/Cooling source alternatives were considered: (1) Proposed Design (as shown on the drawings) (2) Central Ground Coupled Heat Pump System.

The Proposed Design includes gas fired high efficiency condensing boilers as the primary heat source. It includes indirect evaporative cooling, direct evaporative cooling and water cooled chillers for the primary cooling source. A glycol run-around heat recovery system is incorporated in both alternatives. Both alternatives would have central air handlers for supply and exhaust.

The Central Ground Coupled Heat Pump System consists of a well field of approximately 200 wells, 300 foot deep, multiple water-to-water heat pumps (or heat recovery chillers), a hot water building loop and a chilled water building loop.

A thermal conductivity test was conducted at two test wells drilled on the site. A Utah Geological and Mineral Survey done in 1982 shows some potential for "Low Temperature Geothermal" water. A well approximately ¼ mile from the site showed 70° F water. The normal "deep earth" water temperature in Cache Valley is about 55 ° F.

A Schematic Design Phase DOE II energy simulation model was performed. It was based on an assumed deep earth temperature of 55 ° F. This will be adjusted when the thermal conductivity test is completed. The results of the DOE II energy model are included in the Schematic Design Package. The Baseline energy costs are $471,474.00 per year. The Proposed Design energy costs are $361,540.00 per year. The Heat Pump alternative energy costs are $315,269.00. The simple payback for the heat pump compared to the proposed design is 12.9 years.

The Heat Pump alternative will have a higher initial installed cost than the Proposed Design. The additional installed cost for the Heat Pump alternative is about $600,000.00, roughly the cost of the well field.

In a meeting with the project team at USU, it was resolved to proceed with the proposed design rather than the heat pump alternative.

HEAT SOURCE

The heat source is multiple gas-fired high efficiency condensing boilers. The efficiency will be about 95%. In order to achieve this efficiency, the hot water supply/return temperatures will be 130° F/90° F. The glycol run-around heat recovery loop will recover about 50% of the heating energy from the exhaust air stream. With the heat recovery loop operating, the high efficiency boilers will have capacity to do the space heating. If the heat recovery system fails one of the two high pressure steam gas fired boilers will act as a standby heat source. If the natural gas service fails, heating and process steam will be lost. If one or more of the high efficiency boilers fail, one of the gas steam boilers will act as a standby heat source.

COOLING SOURCE

The cooling source is two water cooled chillers, in conjunction with indirect evaporative cooling and direct evaporative cooling. Outdoor air economizer cooling will also be used.

Each chiller will be sized for 50% of the cooling load. The Vivarium Wing requires 100% cooling redundancy. The chillers will be sized for the total cooling load assuming that both the indirect evaporative cooling and the direct evaporative cooling are not operational. Each chiller will be served by a cooling tower. The cooling towers will also provide cooling for the indirect cooling system.

PROCESS STEAM SYSTEM

Steam is required for the Autoclaves, the Tunnel Washers, the Rack Washers, the Tissue Digester, the Effluent Decontamination Unit and the Steam Humidifiers. The steam will be provided by two high pressure (125 PSI) gas fired steam boilers. Each boiler is sized for 50% of the steam loads for redundancy. Redundancy is required in the Vivarium Wing, in order to keep it operational. Burners for the boilers will be equipped for dual fuel operation (gas and oil), but the fuel oil storage tank and piping system will not be installed at this point. Back up fuel source could then be provided at a future date when funding is available.

Clean steam (using pure water for make-up) is required in the Autoclaves, where direct steam comes in contact with cages, "Dirty" (treated make-up water) steam damages the cages. Clean steam will also be used for humidification, since it does not contain chemicals which may be harmful to the personnel and the animals. The Vivarium requires a steam source to remain operational at all times. There will be one Dirty Steam-to-Clean steam generator sized for 100% of the load with dirty steam as temporary backup.

The steam condensate that is contained in heat exchangers, such as the Rack Washers and Tunnel Washers, will be returned to the boiler. Steam condensate that is exposed to bedding etc., such as the Autoclaves, will be cooled and dumped to the waste water.

A boiler stack economizer coil will be provided on each steam boiler to preheat the makeup water and the combustion air.

SUPPLY AIR HANDLERS

The supply air for the entire building will be 100% outside air. Air cannot be recirculated from the Laboratory spaces or from the Vivarium spaces. The office spaces will be supplied with 100% outside air. The return air from the office spaces will be used for makeup air to the building to keep the entire building from going to negative pressure. The supply air handlers will be sized for reduced air tunnel face velocity to reduce pressure losses and the associated energy. Units with 50% redundancy will have a face velocity of 400 feet per minute in lieu of 500 feet per minute. Units with 75% redundancy will be selected at 500 fpm, but will be at 333 fpm during normal operation.

The Lab/Office wing air handler will have two supply air fans, each sized at 50% of the load, for redundancy.

The Biocontaminant space (Level 3 of the Vivarium Wing) will be served by two independent air handlers, to prevent contamination of other areas. The Biocontaminant space includes BSL3 and BSL3 Enhanced spaces. These spaces will be provided with 75% air handler redundancy. Each air handler will have 75% capacity. In normal operation, both air handlers will run at 33%, in order to reduce the air velocity and pressure drop thru the air handlers.

The General Vivarium spaces (Levels One and Two) of the Vivarium Wing will be served by two separate air handlers. Each air handler will have 50% redundancy.

EXHAUST AIR HANDLERS

The building is 100% exhaust air.

The Lab/Office Wing will be served by two exhaust air handlers, each sized at 50% of the load, for redundancy.

The Biocontaminant space will be served by two independent exhaust air handlers, to prevent contamination of other spaces. Each air handler will be sized for 75% capacity. In normal operation, both units will operate in order to reduce the pressure drop.

The General Vivarium space will be served by two separate air handlers. Each air handler will be sized for 50% redundancy.

The Tunnel Washer and Rack Washer will be served by an independent exhaust air system, since this air stream is saturated with moisture.

The Kitchen hoods will be served by an independent exhaust air system, since this air stream is laden with grease.

HVAC SYSTEMS

The supply air system will be variable air volume (VAV) with hot water reheat coils. VAV reheat systems are common at USU and familiar to the maintenance personnel. Centralized air handlers allow for easy access and maintenance. VAV systems are energy efficient. These systems allow for flexibility to accommodate future changes. VAV reheat systems provide excellent zoning; each space can be independently zoned.

The exhaust air system will be a VAV manifolded system. Manifolded exhaust systems are very flexible; exhaust VAV boxes can be added in the future. Manifolded exhaust systems provide a safer system due to the dilution from general exhaust air and from hoods which may not e in use. Manifolded exhaust systems provide higher terminal exhaust plumes due to smaller fans. VAV manifolded exhaust systems are energy efficient.

ROOM PRESSURE CONTROL

Room pressure control will be accomplished by measuring and controlling the supply air entering each room and the exhaust air leaving each room. This will be done with Phoenix (or equal) Controls and pressure independent VAV boxes. Phoenix VAV boxes will be provided on the room supply air, general exhaust air, chemical fume hoods, animal cage rack exhaust air and biological safety cabinets (with ducted connections). Rooms can be positive or negative pressure as required. Room pressure control will be accomplished by using the volumetric offset method, which can be related to a differential pressure; i.e. for a negative room, the exhaust air flow will be a minimum of 50 CFM or 10% more than the supply air flow.

OUTSIDE AIR INTAKES AND EXHAUST AIR DISCHARGE

The exhaust air is discharged vertically at the roof through stacks which are 10 feet minimum above the penthouse roof. The discharge velocity will be 3000 fpm minimum. The most prevalent wind is the east canyon drainage winds. The next most common wind is from the southwest, ahead of the storm fronts. The next is the northwest winds associated with storm fronts and high pressure systems. The least common wind is from the west.

With the prevalent winds in mind, the outside air intakes are located on the east side of the building. The exhaust air stacks are located west of the outside air intakes. Outside air is brought in through wall louvers at the Penthouse level.

A Wind Study is being performed by an independent engineering from to validate the current design approach.

VIVARIUM ENVIRONMENTAL MONITORING SYSTEM

A monitoring system will be provided equal to Edstrom Watchdog. Monitoring system will be independent of the Building Management System. System will monitor the following in each room:

- Space temperature
- Space relative humidity
- Air change rate
- Relative space pressure
- Lighting

Each animal holding room will have the following local monitors mounted in the corridor:

- Digital space temperature
- Digital space relative humidity
- Digital relative pressure. Relative pressure monitor to be visible from both sides of wall.

LEED MECHANICAL CREDIT

The project goal is LEED Gold. The proposed LEED Mechanical Credits are as listed below:

WE 3.1 Water Use Reduction 20%

Use dual flush toilets, 1/8 gallon flush or waterless urinals, low flow showers, sinks and lavatories (non-lab sinks) to reduce the building water usage.

WE 3.2 Water Reduction 30%

Use dual flush toilets, 1/8 gallon flush or waterless urinals, low flow showers, sinks and lavatories (non-lab sinks) to reduce the building water usage.

EA 1 Optimize Energy Performance

Improve Building envelope construction to achieve a building envelope that is significantly better than code minimum by better insulating walls and roof and by using high performance glass reducing the size of mechanical equipment needed to heat and cool the building.

Improve building lighting beyond the code minimum and employ lighting control strategies to reduce energy use associated with lighting.

Use variable air volume fume hoods and variable air volume supply air and general exhaust to reduce fan energy and reduce energy associated with tempering makeup air.

Use heat recovery on biosafety cabinets, fume hoods, and general lab exhaust air.

Use three stage cooling minimizing the requirement for mechanical cooling, the fist two stages will be indirect and direct evaporative cooling with the third stage being mechanical cooling.

Fume hood exhaust and associated makeup air will be reduced during unoccupied hours and non-use time.

Zone temperatures will be capable of being reset to minimize energy use during unoccupied hours.

High efficiency steam boilers will be used for process steam needs.

Boiler stack economizers will be used on the high pressure steam to reheat makeup water or to preheat combustion air.

High pressure steam boiler burners will be variable speed.

Feedwater pumps serving the high pressure steam boilers will be variable speed.

High Efficiency condensing type gas fired boilers will be utilized for heating needs. This style boiler is more efficient at part load than at full load. The building is almost always in a part load condition.

Reduce the static pressure drop through the supply air handlers and exhaust air handlers by reducing the air velocity in the air handlers.

High efficiency water cooled chillers Variable Frequency Drive control will be used to maintain high efficiency during part load conditions.

A plate type heat exchanger will be utilized for a water side economizer to provide cooling needs through out the winter for process cooling and other year round cooling needs where outside air economizers are not used.

Low pressure drop HEPA filters will be used in ABSL3 rooms.

Premium efficiency motors will be used.

Variable frequency drives will be provided on cooling tower fans.

A high delta T will be used for heating hot water and chilled water to reduce pumping energy.

High efficiency domestic water heater will be used.

The steam condensate will be returned from the jacket of autoclaves and washers in lieu of dumping to waste.

EA 4 Enhanced Refrigerant Management

All HVAC equipment will use non-CFC and non-HCFC refrigerants with zero ozone depletion potential and to minimize contributions to global warming. Building chillers will be R134a; smaller equipment will use R410a or R407c.

EQ 1 Outdoors Air Delivery Monitoring

Airflow measurement stations with feedback will be used for outdoor air intakes and will be controlled and monitored by the building DDC control system to provide required outside air ventilation. If the system fails to provide the required level of fresh air, a visible and audible alarm will be generated by the DDC system.

Conference Rooms and other high density occupancy spaces (higher than 25 people per 1000 square feet) will have individual room CO2 sensors with feedback that are continually monitored by the DDC system, higher than desired CO2 levels will trigger increased ventilation by the variable air volume system. If system does not respond to maintain desired CO2 levels, an alarm will be generated by the DDC system.

EQ 2 Increased Ventilation

Ventilation (per person) will be increased 30%.

EQ 3.1 Construction IAQ Management Plan

Filters will be provided on the return air grille to keep ductwork clean while system is operated during construction.

EQ 5 Indoor Chemical & Poliutant Source Control

The Architectural design will provide for permanent entry way systems in the primary direction of travel to capture dirt and particulates.

Exhaust will be provided from the building general exhaust system to keep areas of pollutants sufficiently negative with respect to adjacent spaces.

Air handlers will have MERV 13 high efficiency filters which filters outside air and return air.

EQ 6.2 Controllability of Systems

The building mechanical system design will provide individual VAV boxes to almost all rooms. each VAV box will have its own thermostat allowing individual control or adjustment. Small offices and other non-lab spaces will have operable windows. Individual Labs will each have an adjustable VAV box and thermostat.

EQ 7.1 Thermal Comfort Design

Each space will be designed to provide comfort levels as established by ASHRAE 55-2004 Thermal Comfort for human occupancy.

EQ 7.2 Thermal Comfort Verification

An assessment of the building thermal comfort satisfaction will performed within 6 to 18 months after occupancy, if it is determine that mire than 20% of occupants are dissatisfied with thermal comfort, a plan for corrective action will be established and implemented.

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PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

MECHANICAL BASIS OF DESIGN

REVISIONS

MARK	DATE	DESCRIPTION

ISSUE DATA

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CHECKED BY:	N. SPENCER
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SHEET NUMBER:

ME002

LEGEND OF MECHANICAL SYMBOLS AND ABBREVIATIONS

MECHANICAL

- POSITIVE PRESSURE DUCT – RISE
- POSITIVE PRESSURE DUCT – DROP
- NEGATIVE PRESSURE DUCT – RISE
- NEGATIVE PRESSURE DUCT – DROP
- ROUND DUCT – RISE
- ROUND DUCT – DROP
- UNDER FLOOR DUCT
- TURNING VANES
- FRESH AIR LOUVER
- RELIEF AIR OR EXHAUST AIR LOUVER
- 12X12 / 200 — CEILING SUPPLY DIFFUSER
- 22X22 / 200 — CEILING RETURN REGISTER
- 12X12 / 200 — CEILING EXHAUST REGISTER, (BALANCE TO MATCH SUPPLY IF RETURN CFM IS NOT SHOWN)
- 24X10 / 200 — SIDEWALL SUPPLY REGISTER
- 24X10 / 200 — SIDEWALL EXHAUST OR RETURN REGISTER
- 12X12 / 200 — CEILING SUPPLY DIFFUSER WITH FLEXIBLE DUCT
- 12X12 / 200 — CEILING AIR GRILLE WITH FLEXIBLE DUCT

  (TOP FIGURES INDICATE NECK SIZE. BOTTOM FIGURE INDICATES CFM.)
- CEILING RETURN AIR GRILE W/ SOUND BOOT
- 3–1" SLOTS, 48 400 — LINEAR DIFFUSER WITH PLENUM AND FLEXIBLE DUCT CONNECTION. NO. OF SLOTS & SIZE OF SLOT ON TOP, ACTIVE LENGTH AND CFM ON BOTTOM
- FLEXIBLE DUCT CONNECTION
- FLEXIBLE DUCT
- FAN
- 12/8 FO — FLAT OVAL DUCT WITH NET INSIDE DIMENSIONS SHOWN IN INCHES.
- 12/8 — RECTANGULAR DUCT WITH NET INSIDE DIMENSIONS SHOWN IN INCHES.
- 12ø — ROUND DUCT WITH NET INSIDE DIMENSIONS SHOWN IN INCHES.
- UP — INCLINED RISE
- DN — INCLINED DROP

  (WITH RESPECT TO AIR FLOW 15° NOMINAL INCLINE WITH RADIUS TURNS=DEPTH OF DUCT.)
- W R — R/W=1. ROUND DUCT SIMILAR TO RECTANGULAR
- 12/12 8/8 — RECTANGULAR TO RECTANGULAR OR ROUND TO ROUND DUCT TRANSFORMATION MAXIMUM 15° INCLUDED ANGLE EXCEPT WHERE SHOWN OTHERWISE.
- 12/12 12ø — RECTANGULAR TO ROUND DUCT TRANSFORMATION
- R — BRANCH DUCT SPLIT WITH 6" WIDTH AND MIN. R=WIDTH OF BRANCH DUCT DOWNSTREAM. ELBOW TURNING VANE OPTIONAL.
- 150 150 45 D — TAP ENTRY AREA EQUALS 150% OF BRANCH AREA
- 12ø 12/12 — HIGH EFFICIENCY FITTING
- MANUAL VOLUME DAMPER
- FD — FIRE DAMPER IN DUCT, W/ ACCESS PANEL REQD.
- FSD — COMBINATION FIRE/SMOKE DAMPER W/ ACCESS PANEL
- SD — SMOKE DAMPER W/ ACCESS PANEL
- BDD — BACK DRAFT DAMPER
- ATC OR — ATC DAMPER
- AD — ACCESS PANEL IN DUCT OR PLENUM
- HEATING OR COOLING COIL IN DUCT
- SINGLE DUCT AIR TERMINAL BOX VARIABLE OR CONSTANT VOLUME. MIN. 1-1/2 TERMINAL INLET SIZE STRAIGHT DUCT AT TERMINAL INLET.
- 4-WAY BLOW PATTERN
- 3-WAY BLOW PATTERN
- 2-WAY BLOW PATTERN
- 2-WAY BLOW PATTERN
- 1-WAY BLOW PATTERN
- STD — DUCT SMOKE DETECTOR
- UNIT HEATER

PLUMBING

- FLOOR SINK
- FLOOR DRAIN
- FCO / COTG — FLOOR CLEAN-OUT OR CLEAN-OUT TO GRADE
- ROOF DRAIN
- DOWNSPOUT NOZZLE
- ARROW INDICATES DIRECTION OF FLOW IN PIPE
- CHECK VALVE
- PRESSURE REDUCING, EXTERNAL PRESSURE VALVE
- PRESSURE REDUCING, SELF CONTAINED VALVE
- ATC VALVE – 2 WAY
- ATC VALVE – 3 WAY
- SOLENOID VALVE
- GATE VALVE
- GATE VALVE – NON RISING STEM
- GLOBE VALVE
- TEMPERATURE AND PRESSURE TEST PORT
- PS — PRESSURE SWITCH
- GAS COCK
- 8.8 GPM — CALIBRATED BALANCING VALVE WITH GPM INDICATED
- RPBP — REDUCED PRESSURE BACKFLOW PREVENTOR W/ DRAIN PAN
- BRANCH – BOTTOM CONNECTION
- BRANCH – TOP CONNECTION
- BRANCH – SIDE CONNECTION
- RISE OR DROP
- RISER – DOWN (ELBOW)
- RISER – DOWN (ELBOW)
- VTR — VENT THRU ROOF
- WATER HAMMER ARRESTOR
- INLINE PUMP
- INLINE PUMP
- CLEAN-OUT
- RELIEF VALVE
- ANGLE VALVE
- FLOW METER
- UNION
- BALANCING COCK
- SHUT-OFF COCK FOR USE WITH PRESSURE GAUGE
- FLEXIBLE EXPANSION JOINT
- THERMOMETER – TEMP RANGE AS INDICATED
- PRESSURE GAUGE WITH SHUT-OFF COCK
- PRESSURE GAUGE WITH PIGTAIL
- LATERAL STRAINER WITH BLOW-OFF VALVE, PROVIDE HOSE END WITH CAP WHERE DISCHARGE IS NOT PIPED TO DRAIN
- BALL VALVE (PIPE SIZES 2" AND SMALLER) BUTTERFLY VALVE (PIPE SIZES 2-1/2" AND LARGER)
- MOTOR OPERATED BUTTERFLY VALVE
- VALVE IN RISE
- AIR VENT-MANUAL
- AIR VENT-AUTO
- FLOW SWITCH
- REDUCER
- CONCENTRIC REDUCER
- ECCENTRIC REDUCER

PLUMBING CONT.

- THERMOSTATIC MIXING VALVE
- HOSE BIBB
- PIPE CAP
- S — SWITCH
- S — SENSOR
- T — THERMOSTAT
- T N — NIGHT THERMOSTAT
- FILL PORT
- DRAIN PAN AND P-TRAP
- (NAME) — FIXTURE FROM LEVEL ABOVE
- GPM LB/HR. — FLOW METER ORIFICE
- FLANGE
- 90° ELBOW
- STEAM TRAP, F&T=FLOAT & THERMOSTATIC 45° ELBOW
- F&T — B=BUCKET, T=THERMOSTATIC
- DN — LEADER INDICATES DOWNWARD SLOPE
- DEMOLITION
- ALIGNMENT GUIDE
- ANCHOR
- LUBRICATED PLUG COCK

SYMBOLS

- P-1 — PLUMBING FIXTURES
- POINT OF CONNECTION
- A / M-101 — SECTION TAG – TOP FIGURE IS SECTION NO. BOTTOM FIGURE IS SHEET NO.
- A / M101 — DETAIL TAG – TOP FIGURE IS DETAIL NO. BOTTOM FIGURE IS SHEET NO.
- EF / 1 — EQUIPMENT IDENTIFICATION
- 1 — KEYED NOTE IDENTIFICATION

FIRE

- HOSE VALVE
- NRS GATE VALVE WITH SUPERVISION
- FLOW SWITCH
- FIRE RISER
- SPRINKLER HEAD
- F — FIRE SPRINKLER WATER

LINETYPES

- AV — ACID VENT
- AW — ACID WASTE
- BBD — BOILER BLOW DOWN
- BF — BOILER FEED WATER
- B — BRINE
- CO2 — CARBON DIOXIDE
- CA — COMPRESSED AIR
- CF — CHEMICAL FEED
- CHWS — CHILLED WATER SUPPLY
- CHWR — CHILLED WATER RETURN
- CS — CONDENSER WATER SUPPLY
- CR — CONDENSER WATER RETURN
- DOMESTIC COLD WATER (DCW)
- DOMESTIC HOT WATER (DHW)
- DOMESTIC HOT WATER RETURN (DHWR)
- DI — DEIONIZED WATER SUPPLY
- DIR — DEIONIZED WATER RETURN
- E(NAME) — EXISTING PIPING
- (NAME) — EXISTING PIPING TO BE REMOVED
- GHR — GLYCOL HEAT RECOVERY PIPING
- G(NAME) — GLYCOL PIPING SOLUTION
- FOR — FUEL OIL RETURN
- FOS — FUEL OIL SUPPLY
- FOV — FUEL OIL VENT
- G — NATURAL GAS
- HG — HOT GAS
- HFR — HELICOPTER FUEL RETURN
- HFS — HELICOPTER FUEL SUPPLY
- HP(NAME) — HIGH PRESSURE DOMESTIC WATER
- HPC — HIGH PRESSURE CONDENSATE
- HPS — HIGH PRESSURE STEAM
- HWR — HEATING HOT WATER RETURN
- HWS — HEATING HOT WATER SUPPLY
- IA — INSTRUMENT AIR
- IA 120 — INSTRUMENT AIR AT PRESSURE INDICATED
- LA — LAB AIR
- LV — LAB VACUUM
- LPC — LOW PRESSURE CONDENSATE
- LPG — LIQUIFIED PETROLEUM GAS
- LPS — LOW PRESSURE STEAM
- MA — MEDICAL AIR
- MA 120 — MEDICAL AIR AT PRESSURE INDICATED
- MPC — MEDIUM PRESSURE CONDENSATE
- MPS — MEDIUM PRESSURE STEAM
- MUW — MAKE UP WATER
- MV — MEDICAL VACUUM
- N — NITROGEN
- N2O — NITROUS OXIDE
- OX — MEDICAL OXYGEN
- OX 120 — MEDICAL OXYGEN AT PRESSURE INDICATED
- PUMPED CONDENSATE

LINETYPES CONT.

- RO — REVERSE OSMOSIS WATER SUPPLY
- ROR — REVERSE OSMOSIS WATER RETURN
- RD — ROOF DRAIN
- RDO — ROOF DRAIN OVERFLOW
- RL — REFRIGERANT LIQUID
- RS — REFRIGERANT SUCTION
- SEWER (BELOW GRADE)
- SEWER (ABOVE GRADE)
- SW — SOFT DOMESTIC WATER (SW)
- V — VACUUM
- VENT (SEWER)

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Internet: http://www.dfcm.utah.gov

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LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

LEGEND

REVISIONS

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DFCM PROJECT #	06292770
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SHEET NUMBER:

ME003

MECHANICAL PIPING GENERAL NOTES

1. PIPING DRAWINGS ARE SCHEMATIC IN NATURE. FIELD VERIFY ALL ROUTING AND COORDINATE WITH ALL OTHER TRADES.
2. NO PIPING TO RUN DIRECTLY OVER ELECTRICAL PANELS, MCCS OF VFDS. ROUTE AROUND AS REQUIRED.
3. INSTALL A MANUAL AIR VENT AT ALL HYDRONIC SYSTEM HIGH POINTS.
4. INSTALL ALL EQUIPMENT WITH SUFFICIENT CLEARANCE FOR MAINTENANCE PER MANUFACTURERS RECOMMENDATION. PROVIDE A 24"X 24" ACCESS DOOR BELOW EQUIPMENT BOX AND CONTROL VALVE WHERE INSTALLED OVER NON LAY-IN CEILING AREAS.
5. COORDINATE EXACT LOCATION OF T-STATS WITH ARCHITECTURAL FURNISHINGS.
6. INSTALL A 24"X 24" ACCESS PANEL BELOW ALL VALVES CIRCUIT SETTERS, & CONTROL VALVES OVER NON-LAYIN CEILINGS.
7. MECHANICAL PIPING TO BE INSTALLED ABOVE DUCTWORK AND EQUIPMENT EXCEPT WHERE SHOWN.
8. FIELD VERIFY ALL EQUIPMENT LOCATIONS.
9. DETAILS REFERENCE ALL SHEETS.

PLUMBING GENERAL NOTES

1. SLOPE PIPE AS FOLLOWS UNLESS OTHERWISE NOTED: WASTE: BRANCHES ¼" PER FOOT. WASTE MAINS: 1/8" PER FOOT.
2. SLEEVE PIPING THRU WALLS/FOUNDATIONS WHERE REQUIRED.
3. PLUMBING DRAWINGS ARE SCHEMATIC IN NATURE. FIELD VERIFY EXACT ROUTING & COORDINATE WITH ALL OTHER TRADES.
4. ALL PIPING IN PLUMBING CHASES TO BE ARRANGED TO ALLOW MAINTENANCE ACCESS.
5. NO PIPING TO RUN OVER ELECTRICAL PANELS, VFD'S, OR MCC'S.
6. COORDINATE FAN ROOM FLOOR DRAIN LOCATIONS AND COOLING COILS.
7. NO FIRE PROTECTION LINE IS TO BE DESIGNED OR INSTALLED PRIOR TO CLOSE COORDINATION WITH ALL OTHER DISCIPLINES, DUCTWORK, MECHANICAL PIPING, AND PLUMBING TAKE SPACE PRECEDENCE OVER FIRE PROTECTION PIPING. FAILURE TO COMPLY WILL RESULT IN FIRE PROTECTION REMOVAL AND REINSTALLATION AT THE FIRE PROTECTION CONTRACTORS EXPENSE.
8. SLEEVE/CONFIGURE CMU WALLS FOR EMBEDDED PIPING AND PIPE PENETRATIONS AS REQUIRED.
9. REFER TO ARCHITECTURAL DRAWINGS FOR FIXTURE MOUNTING HEIGHTS, DIMENSIONS, AND OTHER REQUIREMENTS.
10. CONTRACTOR TO VERIFY CONNECTION SIDE OF ADA FIXTURES AND ADJUST ACCORDINGLY.
11. LOCATE ALL VENTS MINIMUM 25' AWAY FROM AIR INTAKES.
12. INSTALL DOMESTIC WATER LINES BELOW DUCTWORK.
13. INSTALL A 24" X 24" ACCESS DOOR BELOW ALL ISOLATION VALVES & CIRCUIT SETTERS WHERE MOUNTED ABOVE HARD CEILINGS.
14. MOUNT ALL CEILING TYPE ISOLATION VALVES, CONTROL VALVES, CIRCUIT SETTERS, ETC. NEAR CEILING HEIGHT FOR ACCESSIBILITY.
15. DETAILS REFERENCE ALL SHEETS.

MECHANICAL GENERAL NOTES

1. PROVIDE BALANCING DAMPER AT EACH BRANCH TAKE-OFF TO SERVE DIFFUSER OR GRILLE AS WELL AS WHERE INDICATED.
2. COORDINATE EXACT LOCATION OF DUCTS WITH STRUCTURAL MEMBERS, LIGHTS, REFLECTED CEILING, CABLE TRAY, PLUMBING, MECHANICAL PIPING, FIRE PROTECTION, ETC.
3. BRANCH DUCTWORK SHALL BE SIZED TO MATCH THE NECK SIZE OF THE DIFFUSER, REGISTER OR GRILLE IT SERVES UNLESS NOTED OTHERWISE, TYPICAL.
4. COORDINATION DRAWING SUBMITTALS ARE REQUIRED FOR THIS SHEET.
5. SEE ARCHITECTURAL PLANS FOR EXACT LOCATION OF ALL REGISTERS, DIFFUSERS AND GRILLES.
6. INSTALL ALL HARD ELBOWS AS SHOWN. HARD ELBOWS ARE REQUIRED FOR SOUND ATTENUATION.
7. INSTALL EQUIPMENT WITH CLEARANCE PER MANUFACTURERS RECOMMENDATIONS. MAINTAIN PROPER SPACE FOR COIL PULL, CONTROLS, AND MAINTENANCE ACCESS.
8. ALL BRANCH TAKE-OFFS TO HAVE A HIGH EFFICIENCY FITTING. SEE DETAIL.
9. INSTALL TURNING VANES IN ALL SQUARE LOW PRESSURE DUCTWORK.
10. DETAILS REFERENCE ALL SHEETS.
11. UNLESS OTHERWISE NOTED, ALL SUPPLY DIFFUSERS SHALL BE OF THE CD-1 TYPE, ALL RETURN GRILLES SHALL BE OF THE RG-1 TYPE AND ALL EXHAUST GRILLES SHALL BE OF THE EX-1 TYPE.

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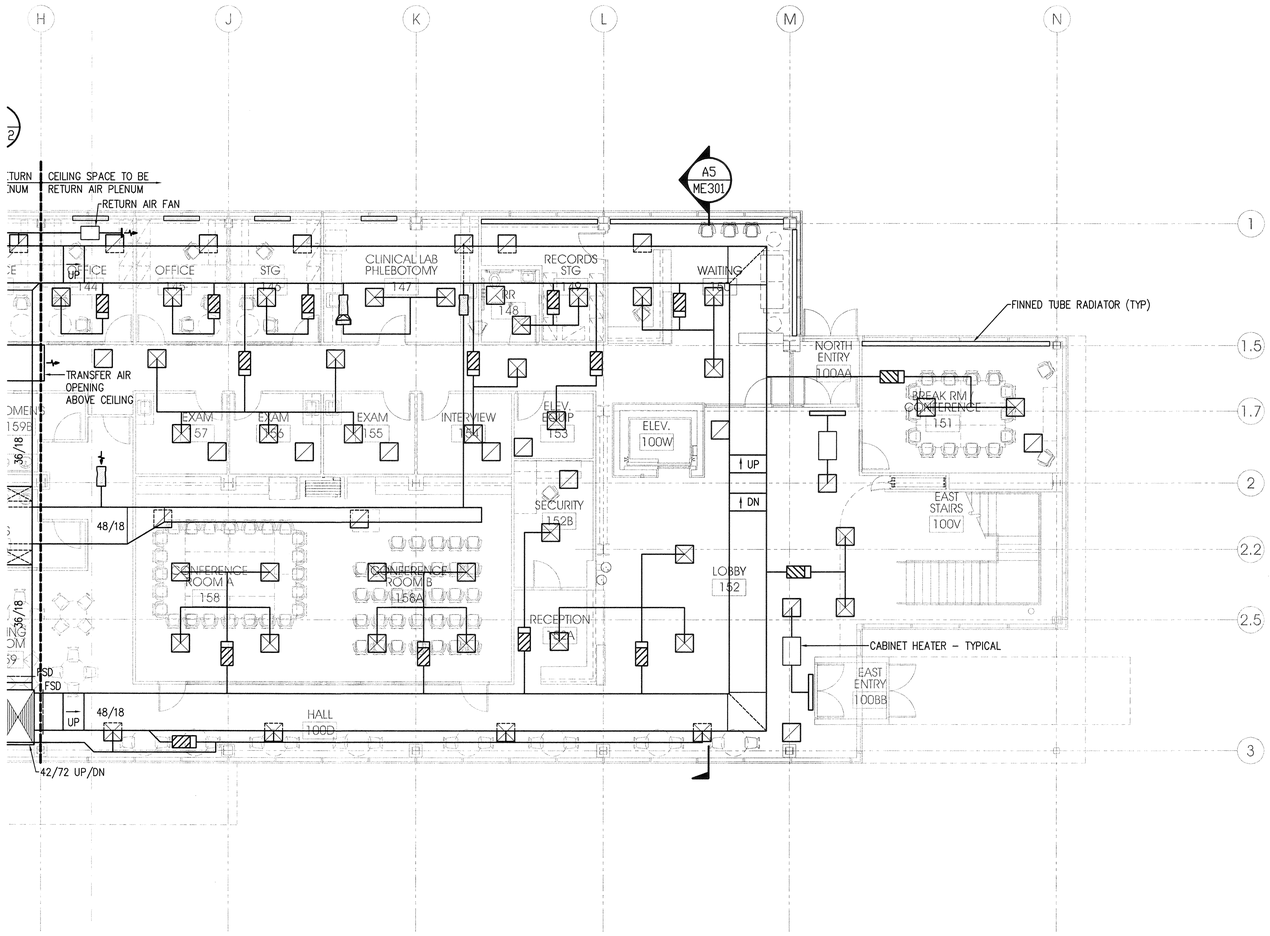
ME004



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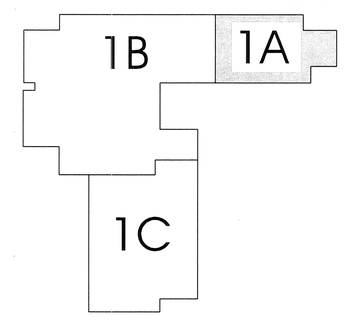

PLAN
n
8' 0' 8'
scale = 1/8" = 1'-0"

LEVEL 1 AREA A MECHANICAL DUCTWORK PLAN
A4
MH101A

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LEVEL 1 AREA A MECHANICAL DUCTWORK PLAN

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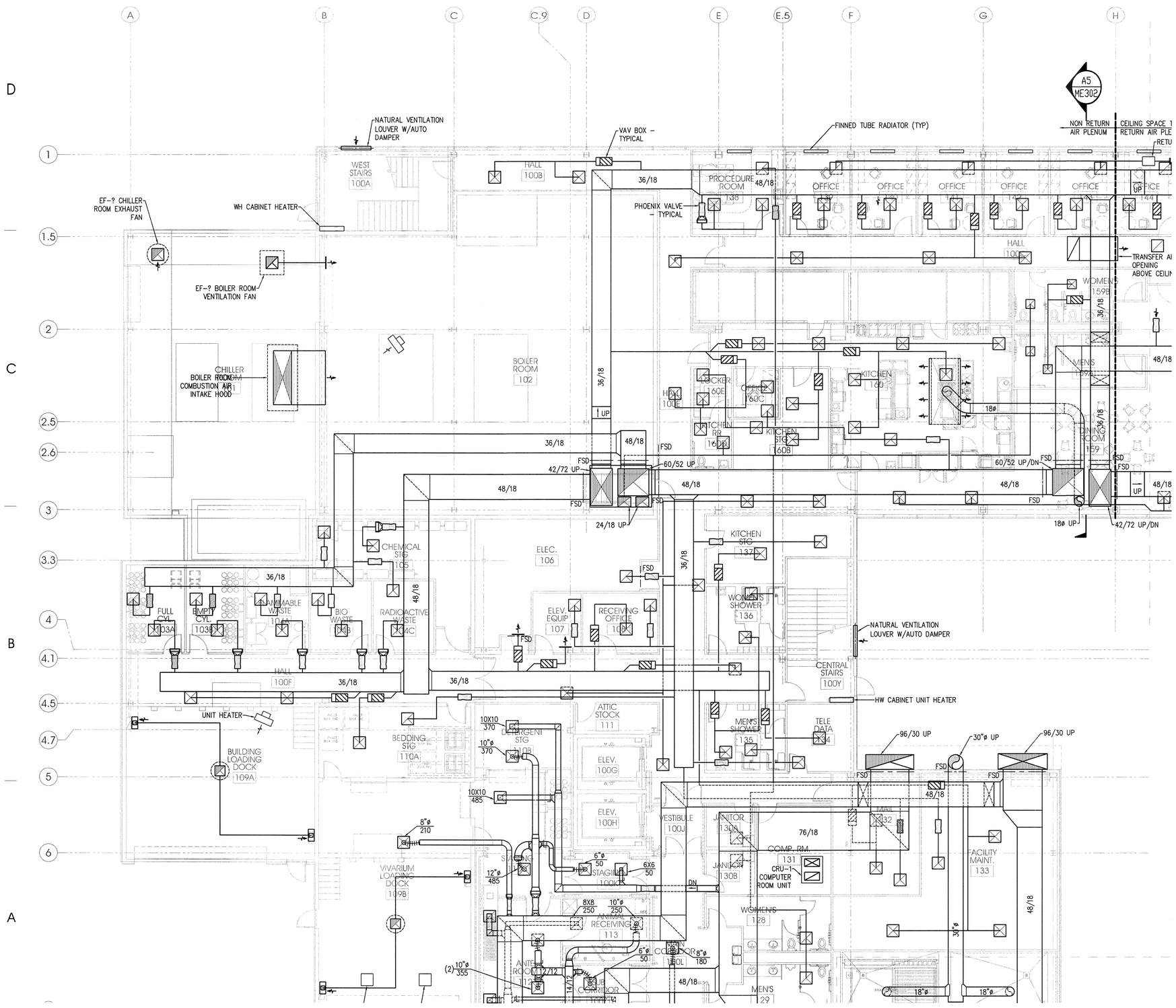
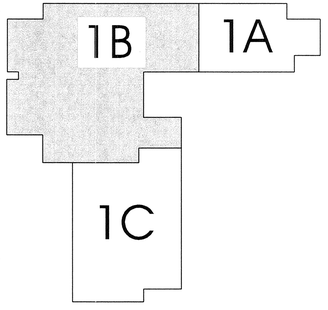


LEVEL 1 AREA B MECHANICAL DUCTWORK PLAN (A4 / MH101B)

KEY PLAN



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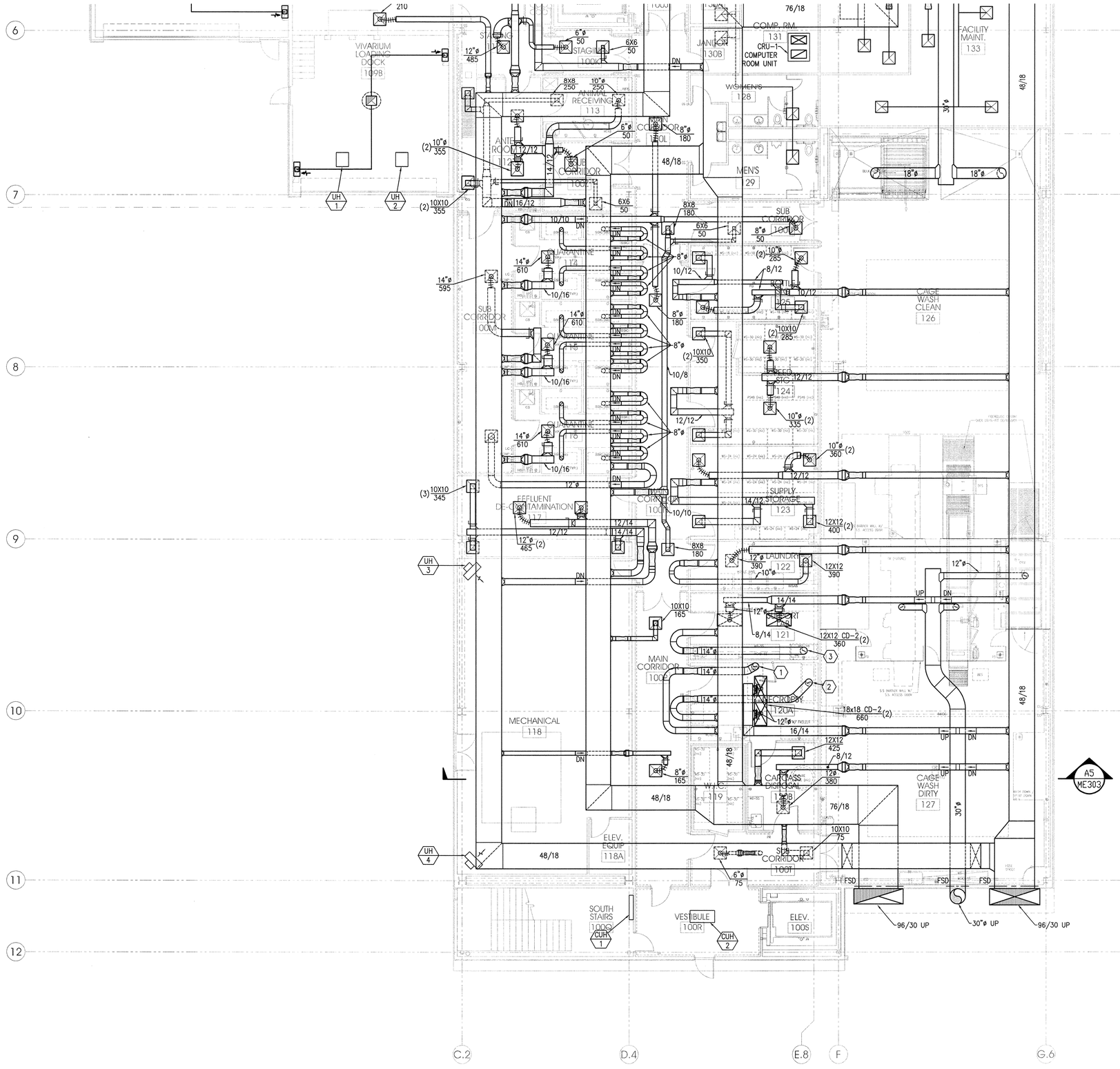
MH101B



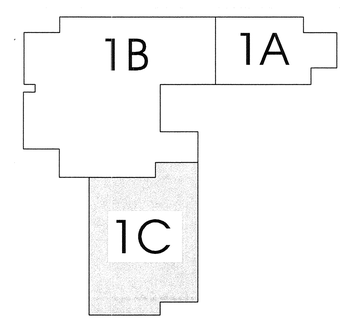
LEVEL 1 AREA C MECHANICAL DUCTWORK PLAN

A4 MH101C

KEYED NOTES

1. CONNECT EXHAUST TO NECROPSY TABLE. BALANCE TO 150 FPM FACE VELOCITY.
2. CONNECT EXHAUST DUCT TO FUME HOOD. INSTALL SASH STOP AT 18". BALANCE FUME HOOD FACE VELOCITY TO 100 FPM AT SASH HEIGHT. EXHAUST DUCT SHALL BE 316 STAINLESS STEEL.
3. CONNECT EXHAUST DUCT TO BIO SAFETY CABINET. BALANCE BIO SAFETY CABINET EXHAUST TO 100 FPM AT 8" SASH HEIGHT.

KEY PLAN



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LEVEL 1 AREA C MECHANICAL DUCTWORK PLAN

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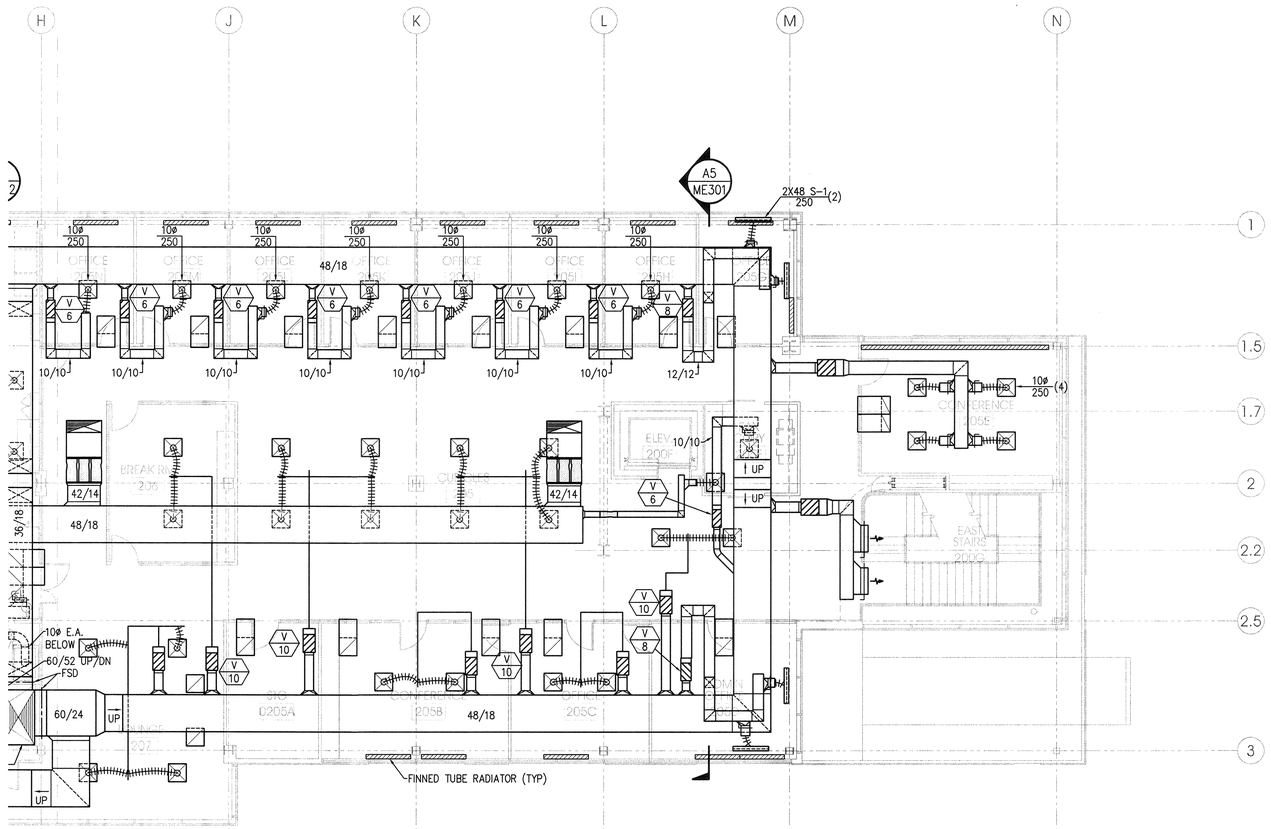

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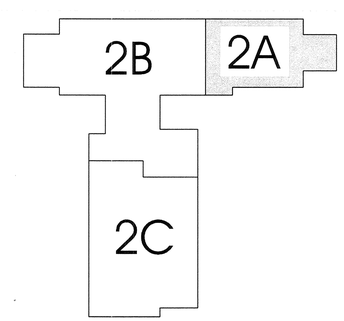

TRUE PLAN

8' 0' 8'

scale = 1/8" = 1'-0"

LEVEL 2 AREA A MECHANICAL DUCTWORK PLAN

A4
MH102A

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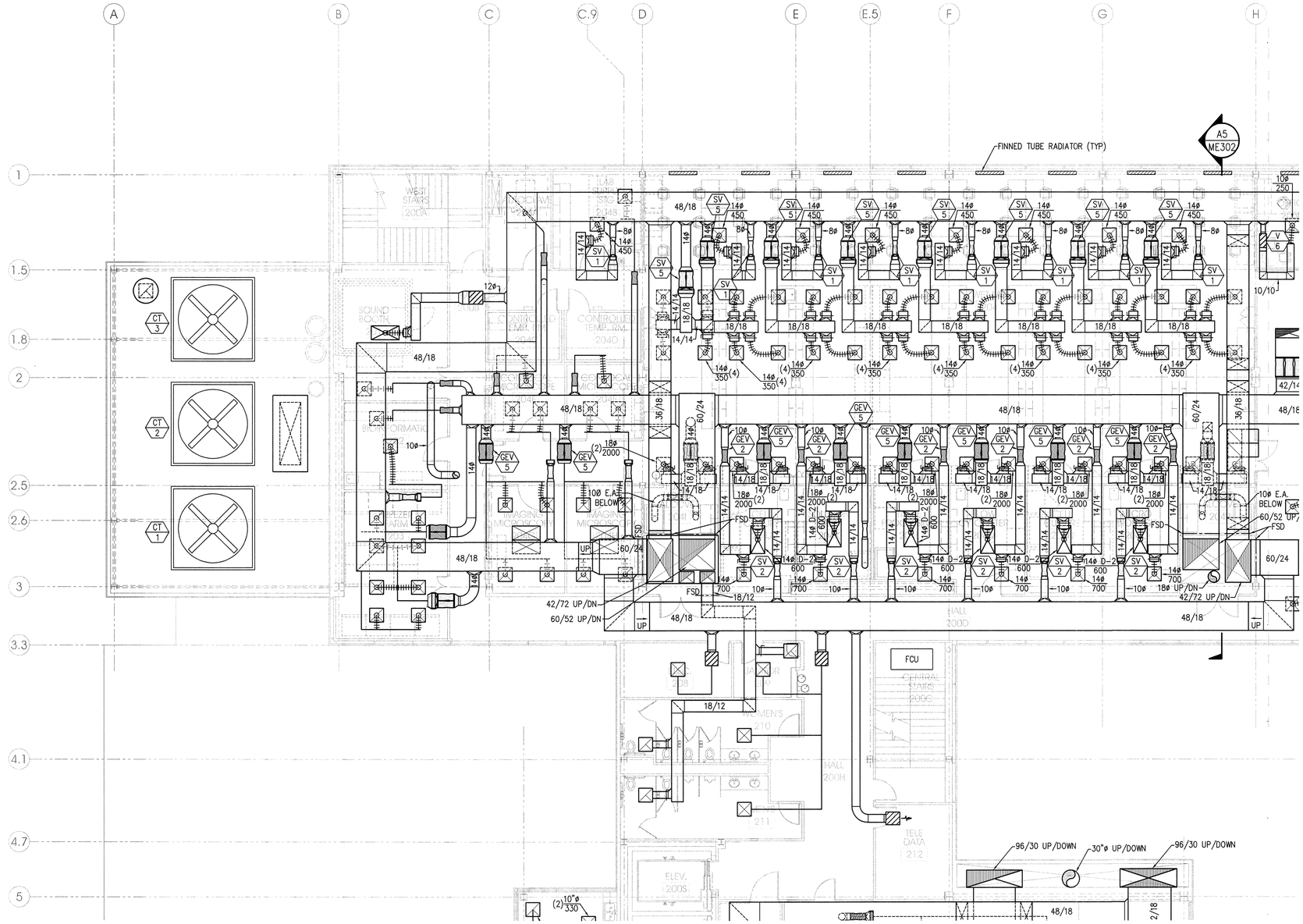

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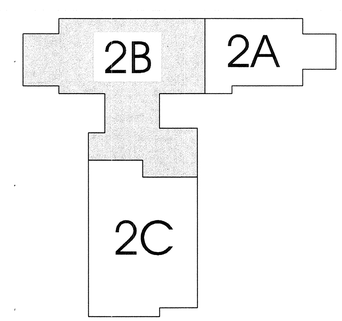

TRUE PLAN

scale = 1/8" = 1'-0"

LEVEL 2 AREA B MECHANICAL DUCTWORK PLAN

A4
MH102B

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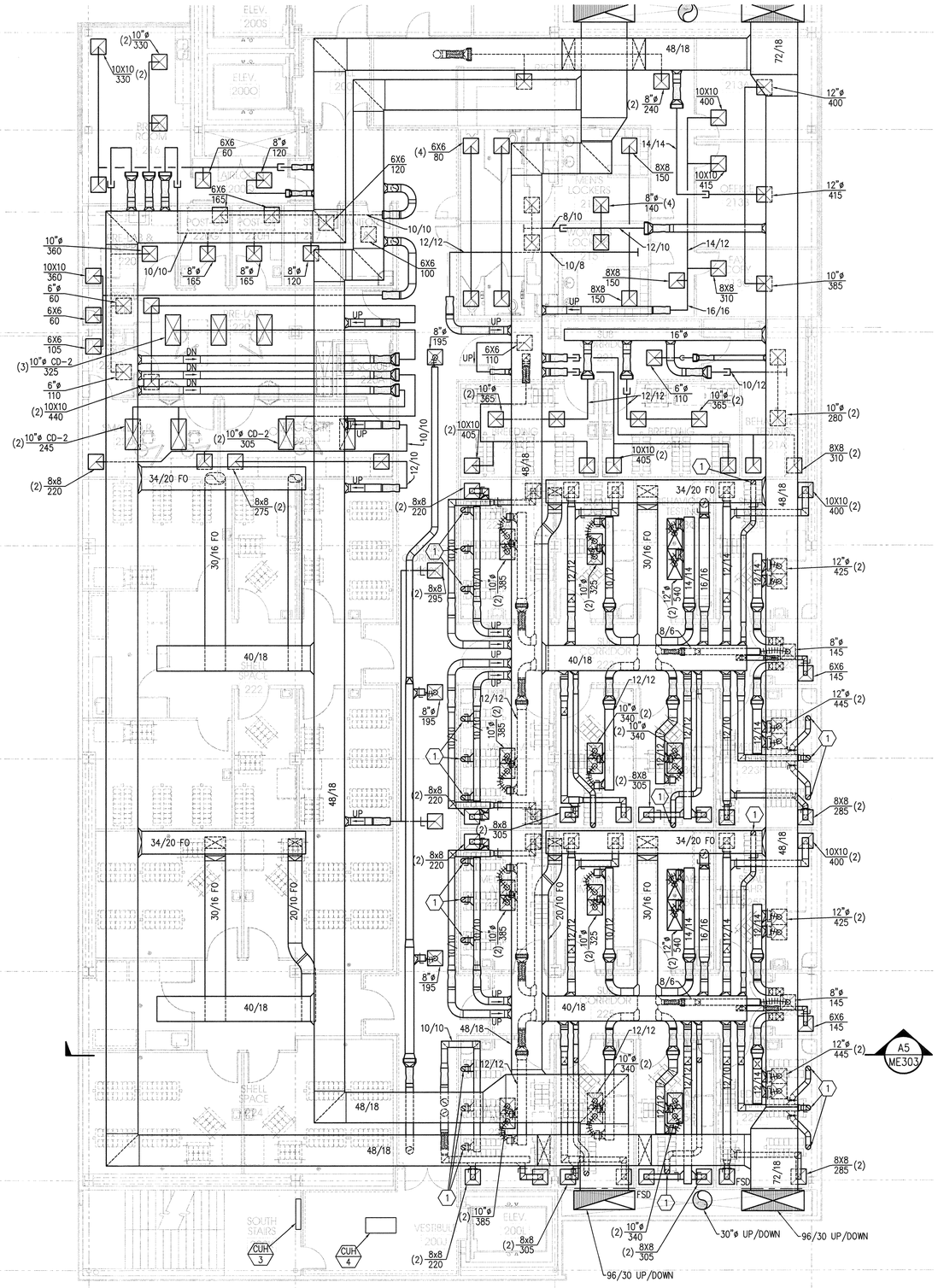


TRUE PLAN

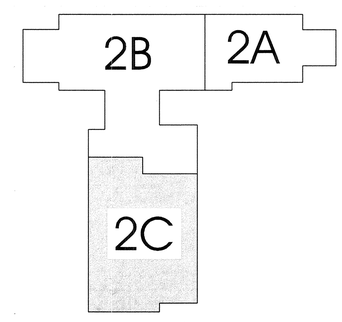
scale= 1/8" = 1'-0"

LEVEL 2 AREA C MECHANICAL DUCTWORK PLAN A4 MH102C

KEYED NOTES

1. 8"ø EXHAUST TO ANIMAL CAGE RACK. BALANCE TO 140 CFM.

KEY PLAN



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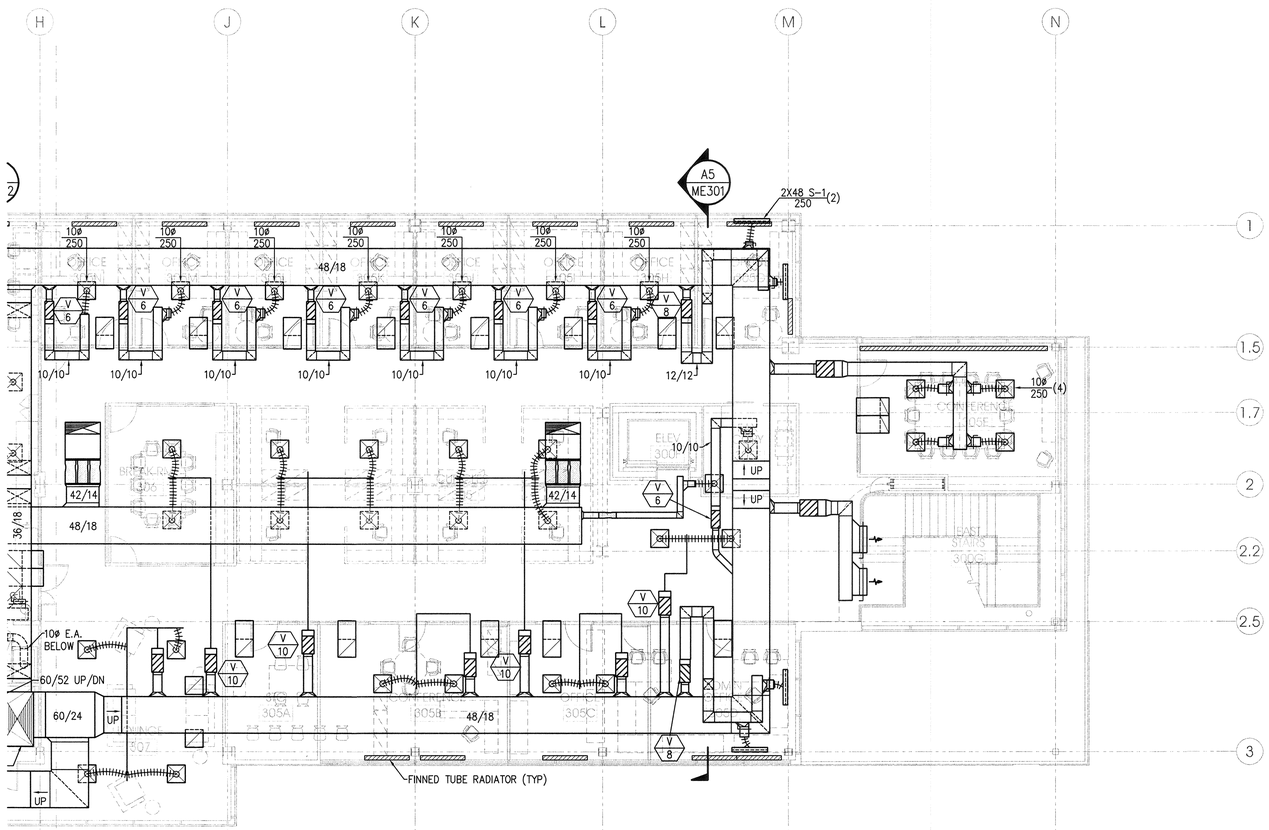


PLAN

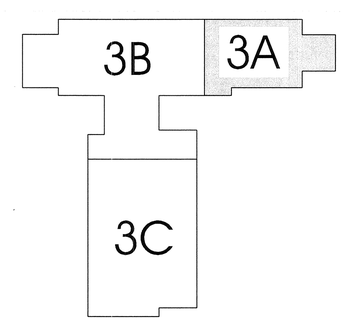
8' 0' 8'

scale = 1/8" = 1'-0"

LEVEL 3 AREA A MECHANICAL DUCTWORK PLAN

A4
MH103A

KEY PLAN



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Salt Lake City, Utah 84114
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Fax: (801) 538 - 3267

Internet: http://www.dfcm.utah.gov

PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

LEVEL 3 AREA A MECHANICAL DUCTWORK PLAN

REVISIONS

MARK	DATE	DESCRIPTION

ISSUE DATA

ISSUE DATE:	DEC. 9, 2008
ISSUE TYPE:	DESDEV
DRAWN BY:	P. COOPER
CHECKED BY:	N. SPENCER
CAD FILE NAME:	
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STATE PROPERTY #	-
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SHEET NUMBER:

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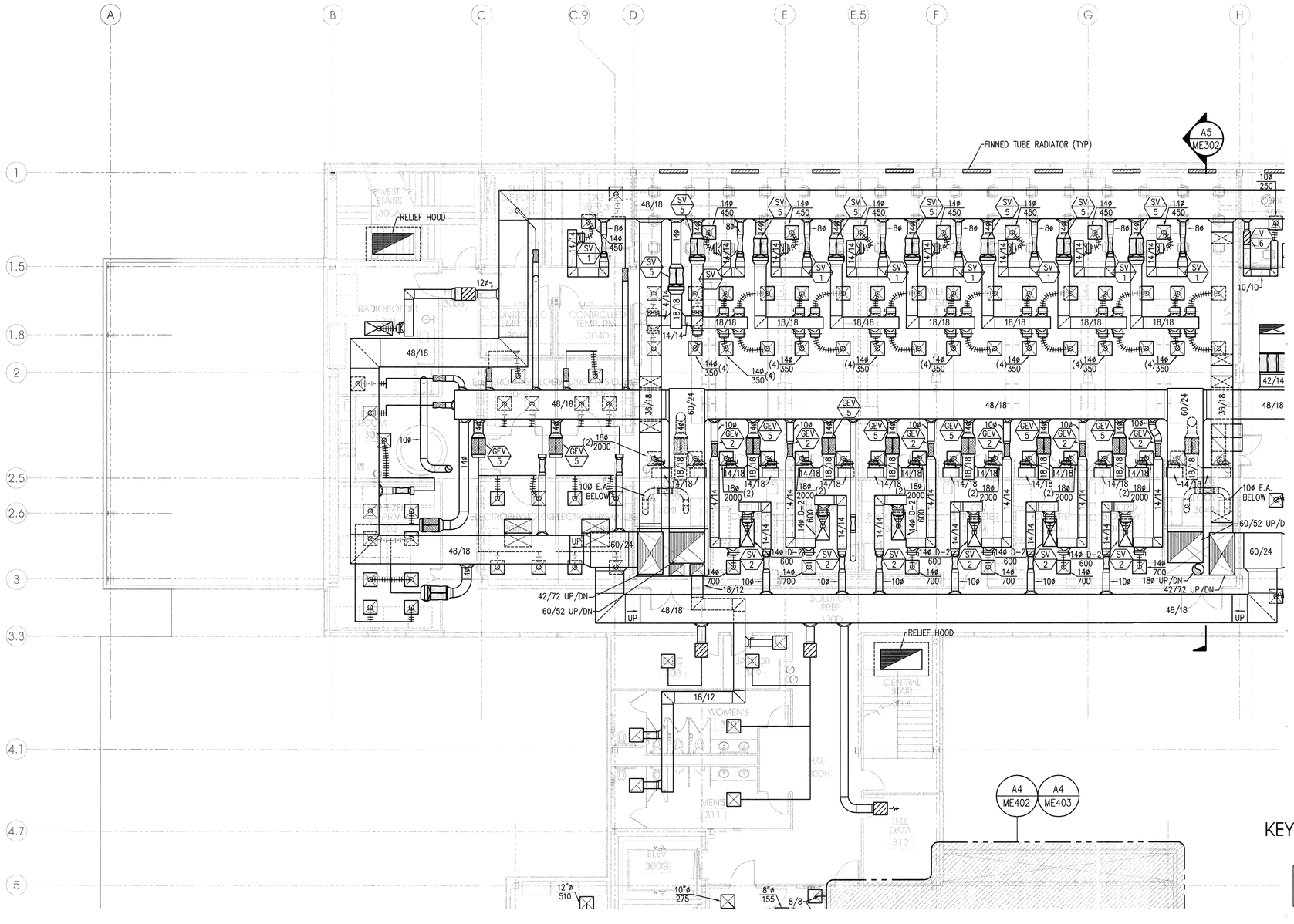


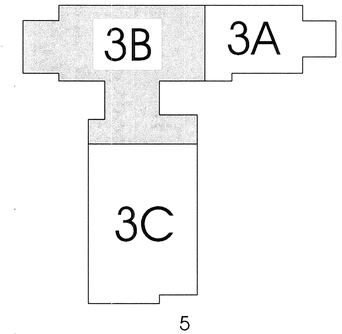
PLAN

scale = 1/8" = 1'-0"

LEVEL 3 AREA B MECHANICAL DUCTWORK PLAN

A4 MH103B

KEY PLAN



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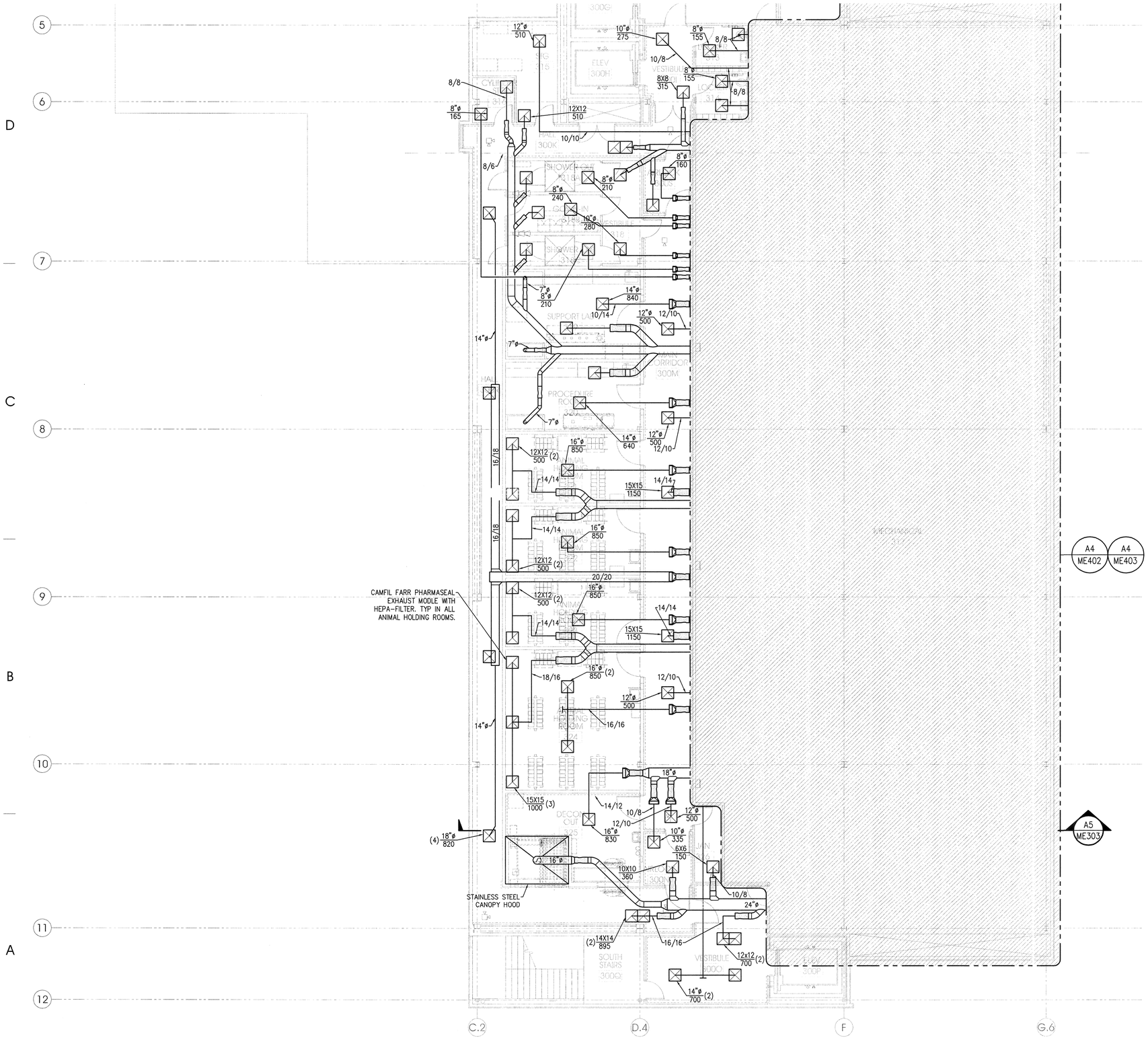


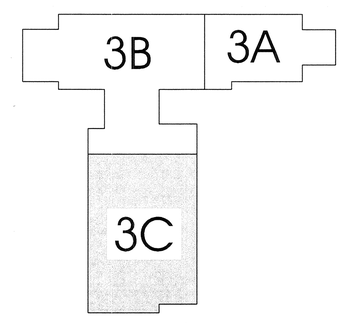
PLAN

scale= 1/8" = 1'-0"

LEVEL 3 AREA C MECHANICAL DUCTWORK PLAN

A4 MH103C

KEY PLAN



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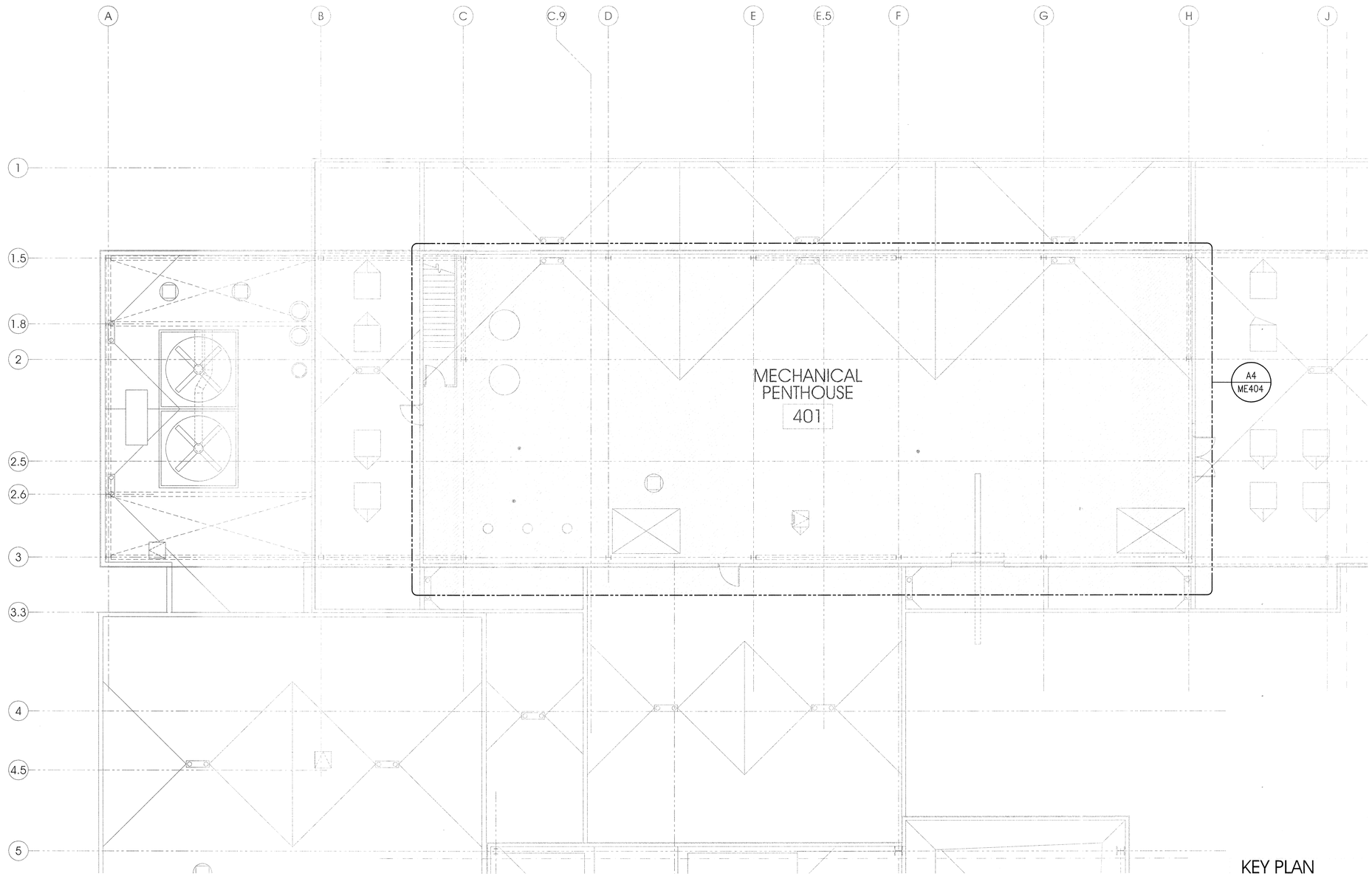

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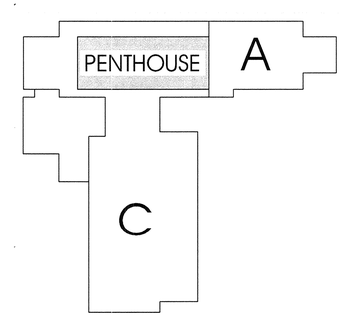

PLAN
n

8' 0' 8'
scale = 1/8" = 1'-0"

LEVEL 4 AREA B MECHANICAL DUCTWORK PLAN (A4 / MH104B)

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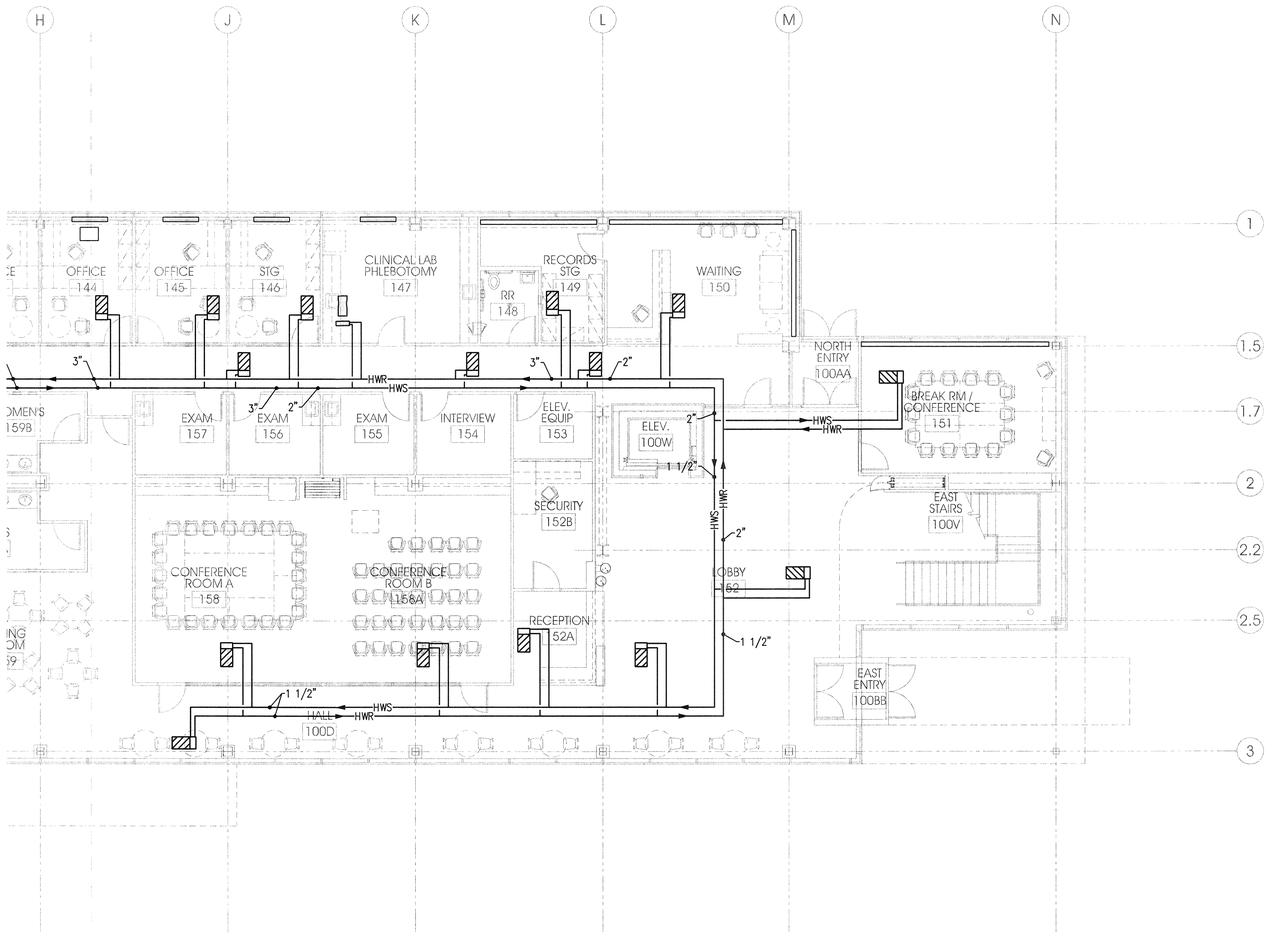


PLAN

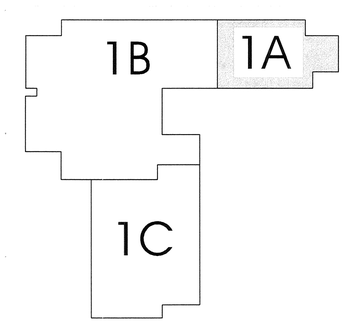
8' 0' 8'

scale = 1/8" = 1'-0"

LEVEL 1 AREA A MECHANICAL PIPING PLAN

A4
MP201A

KEY PLAN



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LEVEL 1 AREA A MECHANICAL PIPING PLAN

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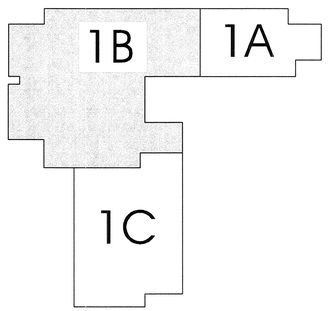
MP201A

LEVEL 1 AREA B MECHANICAL PIPING PLAN

A4
MP201B

KEY PLAN



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LEVEL 1 AREA B
MECHANICAL
PIPING PLAN

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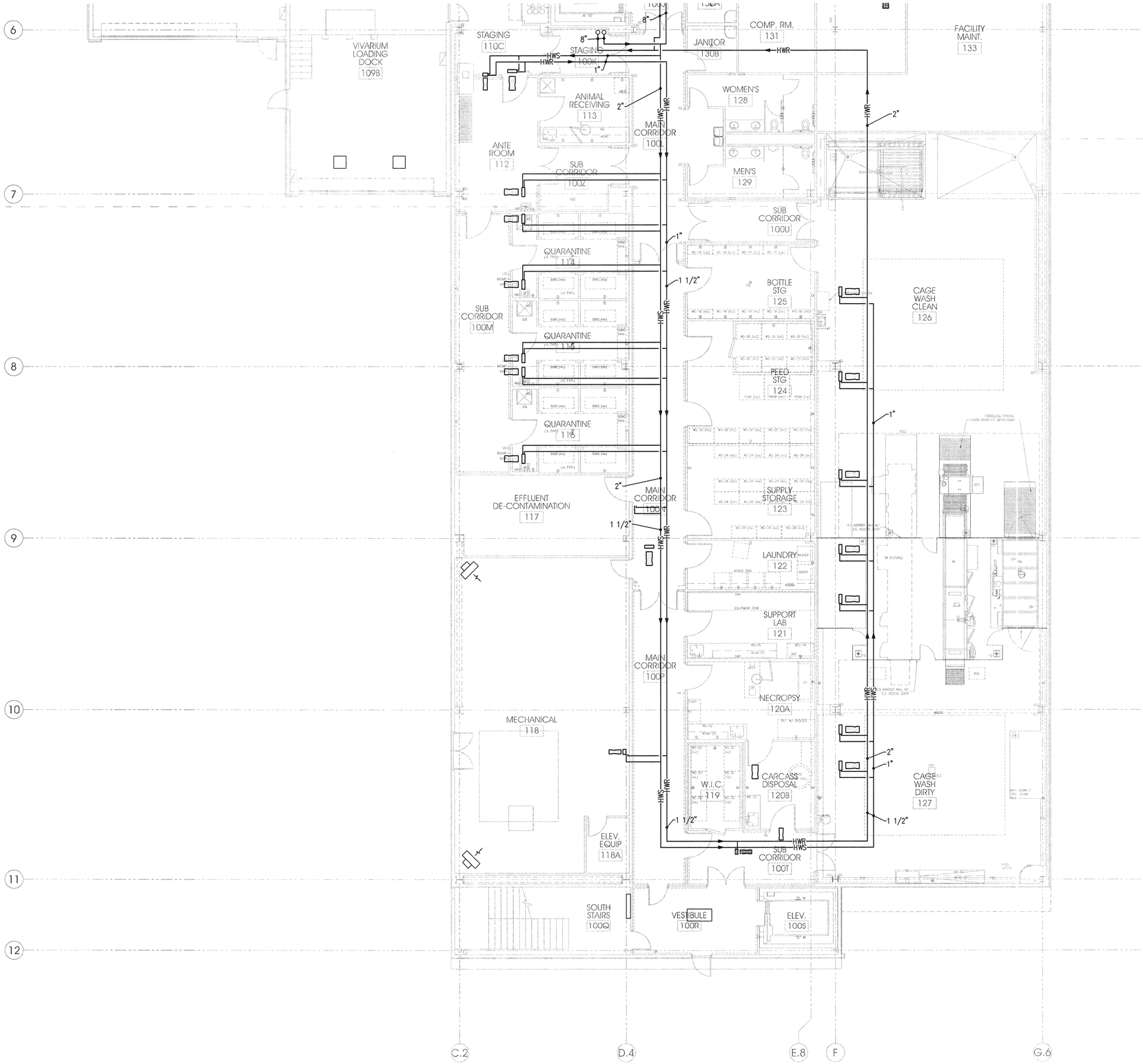


PLAN

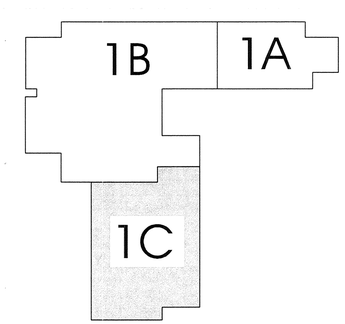
8' 0' 8'

scale = 1/8" = 1'-0"

LEVEL 1 AREA C MECHANICAL PIPING PLAN

A4
MP201C

KEY PLAN



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LEVEL 1 AREA C MECHANICAL PIPING PLAN

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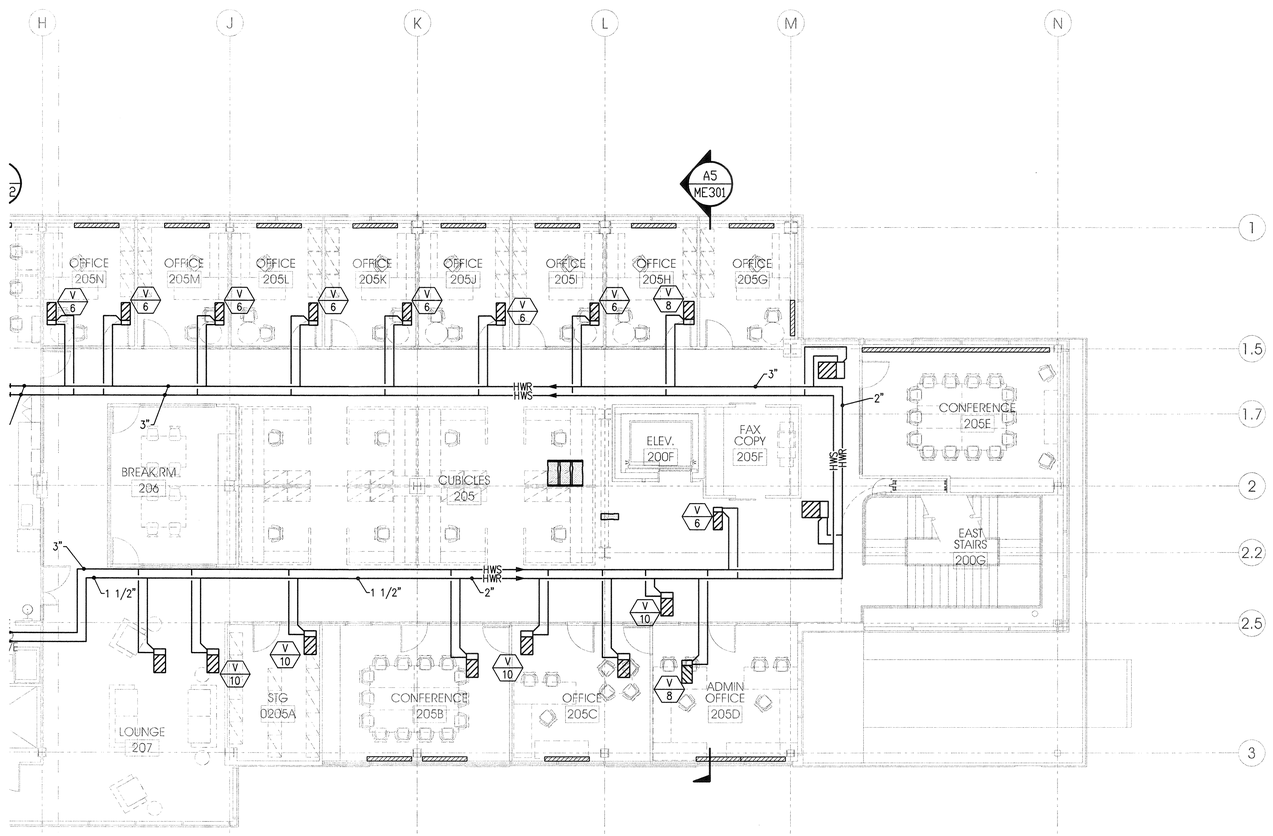
MP201C



TRUE PLAN

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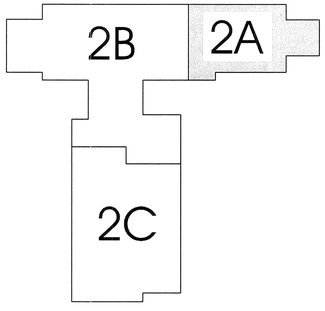
LEVEL 2 AREA A MECHANICAL PIPING PLAN (A4 / MP202A)

KEY PLAN



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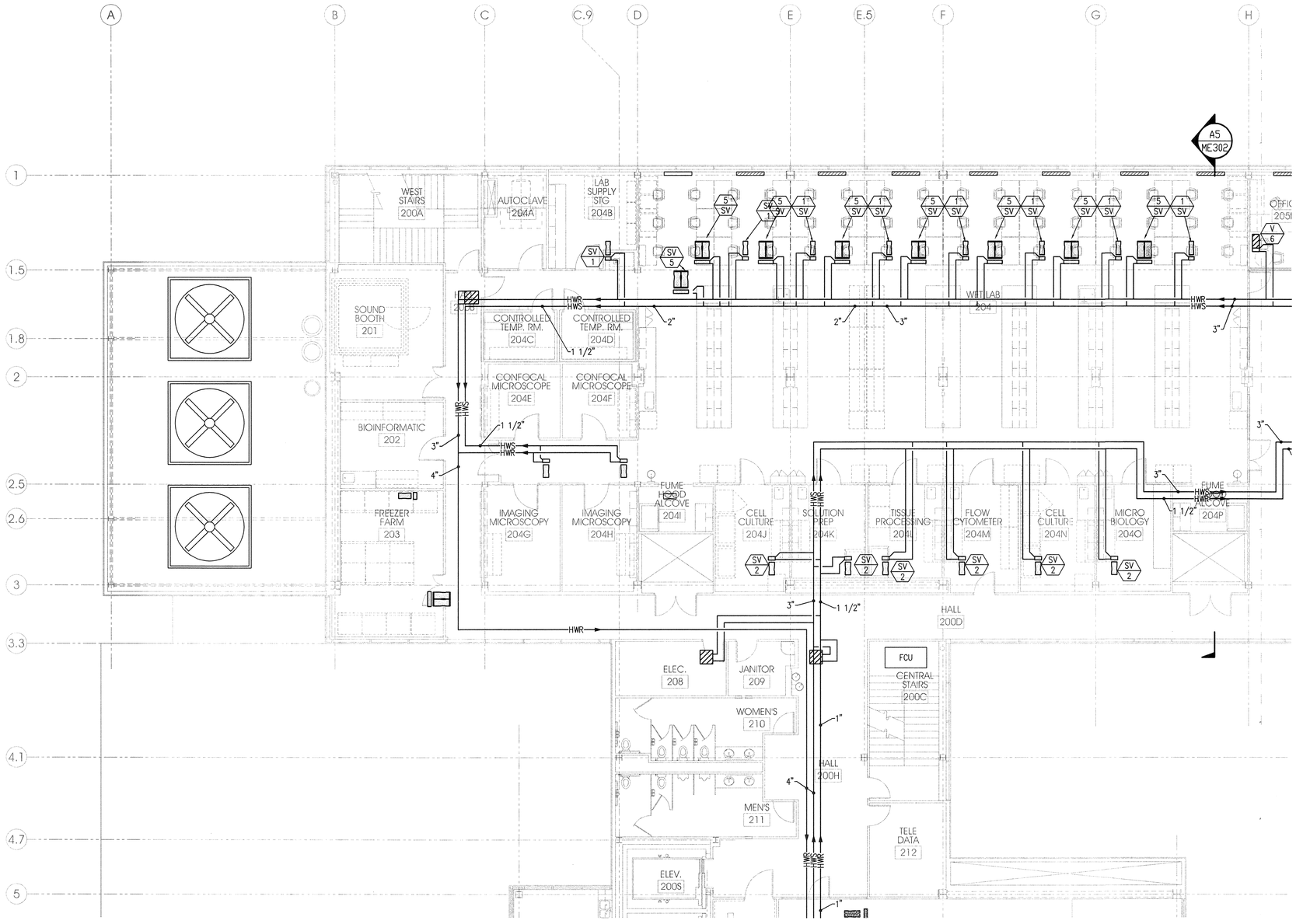

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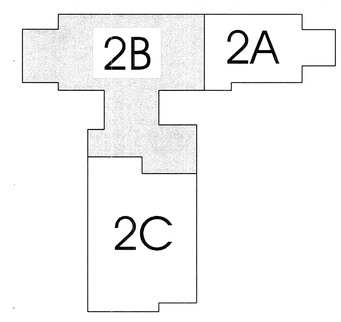

TRUE PLAN

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scale= 1/8" = 1'-0"

LEVEL 2 AREA B MECHANICAL PIPING PLAN

A4
MP202B

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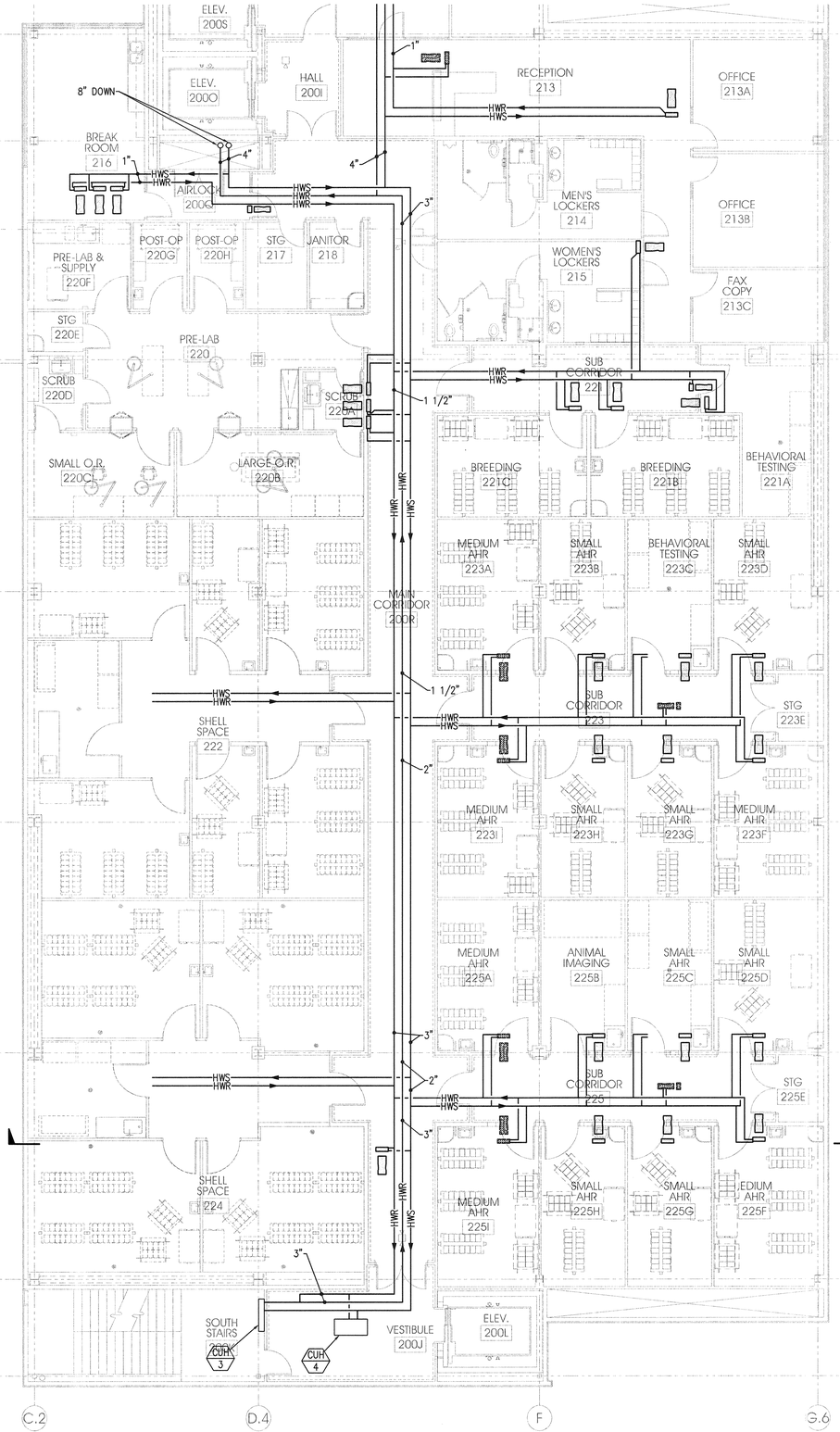

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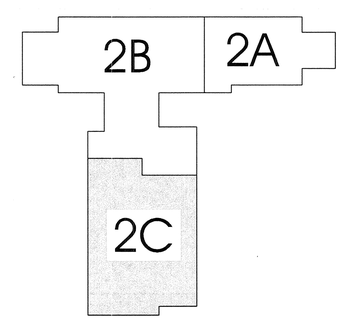
LEVEL 2 AREA C MECHANICAL PIPING PLAN

A4 MP202C

KEY PLAN



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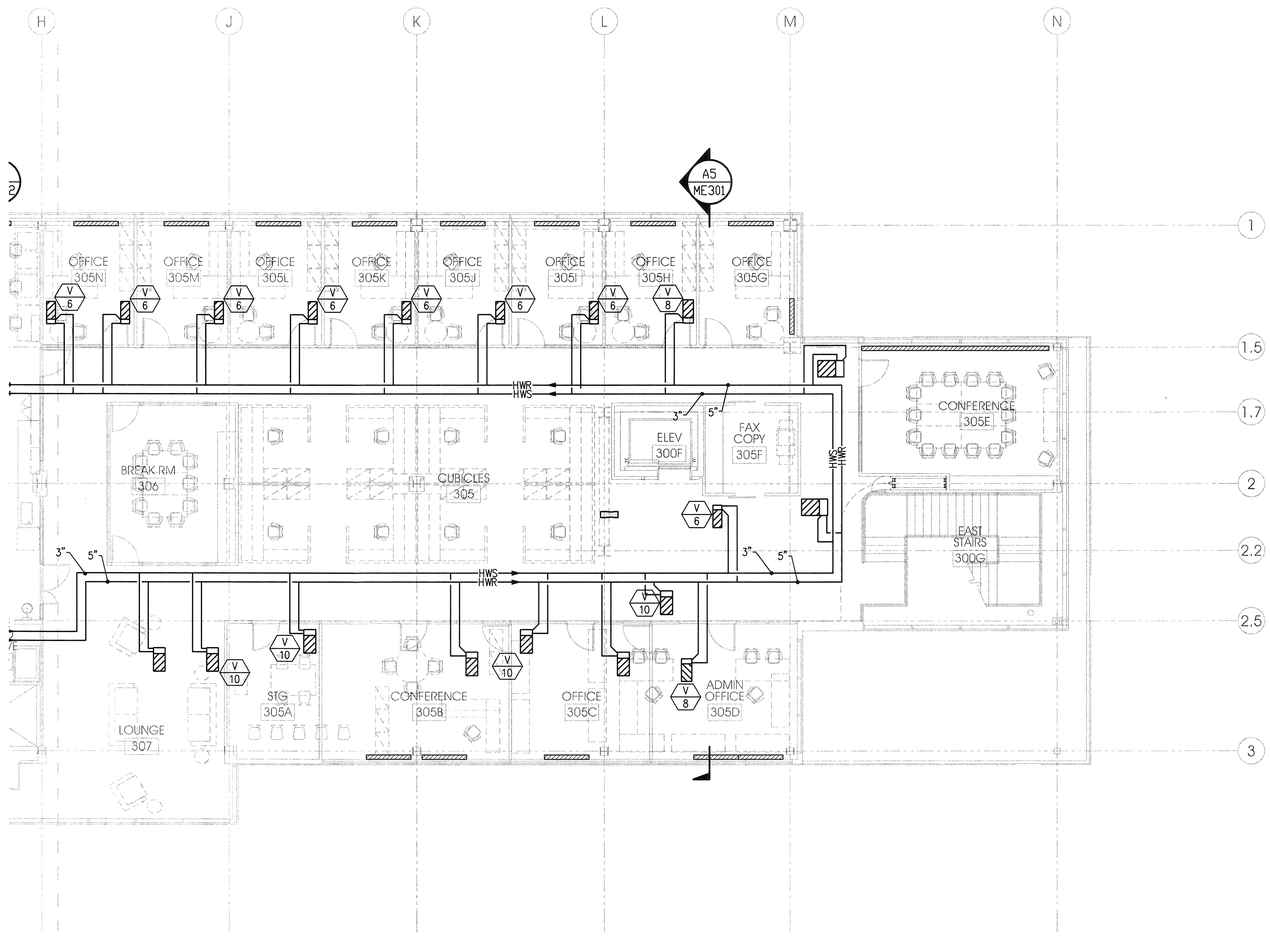

PLAN
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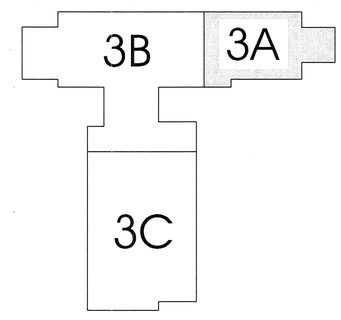
8' 0' 8'
scale = 1/8" = 1'-0"

LEVEL 3 AREA A MECHANICAL PIPING PLAN

A4
MP203A

KEY PLAN



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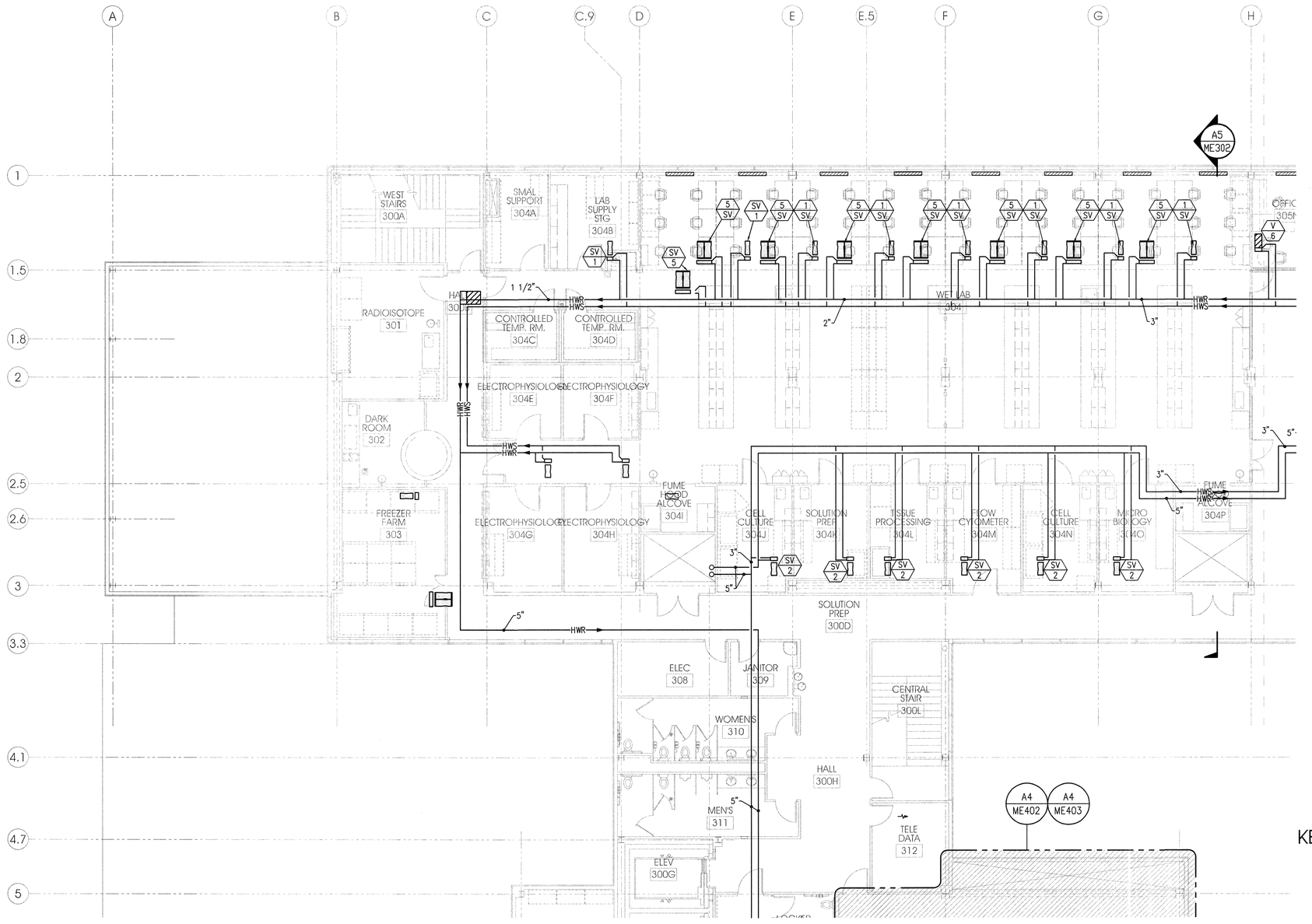

PLAN

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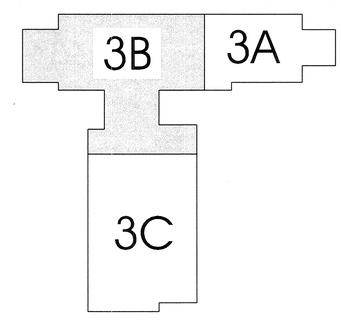
LEVEL 3 AREA B MECHANICAL PIPING PLAN (A4 / MP203B)

KEY PLAN



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OWNER INFORMATION

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Internet: http://www.dfcm.utah.gov

PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:
LEVEL 3 AREA B MECHANICAL PIPING PLAN

REVISIONS

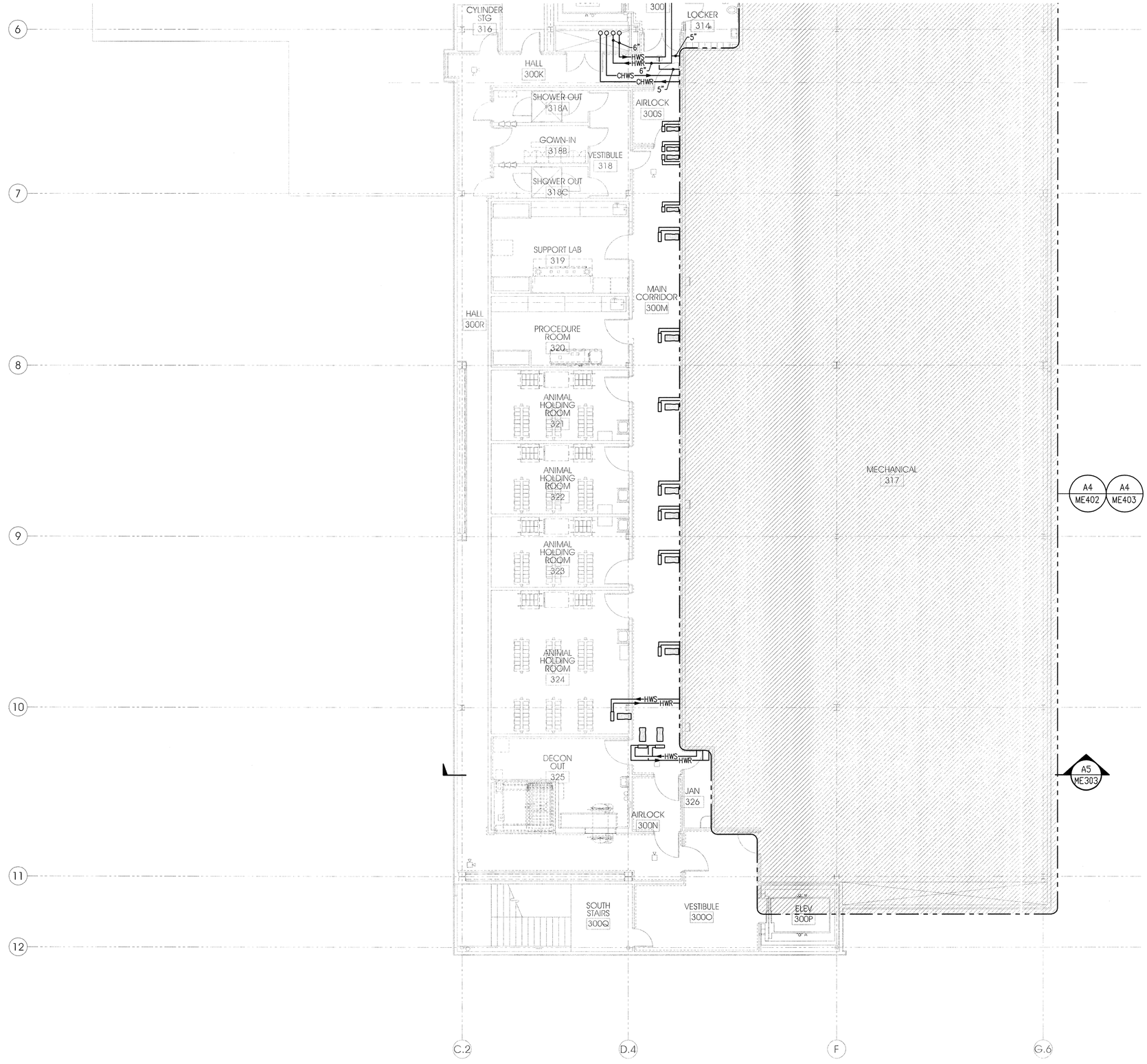
MARK	DATE	DESCRIPTION

ISSUE DATA

ISSUE DATE:	DEC. 9, 2008
ISSUE TYPE:	DESDEV
DRAWN BY:	P. COOPER
CHECKED BY:	N. SPENCER
CAD FILE NAME:	
DFCM PROJECT #	06292770
STATE PROPERTY #	-
COPYRIGHT:	STATE OF UTAH

SHEET NUMBER:

MP203B



PLAN
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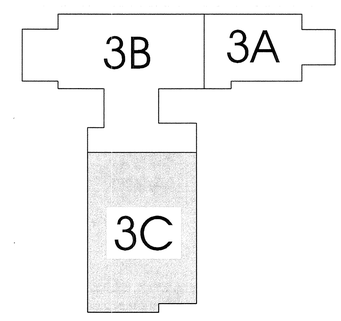
LEVEL 3 AREA C MECHANICAL PIPING PLAN
A4
MP203C

KEY PLAN



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LOGAN, UTAH

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LEVEL 3 AREA C
MECHANICAL
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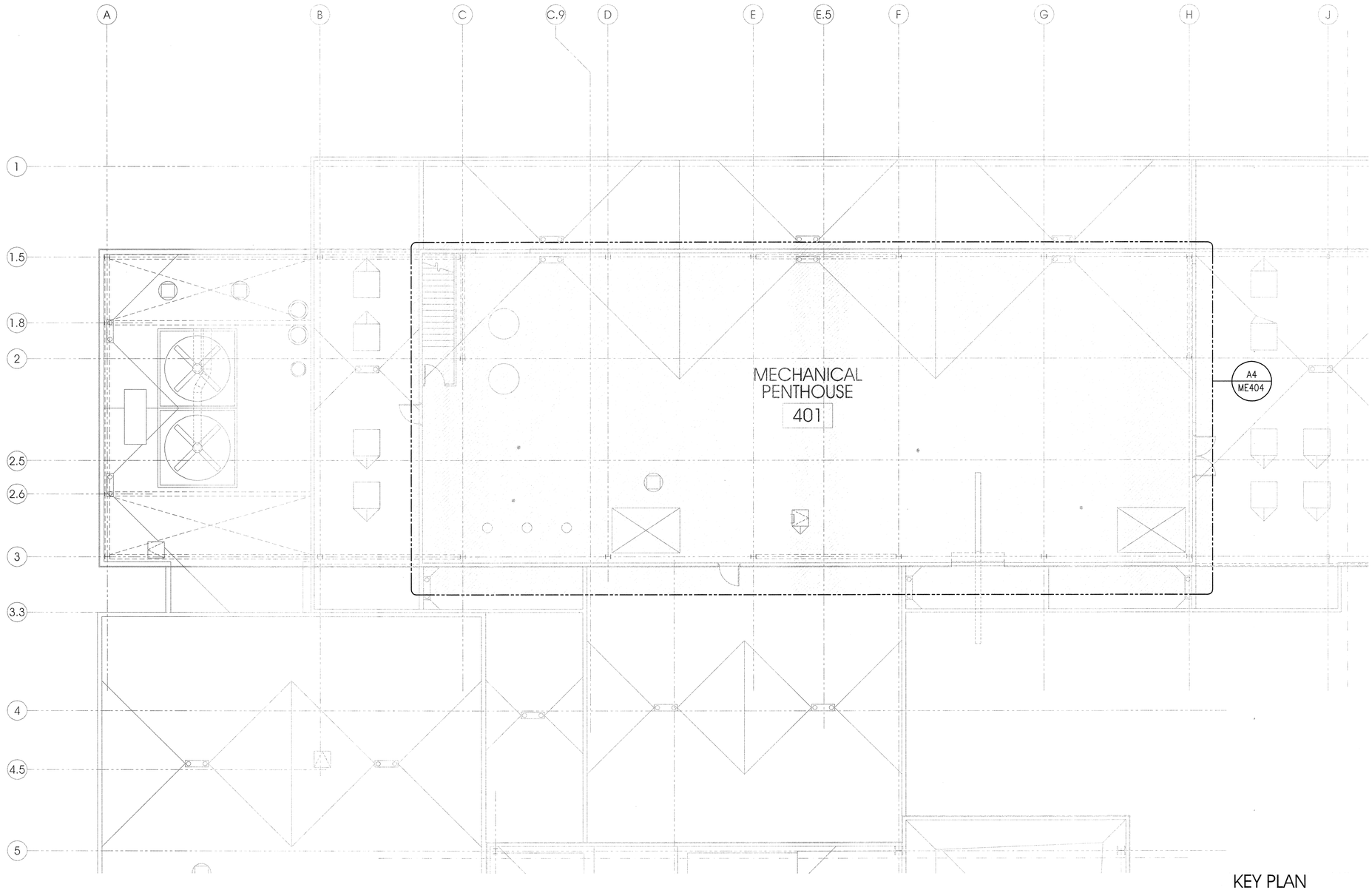
MP203C



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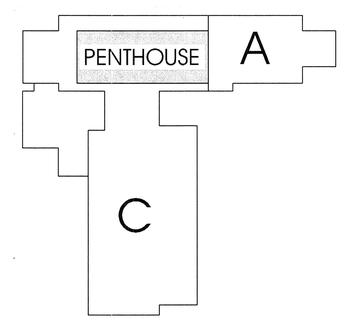

PLAN
n

8' 0' 8'
scale = 1/8" = 1'-0"

LEVEL 4 AREA B MECHANICAL PIPING PLAN

A4
MP204B

ARCHITECT 0818

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LEVEL 4 AREA B
MECHANICAL
PIPING PLAN

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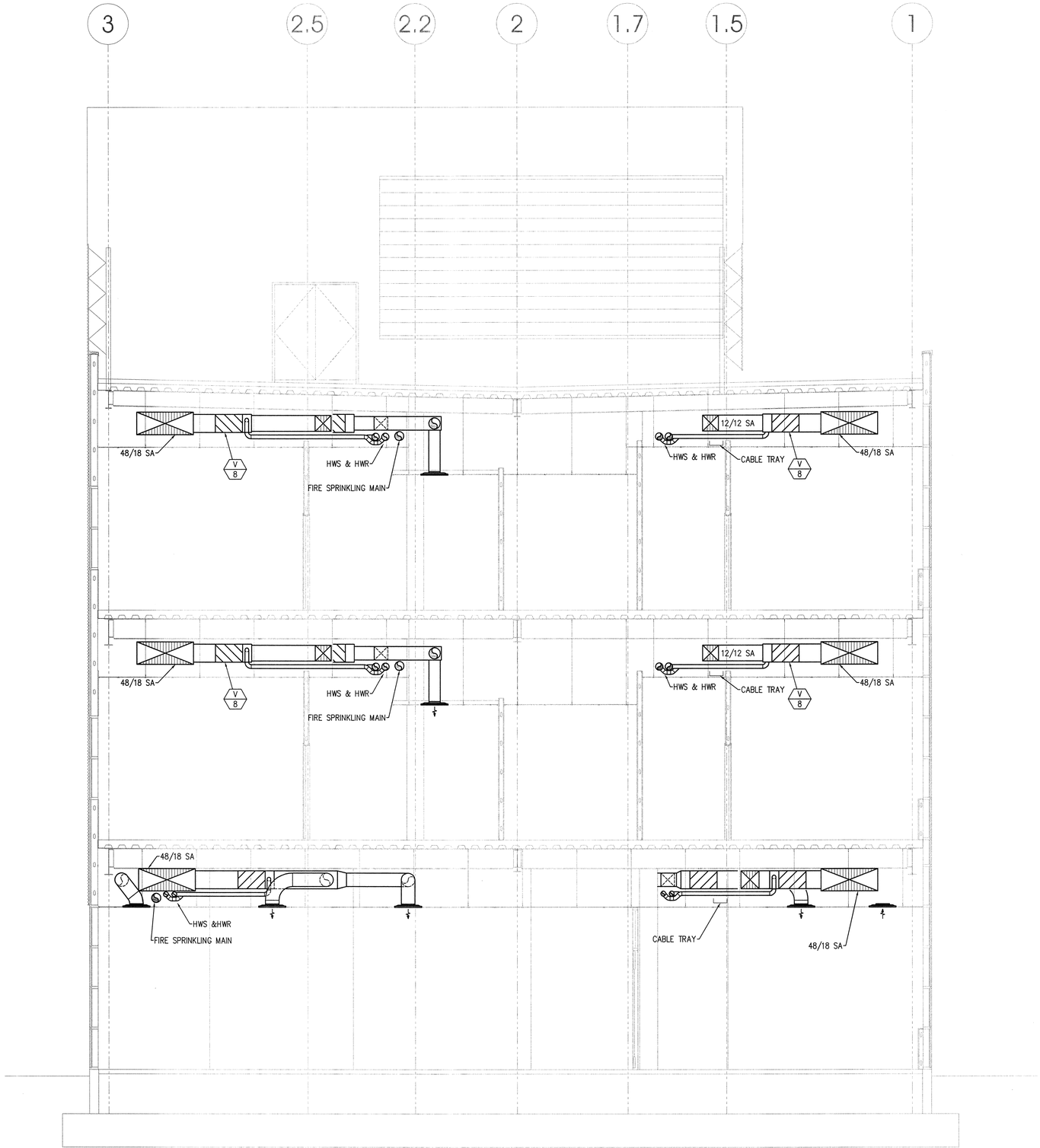
SHEET NUMBER:

MP204B



4' 0' 4'
scale = 1/4" = 1'-0"

MECHANICAL SECTION A4 ME301

ARCHITECT 0818

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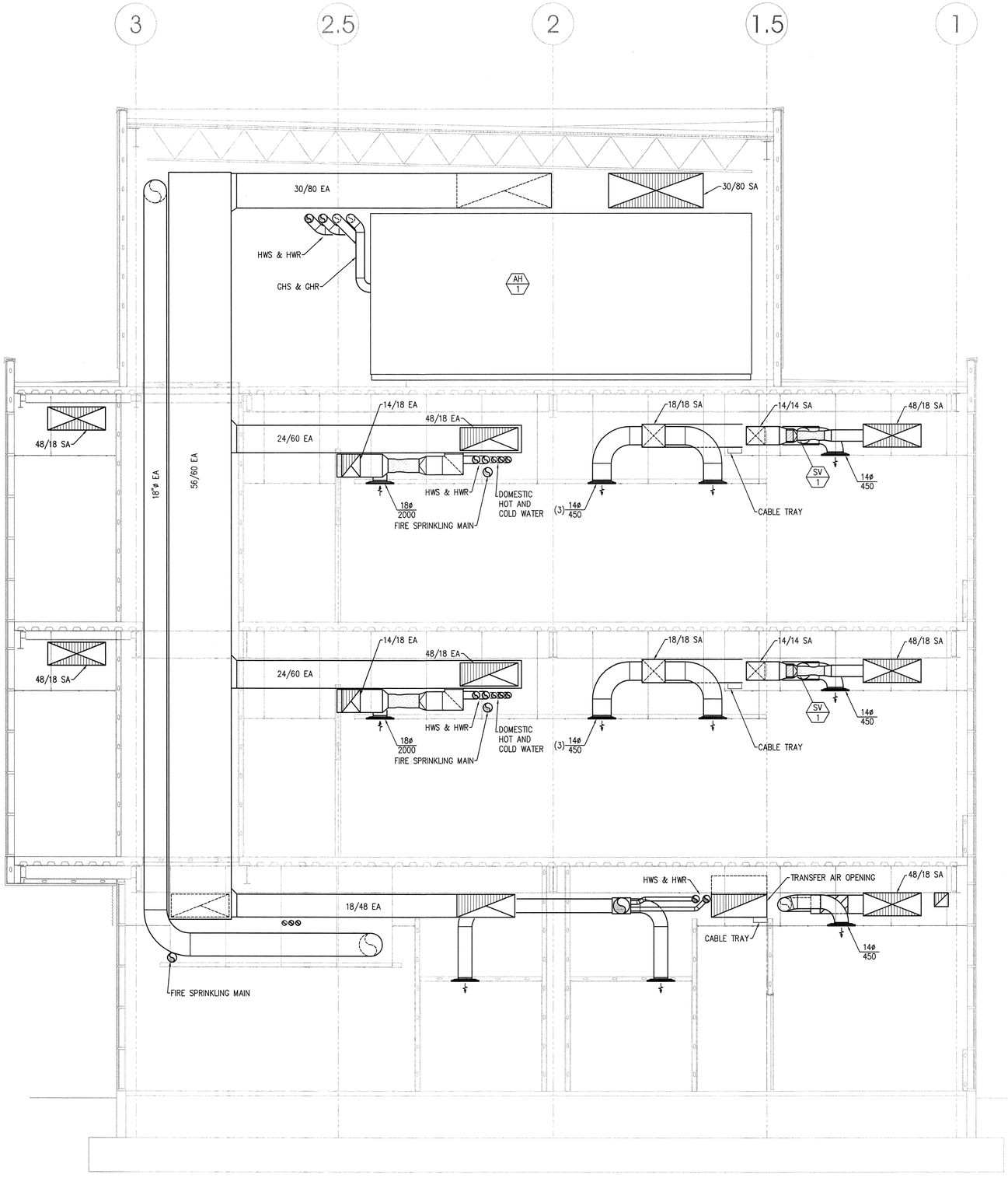
ME301



4' 0' 4'
scale = 1/4" = 1'-0"

MECHANICAL SECTION A4 ME302

ARCHITECT 0818

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SHEET NUMBER:
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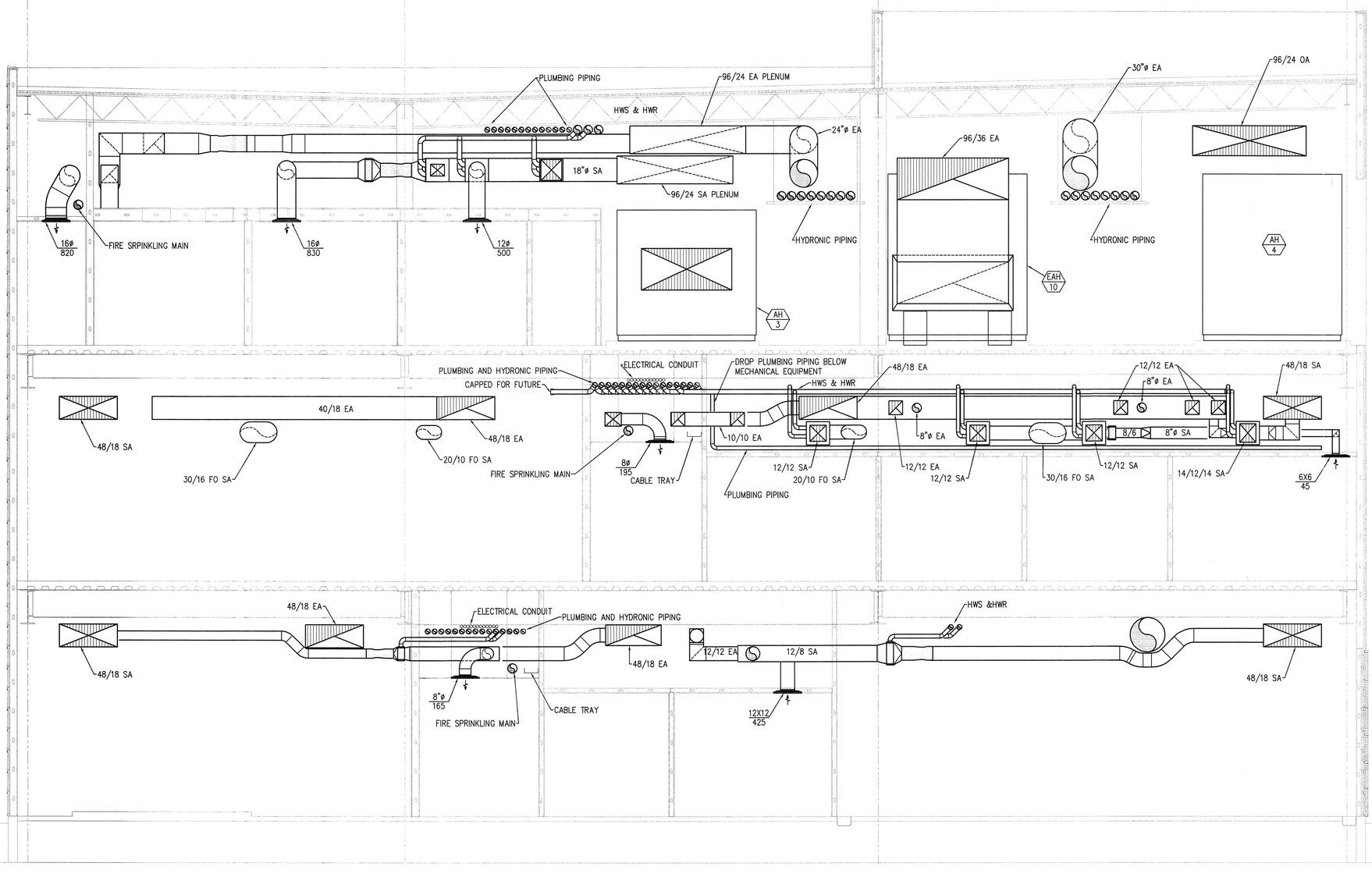

4' 0' 4'
scale = 1/4" = 1'-0"

MECHANICAL SECTION (A4 / ME303)

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SHEET NUMBER:
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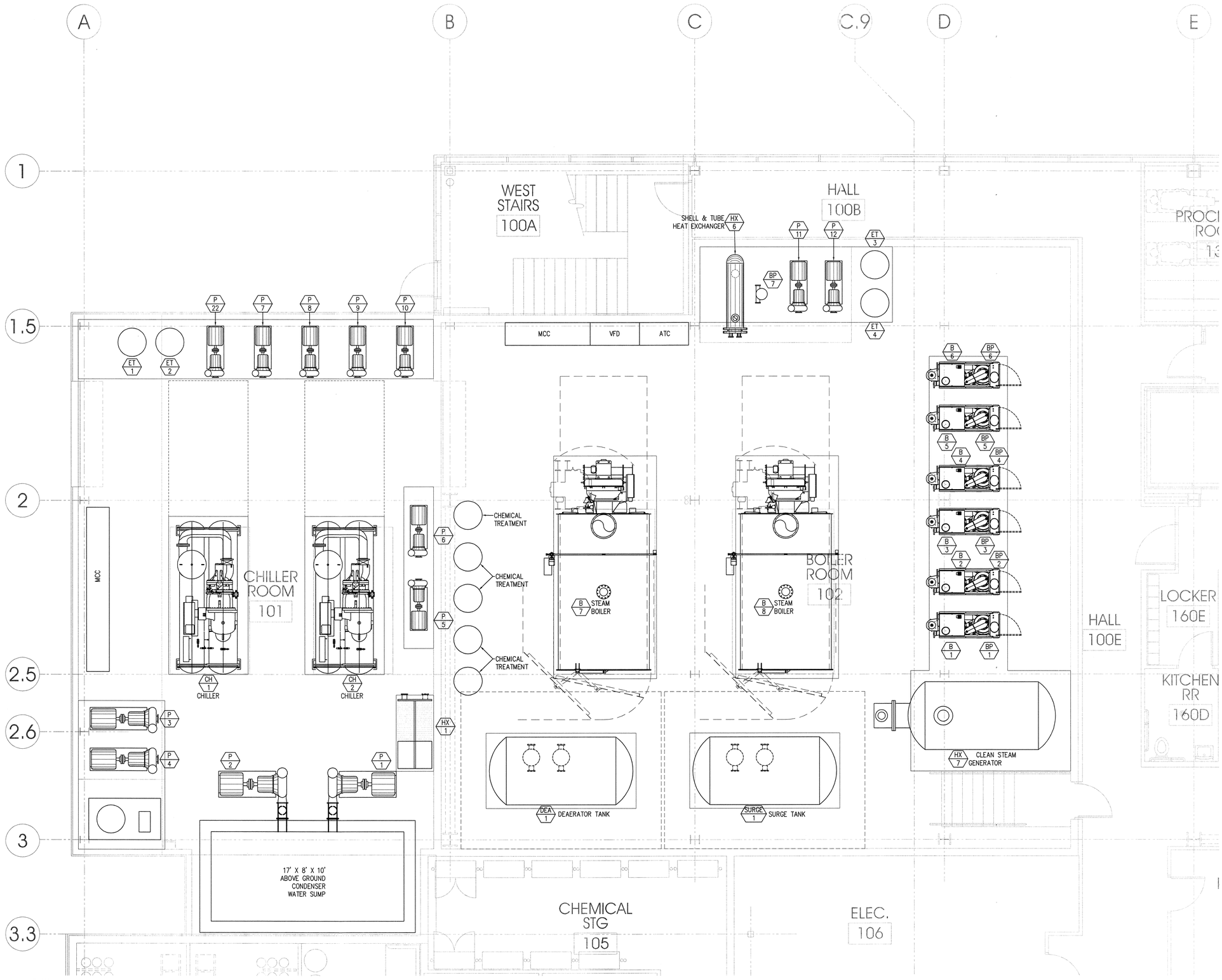

BOILER/CHILLER ROOM PLAN A3 ME401

ARCHITECT 0818

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USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

LARGE SCALE BOILER & CHILLER ROOM PLAN

REVISIONS

MARK	DATE	DESCRIPTION

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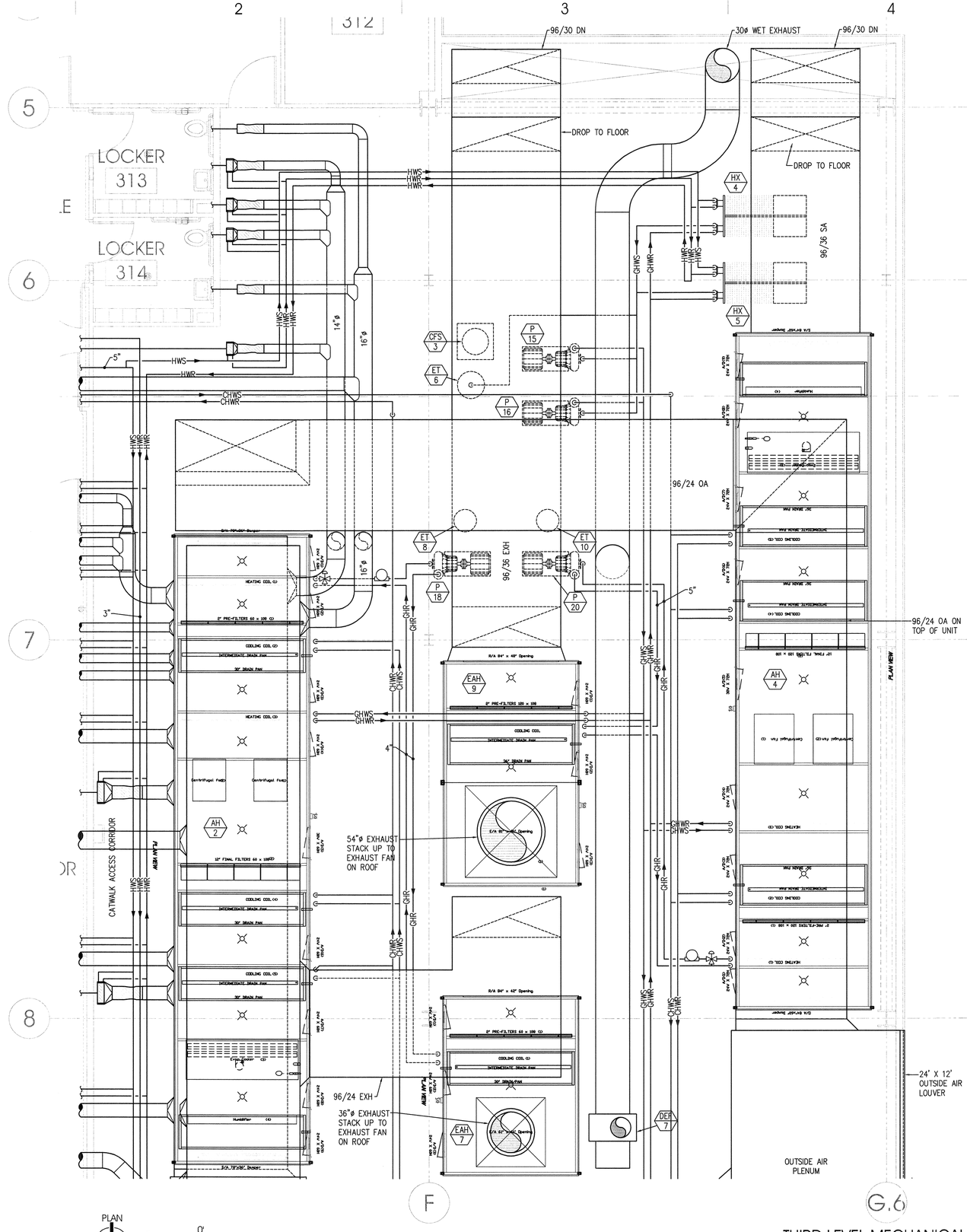
ME401



PLAN
n

4' 0' 4'
scale= 1/4" = 1'-0"

THIRD LEVEL MECHANICAL PLAN A4 ME402

ARCHITECT 0818

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SHEET NAME:

LARGE SCALE THIRD LEVEL MECHANICAL ROOM PLAN

REVISIONS

MARK	DATE	DESCRIPTION

ISSUE DATA

ISSUE DATE:	DEC. 9, 2008
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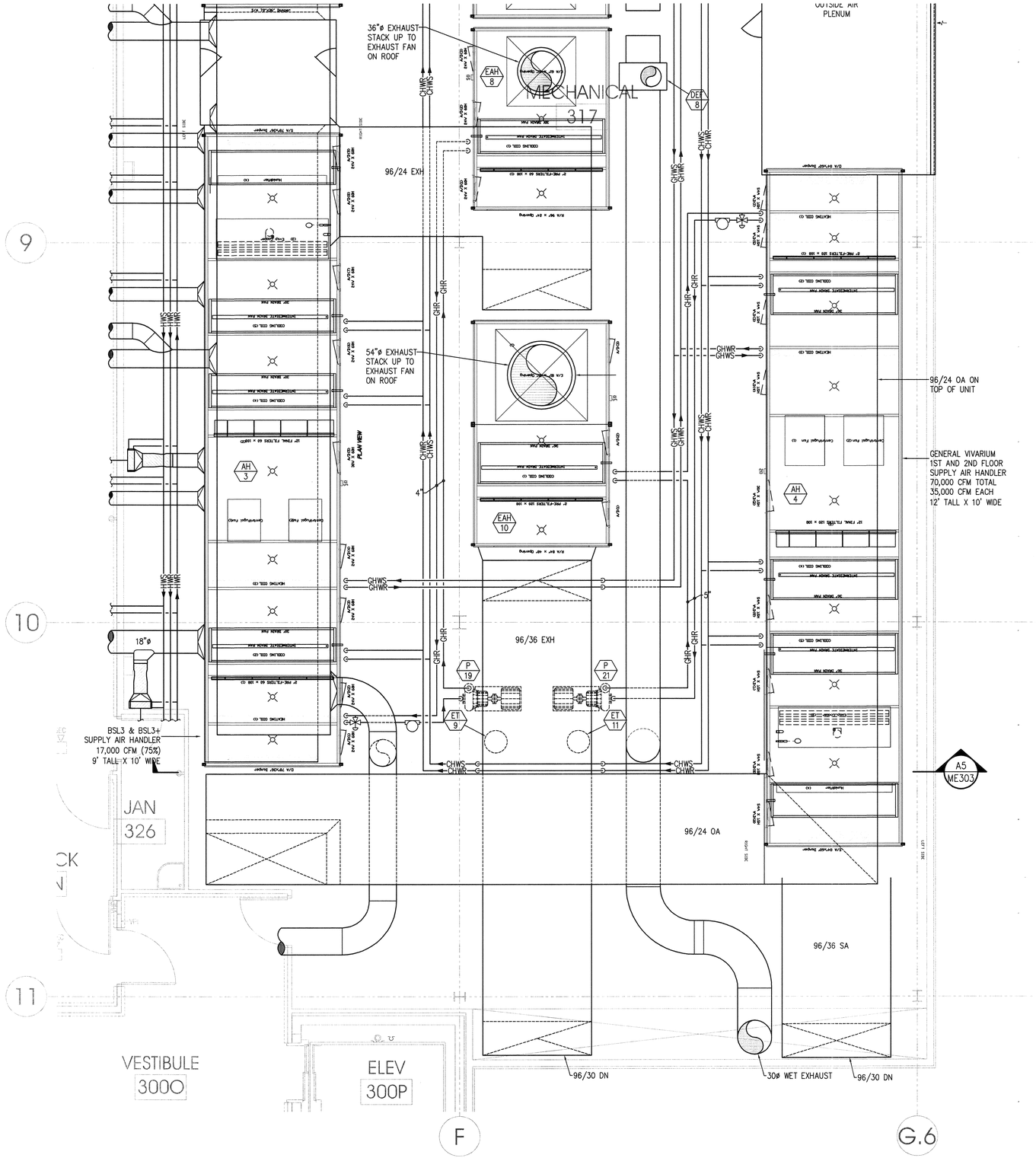
SHEET NUMBER:

ME402



PLAN n

4' 0' 4'
scale = 1/4" = 1'-0"

THIRD LEVEL MECHANICAL ROOM PLAN A4 ME403

ARCHITECT 0818

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USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

LARGE SCALE THIRD LEVEL MECHANICAL ROOM PLAN

REVISIONS

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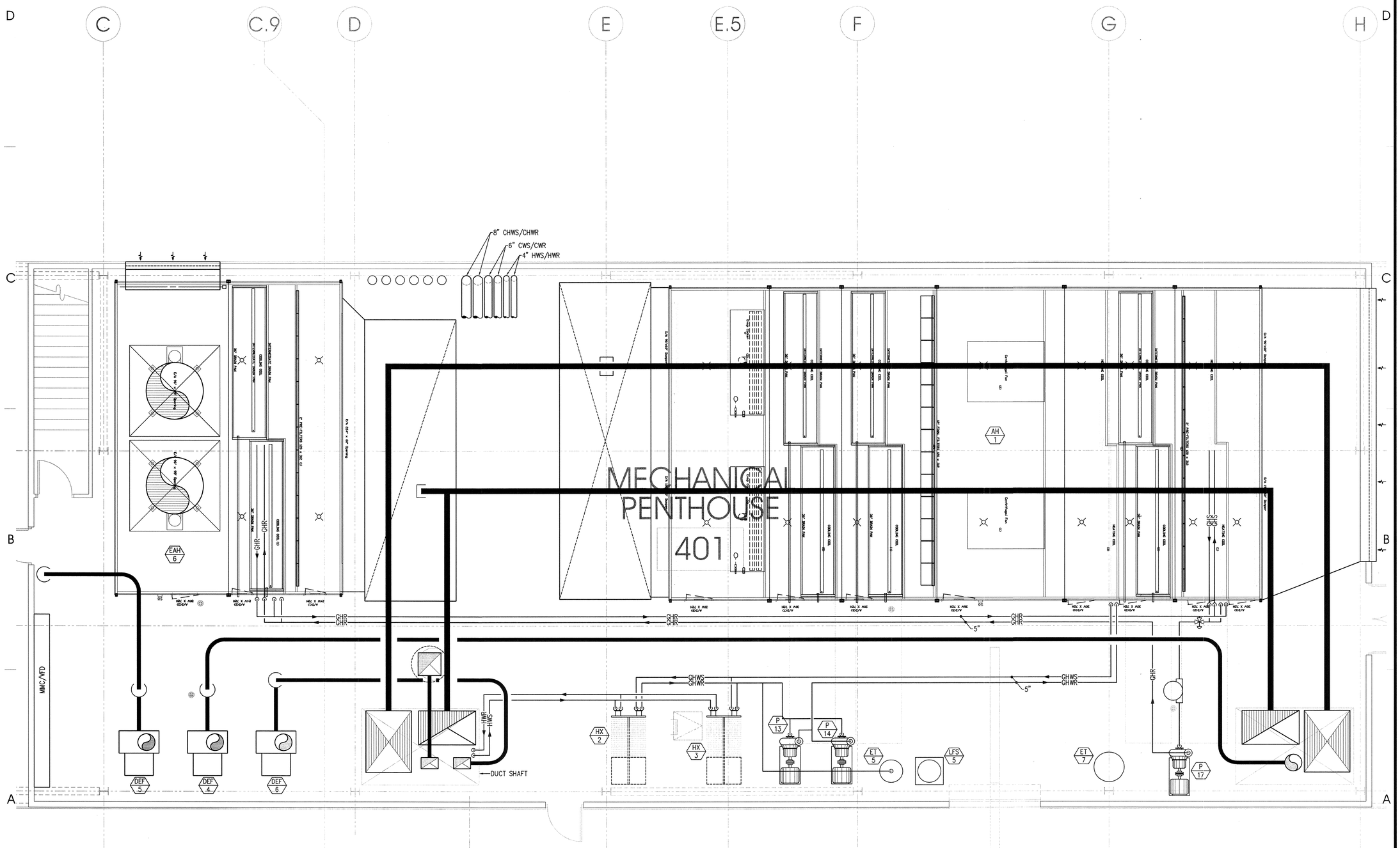
ME403



PLAN

scale= 1/4" = 1'-0"

PENTHOUSE LEVEL MECHANICAL PLAN (A4 / ME404)

ARCHITECT 0818

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USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

LARGE SCALE PENTHOUSE MECHANICAL ROOM PLAN

REVISIONS

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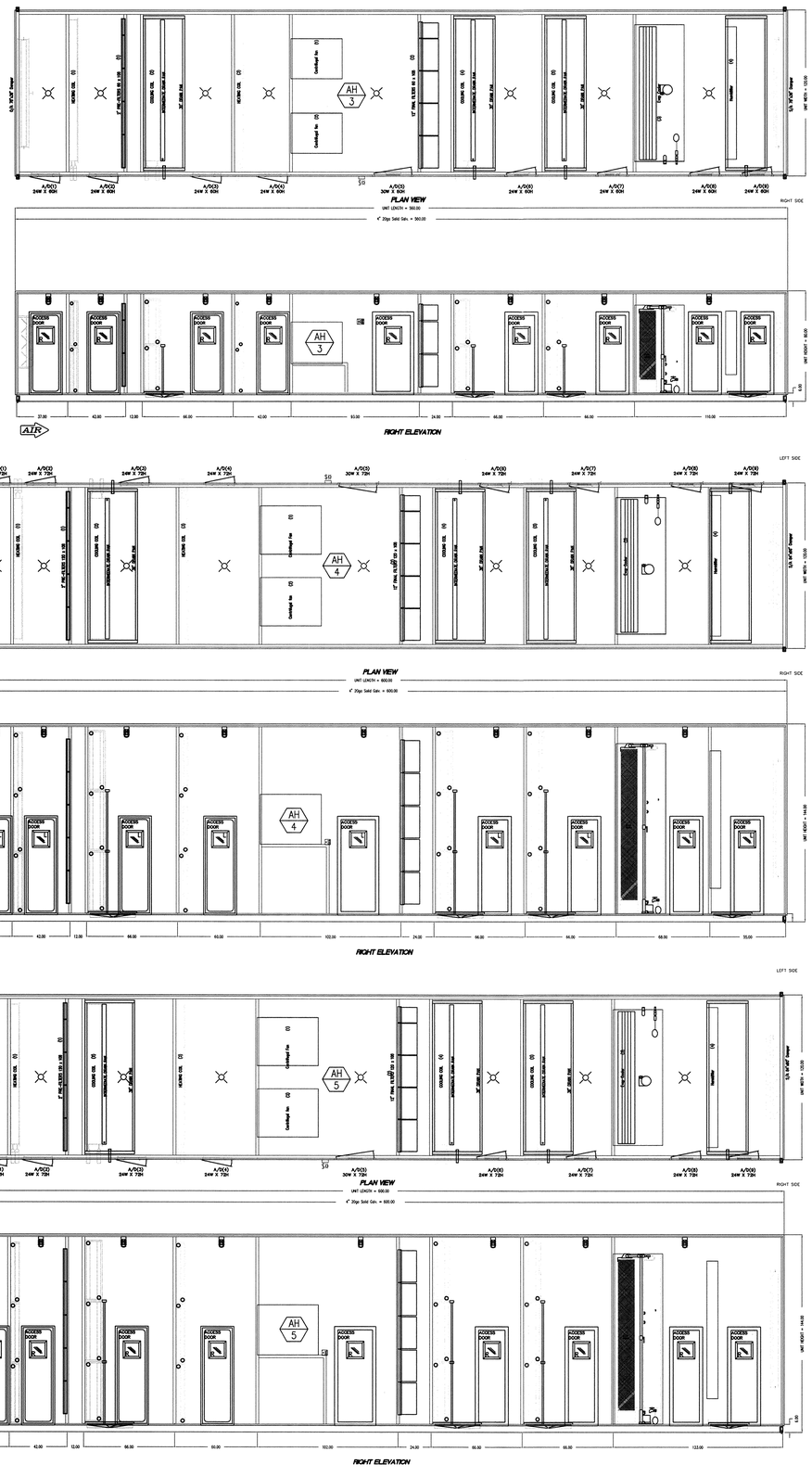

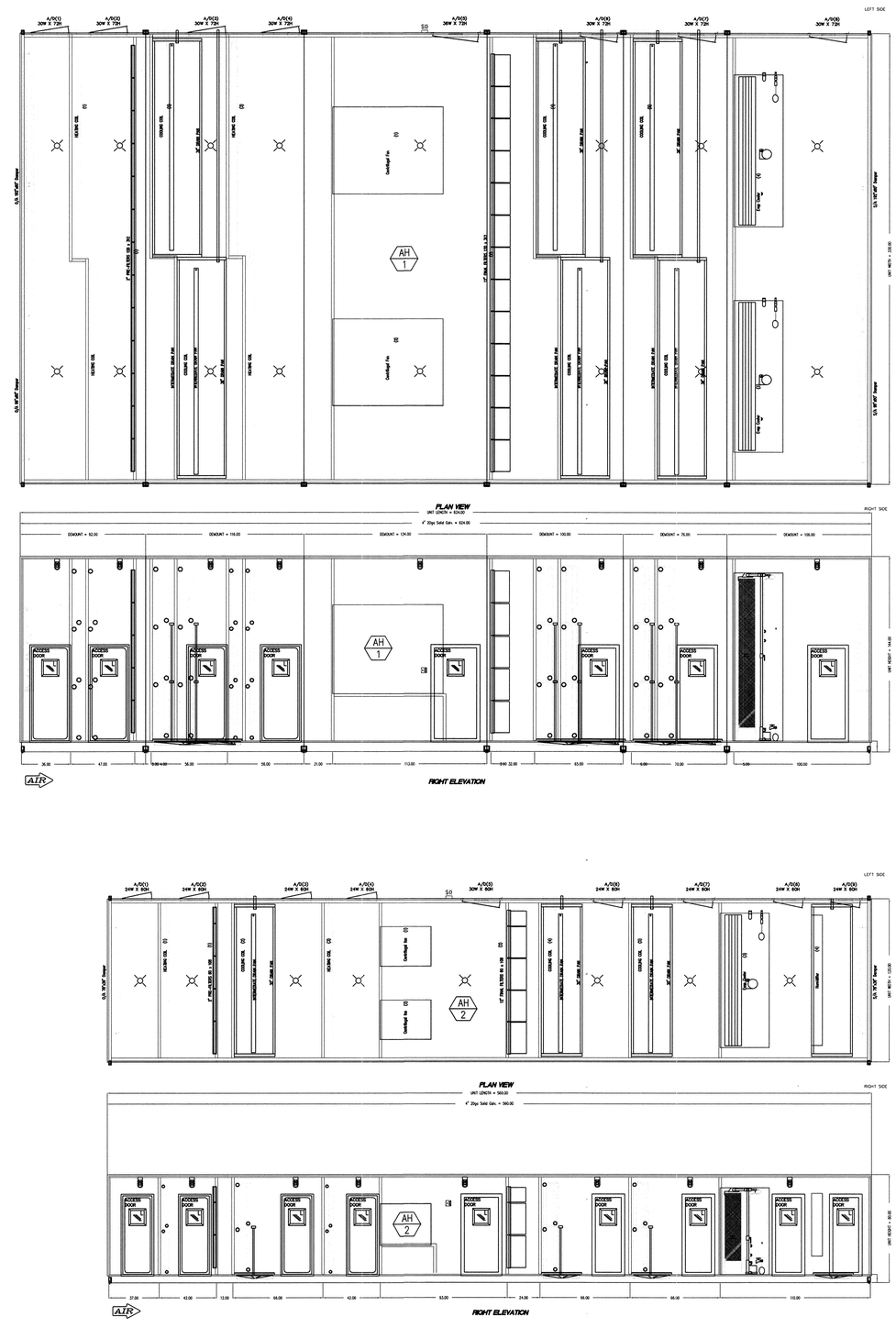

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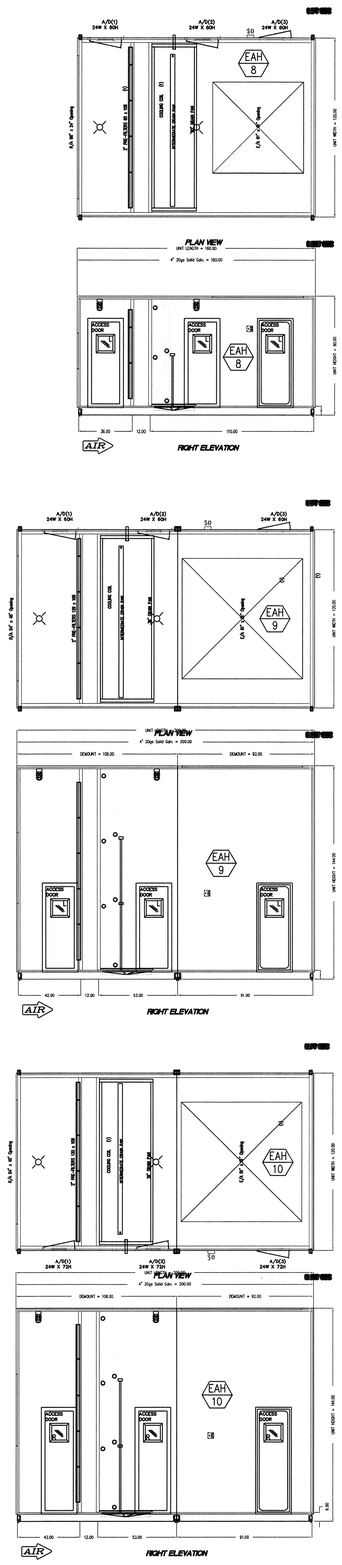
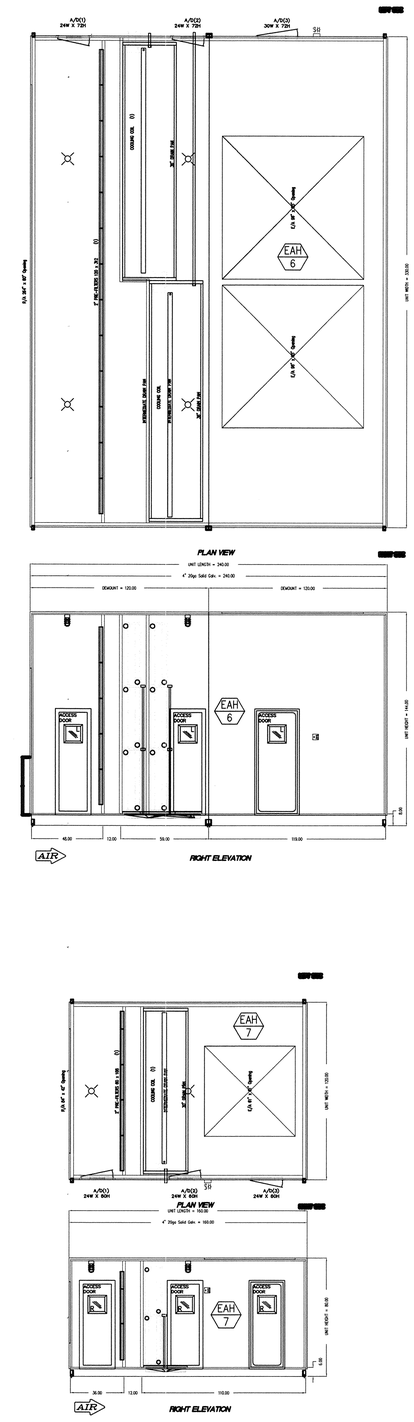
ME501





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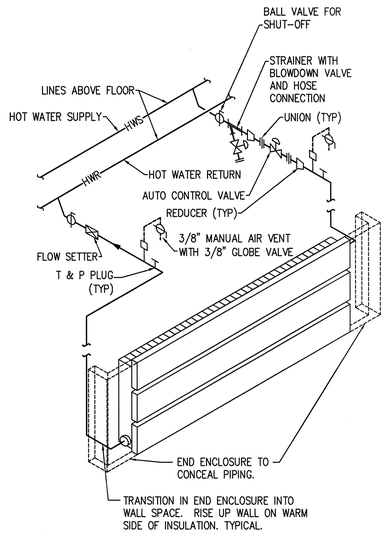
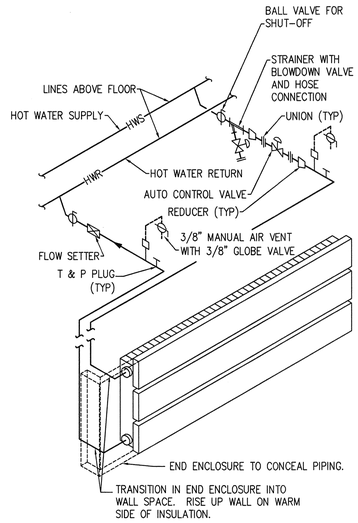
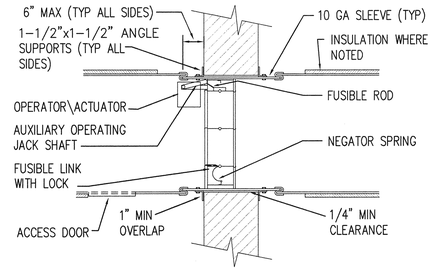
ME502



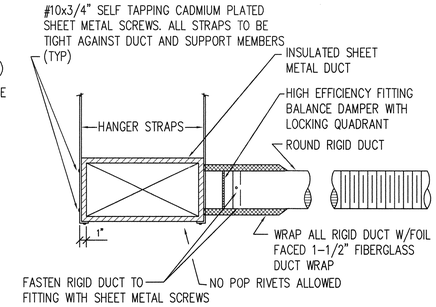
C1 ME503 **RADIANT PANEL PIPING SCHEMATIC**
NO SCALE



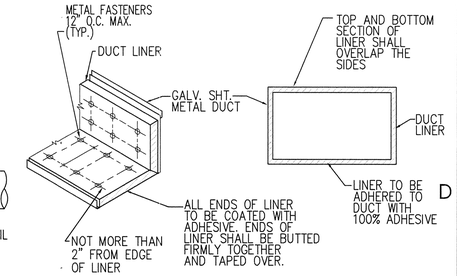
C2 ME503 **RADIANT PANEL PIPING SCHEMATIC**
NO SCALE



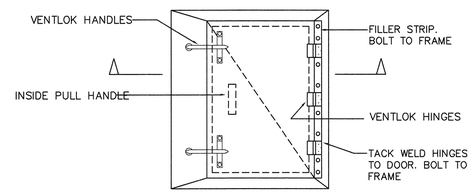
D3 ME503 **COMBINATION FIRE SMOKE DAMPER DETAIL**
NO SCALE



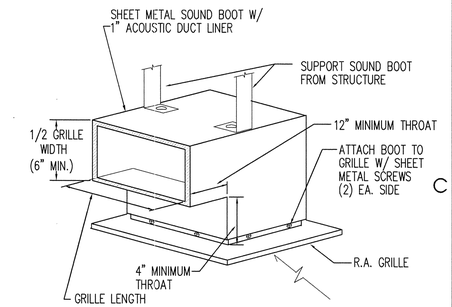
D4 ME503 **FLEX DUCT / HIGH EFFICIENCY TYPE FITTING**
NO SCALE



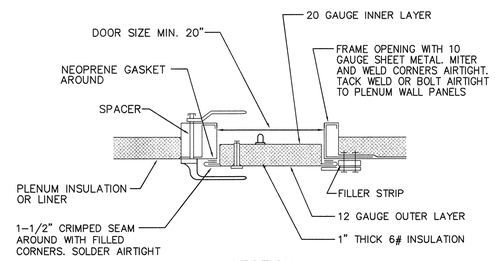
D5 ME503 **DUCT LINER DETAIL**
NO SCALE



FRONT



C5 ME503 **R.A. GRILLE WITH SOUND BOOT**
NO SCALE

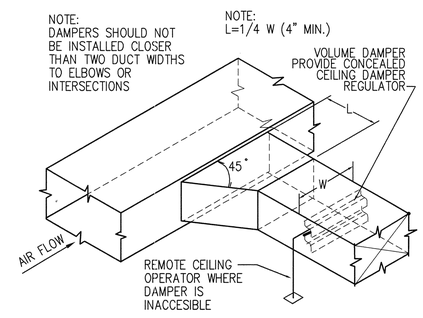


SECTION

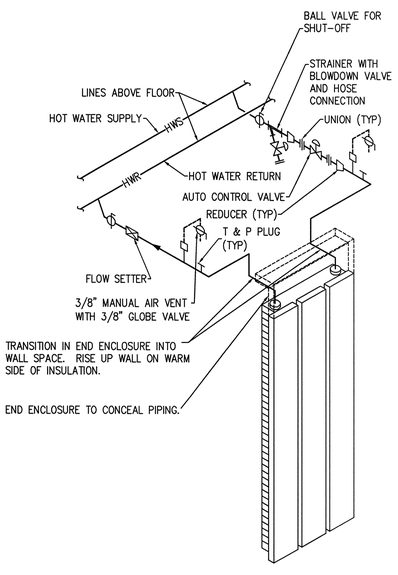
NOTES:

1. BOLTED JOINTS SET IN MASTIC FOR AIRTIGHT JOINT.
2. DOORS SHALL BE A MINIMUM 2'-6" x 1'-8" UNLESS SHOWN OTHERWISE

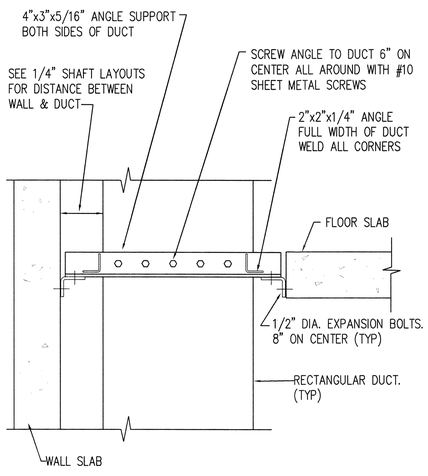
B3 ME503 **PLENUM DOOR**
NO SCALE



B5 ME503 **BRANCH DUCT TAKE-OFF & DAMPER DETAIL**
NO SCALE

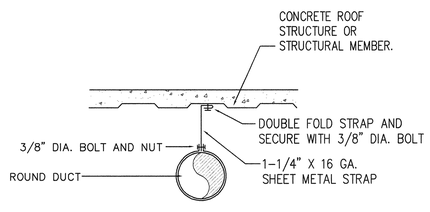


A1 ME503 **RADIANT PANEL PIPING SCHEMATIC**
NO SCALE



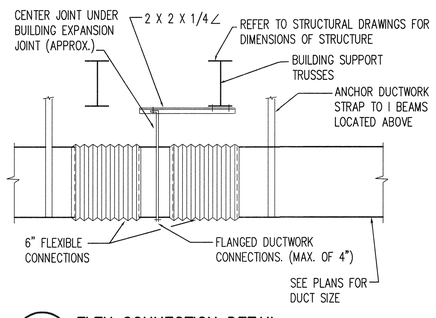
NOTES:
1. SUPPORT DUCT AT EACH FLOOR.
2. SUPPORT OF ROUND DUCT SIMILAR EXCEPT SCREW CLAMP TO DUCT SAME SIZE AS DUCT OUTSIDE DIAMETER AND BOLT CLAMP TO ANGLE SUPPORTS.
3. SIZE SUPPORT ANGLES AND DUCT CLAMPS AS REQUIRED TO SUPPORT WEIGHT OF DUCTWORK.
4. OMIT SCREWS AT FUME EXHAUST DUCTS AND BOLT ANGLES TO DUCT COMPANION ANGLE FLANGES.

A2 ME503 **DUCT RISER SUPPORT IN CHASE DETAIL**
NO SCALE

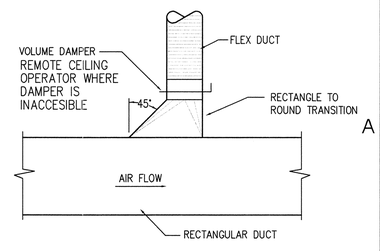


NOTE:
USE SPECIFIED SPACING AND NOT LESS THAN ONE SUPPORT PER BRANCH.

A3 ME503 **ROUND DUCT SUPPORT DETAIL**
NO SCALE



A4 ME503 **FLEX CONNECTION DETAIL**
NO SCALE



A5 ME503 **HIGH EFFICIENCY TAKE-OFF DETAIL**
NO SCALE

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VBFA Project Number:8142_

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UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:
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MARK	DATE	DESCRIPTION

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ISSUE DATE:	DEC. 9, 2008
ISSUE TYPE:	DESDEV
DRAWN BY:	P. COOPER
CHECKED BY:	N. SPENCER
CAD FILE NAME:	
DFCM PROJECT #	06292770
STATE PROPERTY #	-
COPYRIGHT:	STATE OF UTAH

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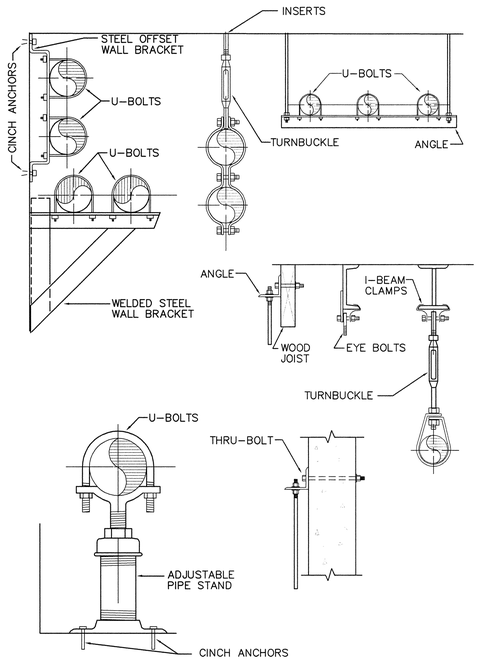
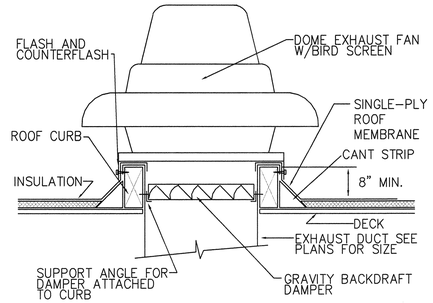
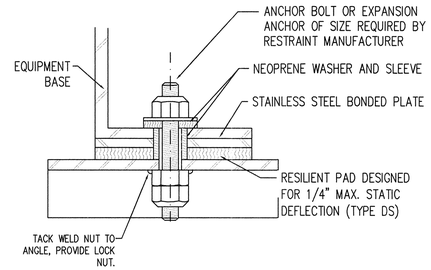
ME503



C1 / ME504 **TYPICAL PIPE SUPPORT DETAIL**
NO SCALE

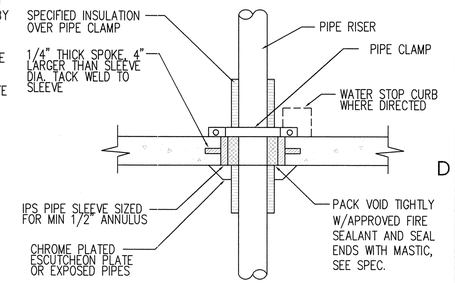


D3 / ME504 **EXHAUST FAN DETAIL**
NO SCALE

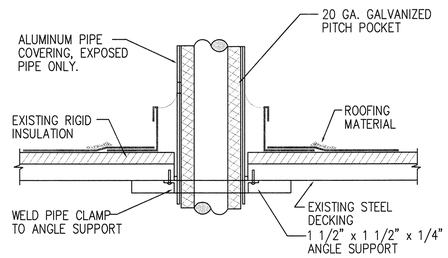


ISOLATION ASSEMBLE MUST BE DESIGNED TO WITHSTAND 0.5g LATERAL AND VERTICAL LOADS

D4 / ME504 **RESILIENT PAD ISOLATOR RESTRAINT DETAIL**
NO SCALE

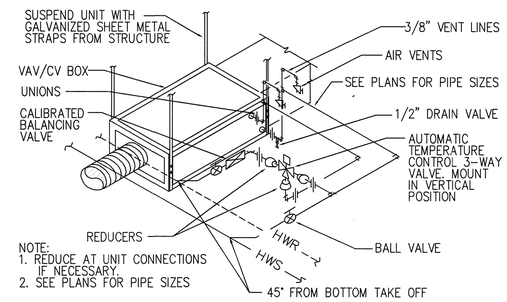


D5 / ME504 **PIPE THROUGH FLOOR SLAB DETAIL**
NO SCALE



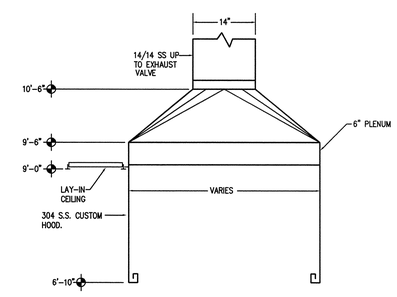
NOTE:
ROOFER TO FLASH, SEAL FLASHING IN PLACE AND FILL PITCH POCKET WITH COAL TAR TO SEAL WATER TIGHT

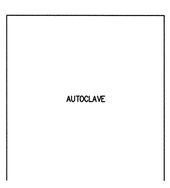
C3 / ME504 **PIPE PENETRATION AT ROOF**
NO SCALE



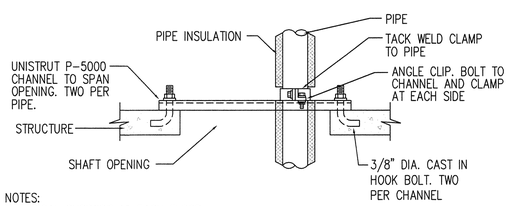
NOTE:
1. REDUCE AT UNIT CONNECTIONS IF NECESSARY.
2. SEE PLANS FOR PIPE SIZES

C4 / ME504 **VAV/CV BOX PIPING DETAIL WITH 3-WAY AUTO-VALVE**
NO SCALE



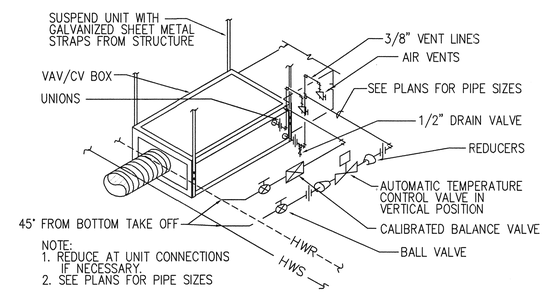


A1 / ME504 **AUTO CLAVE HOOD DETAIL**
NO SCALE



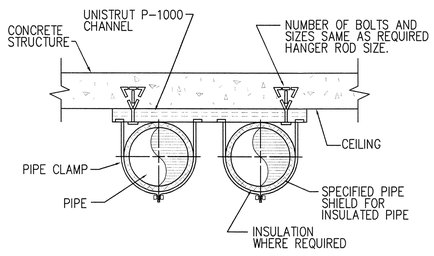
NOTES:
1. TYPICAL SUPPORT AT EACH FLOOR.
2. FOR MULTIPLE PIPES INSTALL CHANNELS IN PARALLEL AND PROVIDE ADDITIONAL FRAMING. SIZES OF FRAMING MEMBERS AS REQUIRED TO SUPPORT TOTAL WEIGHT OF PIPE.
3. INSULATE CLAMP AT CHILLED WATER PIPE ONLY.

B2 / ME504 **PIPE RISER SUPPORT DETAIL**
NO SCALE



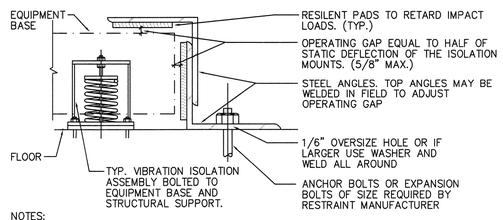
NOTE:
1. REDUCE AT UNIT CONNECTIONS IF NECESSARY.
2. SEE PLANS FOR PIPE SIZES

B4 / ME504 **VAV/CV BOX PIPING DETAIL WITH 2-WAY AUTO-VALVE**
NO SCALE



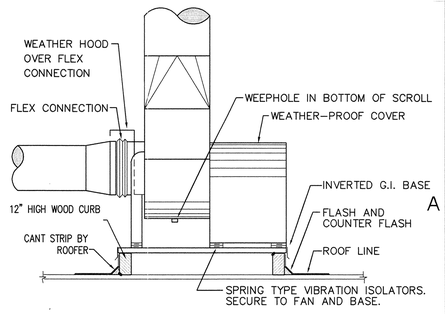
NOTES:
1. PIPE SUPPORT ON WALL SIMILAR

A2 / ME504 **PIPE SUPPORT ON CEILING**
NO SCALE



NOTES:
1 DESIGN RESTRAINT DEVICES (ANGLES AND BOLTS) TO WITHSTAND 1.0g LATERAL AND VERTICAL LOADS.
2 INSTALL LATERAL RESTRAINING DEVICES ON ALL SIDES OF EQUIPMENT BASE

A3 / ME504 **SPRING ISOLATOR RESTRAINT DETAIL**
NO SCALE



A5 / ME504 **UTILITY EXHAUST FAN DETAIL**
NO SCALE

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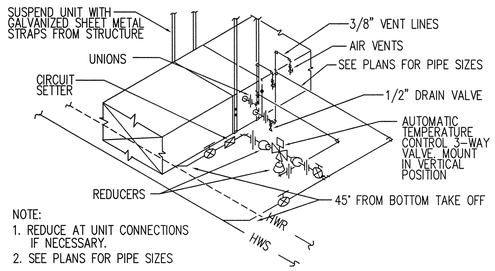
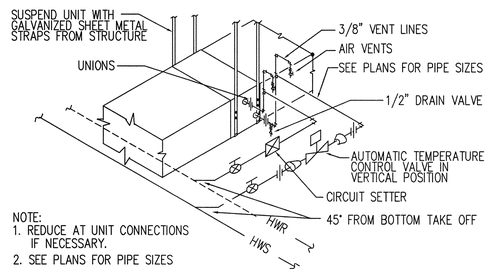
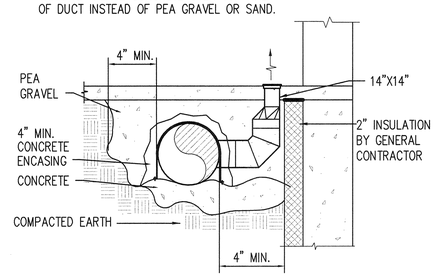


D1 / ME505 **BOOSTER COIL PIPING DETAIL WITH 3-WAY AUTO-VALVE**
NO SCALE

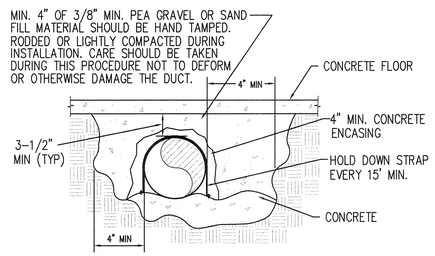


C1 / ME505 **BOOSTER COIL PIPING DETAIL WITH 2-WAY AUTO-VALVE**
NO SCALE

NOTE:
DETAIL APPLIES TO DUCTS WITH A DIAMETER 12" OR LESS. IF DUCT DIAMETER IS LARGER THAN 12" PLACE CONCRETE OVER TOP HALF OF DUCT INSTEAD OF PEA GRAVEL OR SAND.

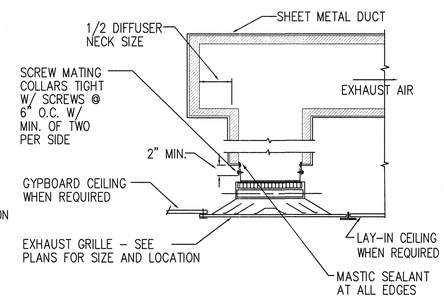


DUCT NEAR FOUNDATION

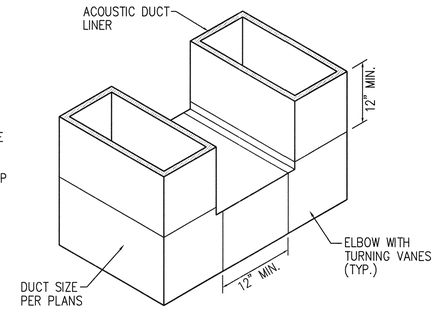


TYP. UNDERFLOOR DUCT

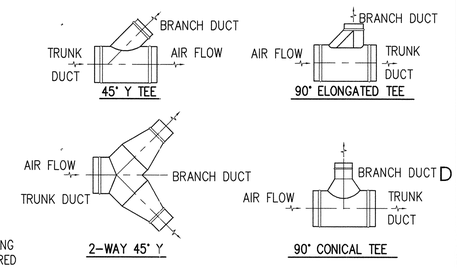
C3 / ME505 **UNDERFLOOR DUCT DETAILS**
NO SCALE



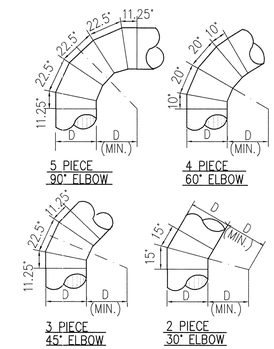
D4 / ME505 **TYPICAL EXHAUST GRILLE DETAIL**
NO SCALE



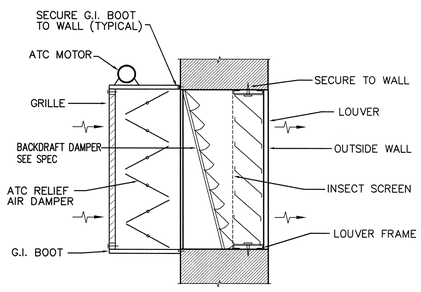
C4 / ME505 **RETURN AIR TRANSFER DUCT DETAIL**
NO SCALE



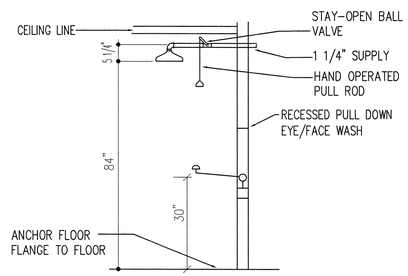
D5 / ME505 **ROUND DUCT BRANCH TAKE-OFF DETAILS**
NO SCALE



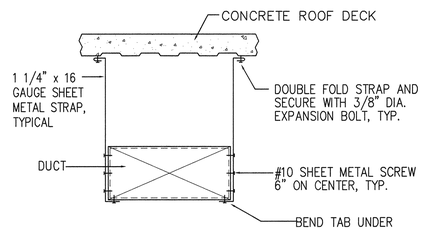
C5 / ME505 **ROUND DUCT ELBOW DETAILS**
NO SCALE



B2 / ME505 **ATC RELIEF AIR DAMPER & LOUVER SECTION**
NO SCALE

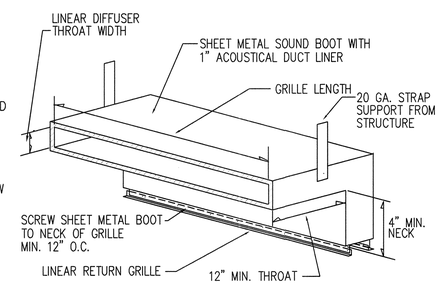


A2 / ME505 **EMERGENCY SHOWER/EYE/FACE WASH**
NO SCALE

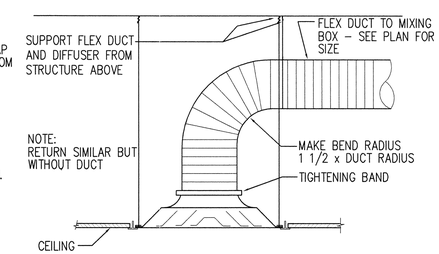


NOTE:
USE SPECIFIED SPACING AND NOT LESS THAN ONE SUPPORT PER BRANCH.

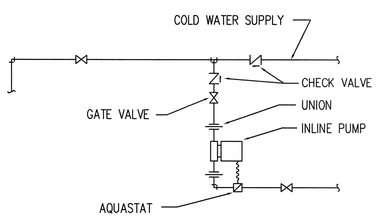
B3 / ME505 **RECTANGULAR DUCT SUPPORT**
NO SCALE



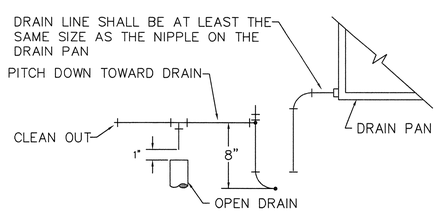
B4 / ME505 **LINEAR RETURN GRILLE WITH SOUND BOOT**
NO SCALE



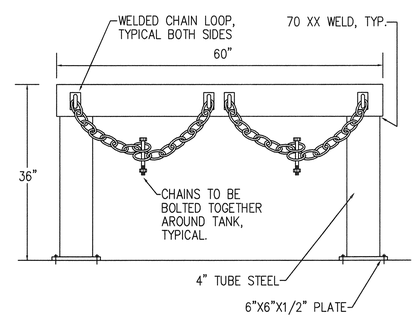
B5 / ME505 **DIFFUSER CONNECTION DETAIL**
NO SCALE



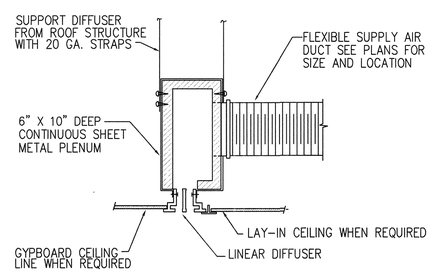
A1 / ME505 **DOMESTIC HOT WATER RECIRCULATING PUMP DETAIL**
NO SCALE



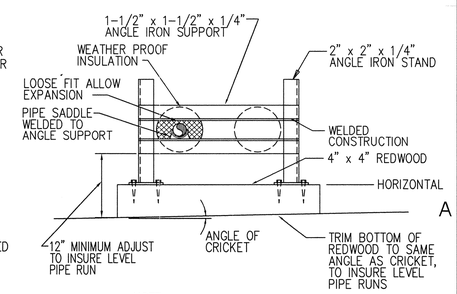
A2 / ME505 **AIR HANDLING UNIT DRAIN TRAP**
NO SCALE



A3 / ME505 **SUPPORT STAND DETAIL**
NO SCALE



A4 / ME505 **LINEAR DIFFUSER & PLENUM DETAIL**
NO SCALE



NOTE:
PIPE SUPPORT ASSEMBLY TO BE PAINTED WITH ZINC CHROMATE INDUSTRIAL PRIMER, FOLLOWED BY 2 COATS OF OIL-BASE ENAMEL PAINT.

A5 / ME505 **ROOF PIPING SUPPORT DETAIL**
NO SCALE

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MARK	DATE	DESCRIPTION

ISSUE DATA

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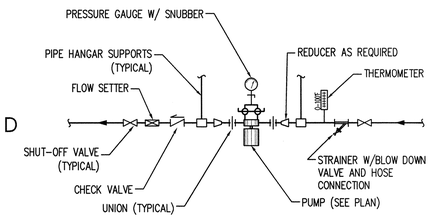
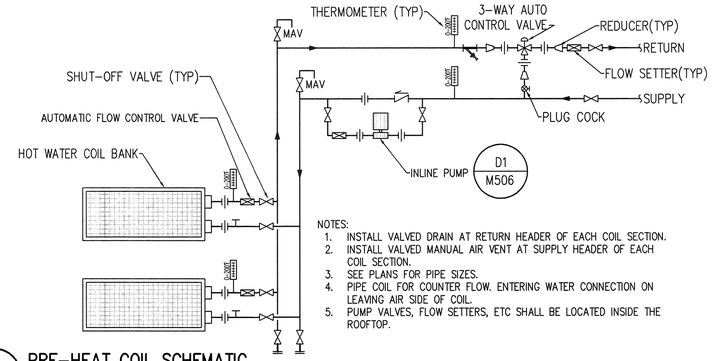
CHECKED BY:	N. SPENCER
CAD FILE NAME:	
DFCM PROJECT #	06292770
STATE PROPERTY #	-
COPYRIGHT:	STATE OF UTAH

SHEET NUMBER:
ME505



D1 / ME506 **IN-LINE PUMP DETAIL**
NO SCALE



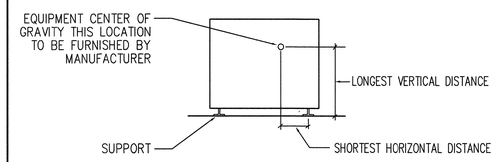
NOTES:
1. INSTALL VALVED DRAIN AT RETURN HEADER OF EACH COIL SECTION.
2. INSTALL VALVED MANUAL AIR VENT AT SUPPLY HEADER OF EACH COIL SECTION.
3. SEE PLANS FOR PIPE SIZES.
4. PIPE COIL FOR COUNTER FLOW. ENTERING WATER CONNECTION ON LEAVING AIR SIDE OF COIL.
5. PUMP VALVES, FLOW SETTERS, ETC SHALL BE LOCATED INSIDE THE ROOFTOP.

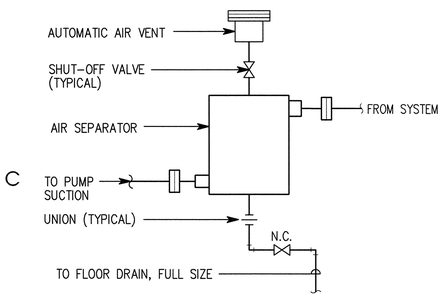
D2 / ME506 **PRE-HEAT COIL SCHEMATIC**
NO SCALE

EQUIPMENT ANCHORAGE TO CONCRETE FLOOR LIST

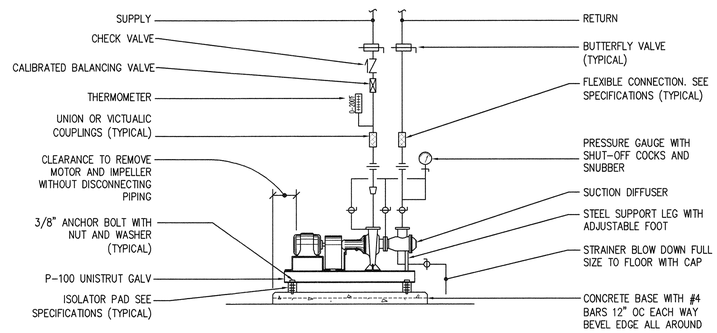
EQUIPMENT WEIGHT PER ANCHOR BOLT	MINIMUM ANCHOR DIAMETER (INCHES)	MINIMUM DEPTH OF EMBEDMENT (INCHES)	ICBO ALLOWABLE SHEAR PER BOLT (LBF)	ICBO ALLOWABLE TENSION PER BOLT (LBF)
UP TO 150#	1/4"	1-1/2"	380	215
300#	3/8"	2-1/2"	860	355
600#	1/2"	3"	1710	665
900#	5/8"	4-1/2"	2500	855
1300#	3/4"	6"	3050	1585
2000#	1"	6"	6280	2020

1 THE SIZES AND EMBEDMENT ARE FOR ANCHORS INSTALLED IN STONE AGGREGATE CONCRETE HAVING A FC = 2000 PSI ULTIMATE COMPRESSIVE STRENGTH AT THE TIME OF INSTALLATION. ALL BOLTS ARE TO BE INSTALLED PER MANUFACTURER INSTRUCTIONS AND TO BE INSTALLED NO CLOSER THAN 12 DIAMETERS ON CENTER AND WITH A MINIMUM EDGE DISTANCE OF 6 DIAMETERS.
2 EACH EQUIPMENT SUPPORT LEG WILL BE ANCHORED AND ALL EQUIPMENT WILL BE ANCHORED AT ALL CORNERS. A MINIMUM OF TWO ANCHORS WILL BE REQUIRED FOR ALL EQUIPMENT.
3 EQUIPMENT WEIGHT PER ANCHOR IS THE TOTAL OPERATING OF EQUIPMENT PLUS BASES AND SUPPORTS DIVIDED BY THE NUMBER OF ANCHORS.
4 ANCHORAGE IS TO PREVENT HORIZONTAL MOVEMENT, IF EQUIPMENT GEOMETRY IS SUCH THAT THE VERTICAL DISTANCE FROM SUPPORT LEG TO CENTER OF GRAVITY IS GREATER THAN FOUR TIMES THE SHORTEST DISTANCE FROM A SUPPORT LEG TO THE CENTER OF GRAVITY, ADDITIONAL ANCHORAGE AND RESTRAINTS WILL BE REQUIRED TO PREVENT OVERTURNING.

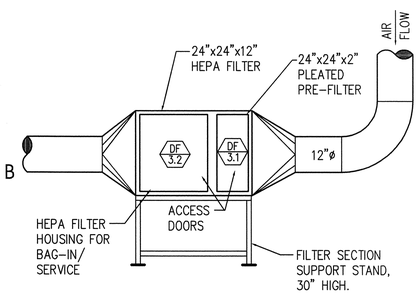




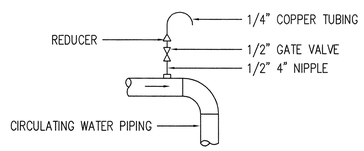
B1 / ME506 **AIR SEPARATOR DETAIL**
NO SCALE



C2 / ME506 **PUMP CONNECTION DETAIL**
NO SCALE

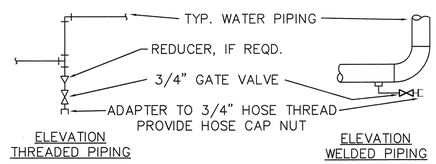


B1 / ME506 **HEPA FILTER SECTION DETAIL**
NO SCALE



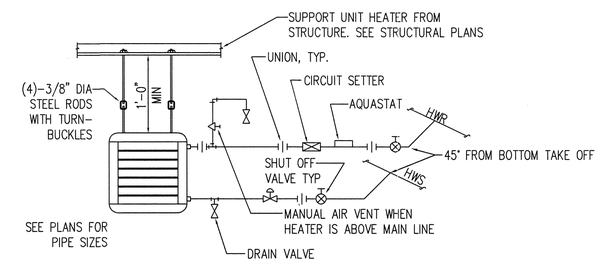
NOTES:
1. VENT ALL HIGH POINTS AS INDICATED ABOVE.
2. IF AUTOMATIC AIR VENTS ARE USED, PIPE DISCHARGE TO DRAIN.

B2 / ME506 **TYPICAL AIR VENT**
NO SCALE

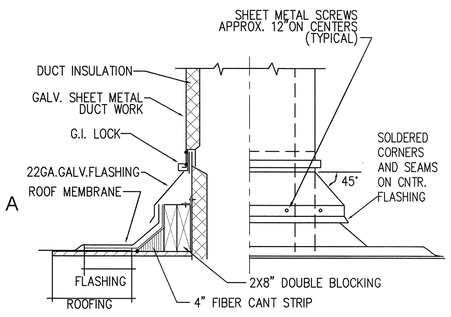


NOTES:
1. DRAIN ALL LOW POINTS AS INDICATED ABOVE.
2. WHERE SCALE POCKETS ARE SHOWN ON PIPE RISER DIAGRAMS AND/OR PLANS LOCATE DRAIN AT BOTTOM OF SCALE POCKET.

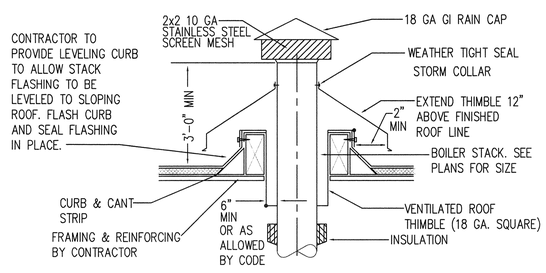
B3 / ME506 **TYPICAL DRAIN VALVE CONNECTION**
NO SCALE



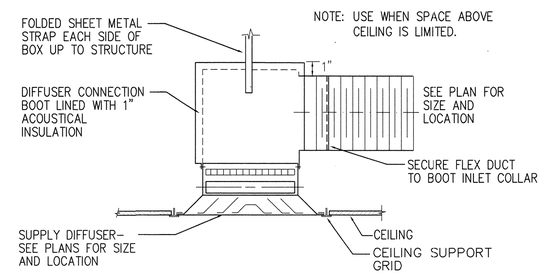
B4 / ME506 **HOT WATER UNIT HEATER DETAIL**
NO SCALE



B2 / ME506 **TYPICAL ROOF PENETRATION & CURB DETAIL**
NO SCALE



A2 / ME506 **BOILER STACK DETAIL**
NO SCALE



A4 / ME506 **SUPPLY DIFFUSER W/ FLEX DUCT DETAIL**
NO SCALE

ARCHITECT 0818

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VBFA Project Number:8142_

OWNER INFORMATION
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4110 State Office Building
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Phone: (801) 538 - 3018
Fax: (801) 538 - 3267
Internet: http://www.dfcm.utah.gov

PROJECT DESCRIPTION
LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:
MECHANICAL DETAILS

REVISIONS

MARK	DATE	DESCRIPTION

ISSUE DATA

ISSUE DATE:	DEC. 9, 2008
ISSUE TYPE:	DESDEV
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CHECKED BY:	N. SPENCER
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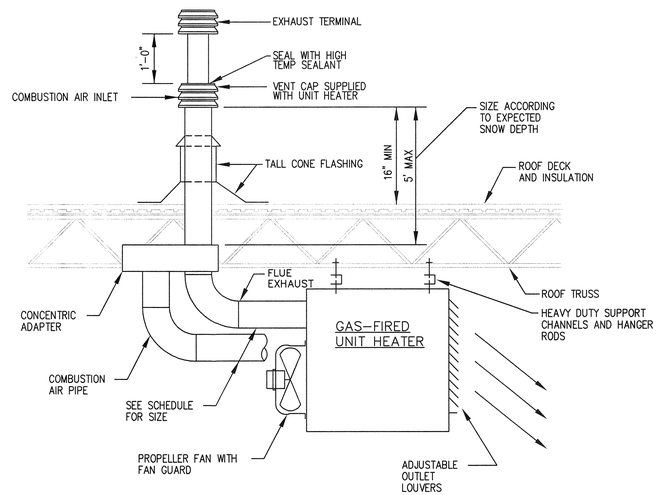
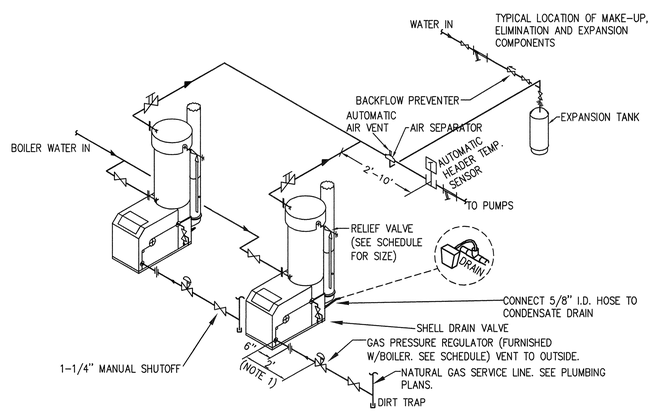
DFCM PROJECT #	06292770
STATE PROPERTY #	-
COPYRIGHT:	STATE OF UTAH

SHEET NUMBER:
ME506



C2 / ME507 GAS FIRED UNIT HEATER

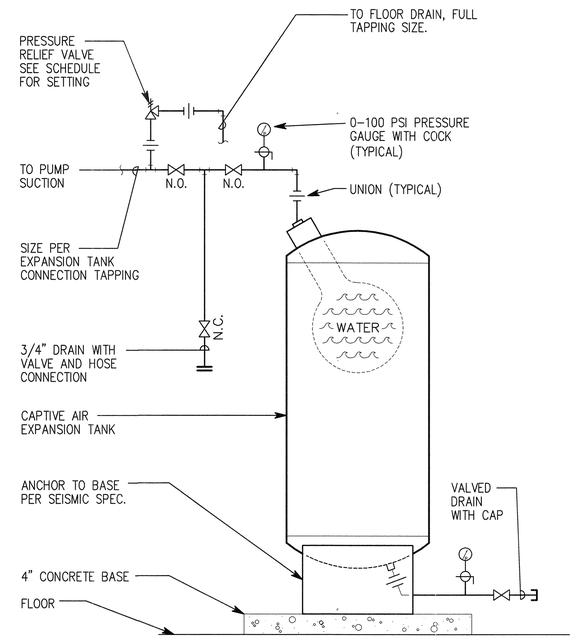
NO SCALE



NOTES:
1. LOCATE WATER INLET AND OUTLET FITTINGS (i.e. UNIONS, ELBOWS, ETC.) AND ALL PIPING A MINIMUM OF 6" FROM BOILER FITTINGS TO PREVENT INTERFERENCE WITH REMOVAL OF BOILER.

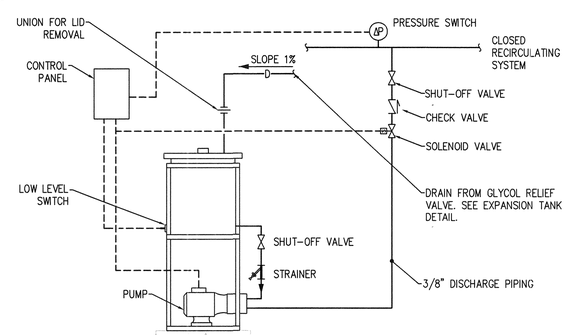
A2 / ME507 BOILER PIPING SCHEMATIC

NO SCALE



B4 / ME507 EXPANSION TANK DETAIL

NO SCALE



NOTES:

1. CONTROL PANEL IS MOUNTED ON TANK SUPPORT STAND.

2. PUMP CAPACITY IS 1.3 GPM AT 100 PSIG, 1/3 HP.

3. ALL WIRING TO BE PROVIDED BY ELECTRICAL CONTRACTOR.

4. GLYCOL FEED SYSTEM INCLUDES 50 GAL CLEAR POLYEHTYLENE TANK. STEEL SUPPORT STAND, PUMP, LOW LEVEL SWITCH, STRAINER, SHUT-OFF VALVE, CONTROL PANEL, SOLENOID VALVE AND PRESSURE SWITCH.

A4 / ME507 PACKAGED GLYCOL FEED SYSTEM

NO SCALE

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VBFA Project Number:8142_

OWNER INFORMATION

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Department of Administrative Services

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4110 State Office Building
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Internet: http://www.dfcm.utah.gov

PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

MECHANICAL DETAILS

REVISIONS

MARK	DATE	DESCRIPTION

ISSUE DATA

ISSUE DATE:	DEC. 9, 2008
ISSUE TYPE:	DESDEV
DRAWN BY:	P. COOPER
CHECKED BY:	N. SPENCER
CAD FILE NAME:	
DFCM PROJECT #	06292770
STATE PROPERTY #	-
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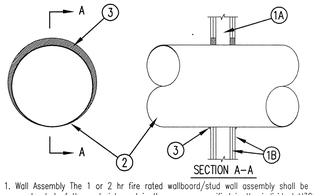
SHEET NUMBER:

ME507

System No. W-L-7042

F Ratings – 1 and 2 Hr (See Items 1 and 3)
T Rating – 0 Hr

WL 7042



1. Wall Assembly The 1 or 2 hr fire rated 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. lumber spaced 16 in. OC. Steel studs to be min 2–1/2 in. wide and spaced 24 in. OC.
   B. Gypsum Board* For 1 hr assembly, one layer of min 5/8 in. thick wallboard as required in the individual Wall and Partition Design. For 2 hr assembly, two layers of min 5/8 in. thick wallboard as required in the individual Wall and Partition Design. Max diam of opening is 14–1/2 in. for wood stud walls and 21–3/4 for steel stud walls.
   The hourly F and T Ratings of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.
2. Through Penetrant Galv steel duct to be installed concentrically or eccentrically within the firestop system. The annular space between the duct and periphery of opening shall be 0 in. (point contact) and max 1–1/2 in. Duct to be rigidly supported on both sides of wall assembly.
   A. Spiral Wound HVAC Duct Nom 20 in. diam (or smaller) No. 24 MSG (or heavier) galv steel spiral wound duct.
   B. Sheet Metal Duct Nom 12 in. diam (or smaller) No. 28 MSG (or heavier) galv sheet steel duct.
3. Fill, Void or Cavity Material*—Sealant Min 5/8 in. and 1–1/4 in. thickness of fill material applied within annulus, flush with both surfaces of wall assembly for 1 or 2 hr rated walls, respectively. At the point contact location between duct and wallboard, a min 1/2 in. diam bead of sealant shall be applied at the wallboard/duct interface on both surfaces of wall assembly.
   HILTI CONSTRUCTION CHEMICALS, DIV OF
   HILTI INC – CP601S Elastomeric Firestop Sealant, FS–ONE Sealant or CP606 Flexible Firestop Sealant

*Bearing the UL Classification Mark

HILTI® FIRESTOP SYSTEMS

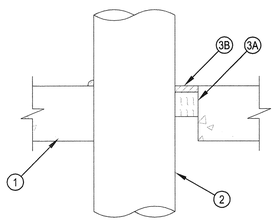
Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. November 30, 2000

CLASSIFIED UL C US

System No. C-AJ-1435

F Rating - 2 Hr
T Rating - 0 Hr

CAJ 1435



1. Floor or Wall Assembly — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of any UL Classified Concrete Blocks*. Max diameter of opening is 31-7/8 in.
   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. Through Penetrants — One metallic pipe, conduit or tubing to be installed concentrically or eccentrically within the firestop system. Pipe, conduit or tubing to be rigidly supported on both sides of floor assembly. The annular space between pipe conduit or tubing and the periphery of the opening shall be min 0 in. (point contact) to max 1-7/8 in. The following types of pipe, conduit or tubing may be used:
   Steel Pipe — Nom 30 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.
   Iron Pipe — Nom 30 in. diam (or smaller) cast or ductile iron pipe.
   Conduit — Nom 6 in. diam (or smaller) rigid steel conduit.
   Conduit — Nom 4 in. diam (or smaller) steel electrical metallic conduit.
   Copper Tubing — Nom 6 in. diam (or smaller) Type L (or heavier) copper tubing.
   Copper Pipe — Nom 6 in. diam (or smaller) Regular (or heavier) copper pipe.
3. Firestop System — The firestop system shall consist of the following:
   A. Packing Material — Min 2 in. (51mm) thickness of min 4 pcf (64 kg/m3) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall to accommodate the required thickness of fill material.
   B. Fill Void or Cavity Material* - Sealant — Min 1/2 in. (13mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall. At the point contact location between pipe and concrete, a min 1/2 in. (13mm) diam bead of fill material shall be applied at the concrete/pipe interface on the top surface of floor or both surfaces of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 606 Sealant

*Bearing the UL Classification Mark

HILTI® FIRESTOP SYSTEMS

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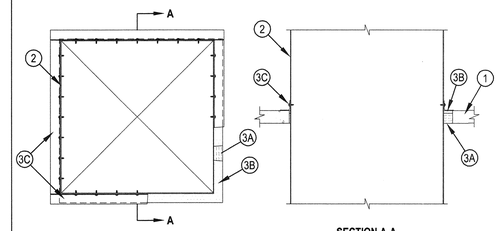
CLASSIFIED UL C US

System No. C-AJ-7111

F Rating -- 2 Hr
T Rating -- 0 Hr

CAJ 7111



1. Floor or Wall Assembly -- Min 2-1/2 in. (64 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete floor or min 3 in. (76 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete wall. Wall may also be constructed of any UL Classified Concrete Blocks*. Max area of opening is 7.1 sq ft (0.66 m2) with max dimension of 32 in. (813 mm).
   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. Steel Duct -- Max 30 by 30 in. (762 by 762 mm) No. 24 gauge (or heavier) steel duct. One duct to be installed within the firestop system with a min 1/4 in. (6 mm) to max 1-3/4 in. (44 mm) annular space. Steel duct to be rigidly supported on both sides of floor or wall assembly.
3. Firestop System -- The firestop system shall consist of the following:
   A. Packing Material -- Min 2 in. (51 mm) thickness of min 4 pcf (64 kg/m3) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall as required to accommodate the required thickness of fill material.
   B. Fill, Void or Cavity Material* -- Sealant -- Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC -- FS-One Sealant
   C. Steel Angle -- Min 2 in. (51 mm) wide by 2 in. (51 mm) high No. 16 gauge (or heavier) steel angle cut to fit the contour of the duct with a min 1/4 in. (6 mm) lap on the top surface of floor or on both surfaces of wall on all sides of the opening. Legs of angles secured to duct with No. 8 by 3/4 in. (19 mm) long steel sheet metal screws spaced max 4 in. (102 mm) OC.

*Bearing the UL Classification Mark

HILTI® FIRESTOP SYSTEMS

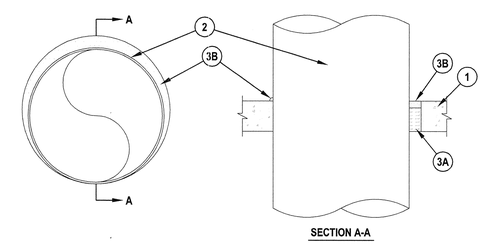
Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. September 09, 2005

CLASSIFIED UL C US

System No. C-AJ-7084

F Rating - 2 Hr
T Rating - 0 Hr

CAJ 7084



1. Floor or Wall Assembly - Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of any UL Classified Concrete Blocks*. Max diam of opening is 21-3/4 in.
   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. Through Penetrant - Galv steel duct to be installed concentrically or eccentrically within the firestop system. The annular space between the duct and periphery of opening shall be 0 in. (point contact) and max 1-1/2 in. Duct to be rigidly supported on both sides of wall assembly.
   A. Spiral Wound HVAC Duct - Nom 20 in. diam (or smaller) No. 24 MSG (or heavier) galv steel spiral wound duct.
   B. Sheet Metal Duct - Nom 12 in. diam (or smaller) No. 28 MSG (or heavier) galv sheet steel duct.
3. Firestop System - The firestop system shall consist of the following:
   A. Packing Material - Min 3-1/2 in. thickness of min 4.0 pcf mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or both surfaces of wall to accommodate the required thickness of fill material.
   B. Fill, Void or Cavity Material*-Sealant - Min 1 in. thickness of fill material applied within annulus, flush with top surface of floor or both surfaces of wall assembly. At the point contact location between duct and periphery of opening, a min 1/2 in. diam bead of sealant shall be applied at the concrete/duct interface.
   HILTI CONSTRUCTION CHEMICALS, DIV OF
   HILTI INC - FS-ONE Sealant, CP601S Elastomeric Firestop Sealant, CP606 Flexible Firestop Sealant or CP 604 Self-Leveling Firestop Sealant.
   (Note: CP 604 Self-Leveling Firestop Sealant to be used on floor assemblies only.)

*Bearing the UL Classification Mark

HILTI® FIRESTOP SYSTEMS

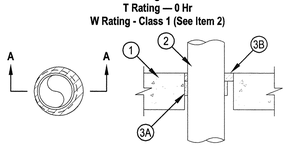
Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. July 08, 2003

CLASSIFIED UL C US

System No. C-AJ-2565

F Rating — 2 Hr
T Rating — 0 Hr
W Rating - Class 1 (See Item 2)

CAJ 2565



1. Floor or Wall Assembly — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete floor or wall. Wall may also be constructed of any UL Classified Concrete Blocks*. Max diam of opening is 6 in. (152 mm).
   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. Through Penetrants — One nonmetallic pipe to be installed concentrically or eccentrically within the firestop system. Annular space within the firestop system is dependent upon the max diam and type of penetrant used as tabulated in Item 3A. Pipe to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of nonmetallic pipes may be used:
   A. Polyvinyl Chloride (PVC) Pipe — Nom 4 in. (102 mm) diam (or smaller) Schedule 40 solid or cellular core PVC for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
   B. Chlorinated Polyvinyl Chloride (CPVC) Pipe — Nom 4 in. (102 mm) diam (or smaller) SDR13.5 CPVC for use in closed (process or supply) piping systems.
   C. Rigid Nonmetallic Conduit+ — Nom 4 in. (102 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with Article 347 of the National Electrical Code (NFPA 70).
   D. Acrylonitrile Butadiene Styrene (ABS) Pipe — Nom 4 in. (102 mm) diam (or smaller) Schedule 40 solid or cellular core ABS for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
   E. Flame Retardant Polypropylene (FRPP) Pipe — Nom 4 in. (102 mm) diam (or smaller) Schedule 40 FRPP pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
   W Rating applies to nom 1-1/2 in. diam penetrants only.
3. Firestop System — The firestop system shall consist of the following:
   A. Fill, Void or Cavity Material* - Wrap Strip — One layer of intumescent wrap strip is continuously wrapped around the pipe with ends butted and held in place with integrated tape. Wrap strip installed recessed from top surface of floor or both wall surfaces to accommodate fill material. Size of wrap strip for a given size penetrant is shown in the table below.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP648-S-1.5" US, CP648-S-2" US, CP648-S-3" US or CP648-S-4" US Wrap Strip

Product Designation	Pipe Size Diam in. (mm)	Max Opening in. (mm)	Annular Space Min in. (mm)	Annular Space Max in. (mm)	Nom Wrap Strip Length in. (mm)	Nom Wrap Strip Thick in. (mm)	Nom Wrap Strip Width in. (mm)
CP648-S-1.5" US	1-1/2 (38)	3 (76)	3/16 (5)	3/4 (19)	6.5 (165)	0.18 (5)	1 (25)
CP648-S-2" US	2 (51)	3-1/2 (89)	3/16 (5)	15/16 (24)	8 (203)	0.18 (5)	1 (25)
CP648-S-3" US	3 (76)	4 (102)	3/16 (5)	15/16 (24)	11.5 (292)	0.18 (5)	1-3/4 (44)
CP648-S-4" US	4 (102)	6 (152)	3/8 (5)	1-1/8 (28)	15.1 (384)	0.36 (9)	1-3/4 (44)

   B. Fill, Void or Cavity Material* - Foam — Min 1 in. (25 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP620 Fire Foam

*Bearing the UL Classification Mark

HILTI® FIRESTOP SYSTEMS

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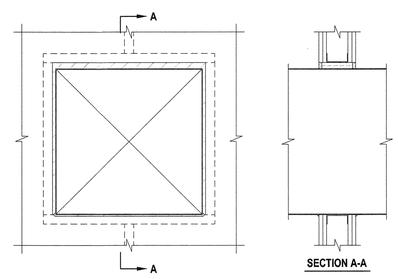
CLASSIFIED UL

System No. W-L-7143

F Ratings -- 1 and 2 Hr (See Items 1 and 2)
T Ratings -- 0 and 1/2 Hr (See Item 1)

WL 7143



1. Wall Assembly -- The 1 and 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs -- Wall framing shall consist of min. 3-1/2 in. (89 mm) wide steel channel studs and spaced max 24 in. (610 mm) OC. Additional 3-1/2 in. (89 mm) wide steel studs shall be used to completely frame opening.
   B. Gypsum Board -- One or two layers of 5/8 in. (16 mm) thick gypsum board as specified in the individual Wall and Partition Design. Max size of opening is 625 sq in. (4032 cm2) with a max dimension of 25 in. (635 mm).
   The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed. The hourly T Rating of the firestop system is 1/2 hr for 2 hr fire rated walls and 0 hr for 1 hr fire rated walls.
2. Steel Duct -- Nom. 24 in. by 24 in. (610 by 610 mm) (or smaller) No. 24 gauge (or heavier) galv. steel duct to be installed within the firestop system. An annular space of min 1/2 in. (13 mm) to max 1 in. (25 mm) is required within the firestop system. As an option, for systems with a 2 hr F Rating only, the min annular space at the bottom of the duct may be 0 in. (point contact) for 2 hr rated assemblies only. Steel duct to be rigidly supported on both sides of wall assembly
3. Firestop System -- The firestop system shall consist of the following:
   A. Packing Material -- Min 3-3/4 in. (95 mm) or 5 in. (127 mm) thickness of min 4 pcf (64 kg/m3) mineral wool batt insulation firmly packed into opening as a permanent form for 1 and 2 hr rated assemblies, respectively. Packing material to be recessed from both surfaces of wall to accommodate the required thickness of fill material.
   B. Fill Void or Cavity Materials* - Sealant -- Min 1/2 in. (13 mm) thickness of sealant applied within annulus, flush with both surfaces of wall assembly. Min 1/4 in. (6 mm) diam bead of sealant shall be applied at the duct/gypsum board interface at any point contact location, on both surfaces of wall assembly.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC -- CP 606 Sealant

*Bearing the UL Classification Mark

HILTI® FIRESTOP SYSTEMS

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CLASSIFIED UL C US

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VBFA Project Number:8142_

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State of Utah
Department of Administrative Services

Division of Facilities Construction & Management
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Salt Lake City, Utah 84114
Phone: (801) 538 - 3018
Fax: (801) 538 - 3267

Internet: http://www.dfcm.utah.gov

PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

MECHANICAL DETAILS

REVISIONS

MARK	DATE	DESCRIPTION

ISSUE DATA

ISSUE DATE:	DEC. 9, 2008
ISSUE TYPE:	DESDEV
DRAWN BY:	P. COOPER
CHECKED BY:	N. SPENCER
CAD FILE NAME:	
DFCM PROJECT #	06292770
STATE PROPERTY #	-
COPYRIGHT:	STATE OF UTAH

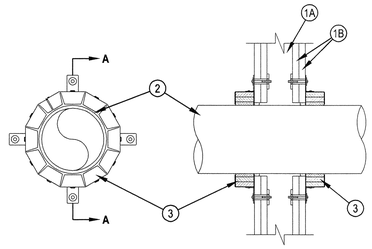
SHEET NUMBER:

ME508

System No. W-L-2078

F Ratings — 1 and 2 Hr (See Item 1)
T Ratings — 0, 1 and 2 Hr (See Items 2 and 3)
L Rating At Ambient — 3 CFM/sq ft
L Rating At 400 F — Less Than 1 CFM/sq ft

WL 2078



SECTION A-A

1. Wall Assembly — The fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400 or V400 Series Wall and Partition Designs in the UL fire Resistance Directory and shall include the construction features noted below:
   A. Studs — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. lumber spaced max 16 in. OC. Steel studs to be min 2-1/2 in. wide and spaced max 24 in. OC.
   B. Gypsum Board* — Nom 5/8 in. thick gypsum board, as specified in the individual Wall and Partition Design. Max diam of opening is 11-1/2 in.
   The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.
2. Through-Penetrants — One nonmetallic pipe, conduit or tubing to be installed within the firestop system. The annular space between pipe and periphery of opening shall be min 0 in. (point contact) to max 1/2 in. Pipe or conduit to be rigidly supported on both sides of the wall assembly.
   The following types and sizes of nonmetallic pipes may be used:
   A. Polyvinyl Chloride (PVC) Pipe — Nom 10 in. diam (or smaller) Schedule 40 solid-core or cellular core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
   B. Chlorinated Polyvinyl Chloride (CPVC) Pipe — Nom 10 in. diam (or smaller) SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.
   C. Acrylonitrile Butadiene Styrene (ABS) Pipe — Nom 6 in. diam (or smaller) Schedule 40 solid-core or cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems
   D. Flame Retardant Polypropylene (FRPP) Pipe — Nom 6 in. diam (or smaller) Schedule 40 FRPP pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
   E. Polyvinylidene Fluoride (PVDF) Pipe — Nom 4 in. diam (or smaller) PVDF pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
   When max 6 in. diam pipe is used, T Rating is equal to the hourly fire rating of the wall. When nom 8 in. or 10 in. diam pipe is used, T Rating is 0 hr.
3. Firestop Device* — Firestop Collar — Firestop collar shall be installed in accordance with the accompanying installation instructions. Collar to be installed and latched around the pipe and secured to both sides of the wall using the anchor hooks provided with the collar. (Minimum two anchor hooks for 1-1/2 and 2 in. diam pipes, three anchor hooks for 3 and 4 in. diam pipes, four anchor hooks for 6 in. diam pipes, ten anchor hooks for 8 in. diam pipes and twelve anchor hooks for 10 in. diam pipes). The anchor hooks are to be secured to the surface of wall with 3/16 in. diam by 2-1/2 in. long steel toggle bolts along with washers. As an alternate for pipe sizes of nom 4 in. diam or less, min No. 10 by 1-1/2 in. long drywall or laminate screws with min 3/4 in. steel washers may be used. When the drywall or laminate screw is used, T Rating shall not exceed 1 hr.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 643 50/1.5"N, CP 643 63/2"N, CP 643 90/3"N, CP 643 110/4"N, CP 643 160/6"N, CP 644 200/8" andCP 644 250/10" Firestop Collars
4. Fill, Void or Cavity Material* — Sealant - (Not Shown) — Min 1/2 in. thickness of sealant applied within the annular space for nom 8 in. and 10 in. diam pipes, flush with each side of wall. Sealant in anar space is optional for max 6 in. diam pipes. A min 1/4 in. thickness of sealant is required within the annular space, flush with each side of wall, to attain the L Ratings for max 6 in. diam pipes.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-One Sealant
*Bearing the UL Classification Mark

HILTI FIRESTOP SYSTEMS

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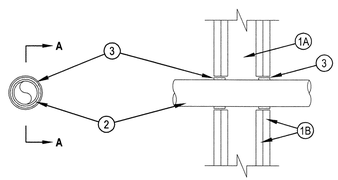
November 29, 2005

CLASSIFIED UL C US

System No. W-L-2235

F Rating - 1 AND 2 Hr (SEE ITEM 1)
T Rating - 0 Hr

WL2235



SECTION A-A

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. lumber spaced 16 in. OC. Steel studs to be min 2-1/2 in. wide and spaced max 24 in. OC.
   B. Gypsum Board* – Min 5/8 in. thick, 4 ft wide with square on tapered edges. The gypsum wallboard type, thickness, number of layers and orientation shall be as specified in the individual Wall and Partition Design. Max diam of opening is 3 in.
   The hourly F rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.
2. Through Penetrants – One nonmetallic pipe or tube to be centered within the firestop system witv a nom 5/16 in. annular space. Pipe or tube to be rigidly supported on both sides of wall assembly. The following types and sizes of pipes may be used:
   A. Polyvinyl Chloride (PVC) Pipe – Nom 2 in. diam (or smaller) Schedule 40 cellular or solid core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
   B. Acrylonitrile Butadiene Styrene (ABS) Pipe – Nom 2 in. diam (or smaller) Schedule 40 cellular or solid core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
   C. Chlorinated Polyvinyl Chloride (CPVC) Pipe – Nom 2 in. diam (or smaller) SDR 13.5 CPVC pipe for use in closed (process or supply) piping systems.
   D. Crosslinked Polyethylene (PEX) Tubing – Nom 1 in. diam (or smaller) SDR 9 PEX tube for use in closed (process or supply) piping systems.
   E. Flame Retardent Polypropylene (FRPP) Pipe – Nom 2 in. diam (or smaller) Schedule 40 FRPP pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
3. Fill, Void or Cavity Material* – Wrap Strip – Nom 3/16 in. thick by 1 in. wide intumescent wrap strip. The wrap strip is continuously wrapped around the outer circumference of the pipe once and slid into annular space such that the ends are flush with the surface of the wall. Wrap strips are installed on each surface of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF
   HILTI INC – CP648-E W25/1" Wrap Strip
   A. Fill, Void or Cavity Material* - Wrap Strip – (As an alternate to the wrap strip in Item 3 on nom 1-1/2" and 2" diam pipes only) - Nom 3/16 in. thick by 1-1/2 or 2 in. wide intumescent wrap strip. One layer of intumescent wrap strip is tightly wrapped around the pipe with ends butted and held in place with integrated tape. Wrap strip slid into annular space such that the ends are flush with the surface of the wall. Wrap strips are installed on each surface of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF
   HILTI INC – CP648-S-1.5" US, CP648-S-2" US
*Bearing the UL Classification Mark

HILTI FIRESTOP SYSTEMS

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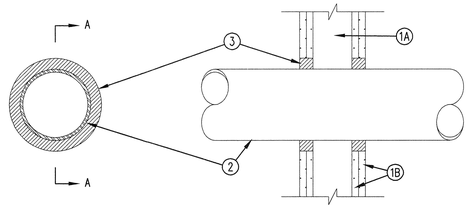
APRIL 22, 2005

CLASSIFIED UL C US

System No. W-L-1054

F Ratings – 1 and 2 Hr (See Items 1 and 3)
T Rating – 0 Hr
L Rating At Ambient – Less Than 1 CFM/Sq Ft
L Rating At 400 F – 4 CFM/Sq Ft

WL 1054



SECTION A–A

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. lumber spaced 16 in. OC. Steel studs to be min 2–1/2 in. wide and spaced max 24 in. OC. 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. wider and 4 to 6 in. higher than the diam of the penetrating item such that, when the penetrating item is installed in the opening, a 2 to 3 in. clearance is present between the penetrating item and the framing on all four sides.
   B. Gypsum Board* -- 5/8 in. thick, 4 ft 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. for steel stud walls. Max diam of opening is 14–1/2 in. for wood stud walls.
   The F Rating of the firestop system is equal to the fire rating of the wall assembly.
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. Pipe may be installed with continuous point contact. Pipe, conduit or tubing may be installed at an angle not greater than 45 degrees from perpendicular. 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 diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. Iron Pipe -- Nom 30 in. diam (or smaller) cast or ductile iron pipe.
   C. Conduit -- Nom 4 in diam (or smaller) steel electrical metallic tubing or 6 in. diam steel conduit.
   D. Copper Tubing -- Nom 6 in. diam (or smaller) Type L (or heavier) copper tubing.
   E. Copper Pipe -- Nom 6 in. diam (or smaller) regular (or heavier) copper pipe.
3. Fill, Void or Cavity Material* -- Sealant -- Min 5/8 in. 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. 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 Sealant
*Bearing the UL Classification Mark

HILTI FIRESTOP SYSTEMS

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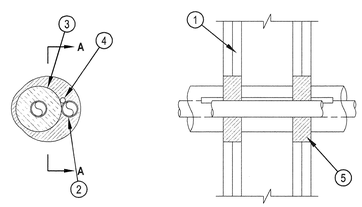
December 4, 2002

CLASSIFIED UL C US

System No. W-L-8047

F Rating -- 2 Hr
T Rating -- 1/4 Hr

WL 8047



SECTION A-A

1. Wall Assembly -- The 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U300 or U400 Series Wall or Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs -- Wall framing shall consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. lumber spaced max 16 in. OC. Steel studs to be min 3-1/2 in. wide and spaced max 24 in. OC.
   B. Gypsum Board* -- The gypsum board type, thickness number of layers, fastener type and sheet orientation shall be specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max diam of opening is 4-1/2 in.
2. Through Penetrants -- One or more pipe or tubing to be installed concentrically or eccentrically within the opening. The space between any penetrant and the periphery of the opening shall be min 0 in. (point contact) to max 1-1/4 in. Pipes or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes or tubing may be used:
   A. Copper Tube -- Nom 1 in. diam (or smaller) Type L (or heavier) copper tube.
   B. Copper Pipe -- Nom 1 in. diam (or smaller) Regular (or heavier) copper pipe.
3. Tube Insulation - Plastics+ -- Nom 3/4 in. thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. Tube insulation to be installed on one or more of the metallic pipes or tubes.
   See Plastics+ (QMFZ2) category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL 94 Flammability Classification of 94-5VA may be used.
4. Cables -- Max of one 4 pair No. 18 AWG (or smaller) cable with PVC insulation and jacket materials.
5. Fill, Void or Cavity Material - Sealant* -- Min 1-1/4 in. thickness of fill material applied within annulus between penetrants and gypsum board, flush with both surfaces of wall. At point contact, a 1/4 in. bead of fill material shall be applied at the penetrant/gypsum board interface on both sides of wall.
   HILTI CONSTRUCTION CHEMCIALS, DIV OF HILTI INC -- FS-ONE Sealant
*Bearing the UL Classification Mark

HILTI FIRESTOP SYSTEMS

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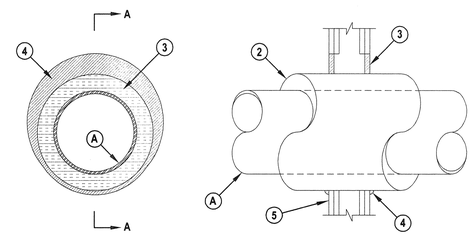
July 06, 2005

CLASSIFIED UL C US

System No. W-L-5029

F Ratings — 1 and 2 Hr (See Item 1)
T Ratings — 1/2, 3/4, 1, 1-1/2 and 1-3/4 Hr (See Item 3)
L Rating At Ambient — 4 CFM/Sq Ft
L Rating At 400 F — Less Than 1 CFM/Sq Ft

WL 5029



SECTION A-A

1. Wall Assembly — The 1 or 2 hr fire-rated gypsum board/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. lumber spaced 16 in. OC. Steel studs to be min 2-1/2 in. wide and spaced max 24 in. OC.
   B. Gypsum Board* — 5/8 in. thick, 4 ft 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 Wall and Partition Design. Max diam of opening is 18-5/8 in.
   The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.
2. Through Penetrants — One metallic pipe or tubing to be centered within the firestop system. Pipe or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes or tubing may be used:
   A. Steel Pipe — Nom 12 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. Iron Pipe — Nom 12 in. diam (or smaller) cast or ductile iron pipe.
   C. Copper Tubing — Nom 6 in. diam (or smaller) Type L (or heavier) copper tubing.
   D. Copper Pipe — Nom 6 in. diam (or smaller) Regular (or heavier) copper pipe.
3. Pipe Covering* — Nom 1, 1-1/2 or 2 in. thick hollow cylindrical heavy density (min 3.5 pcf) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product.

Wall Assembly Rating Hr	Through Penetrant		Pipe Covering Thkns In.	Annular Space		T Rating Hr
	Type +	Max Diam In.		Min In.	Max In.	
1	A	4	1	0	1-1/2	1/2
1	B or C	2	1 or 1-1/2	0	1-1/2	1/2
1	A	4	1-1/2	0	1-1/2	1
1	A	12	2	0	1-7/8	3/4
1	B or C	6	2	0	1-7/8	1
2	A	4	1	0	1-1/2	1
2	B or C	4	1 or 1-1/2	0	1-1/2	1
2	B or C	6	2	0	1-7/8	1
2	A	4	1-1/2	0	1-1/2	1-3/4
2	A	12	2	0	1-7/8	1-1/2
2	B or C	6	2	0	1-7/8	1

+Indicates penetrant type as itemized in Item 2.

3A. Pipe Covering* — (Not Shown) — As an alternate to Item 3, max 2 in. thick cylindrical calcium silicate (min 14 pcf) units sized to the outside diam of the pipe or tube may be used. Pipe insulation secured with stainless steel bands or min 8 AWG stainless steel wire spaced max 12 in. OC. When the alternate pipe covering is used, the T Rating shall be determined from the table above.
   See Pipe and Equipment Covering — Materials (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.
4. Fill, Void or Cavity Material* — Sealant — Min 5/8 in. thickness of fill material applied within the annulus, flush with both surfaces of wall . At the point contact location between pipe covering and gypsum board, a min 1/2 in. diam bead of fill material shall be applied at the pipe covering/gypsum board interface on both surfaces of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-One Sealant
*Bearing the UL Classification Mark

HILTI FIRESTOP SYSTEMS

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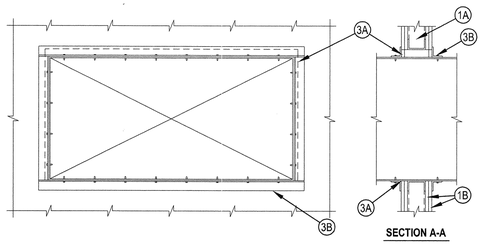
November 13, 2001

CLASSIFIED UL C US

System No. W-L-7040

F Ratings — 1 and 2 Hrs (See Items 1 and 3)
T Rating — 0 Hr

WL 7040



SECTION A-A

1. Wall Assembly — The 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 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. lumber spaced 16 in. OC. Steel studs to be min 2-1/2 in. wide and spaced max 24 in. Additional framing members shall be used to completely frame around opening.
   B. Gypsum Board* — Nom 5/8 in. thick with square or tapered edges. The gypsum wallboard type, number of layers and sheet orientation shall be as specified in the individual Wall and Partition Design Number. Max area of opening is 1300 in. with the dimension of 50 in. The hourly F rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.
2. Steel Duct — Nom 24 in. by 48 in. (or smaller) No. 24 gauge (or heavier) galv steel duct to be installed within the firestop system. The annular space shall be min 0 (point contact) in. to a max 2 in. Duct to be rigidly supported on both sides of the wall assembly.
3. Firestop System — The firestop system shall consist of the following:
   A. Fill, Void or Cavity Material*—Sealant — Min 5/8 in. thickness of fill material applied within annulus flush with both surfaces of wall. At point contact location, a min 1/2 in. diam bead of fill material shall be applied to the wall/duct interface on both surfaces of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE Sealant, CP601S Elastomeric Firestop Sealant or CP606 Flexible Sealant.
   B. Steel Retaining Angle — No. 18 MSG (0.048 in.) galv steel angles cut to fit contour of duct with a 2 in. overlap on the duct and a min 1 in. overlap on the gypsum board assembly on both sufaces of wall. 2 in. leg of angle secured to duct with min No. 8 by 3/4 in. long sheet metal screws, spaced a max of 6 in. OC. When bead of fill material is used at joint contact locations, angles shall be installed prior to full material curing.
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HILTI FIRESTOP SYSTEMS

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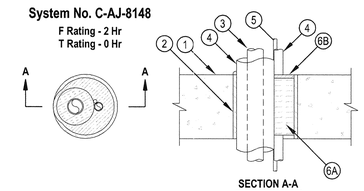
November 13, 2001

CLASSIFIED UL C US

System No. C-AJ-8148

F Rating - 2 Hr
T Rating - 0 Hr

CAJ 8148



SECTION A-A

1. Floor or Wall Assembly — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete. Floor may also be constructed of any min 6 in. (152 mm) thick UL Classified hollow-core Precast Concrete Units*. Wall may also be constructed of any UL Classified Concrete Blocks*. Max diam of opening is 4 in.
   See Concrete Blocks (CAZT) and Precast Concrete Units (CFTV) categories in the Fire Resistance Directory for names of manufacturers.
2. Metallic Sleeve — (Optional) — Nom 4 in. diam (or smaller) Schedule 10 (or heavier) steel sleeve cast or grouted into floor or wall assembly, flush with floor or wall surfaces.
3. Through-Penetrants — A max of two pipes, conduits or tubing to be installed within the opening. Of the two pipes, conduits or tubing, only one of the pipes, conduit or tubing shall have a nom diam greater than 1/2 in. The annular space between pipes, conduits or tubing and the periphery of the opening shall be min 1/4 in. to max 1-1/2 in. The annular space between metallic penetrating items and the other penetrants shall be min 0 in. (point contact) to max 1-1/2 in. Pipes, conduits or tubing to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:
   A. Steel Pipe — Nom 1 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. Iron Pipe — Nom 1 in. diam (or smaller) cast or ductile iron pipe.
   C. Conduit — Nom 1 in. diam (or smaller) steel electrical metallic tubing or nom 1 in. diam (or smaller) steel conduit.
   D. Copper Tubing — Nom 1 in. diam (or smaller) Type L (or heavier) copper tubing.
   E. Copper Pipe — Nom 1 in. diam (or smaller) Regular (or heavier) copper pipe.
4. Tube Insulation — Plastics+ — Nom 3/4 in. thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The tube insulation may be installed on a max of one pipe or tubing. The annular space between insulated penetrating item and periphery of opening shall be min 0 in. (point contact) to max 1-1/2 in. The annular space between insulated penetrating item and the other penetrants shall be a min 0 in. (point contact) to a max 1 in.
   See Plastics+ (QMFZ2) category in the Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL 94 Flammability Classification of 94-5VA may be used.
5. Cables — Max one, 4 pair No. 18 AWG (or smaller) thermostat cable with polyvinyl chloride (PVC) insulation and jacket materials. Cable to be spaced a min 0 in. (point contact) to max 1-1/2 in. from the other penetrants. The annular space between the cable and the periphery of the opening shall be a min 1/2 in. to max 1 in. Cable to be rigidly supported on both sides of wall assembly.
6. Firestop System — The firestop system shall consist of the following:
   A. Packing Material — Min 4 in. thickness of min 4 pcf mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be forced into interstices of through penetrants to max extent possible. Packing material to be recessed from top surface of concrete floor or from both surfaces of wall to accommodate the required thickness of fill material. When the floor is constructed of hollow-core precast concrete units, packing material shall be installed flush with bottom surface of floor and recessed from top surface of floor to accommodate the required thickness of fill material.
   B. Fill, Void or Cavity Material* — Sealant — Min 1/4 in. thickness of fill material applied within the annulus, flush with top surface of concrete floor or with both surfaces of wall assembly. Fill material to be forced into interstices of through penetrants to max extent possible.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE Sealant
+Bearing the UL Recognized Component Mark
*Bearing the UL Classification Mark

HILTI FIRESTOP SYSTEMS

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February 11, 2006

CLASSIFIED UL C US

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PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:
MECHANICAL DETAILS

REVISIONS

MARK	DATE	DESCRIPTION

ISSUE DATA

ISSUE DATE:	DEC. 9, 2008
ISSUE TYPE:	DESDEV
DRAWN BY:	P. COOPER
CHECKED BY:	N. SPENCER
CAD FILE NAME:	
DFCM PROJECT #	06292770
STATE PROPERTY #	-
COPYRIGHT:	STATE OF UTAH

SHEET NUMBER:

ME509

AIR HANDLER SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	AIR SUPPLY AIRFLOW (CFM)	COMPONENTS: FANS	COILS	FILTERS	OTHER	ELECTRICAL: SINGLE POINT VOLT/PH/HZ	PHYSICAL: CABINET LENGTH/ WIDTH/HEIGHT (IN)	WEIGHT (LB)	NOTES
AH-1		PENTHOUSE	100000	SF-1.1, SF-1.2	HC-1.2, HCC-1, HC-1.1, CC-1.2, CC-1.1, EC-1	F-1.1, F-1.2					1
AH-2		PENTHOUSE	16500	SF-2.1, SF-2.2	HC-2.2, HCC-2, HC-2.1, CC-2.2, CC-2.1, EC-2, H-2	F-2.1, F-2.2					1
AH-3		PENTHOUSE	16500	SF-3.1, SF-3.2	HC-3.2, HCC-3, HC-3.1, CC-3.2, CC-3.1, EC-3, H-3	F-3.1, F-3.2					1
AH-4		PENTHOUSE	35000	SF-4.1, SF-4.2	HC-4.2, HCC-4, HC-4.1, CC-4.2, CC-4.1, EC-4, H-4	F-4.1, F-4.2					1
AH-5		PENTHOUSE	35000	SF-5.1, SF-5.2	HC-5.2, HCC-5, HC-5.1, CC-5.2, CC-5.1, EC-5, H-5	F-5.1, F-5.2					1
AH-6		PENTHOUSE	77697	EF-6.1, EF-6.2	RC-6	F-6					1
AH-7		PENTHOUSE	16500	EF-7	RC-7	F-7					1
AH-8		PENTHOUSE	16500	EF-8	RC-8	F-8					1
AH-9		PENTHOUSE	26950	EF-9	RC-9	F-9					1
AH-10		PENTHOUSE	26950	EF-10	RC-10	F-10					1

1. UNIT ON EMERGENCY POWER

STEAM BOILER SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	DRAFT TYPE	FUEL TYPE	INPUT LOAD (BTU/H)	OUTPUT LOAD (BTU/H)	STEAM: FLOW RATE (LB/H)	OPERATING PRESSURE (PSIG)	ELECTRICAL: MOTOR QUAN.	MOTOR SIZE (HP)	MOTOR VOLT/PH/HZ	CONTROL CIRCUIT VOLT/PH/HZ	PHYSICAL: STACK DIAMETER (IN)	LENGTH/ WIDTH/ HEIGHT (IN)	NOTES
B-7	HURST 200-GP2-300-150		FIRETUBE, DRY	FORCED	NAT GAS/#2 FUEL OIL, PUMP	1547400	9191700	10419.7	100	1	7.5	460/3/60	120/1/60	20	262/89/102.5	1-2
B-8	HURST 200-GP2-300-150		FIRETUBE, DRY	FORCED	NAT GAS/#2 FUEL OIL, PUMP	1547400	9191700	10419.7	100	1	7.5	460/3/60	120/1/60	20	262/89/102.5	1-2

1. ASME CERTIFIED
2. OIL PUMP: 1.5 HP, 460/3/60

BOILER SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	DRAFT TYPE	FUEL TYPE	INPUT LOAD (BTU/H)	OUTPUT LOAD (BTU/H)	FLUID: FLOW RATE (GPM)	ENTERING/ LEAVING TEMP. (°F)	WORKING FLUID	HEAD LOSS (FT)	ELECTRICAL: MOTOR QUAN.	MOTOR SIZE (HP)	MOTOR VOLT/PH/HZ	CONTROL CIRCUIT VOLT/PH/HZ	PHYSICAL: STACK DIAMETER (IN)	LENGTH/ WIDTH/ HEIGHT (IN)	NOTES
B-1	AERCO BMK-3.0 LN	BOILER RM	CONDENSING	NAT SEALD PV	NAT GAS	3420400	2750000	164.7	95.2/130	WATER	5	1	1	460/3/60	110/1/60	8	64/27/77	1-6
B-2	AERCO BMK-3.0 LN	BOILER RM	CONDENSING	NAT SEALD PV	NAT GAS	3420400	2750000	164.7	95.2/130	WATER	5	1	1	460/3/60	110/1/60	8	64/27/77	1-6
B-3	AERCO BMK-3.0 LN	BOILER RM	CONDENSING	NAT SEALD PV	NAT GAS	3420400	2750000	164.7	95.2/130	WATER	5	1	1	460/3/60	110/1/60	8	64/27/77	1-6
B-4	AERCO BMK-3.0 LN	BOILER RM	CONDENSING	NAT SEALD PV	NAT GAS	3420400	2750000	164.7	95.2/130	WATER	5	1	1	460/3/60	110/1/60	8	64/27/77	1-6
B-5	AERCO BMK-3.0 LN	BOILER RM	CONDENSING	NAT SEALD PV	NAT GAS	3420400	2750000	164.7	95.2/130	WATER	5	1	1	460/3/60	110/1/60	8	64/27/77	1-6
B-6	AERCO BMK-3.0 LN	BOILER RM	CONDENSING	NAT SEALD PV	NAT GAS	3420400	2750000	164.7	95.2/130	WATER	5	1	1	460/3/60	110/1/60	8	64/27/77	1-6
B-9	SEE WH-1 THRU 4																	
B-10	SEE WH-1 THRU 4																	
B-11	SEE WH-1 THRU 4																	
B-12	SEE WH-1 THRU 4																	

1. SEALED COMBUSTION
2. 15 AMP POWER
3. 15:1 TURNDOWN
4. UNIT WITH MULTIPLE BOILER SEQUENCING PACKAGE
5. UNIT ON EMERGENCY POWER
6. ASME CERTIFIED

COOLING TOWER SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	FAN AIRFLOW (CFM)	AMBIENT TEMP. DB/WB (°F)	FLUID: FLOW RATE (GPM)	ENTERING/ LEAVING TEMP. (°F)	WORKING FLUID	INLET/ OUTLET HEAD LOSS (FT)	ELECTRICAL, FAN: MOTOR QUAN.	MOTOR SIZE (HP)	MOTOR SPEED (RPM)	TOWER AND CONTROL CIRCUIT VOLT/PH/HZ	PHYSICAL: OPERATING WEIGHT (LB)	LENGTH/ WIDTH/ HEIGHT (IN)	NOTES
CT-1	EVAPCO USS 212-924	CHILLER RM ROO	OPEN, COUNTERFLOW, AXIAL	107135	86/66	631.1	81.8/70	WATER	15/0	1	40	1750	460/3/60 120/1/60	15110	145/142/198.5	1,2,4,5
CT-2	EVAPCO USS 212-924	CHILLER RM ROO	OPEN, COUNTERFLOW, AXIAL	107135	86/66	631.1	81.8/70	WATER	15/0	1	40	1750	460/3/60 120/1/60	15110	145/142/198.5	1,2,4
CT-1	EVAPCO USS 212-924	CHILLER RM ROO	OPEN, COUNTERFLOW, AXIAL	107135	95/70	1250.8	90/80	WATER	15/0	1	40	1750	460/3/60 120/1/60	15110	145/142/198.5	1-3,4,5
CT-2	EVAPCO USS 212-924	CHILLER RM ROO	OPEN, COUNTERFLOW, AXIAL	107135	95/70	1250.8	90/80	WATER	15/0	1	40	1750	460/3/60 120/1/60	15110	145/142/198.5	1-3,4
CT-3	EVAPCO ESWA 144-44M	CHILLER RM ROOF	CLOSED, AXIAL	95400	-20/-21.19	149.8	120/70	40% P GLY	15/15	1	30	1750	460/3/60 120/1/60	25550	144/142/219.5	4

1. WITH SUPER LOW NOISE FAN, LADDER AND VIBRATION SWITCH
2. MODEL # IS FOR CT-1 AND CT-2 COMBINED.
3. CONDITION #2: SELECT TOWER TO OPERATE AT BOTH CONDITIONS.
4. UNIT ON VFD.
5. UNIT ON EMERGENCY POWER

WATER-COOLED CHILLER SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	REFRIG.	LOAD (TONS)	EFF. (%)	FLUID: DESCRIPTION	FLOW RATE (GPM)	ENTERING/ LEAVING TEMP. (°F)	WORKING FLUID	HEAD LOSS (FT)	ELECTRICAL: MAXIMUM KW	TOTAL MCA	MAXIMUM UNIT EFFICIENCY (KW/TON)	EFFICIENCY RATING	CHILLER AND CONTROL CIRCUIT VOLT/PH/HZ	PHYSICAL: LENGTH/ WIDTH/ HEIGHT (IN)	NOTES
CH-1	YORK		SCREW	R-22	403.7	80	EVAPORATOR	827.2	56/44	WATER	15	224	393	0.56	0.506	460/3/60		1
	YRWDWDT3-46C						CONDENSER	1250.8	80/90	WATER	15							
CH-2	YORK		SCREW	R-22	403.7	80	EVAPORATOR	827.2	56/44	WATER	15	224	393	0.56	0.506	460/3/60		
	YRWDWDT3-46C						CONDENSER	1250.8	80/90	WATER	15							

1. UNIT ON EMERGENCY POWER

ARCHITECT 0818

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PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

MECHANICAL SCHEDULES

REVISIONS

MARK DATE DESCRIPTION

ISSUE DATA

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CHECKED BY: N. SPENCER
CAD FILE NAME:
DFCM PROJECT # 06292770
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COPYRIGHT: STATE OF UTAH

SHEET NUMBER:

ME601

COIL SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	USAGE	AIR: AIRFLOW RATE (CFM)	AIR: LOAD (BTU/H)	AIR: SENSIBLE LOAD (BTU/H)	AIR: ENTERING TEMP. DB/WB (°F)	AIR: LEAVING TEMP. DB/WB (°F)	AIR: STATIC PRESSURE (IN. WATER)	FLUID: FLOW RATE (GPM)	FLUID: ENTERING/ LEAVING TEMP. (°F)	FLUID: WORKING FLUID	FLUID: HEAD LOSS (FT)	PHYSICAL: NO. COILS	PHYSICAL: EACH COIL FIN WIDTH/ HEIGHT (IN)	PHYSICAL: MINIMUM FACE AREA (FT²)	PHYSICAL: MINIMUM NO. ROWS/ FINS PER INCH	NOTES
CC-1.1	YORK WC	AH-1	COOLING	100000	4729200	4729200	103.9/64.7	52/48.9	0.75	807.5	44/56	WATER	15	9	103/39	251.1	8/8	
CC-1.2	YORK WC	AH-1	COOLING	100000	1909500	1791300	97.7/62.8	78/56	0.75	393.8	73/83	WATER	15	9	103/39	251.1	8/8	
CC-2.1	YORK WC	AH-2	COOLING	16500	804300	804300	105.5/65.2	52/48.9	0.75	137.3	44/56	WATER	15	1	105/57	41.6	8/8	
CC-2.2	YORK WC	AH-2	COOLING	16500	312000	292600	97.5/62.8	78/56	0.75	64.3	73/83	WATER	15	1	105/57	41.6	8/8	
CC-3.1	YORK WC	AH-3	COOLING	16500	804300	804300	105.5/65.2	52/48.9	0.75	137.3	44/56	WATER	15	1	105/57	41.6	8/8	
CC-3.2	YORK WC	AH-3	COOLING	16500	312000	292600	97.5/62.8	78/56	0.75	64.3	73/83	WATER	15	1	105/57	41.6	8/8	
CC-4.1	YORK WC	AH-4	COOLING	35000	1675800	1675800	104.6/64.9	52/48.9	0.75	286.1	44/56	WATER	15	3	108/39	87.8	8/8	
CC-4.2	YORK WC	AH-4	COOLING	35000	691600	649900	98.4/63	78/56	0.75	142.6	73/83	WATER	15	3	108/39	87.8	8/8	
CC-5.1	YORK WC	AH-5	COOLING	35000	1675800	1675800	104.6/64.9	52/48.9	0.75	286.1	44/56	WATER	15	3	108/39	87.8	8/8	
CC-5.2	YORK WC	AH-5	COOLING	35000	691600	649900	98.4/63	78/56	0.75	142.6	73/83	WATER	15	3	108/39	87.8	8/8	
HC-1.1	YORK WC	AH-1	HEATING	100000	5919800	5919800	-10/-12.1	55/33.7	0.25	316.8	120/80	40% P GLY	5	9	103/39	251.1	2/12	
HC-1.2		AH-1	HEATING	100000	906900	906900	-20/-21.2	-10/-12.1	0.25	48.5	120/80	40% P GLY	5	9	103/39	251.1	2/6	
HC-2.1	YORK WC	AH-2	HEATING	16500	976800	976800	-10/-12.1	55/33.7	0.25	52.3	120/80	40% P GLY	5	1	105/57	41.6	2/12	
HC-2.2		AH-2	HEATING	16500	149600	149600	-20/-21.2	-10/-12.1	0.25	8	120/80	40% P GLY	5	1	105/57	41.6	2/6	
HC-3.1	YORK WC	AH-3	HEATING	16500	976800	976800	-10/-12.1	55/33.7	0.25	52.3	120/80	40% P GLY	5	1	105/57	41.6	2/12	
HC-3.2		AH-3	HEATING	16500	149600	149600	-20/-21.2	-10/-12.1	0.25	8	120/80	40% P GLY	5	1	105/57	41.6	2/6	
HC-4.1	YORK WC	AH-4	HEATING	35000	2071900	2071900	-10/-12.1	55/33.7	0.25	110.9	120/80	40% P GLY	5	3	108/39	87.8	2/12	
HC-4.2		AH-4	HEATING	35000	317400	317400	-20/-21.2	-10/-12.1	0.25	17	120/80	40% P GLY	5	3	108/39	87.8	2/6	
HC-5.1	YORK WC	AH-5	HEATING	35000	2071900	2071900	-10/-12.1	55/33.7	0.25	110.9	120/80	40% P GLY	5	3	108/39	87.8	2/12	
HC-5.2		AH-5	HEATING	35000	317400	317400	-20/-21.2	-10/-12.1	0.25	17	120/80	40% P GLY	5	3	108/39	87.8	2/6	
HCC-1	YORK WC	AH-1	HEAT DEL	100000	1344500	1344500	-10/-12.1	4.8/0.6	0.75	243.2	44/32	40% P GLY	15	9	103/39	251.1	6/10	
			COOL DEL	100000	576100	566100	95/62	88.8/60	0.75	247.9	80/85		15					
HCC-2	YORK WC	AH-2	HEAT DEL	16500	285500	285500	-10/-12.1	9.1/4	0.75	51.7	44/32	40% P GLY	15	1	105/57	41.6	6/10	
			COOL DEL	16500	122300	120200	95/62	87/59.4	0.75	52.6	80/85		15					
HCC-3	YORK WC	AH-3	HEAT DEL	16500	285500	285500	-10/-12.1	9.1/4	0.75	51.7	44/32	40% P GLY	15	1	105/57	41.6	6/10	
			COOL DEL	16500	122300	120200	95/62	87/59.4	0.75	52.6	80/85		15					
HCC-4	YORK WC	AH-4	HEAT DEL	35000	466300	466300	-10/-12.1	4.7/0.5	0.75	84.4	44/32	40% P GLY	15	3	108/39	87.8	6/10	
			COOL DEL	35000	199800	196400	95/62	88.8/60	0.75	86	80/85		15					
HCC-5	YORK WC	AH-5	HEAT DEL	35000	466300	466300	-10/-12.1	4.7/0.5	0.75	84.4	44/32	40% P GLY	15	3	108/39	87.8	6/10	
			COOL DEL	35000	199800	196400	95/62	88.8/60	0.75	86	80/85		15					
RC-6	YORK WC	AH-6	HEAT REC	77697	1344500	1344500	72/53.2	53/45.5	0.75	243.2	32/44	40% P GLY	15	6	120/39	195	8/8	
			COOL REC	77697	576100	566100	74/59.5	82/62	0.75	247.9	85/80		15					
RC-7	YORK WC	AH-7	HEAT REC	16500	285500	285500	72/53.2	53/45.5	0.75	51.7	32/44	40% P GLY	15	1	105/57	41.6	8/8	
			COOL REC	16500	122300	120200	74/59.5	82/62	0.75	52.6	85/80		15					
RC-8	YORK WC	AH-8	HEAT REC	16500	285500	285500	72/53.2	53/45.5	0.75	51.7	32/44	40% P GLY	15	1	105/57	41.6	8/8	
			COOL REC	16500	122300	120200	74/59.5	82/62	0.75	52.6	85/80		15					
RC-9	YORK WC	AH-9	HEAT REC	26950	466300	466300	72/53.2	53/45.5	0.75	84.4	32/44	40% P GLY	15	3	83/39	67.4	8/8	
			COOL REC	26950	199800	196400	74/59.5	82/62	0.75	86	85/80		15					
RC-10	YORK WC	AH-10	HEAT REC	26950	466300	466300	72/53.2	53/45.5	0.75	84.4	32/44	40% P GLY	15	3	83/39	67.4	8/8	
			COOL REC	26950	199800	196400	74/59.5	82/62	0.75	86	85/80		15					

EVAPORATIVE COOLER SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	AIR: AIRFLOW RATE (CFM)	AIR: SENSIBLE LOAD (BTU/H)	AIR: ENTERING TEMP. DB/WB (°F)	AIR: LEAVING TEMP. DB/WB (°F)	AIR: STATIC PRESSURE (IN. WATER)	MAKEUP: FLOW RATE (GPM)	MISC: EFF (%)	ELECTRICAL, PUMP: MOTOR SIZE (HP)	ELECTRICAL, PUMP: VOLT/PH/HZ	ELECTRICAL, FAN: MOTOR SIZE (HP)	ELECTRICAL, FAN: VOLT/PH/HZ	PHYSICAL: NO. MODULES	PHYSICAL: EACH MODULE WIDTH/ HEIGHT (IN)	PHYSICAL: MINIMUM FACE AREA (FT²)	PHYSICAL: PAD THICKNESS (IN)	NOTES
EC-1	UNITECH MUNTERS	AH-1	DIRECT	100000	1090200	64/50.7	52/50.7	0.75	2.1	90	0.5	120/1/60	-----	-----	2	140/129	250.8	12	
EC-2	UNITECH MUNTERS	AH-2	DIRECT	16500	179900	64/50.7	52/50.7	0.75	0.3	90	0.5	120/1/60	-----	-----	1	105/57	41.6	12	
EC-3	UNITECH MUNTERS	AH-3	DIRECT	16500	179900	64/50.7	52/50.7	0.75	0.3	90	0.5	120/1/60	-----	-----	1	105/57	41.6	12	
EC-4	UNITECH MUNTERS	AH-4	DIRECT	35000	381600	64/50.7	52/50.7	0.75	0.7	90	0.5	120/1/60	-----	-----	1	98/129	87.8	12	
EC-5	UNITECH MUNTERS	AH-5	DIRECT	35000	381600	64/50.7	52/50.7	0.75	0.7	90	0.5	120/1/60	-----	-----	1	98/129	87.8	12	

STEAM-TO-HYDRONIC HEAT EXCHANGER SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	USAGE	LOAD (BTU/H)	SOURCE MEDIUM (STEAM): FLOW RATE (LB/H)	SOURCE MEDIUM (STEAM): ENTERING PRESSURE (PSIG)	TRANSFER MEDIUM (HYDRONIC): FLOW RATE (GPM)	TRANSFER MEDIUM (HYDRONIC): ENTERING/ LEAVING TEMP. (°F)	TRANSFER MEDIUM (HYDRONIC): WORKING FLUID	TRANSFER MEDIUM (HYDRONIC): HEAD LOSS (FT)	PHYSICAL: DIA./ LENGTH/ NO. PLATES (IN/IN)	PHYSICAL: SURFACE AREA (FT²)	NOTES
HX-6	TACO C08108-S		SHELL & TUBE	HEATING	2752800	3081.2	65	164.9	95.2/130	30% P GLY	15	8.62/64/	33.7	1

1. ASME CERTIFIED

DEAERATOR SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	PUMPS	STEAM: FLOW RATE (LB/H)	ELECTRICAL: CONTROL CIRCUIT VOLT/PH/HZ	PHYSICAL: TANK SIZE (GAL)	PHYSICAL: LENGTH/ WIDTH/ HEIGHT (IN)	NOTES
DEA-1			VERTICAL SPRAY	ECP-DEA-1.1, ECP-DEA-1.2	116582.2	120/1/60			

DEAERATOR, PUMP SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	CONDENSATE: FLOW RATE (GPM)	CONDENSATE: HEAD LOSS (FT)	PUMP: CONSTRUCTION	ELECTRICAL: MOTOR SIZE (HP)	ELECTRICAL: VOLT/PH/HZ	NOTES
ECP-DEA-1.1			484.2	230.7	OTHER	15	460/3/60	
ECP-DEA-1.2			484.2	230.7	OTHER	15	460/3/60	

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PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:
MECHANICAL SCHEDULES

REVISIONS

MARK	DATE	DESCRIPTION

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ME602

FAN SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	AIR TYPE	AIR: MAXIMUM AIRFLOW RATE (CFM)	AIR: STATIC PRESSURE (IN. WATER)	FAN: FAN SPEED (RPM)	FAN: FAN WHEEL DIAMETER (IN)	FAN: STATIC EFFICIENCY (%)	ELECTRICAL: MOTOR SIZE (HP)	ELECTRICAL: MOTOR BHP (HP)	ELECTRICAL: MOTOR SPEED (RPM)	ELECTRICAL: VOLT/PH/HZ	PHYSICAL: LENGTH/ WIDTH/ HEIGHT (IN)	NOTES
DEF-1	TWIN CITY BCRD 160C	DOCK ROOF	ROOF DOWNBLAST, DOME	EXHAUST AIR	2799	0.8	1321	16.5	55.7	1	0.629	1800	460/3/60	33.81/33.81/35.25	
DEF-2	TWIN CITY BCRD 160C	DOCK ROOF	ROOF DOWNBLAST, DOME	EXHAUST AIR	2100	0.79	1147	16.5	63.8	0.75	0.41	1800	460/3/60	33.81/33.81/35.25	
DEF-3	TWIN CITY BCRD 240HP	NORTH PENTHOUSE	ROOF DOWNBLAST, DOME	EXHAUST AIR	3996	1.13	891	27.95	61.2	2	1.165	1800	460/3/60	43/43/38.38	
DEF-4	TWIN CITY BCV 182	NORTH PENTHOUSE	BACKWARD INCLINED VENT	EXHAUST AIR	3996	4.02	2062	18.25	71.2	7.5	3.545	1800	460/3/60	30.19/38.82/41.56	1-3
DEF-5	TWIN CITY BCV 122	NORTH PENTHOUSE	BACKWARD INCLINED VENT	EXHAUST AIR	1197	4.02	2845	12.25	60.8	2	1.245	3600	460/3/60	20.31/27.19/28.44	1-3
DEF-6	TWIN CITY BCJ 105	NORTH PENTHOUSE	BACKWARD INCLINED VENT	EXHAUST AIR	300	1.49	2015	10.5	45.5	0.33	0.155	1800	120/1/60	18.56/26.44/26.63	1-3
DEF-7	TWIN CITY BCV 270	SOUTH L3 MECH RM	BACKWARD INCLINED VENT	EXHAUST AIR	7000	4.02	1295	27	71.6	10	6.174	1800	460/3/60	44.63/45.94/60.56	1-3
DEF-8	TWIN CITY BCV 270	SOUTH L3 MECH RM	BACKWARD INCLINED VENT	EXHAUST AIR	7000	4.02	1295	27	71.6	10	6.174	1800	460/3/60	44.63/45.94/60.56	1-3
DEF-9	TWIN CITY BCRU 360	CHILLER RM ROOF	ROOF UPBLAST, DOME	EXHAUST AIR	12400	0.34	486	39.37	45.8	2	1.436	1800	460/3/60	64/64/46	
DEF-10	TWIN CITY BCRU 160	CHILLER RM ROOF	ROOF UPBLAST, DOME	EXHAUST AIR	2550	0.32	1080	16.78	30.1	0.75	0.42	1800	460/3/60	31/31/35	
EF-6.1	TWIN CITY QSL 402	AH-6	MIXED FLOW, CENTRIFUGAL	EXHAUST AIR	38849	5.04	1233	49	71.6	60	42.958	1800	460/3/60	73/59.75/89.645	1, 4-7
EF-6.2	TWIN CITY QSL 402	AH-6	MIXED FLOW, CENTRIFUGAL	EXHAUST AIR	38849	5.04	1233	49	71.6	60	42.958	1800	460/3/60	73/59.75/89.645	1, 4-7
EF-7	TWIN CITY QSL 270	AH-7	MIXED FLOW, CENTRIFUGAL	EXHAUST AIR	16500	5.04	1839	33	69.9	25	18.693	1800	460/3/60	48.83/39.75/62.035	1, 4-7
EF-8	TWIN CITY QSL 270	AH-8	MIXED FLOW, CENTRIFUGAL	EXHAUST AIR	16500	5.04	1839	33	69.9	25	18.693	1800	460/3/60	48.83/39.75/62.035	1, 4-7
EF-9	TWIN CITY QSL 365	AH-9	MIXED FLOW, CENTRIFUGAL	EXHAUST AIR	26950	5.04	1283	44.5	71	50	30.061	1800	460/3/60	66.37/53.75/78.375	1, 4-7
EF-10	TWIN CITY QSL 365	AH-10	MIXED FLOW, CENTRIFUGAL	EXHAUST AIR	26950	5.04	1283	44.5	71	50	30.061	1800	460/3/60	66.37/53.75/78.375	1, 4-7
SF-1.1	TWIN CITY QSL 600	AH-1	MIXED FLOW, CENTRIFUGAL	SUPPLY AIR	50000	7.66	875	73	62	125	97.193	1800	460/3/60	108.74/87.5/122.16	4, 6-8
SF-1.2	TWIN CITY QSL 600	AH-1	MIXED FLOW, CENTRIFUGAL	SUPPLY AIR	50000	7.66	875	73	62	125	97.193	1800	460/3/60	108.74/87.5/122.16	4, 6-8
SF-2.1	TWIN CITY QSL 270	AH-2	MIXED FLOW, CENTRIFUGAL	SUPPLY AIR	8250	7.91	1951	33	56.5	25	18.167	1800	460/3/60	48.83/39.75/62.035	4, 6-8
SF-2.2	TWIN CITY QSL 270	AH-2	MIXED FLOW, CENTRIFUGAL	SUPPLY AIR	8250	7.91	1951	33	56.5	25	18.167	1800	460/3/60	48.83/39.75/62.035	4, 6-8
SF-3.1	TWIN CITY QSL 270	AH-3	MIXED FLOW, CENTRIFUGAL	SUPPLY AIR	8250	7.91	1951	33	56.5	25	18.167	1800	460/3/60	48.83/39.75/62.035	4, 6-8
SF-3.2	TWIN CITY QSL 270	AH-3	MIXED FLOW, CENTRIFUGAL	SUPPLY AIR	8250	7.91	1951	33	56.5	25	18.167	1800	460/3/60	48.83/39.75/62.035	4, 6-8
SF-4.1	TWIN CITY QSL 365	AH-4	MIXED FLOW, CENTRIFUGAL	SUPPLY AIR	17500	7.91	1449	44.5	60.3	50	36.09	1800	460/3/60	66.37/53.75/78.375	4, 6-8
SF-4.2	TWIN CITY QSL 365	AH-4	MIXED FLOW, CENTRIFUGAL	SUPPLY AIR	17500	7.91	1449	44.5	60.3	50	36.09	1800	460/3/60	66.37/53.75/78.375	4, 6-8
SF-5.1	TWIN CITY QSL 365	AH-5	MIXED FLOW, CENTRIFUGAL	SUPPLY AIR	17500	7.91	1449	44.5	60.3	50	36.09	1800	460/3/60	66.37/53.75/78.375	4, 6-8
SF-5.2	TWIN CITY QSL 365	AH-5	MIXED FLOW, CENTRIFUGAL	SUPPLY AIR	17500	7.91	1449	44.5	60.3	50	36.09	1800	460/3/60	66.37/53.75/78.375	4, 6-8

1. BACKWARD INCLINE CLASS III ALUMINUM AIRFOIL WHEEL.
2. ON EMERGENCY POWER.
3. PROVIDE SHAFT SEAL, TYPE B SPARK PROOF CONSTRUCTION, PHENOLIC COATING ON INTERNAL PARTS, UP BLAST, DRAIN PLUG AT BOTTOM.
4. FANS TO BE ON EMERGENCY POWER (RUN AT HALF SPEED),
5. PROVIDE SHAFT SEAL, TYPE B SPARK PROOF CONSTRUCTION, UP BLAST, DRAIN PLUG AT BOTTOM.
6. ON VFD
7. CLASS II FAN
8. PROVIDE CLASS III WHEEL.

PUMP SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	FLUID: FLOW RATE (GPM)	FLUID: WORKING FLUID	FLUID: HEAD LOSS (FT)	PUMP: EFFICIENCY (%)	PUMP: CONSTRUCTION	ELECTRICAL: MOTOR SIZE (HP)	ELECTRICAL: MOTOR BHP (HP)	ELECTRICAL: MOTOR SPEED (RPM)	ELECTRICAL: VOLT/PH/HZ	NOTES
BP-01	TACO 1941	BOIL RM	VERTICAL CLOSE-COUPLED INLINE	164.7	WATER	25.4	57.2	IRON	2	1.838	1750	460/3/60	1
BP-02	TACO 1941	BOIL RM	VERTICAL CLOSE-COUPLED INLINE	164.7	WATER	25.4	57.2	IRON	2	1.838	1750	460/3/60	1
BP-03	TACO 1941	BOIL RM	VERTICAL CLOSE-COUPLED INLINE	164.7	WATER	25.4	57.2	IRON	2	1.838	1750	460/3/60	1
BP-04	TACO 1941	BOIL RM	VERTICAL CLOSE-COUPLED INLINE	164.7	WATER	22.9	55.2	IRON	2	1.72	1750	460/3/60	1
BP-05	TACO 1941	BOIL RM	VERTICAL CLOSE-COUPLED INLINE	164.7	WATER	22.9	55.2	IRON	2	1.72	1750	460/3/60	1
BP-06	TACO 1941	BOIL RM	VERTICAL CLOSE-COUPLED INLINE	164.7	WATER	22.9	55.2	IRON	2	1.72	1750	460/3/60	1
BP-07	TACO KV3007	BOIL RM	VERTICAL CLOSE-COUPLED INLINE	164.9	WATER	35.4	71.2	BRONZE FITTED	3	2.061	1760	460/3/60	1
P-1	TACO TA2038	CHILLER ROOM	HORIZ FRAME-MOUNT SPLIT-CASE	1250.8	WATER	62.2	79.1	IRON	30	24.816	1160	460/3/60	1
P-2	TACO TA2038	CHILLER ROOM	HORIZ FRAME-MOUNT SPLIT-CASE	1250.8	WATER	62.2	79.1	IRON	30	24.816	1160	460/3/60	
P-3	TACO FI5095	CHILLER ROOM	HORIZ FRAME-MOUNT END-SUCTION	1250.8	WATER	38.4	63.7	BRONZE FITTED	25	19.011	1760	460/3/60	1,2
P-4	TACO FI5095	CHILLER ROOM	HORIZ FRAME-MOUNT END-SUCTION	1250.8	WATER	38.4	63.7	BRONZE FITTED	25	19.011	1760	460/3/60	2
P-5	TACO FI3011	CHILLER ROOM	HORIZ FRAME-MOUNT END-SUCTION	403.8	WATER	111.4	76.8	BRONZE FITTED	20	14.773	1760	460/3/60	1,4,6
P-6	TACO FI3011	CHILLER ROOM	HORIZ FRAME-MOUNT END-SUCTION	403.8	WATER	111.4	76.8	BRONZE FITTED	20	14.773	1760	460/3/60	4,6
P-7	TACO FI5095	CHILLER ROOM	HORIZ FRAME-MOUNT END-SUCTION	827.2	WATER	47.5	81	BRONZE FITTED	15	12.264	1760	460/3/60	1,4
P-8	TACO FI5095	CHILLER ROOM	HORIZ FRAME-MOUNT END-SUCTION	827.2	WATER	47.5	81	BRONZE FITTED	15	12.264	1760	460/3/60	4
P-9	TACO FI5011	CHILLER ROOM	HORIZ FRAME-MOUNT END-SUCTION	827.2	WATER	90.4	84.1	BRONZE FITTED	30	22.499	1760	460/3/60	1,4-5,6
P-10	TACO FI5011	CHILLER ROOM	HORIZ FRAME-MOUNT END-SUCTION	827.2	WATER	90.4	84.1	BRONZE FITTED	30	22.499	1760	460/3/60	4-5,6
P-11	TACO FI6013	BOIL RM	HORIZ FRAME-MOUNT END-SUCTION	1153.1	WATER	134.3	84.1	BRONZE FITTED	75	46.307	1760	460/3/60	1,5,6
P-12	TACO FI6013	BOIL RM	HORIZ FRAME-MOUNT END-SUCTION	1153.1	WATER	134.3	84.1	BRONZE FITTED	75	46.307	1760	460/3/60	1,5,6
P-13	TACO FI2510	NORTH PENTHOUSE	HORIZ FRAME-MOUNT END-SUCTION	182.7	40% P GLY	83.4	63.4	BRONZE FITTED	15	6.275	1760	460/3/60	1,6,7
P-14	TACO FI2510	NORTH PENTHOUSE	HORIZ FRAME-MOUNT END-SUCTION	182.7	40% P GLY	83.4	63.4	BRONZE FITTED	15	6.275	1760	460/3/60	1,6,7
P-15	TACO FI2510	SOUTH L3 MECH RM	HORIZ FRAME-MOUNT END-SUCTION	188.1	40% P GLY	83.4	63.9	BRONZE FITTED	15	6.408	1760	460/3/60	1,6,7
P-16	TACO FI2510	SOUTH L3 MECH RM	HORIZ FRAME-MOUNT END-SUCTION	188.1	40% P GLY	83.4	63.9	BRONZE FITTED	15	6.408	1760	460/3/60	1,6,7
P-17	TACO FI3011	NORTH PENTHOUSE	HORIZ FRAME-MOUNT END-SUCTION	247.9	40% P GLY	92.2	66.6	BRONZE FITTED	15	8.959	1760	460/3/60	4
P-18	TACO FI1511	SOUTH L3 MECH RM	HORIZ FRAME-MOUNT END-SUCTION	52.6	40% P GLY	92.2	39.3	BRONZE FITTED	7.5	3.22	1760	460/3/60	8
P-19	TACO FI1511	SOUTH L3 MECH RM	HORIZ FRAME-MOUNT END-SUCTION	52.6	40% P GLY	92.2	39.3	BRONZE FITTED	7.5	3.22	1760	460/3/60	8
P-20	TACO FI1511	SOUTH L3 MECH RM	HORIZ FRAME-MOUNT END-SUCTION	86	40% P GLY	92.2	47.2	BRONZE FITTED	7.5	4.387	1760	460/3/60	8
P-21	TACO FI1511	SOUTH L3 MECH RM	HORIZ FRAME-MOUNT END-SUCTION	86	40% P GLY	92.2	47.2	BRONZE FITTED	7.5	4.387	1760	460/3/60	8
P-22	TACO FI2510		HORIZ FRAME-MOUNT END-SUCTION	149.8	40% P GLY	84.3	59.5	BRONZE FITTED	15	5.557	1760	460/3/60	7
P-23			VERTICAL CLOSE-COUPLED INLINE	0	WATER	0	0	OTHER		-			
P-24			VERTICAL CLOSE-COUPLED INLINE	0	WATER	0	0	OTHER					
P-25			VERTICAL CLOSE-COUPLED INLINE	0	WATER	0	0						

1. PUMP ON EMERGENCY POWER
2. SUCTION DIFFUSER MODEL (SUCTION SIDE): SD100080, NON-GROOVED
3. SUCTION DIFFUSER MODEL (SUCTION SIDE): NOT SPECIFIED, NON-GROOVED
4. SUCTION DIFFUSER MODEL (SUCTION SIDE): SD060040, NON-GROOVED
5. SUCTION DIFFUSER MODEL (SUCTION SIDE): SD080060, NON-GROOVED
6. PUMP ON VFD
7. SUCTION DIFFUSER MODEL (SUCTION SIDE): SD040030, NON-GROOVED
8. SUCTION DIFFUSER MODEL (SUCTION SIDE): SD030025, NON-GROOVED

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PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

MECHANICAL SCHEDULES

REVISIONS

MARK DATE DESCRIPTION

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SHEET NUMBER:

ME603

SPACE SCHEDULE

ID	LOCATION	AIRFLOW (HEATING SEASON/COOLING SEASON) SUPPLY AIRFLOW RATE (CFM)	RETURN AIRFLOW RATE (CFM)	RELIEF AIRFLOW RATE (CFM)	OUTSIDE AIRFLOW RATE (CFM)	EXHAUST AIRFLOW RATE (CFM)	PRESSURIZATION AIRFLOW RATE (CFM)	VENTILATION AIRFLOW RATE (CFM)	AIR HEATING SEASON COOLING SEASON DB/RH (°F/%)	NOTES
ABSL-3 Spaces		22000/22000	0/0	0/0	22000/22000	22000/22000	0/0	22000/22000	72/30 72/45	
Lab and Office Spaces		100000/100000	0/0	0/0	100000/100000	90000/90000	10000/10000	100000/100000	72/30 72/45	
VIVARIUM Spaces		70000/70000	0/0	0/0	70000/70000	70000/70000	0/0	70000/70000	72/30 72/45	

COMPUTER ROOM UNIT SCHEDULE

SYMBOL	MANUF. AND MODEL NO.	LOCATION	SUPPLY FAN AIR FLOW RATE (CFM)	SUPPLY FAN EXTERNAL STATIC PRESSURE DROP (IN H20)	COOLING SENSIBLE MINIMUM COOLING LOAD (BTUH)	COOLING ROOM AIR TEMP. DB/% RH (DEG. F)	COOLING LEAVING AIR TEMP. DB/WB (DEG. F)	COOLING MAX. WATER PRESS. DROP (FT)	COOLING TOTAL FLUID FLOW (GPM)	COOLING ENTER/ LEAV. FLUID TEMP (DEG F)	COOLING WORKING FLUID	REHEAT MINIMUM HEATING LOAD (KW)	HUMID STEAM LOAD (LB/HR)	FILTERS (FILTER BOX) % EFF.	ELECTRICAL FLA/ WSA / MFCB	ELECTRICAL SUPPLY FAN MOTOR (HP)	ELECTRICAL V/PH	REMARKS
CRU-1	LIEBERT MMD40C	LVL 1-3 COMM RM	1,250	0.3	26,300	75/63	55	2	5.0	42/56	CH WATER	4	4.3	30	29.7/37.1/40	0.5	277/1	1-7

1. SELECTION BASED ON 4200 FT
2. PROVIDE WITH VIBRATION ISOLATORS, MOUNTING BRACKET AND 30% EFF FILTER BOX
3. UNIT WITH CONDENSATE PUMP, PIPE TO NEAREST FLOOR DRAIN
4. SEE SPECIFICATIONS FOR REQUIRED COMPONENTS
5. CEILING MOUNTED
6. NOT USED
7. PROVIDE DRAIN PAN UNDER ENTIRE UNIT WITH WATER DETECTOR TO SHUT OFF UNIT

FAN COIL SCHEDULE - 4 PIPE

SYMBOL	MANUF. AND MODEL NO.	LOCATION	AIR HEATING SIDE TOTAL AIR FLOW RATE (CFM)	AIR HEATING SIDE ENT/LEAV. AIR TEMP. DB/DB (DEG F)	AIR HEATING SIDE MINIMUM TOTAL HEATING LOAD (MBH)	AIR COOLING SIDE TOTAL AIR FLOW RATE (CFM)	AIR COOLING SIDE ENT/LEAV. AIR TEMP. DB/WB (DEG F)	AIR COOLING SIDE MINIMUM SENS COOLING LOAD (MBH)	HEATING FLUID SIDE TOTAL FLUID FLOW (GPM)	HEATING FLUID SIDE ENTER/ LEAV. FLUID TEMP (DEG F)	HEATING FLUID SIDE WORKING FLUID	HEATING FLUID SIDE MAX. WATER PRESS. DROP (FT)	COOLING FLUID SIDE TOTAL FLUID FLOW (GPM)	COOLING FLUID SIDE ENTER/ LEAV. FLUID TEMP (DEG F)	COOLING FLUID SIDE WORKING FLUID	COOLING FLUID SIDE MAX. WATER PRESS. DROP (FT)	FAN TOTAL STATIC PRESS. DROP (IN H20)	FAN (RPM)	ELECTRICAL MOTOR (HP)	ELECTRICAL MOTOR (V/PH)	REMARKS
FCU-5	TRANE FC-080	STAIRS	815	70/100	22.7	815	80/62 / 57/54	17.8	1.2	180/140	H WATER	5	2.7	42/56	CH WATER	5	0.10	1526	0.24	277/1	

1.EXPOSED CABINET WITH STAMPED BOTTOM INLET AND FRONT DISCHARGE GRILLE.

HEAT EXCHANGER SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	USAGE	LOAD (BTU/H)	SOURCE MEDIUM (HYDRONIC) FLOW RATE (GPM)	SOURCE MEDIUM (HYDRONIC) ENTERING/ LEAVING TEMP. (°F)	SOURCE MEDIUM (HYDRONIC) WORKING FLUID	SOURCE MEDIUM (HYDRONIC) HEAD LOSS (FT)	TRANSFER MEDIUM (HYDRONIC) FLOW RATE (GPM)	TRANSFER MEDIUM (HYDRONIC) ENTERING/ LEAVING TEMP. (°F)	TRANSFER MEDIUM (HYDRONIC) WORKING FLUID	TRANSFER MEDIUM (HYDRONIC) HEAD LOSS (FT)	PHYSICAL DIA./ LENGTH/ NO. PLATES (IN/IN)	PHYSICAL SURFACE AREA (FT²)	NOTES
HX-1	TACO TPX667H		PLATE & FRAME	COOLING	3916700	807	70/80	WATER	15	807.7	83/73	WATER	15	/64.081/191	1274.45	1
HX-2	TACO TPX258H		PLATE & FRAME	HEATING	3413400	178.1	130/90	WATER	15	182.7	80/120	40% P GLY	15	/62.244/185	477.92	1
HX-3	TACO TPX258H		PLATE & FRAME	HEATING	3413400	178.1	130/90	WATER	15	182.7	80/120	40% P GLY	15	/62.244/185	477.92	1
HX-4	TACO TPX258H		PLATE & FRAME	HEATING	3515800	183.4	130/90	WATER	15	188.1	80/120	40% P GLY	15	/63.693/193	498.58	1
HX-5	TACO TPX258H		PLATE & FRAME	HEATING	3515800	183.4	130/90	WATER	15	188.1	80/120	40% P GLY	15	/63.693/193	498.58	1

1. ASME CERTIFIED

STEAM-TO-STEAM HEAT EXCHANGER SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	USAGE	LOAD (BTU/H)	SOURCE MEDIUM (STEAM) FLOW RATE (LB/H)	SOURCE MEDIUM (STEAM) ENTERING PRESSURE (PSIG)	TRANSFER MEDIUM (STEAM) FLOW RATE (LB/H)	TRANSFER MEDIUM (STEAM) OPERATING PRESSURE (PSIG)	PHYSICAL DIA./ LENGTH/ NO. PLATES (IN/IN)	PHYSICAL SURFACE AREA (FT²)	NOTES
HX-7			SHELL & TUBE	HEATING	6475400	7340.5	100	7247.9	80			

SURGE TANK SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	PUMPS	STEAM FLOW RATE (LB/H)	ELECTRICAL CONTROL CIRCUIT VOLT/PH/HZ	PHYSICAL TANK SIZE (GAL)	PHYSICAL LENGTH/ WIDTH/ HEIGHT (IN)	NOTES
SURGE-1			ECP-SURGE-1.1, ECP-SURGE-1.2	58291.1	120/1/60			

SURGE TANK, PUMP SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	CONDENSATE FLOW RATE (GPM)	CONDENSATE HEAD LOSS (FT)	PUMP CONSTRUCTION	ELECTRICAL MOTOR SIZE (HP)	ELECTRICAL VOLT/PH/HZ	NOTES
ECP-SURGE-1.1			242.1	9.2	STAINLESS STEEL	15	460/3/60	
ECP-SURGE-1.2			242.1	9.2	STAINLESS STEEL	15	460/3/60	

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PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

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VAV BOX SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	INLET SIZE (IN)	AIR: COOLING MAXIMUM AIR (5) (CFM)	AIR: HEATING MAXIMUM AIR (CFM)	AIR: MINIMUM AIR (3) (CFM)	AIR: ENTERING AIR TEMP. DB (DEG. F)	AIR: LEAVING AIR TEMP. DB (DEG. F)	AIR: S.P. LOSS AT MAX CFM (4) (IN H20)	AIR: NC AT 1" H2O (1) S.P.	FLUID (2): HEAT LOAD (MB)	FLUID (2): TOTAL FLUID FLOW (GPM)	FLUID (2): ENT. FLUID TEMP (DEG. F)	FLUID (2): WORKING FLUID	FLUID (2): MAX. FLUID PRESSURE DROP (FT)	COIL: MIN. COIL ROWS	COIL: PIPE SIZE (IN)	COIL: BALANCING VALVE SIZE (IN)	REMARKS
V-6	TITUS-ESV-3	6	400	240	80	52	100	0.5	28	9.9	1	180	H. WATER	1	2	3/4	1/2	1,2,3,4,5,6
V-8	TITUS-ESV-3	8	700	420	145	52	100	0.65	28	17.4	1.5	180	H. WATER	1	2	3/4	1/2	1,2,3,4,5,6
V-10	TITUS-ESV-3	10	1100	660	230	52	100	0.65	26	27..3	2	180	H. WATER	1	2	3/4	3/4	1,2,3,4,5,6
V-12	TITUS-ESV-3	12	1600	960	325	52	100	0.65	26	39.7	2.5	180	H. WATER	1	2	3/4	3/4	1,2,3,4,5,6
V-14	TITUS-ESV-3	14	2200	1320	450	52	100	0.65	26	54.6	3	180	H. WATER	1	2	3/4	3/4	1,2,3,4,5,6
V-16	TITUS-ESV-3	16	2800	1680	580	52	100	0.7	26	69.6	3.5	180	H. WATER	1	2	3/4	3/4	1,2,3,4,5,6
V-20	TITUS-ESV-3	24X16 FO	4200	2520	1260	52	100	0.7	29	104.3	5	180	H. WATER	1.5	2	1	3/4	1,2,3,4,5,6

1. MAXIMUM DISCHARGE NC AT BOX DIFFENTIAL PRESSURE BASED ON ARI STANDARD 880-89
2. COIL HEATING CAPACITY BASED ON HEATING MAIXIMUM AIR FLOW (60% OF MAXIMUM COOLING CFM).
3. MINIMUM CFM IS LOWEST CONTROLLABLE CFM SETTING (BASED ON 400 FPM INLET VELOCITY).
4. MAXIMUM STATIC PRSSURE DROP PERMISSABLE ACROSS BOX AND COIL AT MAXIMUM COOLING CFM.
5. BOX COOLING MAXIMUM IS THE SUM OF DIFFUSERS CFM VALUES AS SHOWN IN THE DRAWINGS. BOX MINIMUM CFM TO BE SET AT 30% OF THIS MAXIMUM. BOX HEATING CFM TO BE SET AT 60% OF THIS SAME MAXIMUM. TYPICAL UNLESS OTHERWISE NOTED.
6. PRESSURE INDEPENDENT TYPE BOX.

LAB SUPPLY VALVE SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	INLET DIA. (IN)	AIR: MINIMUM AIRFLOW (CFM)	AIR: MAXIMUM AIRFLOW (CFM)	AIR: ENT/LEAV AIR TEMP. DB (DEG. F)	AIR: S.P. LOSS AT MAX CFM (4) (IN H20)	FLUID (2): HEAT LOAD (MBH)	FLUID (2): TOTAL FLUID FLOW (GPM)	FLUID (2): ENT. FLUID TEMP (DEG. F)	FLUID (2): LVG. FLUID TEMP (DEG. F)	FLUID (2): WORKING FLUID	FLUID (2): MAX. FLUID PRESSURE DROP (FT)	COIL: MIN. COIL ROWS	COIL: MIN. FINS (FPI)	COIL: COIL SIZE	COIL: PIPE SIZE (IN)	NOTES
SV-1	PHOENIX MAVA 108MA	8	35	700	52/90	0.95	24.4	1.7	180	150	H. WATER	5	4	8	10X10	3/4	1-5
SV-2	PHOENIX MAVA 110MA	10	50	1000	52/90	0.95	34.9	2.5	180	150	H. WATER	5	4	8	12X12	3/4	1-5
SV-3	PHOENIX MAVA 112MA	12	90	1500	52/90	0.95	52.4	3.7	180	150	H. WATER	5	4	8	18X12	1	1-5
SV-4	PHOENIX MAVA 210MA	2X10	100	2000	52/90	0.95	69.9	4.9	180	150	H. WATER	5	4	8	24X12	1	1-5
SV-5	PHOENIX MAVA 114MA	14	200	2500	52/90	0.95	87.3	6.2	180	150	H. WATER	5	4	8	24X14	1	1-5
SV-6	PHOENIX MAVA 212MA	2X12	180	3000	52/90	0.95	104.8	7.4	180	150	H. WATER	5	4	8	26X16	1 1/4	1-5
SV-7	PHOENIX MAVA 312MA	3X12	270	4500	52/90	0.95	157.2	11.1	180	150	H. WATER	5	4	8	40X16	1 1/4	1-5
SV-8	PHOENIX MAVA 214MA	2X14	400	5000	52/90	0.95	174.6	12.3	180	150	H. WATER	5	4	8	44X16	1 1/4	1-5
SV-9	PHOENIX MAVA 412MA	4X12	360	6000	52/90	0.95	209.6	14.8	180	150	H. WATER	5	4	8	52X16	1 1/2	1-5
SV-10	PHOENIX MAVA 314MA	3X14	600	7500	52/90	0.95	261.9	18.5	180	150	H. WATER	5	4	8	64X16	1 1/2	1-5
SV-11	PHOENIX MAVA 414MA	4X14	800	10,000	52/90	0.95	349.3	24.6	180	150	H. WATER	5	4	8	74X18	2	1-5

NOTES:
1. MAXIMUM DISCHARGE NC AT VALVE/COIL DIFFERENTIAL PRESSURE BASED ON ARI STANDARD 880-89.
2. COIL HEATING CAPACITY BASED ON HEATING AIR FLOW OF 60% OF MAXIMUM COOLING CFM. COILS SHALL BE YORK HOT WATER DUCT COILS.
3. MINIMUM CFM IS LOWEST CONTROLLABLE CFM SETTING.
4. MAXIMUM STATIC PRESSURE DROP PERMISSIBLE ACROSS VALVE AND COIL AT MAXIMUM COOLING CFM.
5. COOLING MAXIMUM IS THE SUM OF THE CFM VALUES AS SHOWN IN THE DRAWINGS. VALVE HEATING CFM TO BE SET AT THIS SAME MAXIMUM. TYPICAL UNLESS OTHERWISE NOTED. COORDINATE WITH ENGINEER BEFORE ORDERING FOR EXACT MINIMUM AND MAXIMUM CFM SETTINGS TO MAINTAIN ROOM PRESSURIZATION.

DUCT FREE FAN COIL UNIT WITH REMOTE CONDENSER SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	AIR: TOTAL AIR FLOW RATE (CFM)	AIR: ENTERING AIR TEMP. DB/WB (DEG. F)	AIR: LEAVING AIR TEMP. DB/WB (DEG. F)	COIL: MINIMUM TOTAL COOLING LOAD (MBH)	COIL: MINIMUM TOTAL SENSIBLE LOAD (MBH)	CONDENSING UNIT: REFRIG.	CONDENSING UNIT: COMPRESSOR LRA	CONDENSING UNIT: COMPRESSOR RLA	CONDENSING UNIT: MCA	CONDENSING UNIT: MOCP	VOLT/PH	NOTES
DF-1 & 2	CARRIER 40QNC	ELEVATOR EQUIPMENT ROOM	900	80/67	55.8	36.0	24.0	R410A	-.-	-.-	0.55	15	460/3	1, 2, 6, 7
CU-1 & 2	CARRIER 38HDF	ROOF	1720	95	-.-	-.-	-.-	R410A	44.0	6.6	8.3	15	460/3	3, 4, 5

1. SPLIT SYSTEM WITH REMOTE CONDENSING UNIT
2. PROVIDE REFRIGERANT LINE SET AS PER MANUFACTURER'S RECOMMENDATIONS
3. PROVIDE FACTORY SNOW STAND FOR CONDENSING UNIT
4. WITH LOW AMBIENT CONTROL AND WINTER START KIT
5. CONDENSING UNIT TO BE SIZE MATCHED TO INDOOR UNIT AND TO BE BY SAME MANUFACTURER
6. WITH CONDENSATE PUMP
7. LOAD RATING AT 95 DEG. F. AMBIENT - SEA LEVEL

UNIT HEATER SCHEDULE

SYMBOL	MANUF. AND MODEL NO.	LOCATION	AIR SIDE: TOTAL AIR FLOW RATE (CFM)	AIR SIDE: ENTERING AIR TEMP. DB (DEG. F)	AIR SIDE: LEAVING AIR TEMP. DB (DEG. F)	AIR SIDE: MINIMUM HEATING LOAD (MBH)	FLUID SIDE: TOTAL FLUID FLOW CAPACITY (GPM)	FLUID SIDE: MINIMUM FLUID FLOW (GPM)	FLUID SIDE: ENTER/ LEAVING FLUID TEMP (DEG. F)	FLUID SIDE: WORKING FLUID	FLUID SIDE: MAXIMUM WATER PRESSURE DROP (FT)	MOTOR: MOTOR (HP)	MOTOR: V/PH	REMARKS
UH-1	RITTLING HR-63	MECH RM	1,120	40.0	95.0	32,000.0	4.7	2.0	180/160	HOT WATER	0.6	1/12	120/1	

HUMIDIFIER SCHEDULE

SYMBOL	MANUF. AND MODEL NO.	SERVICE	AIRFLOW RATE (CFM)	ENTERING AIR TEMP (F DB)	ENTERING AIR HUMIDITY (RH)	LEAVING AIR TEMP (F DB)	LEAVING AIR HUMIDITY (RH)	LOAD (LB/HR)	STEAM PRESS (PSI)	MAX. ABSRB DIST (IN)	HUMID. SIZE (H/W/L) (IN/IN/IN)	MAX. TUBE CNTRS (IN)	REMARKS
H-2	DRI STEAM	AH-2	17000	52.0	1.1%	52.0	91.2%	636.1	5	12	112/228/12	-	1
H-3	CAREL USTDBL	AH-3	17000	52.0	1.1%	52.0	91.2%	636.1	5	12	112/228/12	-	1
H-4	CAREL USTDBL	AH-2	35000	52.0	1.1%	52.0	91.2%	1309.7	5	12	112/228/12	-	1
H-5	CAREL USTDBL	AH-2	35000	52.0	1.1%	52.0	91.2%	1309.7	5	12	112/228/12	-	1

1. SEE AIR HANDLER CABINET FOR EXACT SIZE

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PROJECT DESCRIPTION
LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:
MECHANICAL SCHEDULES

REVISIONS
MARK DATE DESCRIPTION

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WALL RADIATION SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TUBES	PANEL HEIGHT (IN)	INSTALL HEIGHT (IN)	EFFECTIVE LENGTH (FT)	MIN. HEATING CAPACITY (BTUH/FT)	TOTAL FLUID FLOW (GPM)	AVE FLUID TEMP (DEG. F)	NOTES
FT-1	PANEL RADIATOR PR-3	(3)	3	8.5	11.5	(3)	166	(3)	120	(1)(2)(3)(4)

(1) PROVIDE WALL MOUNTING SYSTEM AND HARDWARE WITH END TRIM CAPS, CENTER TRIM, AND CORNER TRIM AS REQUIRED.

(2) ENCLOSURE SHALL BE 16 GAGE COLD ROLLED STEEL WITH WELDED ENDS AND POLYESTER POWDER COAT FINISH. HEADERS SHALL CONTAIN ALL SUPPLY, RETURN, AND AIR VENT CONNECTIONS AS REQUIRED. SUBMIT COLOR CHART INCLUDING ALL AVAILABLE COLORS FROM KWAL PAINT AND SHERWIN WILLIAMS PRIOR TO SUBMITTAL FOR APPROVAL.

(3) SEE PLANS.

(4) ALL CAPACITIES BASED ON 65 DEG-F ROOM TEMPERATURE 120 DEG-F AVERAGE WATER TEMPERATURE AND WATER FLUID.

STEAM TRAP SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	BODY CONSTRUCTION	STEAM FLOW RATE (LB/H)	STEAM OPERATING PRESSURE (PSIG)	STEAM PRESSURE DROP (PSI)	PHYSICAL CONNECT SIZE (IN)	NOTES
ST-1	SPIRAX SARCO FT14-10		FLOAT & THERMOSTATIC	CAST IRON	10724	80	19.75	2	
ST-2	SPIRAX SARCO FT14-10		FLOAT & THERMOSTATIC	CAST IRON	14495.7	80	19.75	2	
ST-3			FLOAT & THERMOSTATIC	OTHER	6715.7	80	19.75		
ST-4			FLOAT & THERMOSTATIC	OTHER	0	80	20		
ST-5			FLOAT & THERMOSTATIC	OTHER	0	80	20		
ST-6	SPIRAX SARCO FT-125		FLOAT & THERMOSTATIC	CAST IRON	2250	80	19.75	1.5	
ST-7			FLOAT & THERMOSTATIC	OTHER	1272	80	19.75		
ST-8			FLOAT & THERMOSTATIC	OTHER	1272	80	19.75		
ST-9			FLOAT & THERMOSTATIC	OTHER	2618	80	19.75		
ST-10			FLOAT & THERMOSTATIC	OTHER	2618	80	19.75		
ST-11	SPIRAX SARCO FT14-10		FLOAT & THERMOSTATIC	CAST IRON	5000	80	19.75	1.5	

FAN COIL SCHEDULE

SYMBOL	MANUF. AND MODEL NO.	LOCATION	AIR COOLING SIDE TOTAL AIR FLOW RATE (CFM)	AIR COOLING SIDE ENT/LEAV. AIR TEMP. DB/WB (DEG F)	AIR COOLING SIDE MINIMUM SENS COOLING LOAD (MBH)	COOLING FLUID SIDE TOTAL FLUID FLOW (GPM)	COOLING FLUID SIDE ENTER/ LEAV. FLUID TEMP (DEG F)	COOLING FLUID SIDE WORKING FLUID	COOLING FLUID SIDE MAX. WATER PRESS. DROP (FT)	FAN TOTAL STATIC PRESS. DROP (IN H20)	FAN (RPM)	ELECTRICAL MOTOR (HP)	ELECTRICAL MOTOR (V/PH)	REMARKS
FCU-1	TRANE BCHC-072	MECH RM	2,400	80/62 / 56/53	61	10	42/56	CH WATER	5	0.50	1058	2	460/3	1
FCU-2	TRANE BCHC-072	MECH RM	2,400	80/62 / 56/53	61	10	42/56	CH WATER	5	0.50	1058	2	460/3	1
FCU-3	TRANE BCHC-072	ELEC RM	2,400	80/62 / 56/53	61	10	42/56	CH WATER	5	0.50	1058	2	460/3	1
FCU-4	TRANE BCHC-072	ELEC RM	2,400	80/62 / 56/53	61	10	42/56	CH WATER	5	0.50	1058	2	460/3	1

1. COOLING ONLY FAN COIL

EXPANSION TANK SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	FLUID WORKING FLUID	MIN. TANK/ ACCEPTANCE (GAL)	PHYSICAL TANK SIZE (GAL)	RELIEF VALVE (PSIG)	DIA./ HEIGHT (IN)	NPT FITTING (IN)	NOTES
ET-1	TACO CA-300		VERT BLADDER FULL	WATER	74.5/13.8	79	50	24/57.75	0.5	1
ET-2	TACO CA-500		VERT BLADDER FULL	WATER	138.5/25.7	140	50	24/85.75	0.5	1
ET-3	TACO CA-1000		VERT BLADDER FULL	WATER	263.1/38.9	264	50	36/79	0.5	1
ET-4	TACO CA-1000		VERT BLADDER FULL	WATER	263.1/38.9	264	50	36/79	0.5	1
ET-5	TACO CA-300		VERT BLADDER FULL	40% P GLY	56.4/20.5	79	30	24/57.75	0.5	1
ET-6	TACO CA-300		VERT BLADDER FULL	40% P GLY	75.2/27.4	79	30	24/57.75	0.5	1
ET-7	TACO CA-90		VERT BLADDER FULL	40% P GLY	26.2/9.5	37	30	20/29.125	0.5	1
ET-8	TACO CA-90		VERT BLADDER FULL	40% P GLY	14/5.1	37	30	20/29.125	0.5	1
ET-9	TACO CA-90		VERT BLADDER FULL	40% P GLY	14/5.1	37	30	20/29.125	0.5	1
ET-10	TACO CA-90		VERT BLADDER FULL	40% P GLY	14/5.1	37	30	20/29.125	0.5	1
ET-11	TACO CA-90		VERT BLADDER FULL	40% P GLY	14/5.1	37	30	20/29.125	0.5	1
ET-12	TACO CA-90		VERT BLADDER FULL	30% P GLY	2.9/1.1	37	25	20/29.125	0.5	1
ET-13			VERT DIAPH PIPE	WATER	4.7/1.7		30			
ET-14			VERT DIAPH PIPE	WATER	8.4/3.1		30			
ET-15			VERT DIAPH PIPE	WATER	4.7/1.7		30			

1. ASME CERTIFIED

GRILLES, REGISTERS AND DIFFUSERS

ID	MANUFACTURER	MODEL	MAX NC	DESCRIPTION
D-1	TITUS	OMNI	30	SQUARE PLAQUE FACE CEILING DIFFUSERS. REMOVABLE FACE, C.W./O.B.D. FRAME SHALL BE FOR SURFACE OR LAY-IN MOUNTING AS REQUIRED BY CEILING TYPE. LAY-IN FRAMES SHALL BE 24" x 24" OR AS REQUIRED TO FIT CEILING TILE SPACE AVAILABLE
D-2	TITUS	TRITEC	30	HIGH VOLUME, LOW VELOCETY HEMISPHERICAL PATTERN RADIAL AIR DIFFUSER WITH REMOVABLE FACEAND FACTORY SUPPLIED BACKPAN. FRAME SHALL BE FOR MOUNTING IN 24" X 24" OR 48" X 24" LAY-IN CEILING GRID
D-3	TITUS	TMRA	30	ROUND CONE CEILING DIFFUSERS, FULLY ADJUSTABLE AIR PATTERN. COMPLETE W/ OBD, SPRING LOCK INNER CONES AND CONE RETAINER CABLE.
SR-1	TITUS	300	30	DOUBLE DEFLECTION HIGH SIDEWALL SUPPLY REGISTER. VERTICAL FRONT WITH HORIZONTAL REAR DEFLECTION ADJUSTABLE VANES SPACED AT 3/4 INCH O.C. COMPLETE WITH OBD AND REMOVABLE CORE.
SWR-1	TITUS	355	30	SIDEWALL RETURN AIR GRILLE. HORIZONTAL STATIONARY 35° DEFLECTION VANES SET ON 1/2 INCH CENTER, COMPLETE WITH OBD ADJUSTABLE THROUGH FACE. VANES INSTALLED TOWARD NEAREST SURFACE.
EG-1 RG-1	TITUS	PAR	20	PERFORATED GRILLE. FRAME SHALL BE FOR SURFACE OR LAY-IN MOUNTING AS REQUIRED BY CEILING TYPE. LAY-IN FRAMES SHALL BE 24" x 24" OR 24" x 12" AS REQUIRED TO FIT CEILING TILE SPACE AVAILABLE.
SD-1	EH PRICE	AS215	30	2 SLOT LINEAR CEILING RETURN AIR GRILLE. UNITS SHALL HAVE 1 INCH SLOTS AND INSULATED PLENUM. UNIT SHALL BE FOR LAY-IN OR SURFACE MOUNTING AS REQUIRED.
SWD-1	TITUS	TBF	20	"TURBOFUSER" PANEL-MOUNTED NOZZLE. SIZE 8 SINGLE NOZZLE. ADJUSTABLE UP TO 30 DEGREES IN ANY DIRECTION. COLOR TO BE SELECTED BY ARCHITECT

STACK SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	AIR TYPE	AIR MAXIMUM AIRFLOW RATE (CFM)	AIR STATIC PRESSURE (IN. WATER)	PHYSICAL TOTAL HEIGHT (IN)	PHYSICAL THROAT DIAMETER (IN)	NOTES
STK-1	CONTRACTOR FIELD FABRICATED		FLAT	EXHAUST	38849	0.5	120	42.198	
STK-2	CONTRACTOR FIELD FABRICATED		FLAT	EXHAUST	38849	0.5	120	42.198	
STK-3	CONTRACTOR FIELD FABRICATED		FLAT	EXHAUST	3996	0.5	120	13.534	
STK-4	CONTRACTOR FIELD FABRICATED		FLAT	EXHAUST	1197	0.5	120	7.407	
STK-5	CONTRACTOR FIELD FABRICATED		FLAT	EXHAUST	16500	0.5	120	27.501	
STK-6	CONTRACTOR FIELD FABRICATED		FLAT	EXHAUST	16500	0.5	120	27.501	
STK-7	CONTRACTOR FIELD FABRICATED		FLAT	EXHAUST	26950	0.5	120	35.147	
STK-8	CONTRACTOR FIELD FABRICATED		FLAT	EXHAUST	26950	0.5	120	35.147	
STK-9	CONTRACTOR FIELD FABRICATED		FLAT	EXHAUST	7000	0.5	120	17.912	
STK-10	CONTRACTOR FIELD FABRICATED		FLAT	EXHAUST	7000	0.5	120	17.912	
STK-11	CONTRACTOR FIELD FABRICATED		FLAT	EXHAUST	300	0.5	120	3.706	

HOOD SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	AIR TYPE	AIR MAXIMUM AIRFLOW RATE (CFM)	AIR STATIC PRESSURE (IN. WATER)	PHYSICAL HOOD INLET DIAMETER (IN)	PHYSICAL TOTAL HEIGHT (IN)	PHYSICAL LENGTH / WIDTH (IN)	NOTES
H-1	CAPTIIVE-AIRE VH-1		1	HUMID	440	0.1	14	36	48 / 32	-
H-2	CAPTIIVE-AIRE VH-1		I	HUMID	2700	0.1	14	48	296 / 24	-
H-3	CAPTIIVE-AIRE VH-1		1	HEAT	750	0.1	12 (2)	36	96 / 32	-
H-4	CAPTIIVE-AIRE VH-1		I	HEAT	1500	0.1	12 (4)	36	144 / 32	-

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AUTOMATIC PUMP TRAP SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	STEAM FLOW RATE (LB/H)	STEAM OPERATING PRESSURE (PSIG)	STEAM MOTIVE PRESSURE (PSIG)	STEAM BACK PRESSURE (PSIG)	STEAM MINIMUM FILLING HEAD (IN)	PHYSICAL LENGTH/ WIDTH/ HEIGHT (IN)	NOTES
APT-1	SPIRAX SARCO APT14		3102.8	48	100	6.5	11	15/15/12	
APT-2	SPIRAX SARCO APT14		3102.8	48	100	6.5	11	15/15/12	

HOOD SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	AIR TYPE	AIR MAXIMUM AIRFLOW RATE (CFM)	AIR STATIC PRESSURE (IN. WATER)	PHYSICAL INLET HEIGHT ABOVE ROOF (IN)	PHYSICAL TOTAL HEIGHT (IN)	PHYSICAL THROAT LENGTH/ WIDTH (IN)	NOTES
H-1			SINGLE	COMB F-DRAFT	14400	0.1	14		48/108	

PROJECT SCHEDULE

NAME	LOCATION	OUTSIDE AIR HEATING SEASON DB/RH (°F/%)	OUTSIDE AIR COOLING SEASON DB/WB (°F)	ALTITUDE (FT)	NOTES
USU Life Science Research Center	Logan, Utah	-20/10	95/62	4600	

CONDENSATE RECEIVER SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	STEAM FLOW RATE (LB/H)	PHYSICAL LENGTH/ DIAMETER (IN)	NOTES
REC-1			NOT VENTED	3063.7	24/6	

COOLING TOWER SUMP SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	PHYSICAL OPERATING LENGTH/WIDTH/DEPTH (FT)	NOTES
CTS-1			ABOVE GRADE TANK	17/10/11.5	

HOOD EXHAUST VALVE SCHEDULE

SYMBOL	MANUF. AND MODEL NO.	SERVICE	INLET DIA. (IN)	MINIMUM AIRFLOW (CFM)	MAXIMUM AIRFLOW (CFM)	AIRFLOW @18" SASH OPENING (CFM)	AIRFLOW @ FULL SASH OPENING (CFM)	VALVE PRESS DROP (IN H20)	REMARKS
EV-1	PHOENIX EXVB 108MA	4' FUME HOOD	8	160	485	485	485	0.6-3.0	1,2,3,5
EV-2	PHOENIX EXVB 110MA	5' FUME HOOD	10	200	635	635	635	0.6-3.0	1,2,3,5
EV-3	PHOENIX EXVB 112MA	6' FUME HOOD	12	260	785	785	785	0.6-3.0	1,2,3,5
EV-3	PHOENIX EXVB 112MA	6' BIO-SAFETY HOODS	12	1250	1250	1250	1250	0.6-3.0	1,2,3,4

1. COORDINATE WITH ENGINEER BEFORE ORDERING FOR EXACT MINIMUM AND MAXIMUM CFM SETTINGS TO MAINTAIN ROOM PRESSURIZATION.
2. SEE ARCHITECTURAL EQUIPMENT EXHAUST SCHEDULE FOR HOOD AIRFLOWS.
3. AIR FLOW FOR HOODS DESIGNED AT 18" SASH OPENING.
4. 8' HOODS HAVE 2 EXHAUST CONNECTIONS. VALUES SHOWN ARE COMBINED FOR BOTH VALVES.
5. HOOD VALVE AIRFLOWS ARE BASED ON THE FISHER HAMILTON "CONCEPT" SERIES HOODS. AIRFLOWS OF OTHER HOODS WILL VARY.

CHEMICAL FEED SYSTEM SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	OPERATOR	PRESSURE RATING (PSIG)	ELECTRICAL VOLT/PH/HZ	PHYSICAL LENGTH/ WIDTH/ HEIGHT (IN)	PHYSICAL TANK SIZE (GAL)	NOTES
CFS-1			CHEMICAL FEEDER	MANUAL	150	120/1/60		2.5	
CFS-2			GLYCOL FEEDER	MANUAL	150	120/1/60		2.5	
CFS-3			GLYCOL FEEDER	MANUAL	150	120/1/60		2.5	
CFS-4			GLYCOL FEEDER	MANUAL	150	120/1/60		2.5	
CFS-5			GLYCOL FEEDER	MANUAL	150	120/1/60		2.5	
CFS-6			GLYCOL FEEDER	MANUAL	150	120/1/60		2.5	
CFS-7			GLYCOL FEEDER	MANUAL	150	120/1/60		2.5	
CFS-8			GLYCOL FEEDER	MANUAL	150	120/1/60		2.5	
CFS-9			GLYCOL FEEDER	MANUAL	150	120/1/60		2.5	
CHEM			BYPASS FEEDER	MANUAL	150	120/1/60		2.5	
CHEM			BYPASS FEEDER	MANUAL	150	120/1/60		2.5	

FILTER SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	EFFICIENCY (%)	AIR CLEAN STATIC PRESSURE (IN. WATER)	AIR DIRTY STATIC PRESSURE (IN. WATER)	PHYSICAL NUMBER 24"X24" MODULES	PHYSICAL NUMBER 12"X24" MODULES	NOTES
F-1.1	FARR 3030	AH-1	FLAT	30%	0.5	0.8	65	18	1
F-1.2		AH-1	FLAT	90%	0.7	1.3	65	18	
F-2.1	FARR 3030	AH-2	FLAT	30%	0.5	0.8	8	6	1
F-2.2		AH-2	FLAT	90%	0.7	1.3	8	6	
F-3.1	FARR 3030	AH-3	FLAT	30%	0.5	0.8	8	6	1
F-3.2		AH-3	FLAT	90%	0.7	1.3	8	6	
F-4.1	FARR 3030	AH-4	FLAT	30%	0.5	0.8	20	9	1
F-4.2		AH-4	FLAT	90%	0.7	1.3	20	9	
F-5.1	FARR 3030	AH-5	FLAT	30%	0.5	0.8	20	9	1
F-5.2		AH-5	FLAT	90%	0.7	1.3	20	9	
F-6	FARR 3030	AH-6	FLAT	30%	0.5	0.8	50	15	1
F-7	FARR 3030	AH-7	FLAT	30%	0.5	0.8	8	6	1
F-8	FARR 3030	AH-8	FLAT	30%	0.5	0.8	8	6	1
F-9	FARR 3030	AH-9	FLAT	30%	0.5	0.8	15	8	1
F-10	FARR 3030	AH-10	FLAT	30%	0.5	0.8	15	8	1

1. PROVIDE INDIVIUAL GASKETTED FILTER FRAMES

AIR SEPARATOR SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	FLUID FLOW RATE (GPM)	FLUID WORKING FLUID	FLUID HEAD LOSS (FT)	PHYSICAL DIA./ HEIGHT (IN)	NOTES
AS-1	TACO ACT8F		TANK	807.7	WATER	3	20/44	1
AS-2	TACO AC10F		TANK	1654.5	WATER	3	24/47.5	1
AS-3	TACO AC8F		TANK	1153.1	WATER	3	20/45.5	1
AS-4	TACO AC6F		TANK	365.3	40% P GLY	3	20/34.88	1
AS-5	TACO AC6F		TANK	376.3	40% P GLY	3	20/34.88	1
AS-6	TACO AC6F		TANK	247.9	40% P GLY	2	20/34.88	1
AS-7	TACO ACT3F		TANK	52.6	40% P GLY	2	12/22.5	1
AS-8	TACO ACT3F		TANK	52.6	40% P GLY	2	12/22.5	1
AS-9	TACO ACT3F		TANK	86	40% P GLY	2	12/22.5	1
AS-10	TACO ACT3F		TANK	86	40% P GLY	2	12/22.5	1
AS-11	TACO ACT4F		TANK	149.8	40% P GLY	3	14/32	1

1. ASME CERTIFIED

BLOWDOWN SEPARATOR SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	STEAM FLOW RATE (LB/H)	PHYSICAL LENGTH/ DIAMETER (IN)	NOTES
BS-1	HURST BD14X56		913.5	80/21.75	

LAB RETURN/EXHAUST VALVE SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	INLET DIAMETER (IN)	MINIMUM AIRFLOW (CFM)	MAXIMUM AIRFLOW (CFM)	PRESSURE DROP (IN H20)	NOTES
GEV-1	PHOENIX EXVA 108MA	SEE DRAWINGS	8	35	700	0.6-3.0	1,2,3
GEV-2	PHOENIX EXVA 110MA	SEE DRAWINGS	10	50	1000	0.6-3.0	1,2,3
GEV-3	PHOENIX EXVA 112MA	SEE DRAWINGS	12	90	1500	0.6-3.0	1,2,3
GEV-4	PHOENIX EXVA 210MA	SEE DRAWINGS	2X10	100	2000	0.6-3.0	1,2,3
GEV-5	PHOENIX EXVA 114MA	SEE DRAWINGS	14	200	2500	0.6-3.0	1,2,3
GEV-6	PHOENIX EXVA 212MA	SEE DRAWINGS	2X12	180	3000	0.6-3.0	1,2,3
GEV-7	PHOENIX EXVA 312MA	SEE DRAWINGS	3X12	270	4500	0.6-3.0	1,2,3
GEV-8	PHOENIX EXVA 214MA	SEE DRAWINGS	2X14	400	5000	0.6-3.0	1,2,3
GEV-9	PHOENIX EXVA 412MA	SEE DRAWINGS	4X12	360	6000	0.6-3.0	1,2,3
GEV-10	PHOENIX EXVA 314MA	SEE DRAWINGS	3X14	600	7500	0.6-3.0	1,2,3
GEV-11	PHOENIX EXVA 414MA	SEE DRAWINGS	4X14	800	10000	0.6-3.0	1,2,3

NOTES:
1. MINIMUM CFM IS LOWEST CONTROLLABLE CFM SETTING.
2. MAXIMUM CFM IS THE SUM OF THE CFM VALUES AS SHOWN IN THE DRAWINGS. TYPICAL UNLESS OTHERWISE NOTED.
COORDINATE WITH ENGINEER BEFORE ORDERING FOR EXACT MINIMUM AND MAXIMUM CFM SETTINGS TO MAINTAIN ROOM PRESSURIZATION.
3. THE "E" IN "GEV" DENOTES AN EXHAUST VALVE.

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UTAH STATE UNIVERSITY

USTAR BUILDING #2
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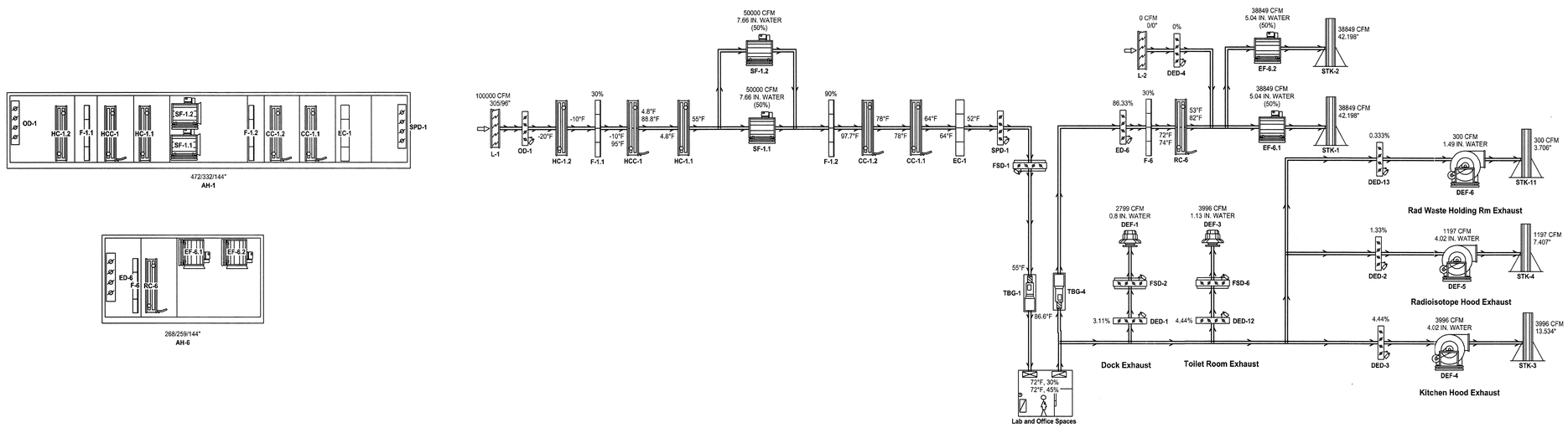
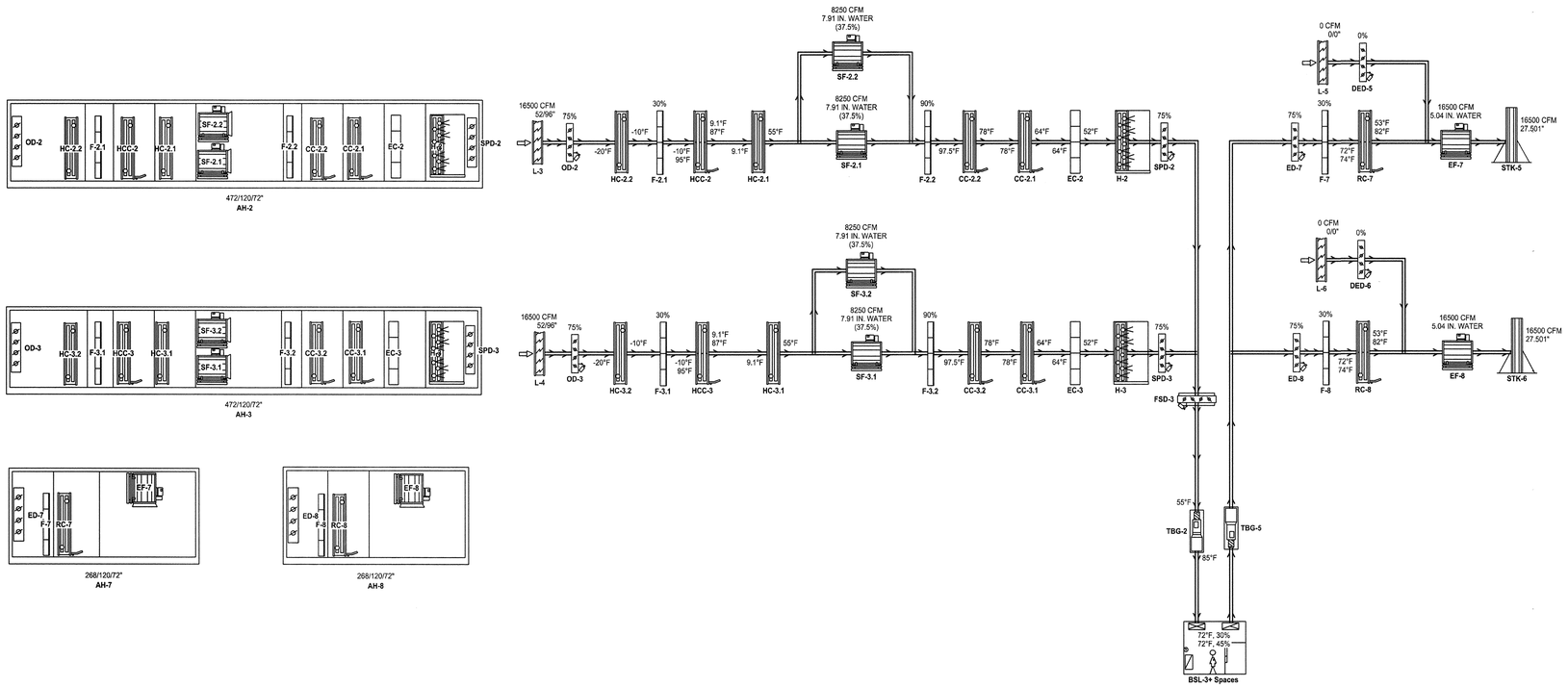


LABORATORY AND OFFICE SPACE AIR FLOW SCHEMATIC



BSL-3+ LABORATORY AIR FLOW SCHEMATIC

SYSTEM SIZING AND PIPING SCHEMATIC WITH ENERGY SAVING DEVICES TURNED ON

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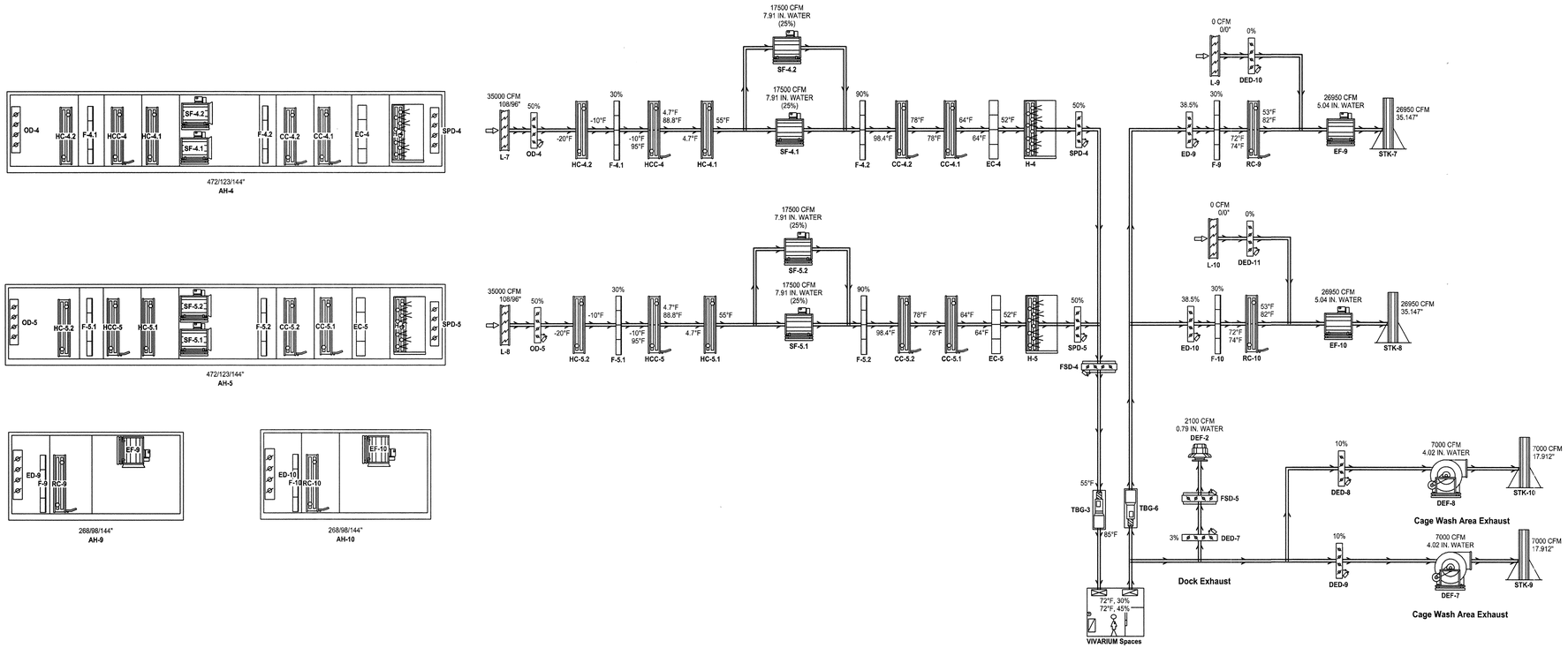

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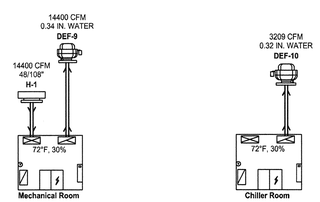

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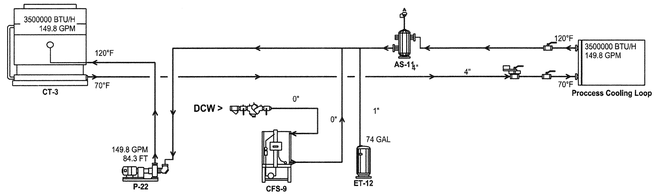

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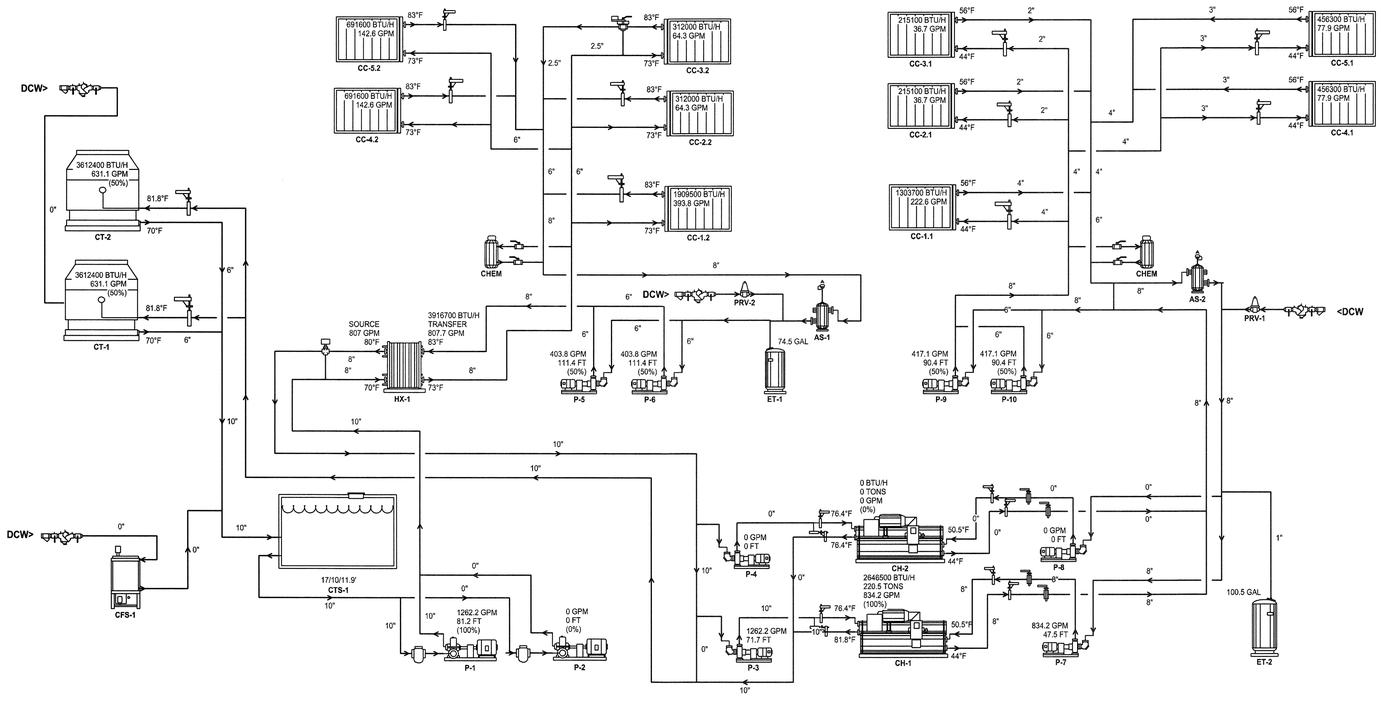
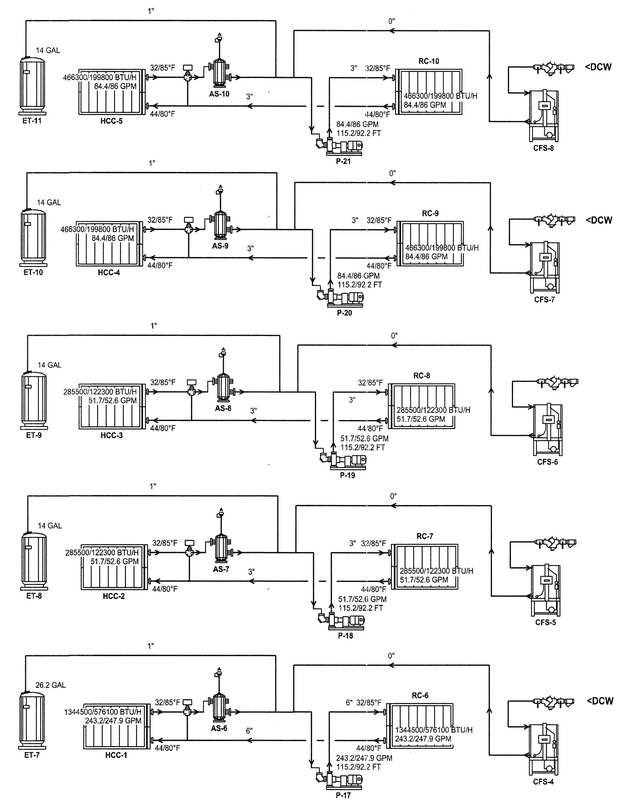


CHILLED AND INDIRECT COOLING SCHEMATIC



HEAT RECOVERY SCHEMATICS

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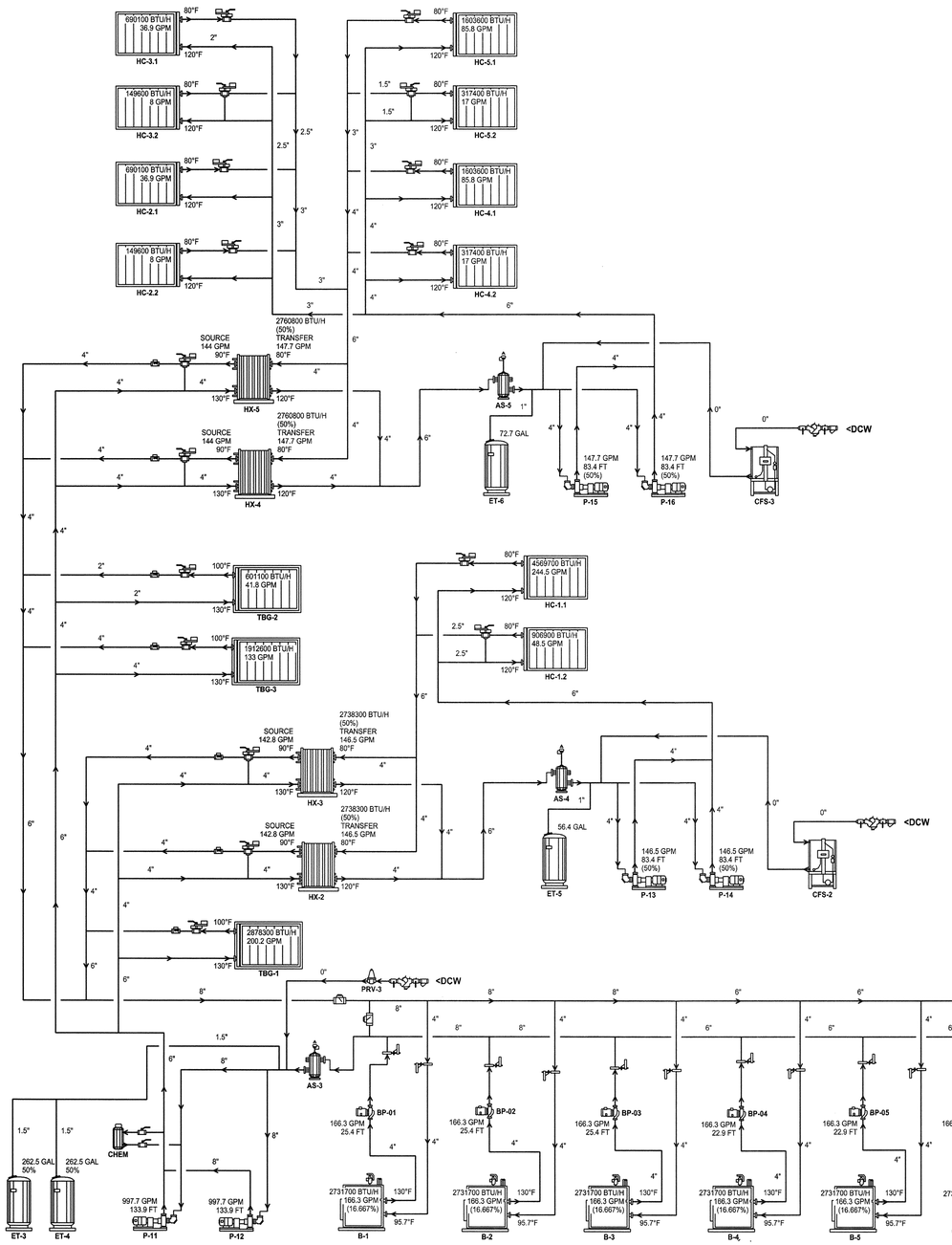
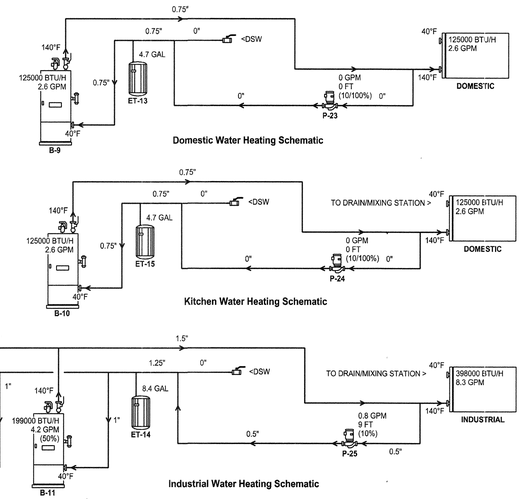
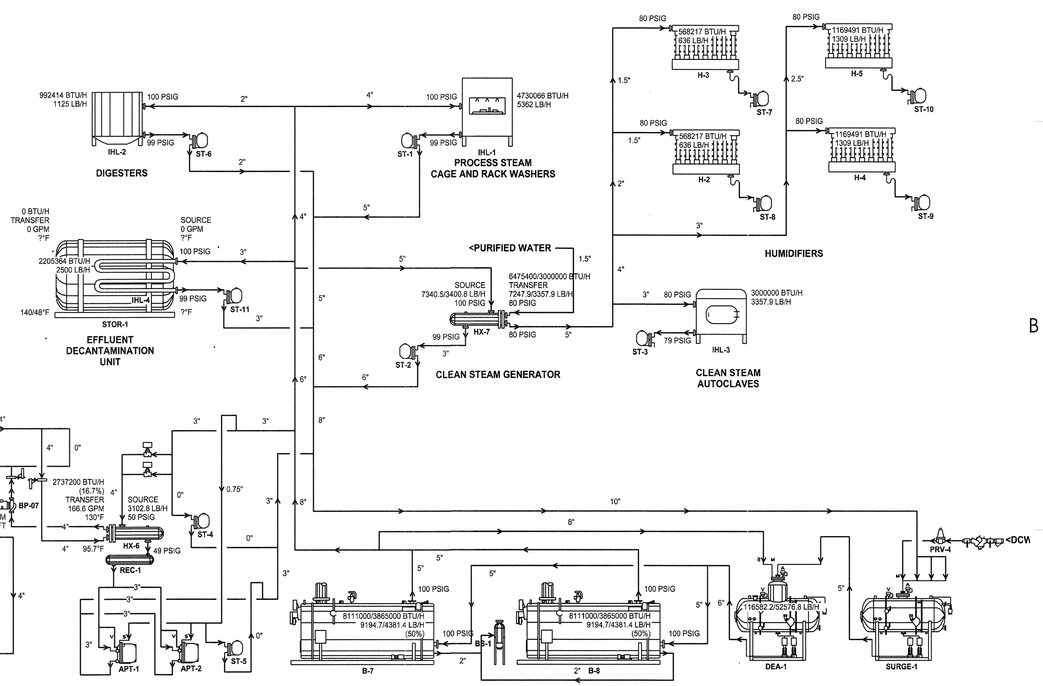




DOMESTIC AND INDUSTRIAL WATER SCHEMATIC



HEATING WATER SCHEMATIC

USE FOR SIZING HEAT RECOVERY, PRECOOL AND EVAP.
95/62 EVERYTHING ON
MIN COOLING LOAD
MIN HEATING LOAD

SYSTEM SIZING AND PIPING SCHEMATIC WITH ENERGY SAVING DEVICES TURNED ON

USE FOR SIZING HEAT RECOVERY, PRECOOL AND EVAP.
97/62 EVERYTHING ON
MIN COOLING LOAD
MIN HEATING LOAD

ARCHITECT 0818

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Salt Lake City, UT 84111 801.530.3150 F
VBFA Project Number:8142_

OWNER INFORMATION

State of Utah
Department of Administrative Services

Division of Facilities Construction & Management
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Internet: http://www.dfcm.utah.gov

PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:
MECHANICAL PIPING SCHEMATICS

REVISIONS

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DRAWN BY:	P. COOPER
CHECKED BY:	N. SPENCER
CAD FILE NAME:	
DFCM PROJECT #	06292770
STATE PROPERTY #	-
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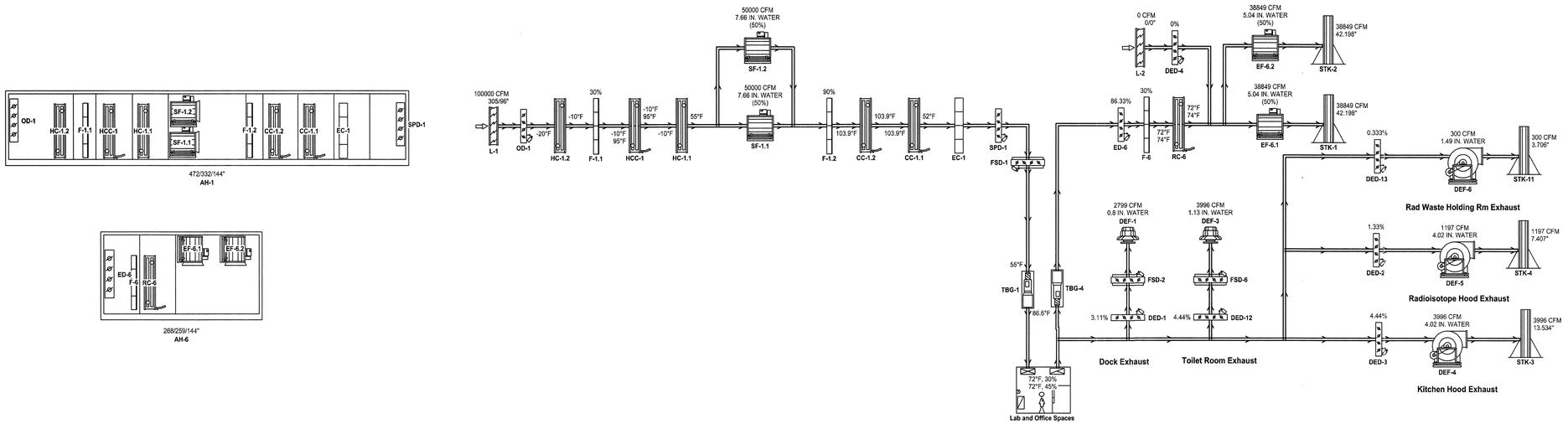
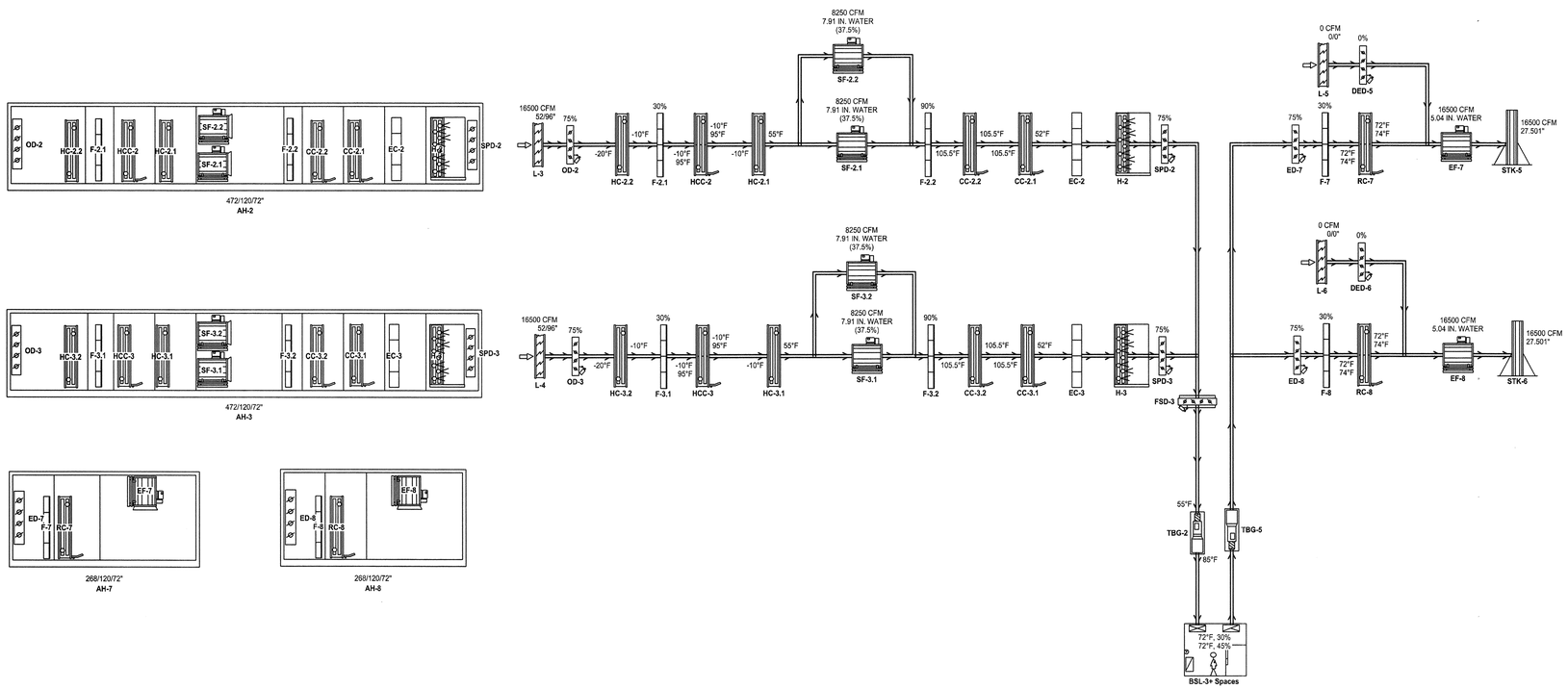
SHEET NUMBER:

ME704



LABORATORY AND OFFICE SPACE AIR FLOW SCHEMATIC



BSL-3+ LABORATORY AIR FLOW SCHEMATIC

SYSTEM SIZING AND PIPING SCHEMATIC WITH ENERGY SAVING DEVICES TURNED OFF

USE FOR SIZING EVERYTHING EXCEPT HEAT RECOVERY, PRECOOL AND EVAP
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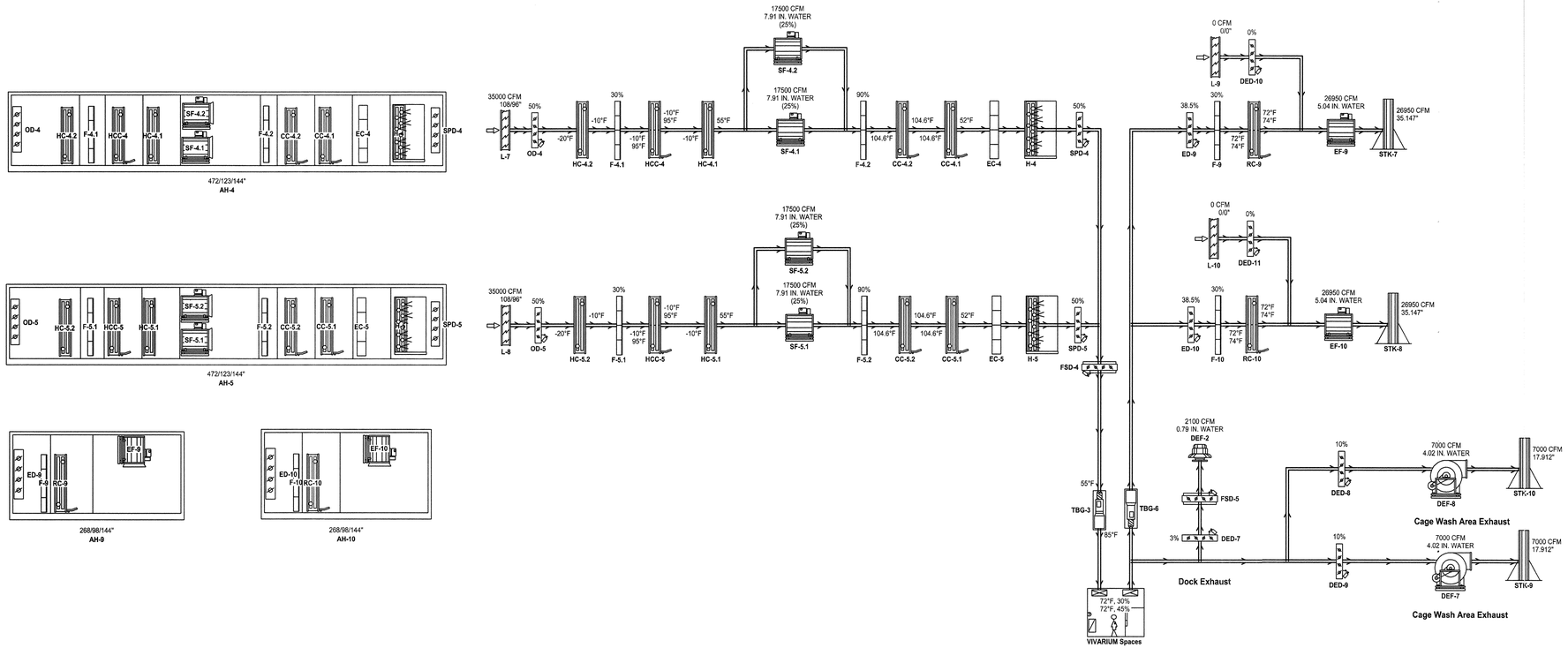
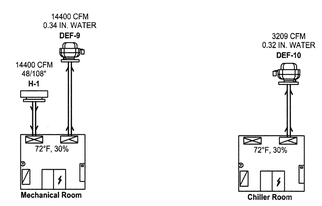


VIVARIUM AIR FLOW SCHEMATIC



SYSTEM SIZING AND PIPING SCHEMATIC WITH ENERGY SAVING DEVICES TURNED OFF

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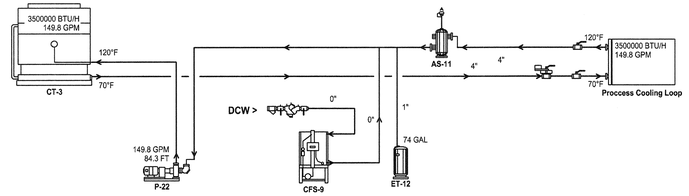
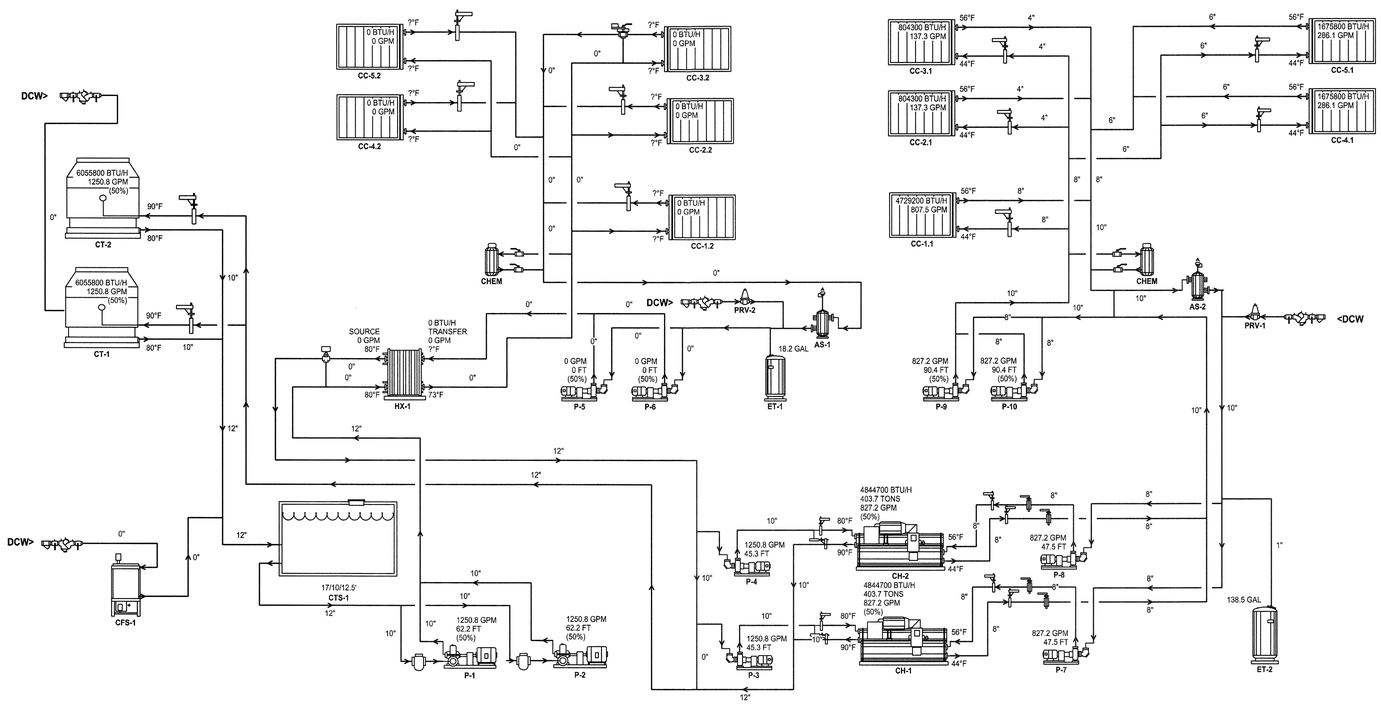
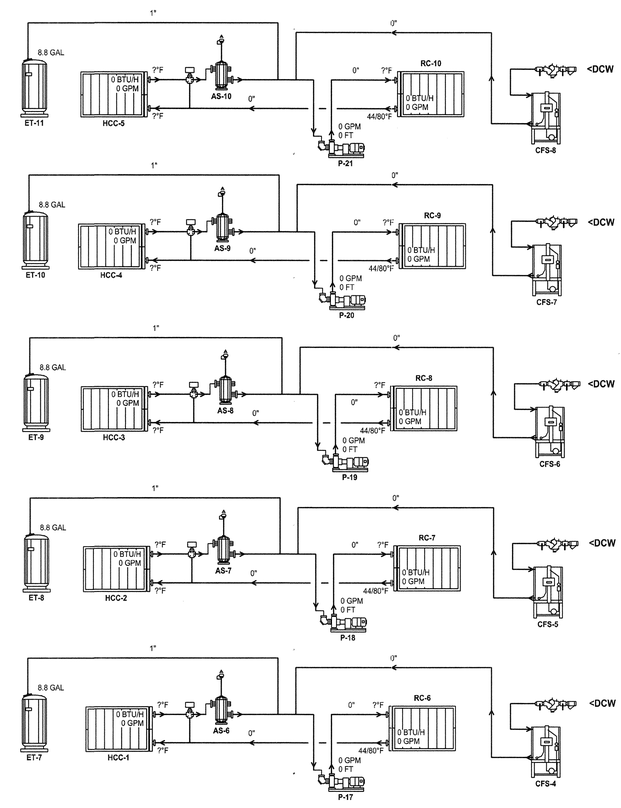


PROCESS COOLING SCHEMATIC



CHILLED AND INDIRECT COOLING SCHEMATIC



HEAT RECOVERY SCHEMATICS

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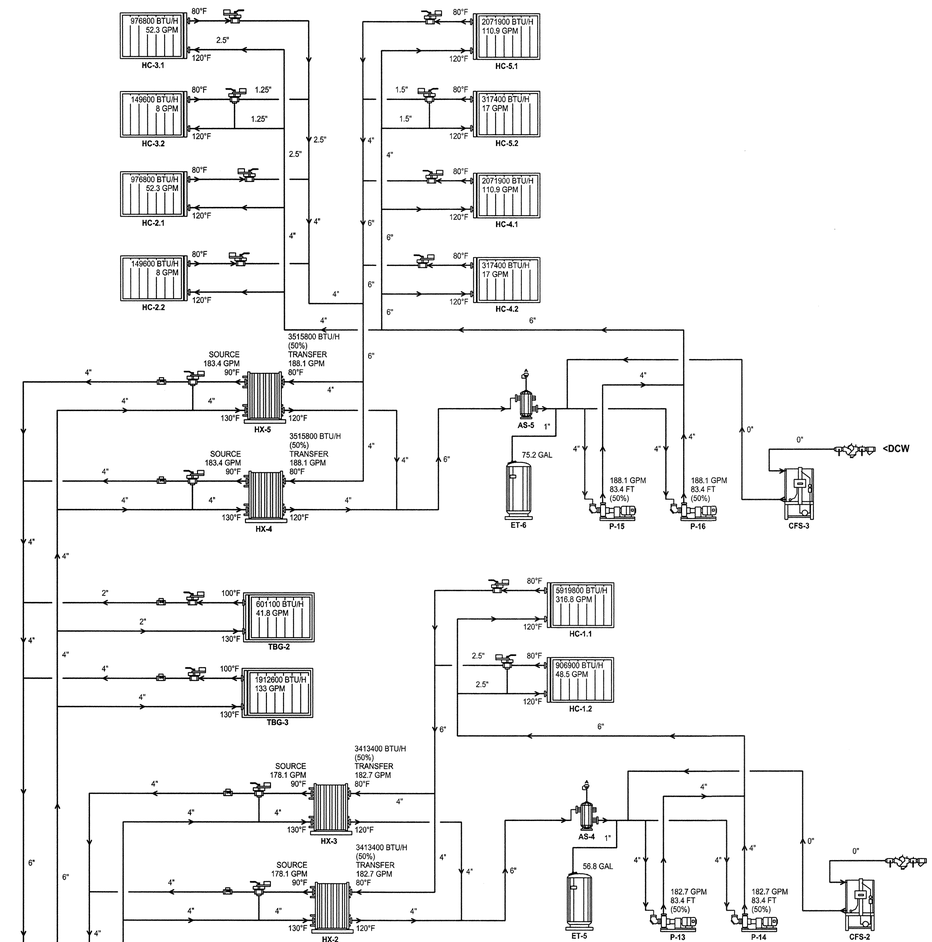
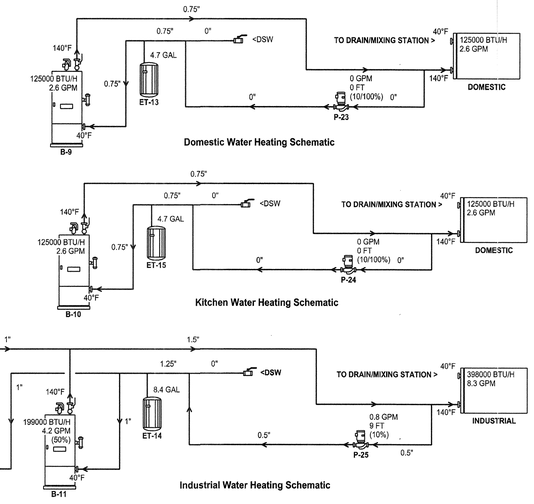
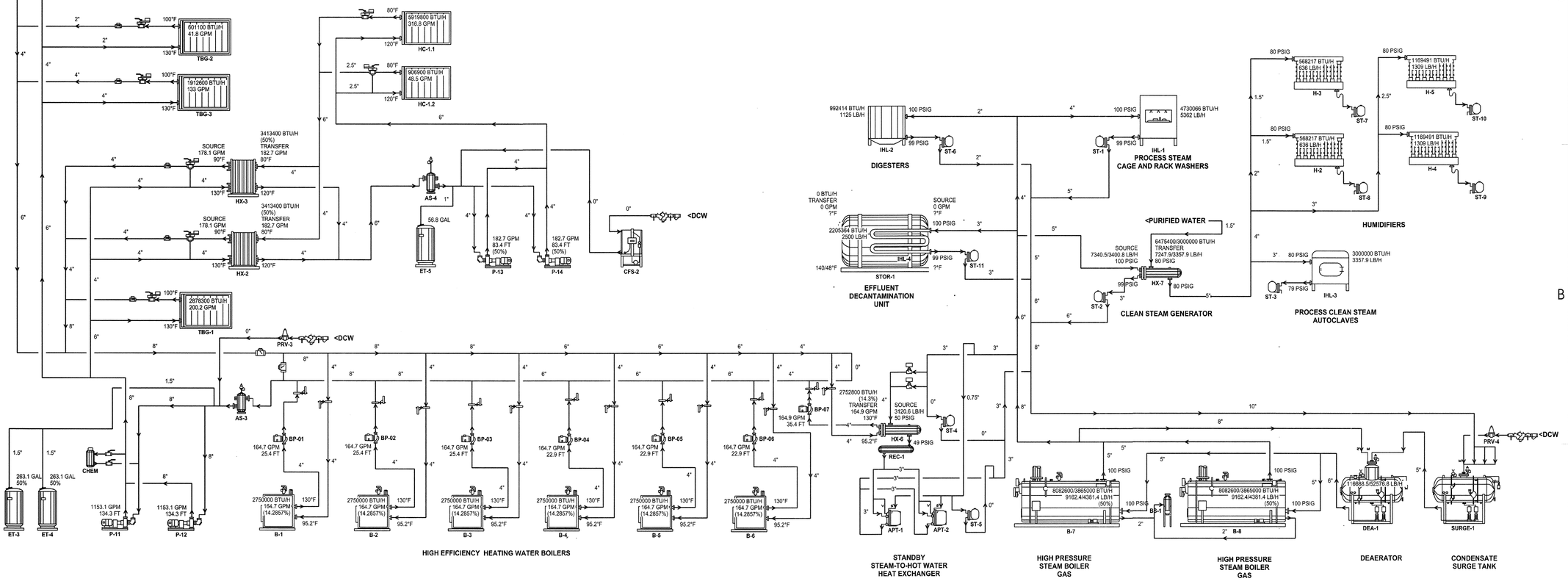




DOMESTIC AND INDUSTRIAL WATER SCHEMATIC



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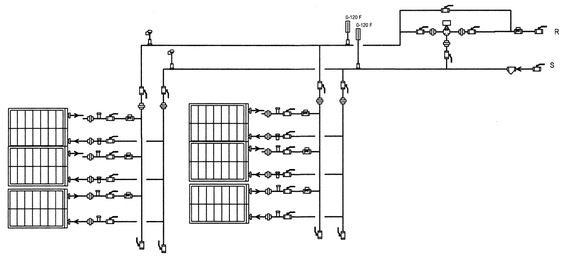
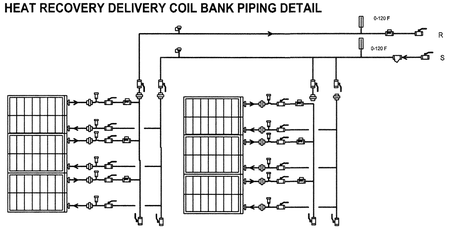
ME708

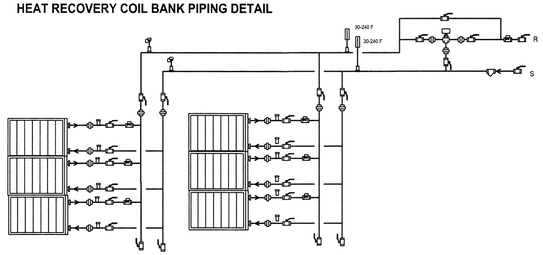
HEATING COILS TO BE PIPED IN COUNTERFLOW ARRANGEMENT SUCH THAT THE HOTEST FLUID CONTACTS THE HOTEST AIR.



HEAT RECOVERY DELIVERY COIL BANK PIPING DETAIL

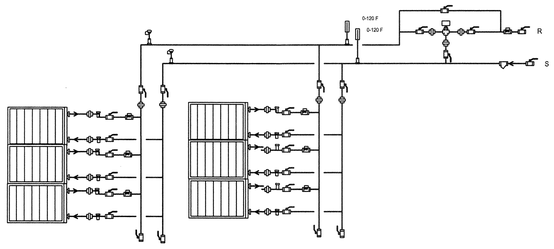


HEAT RECOVERY COIL BANK PIPING DETAIL

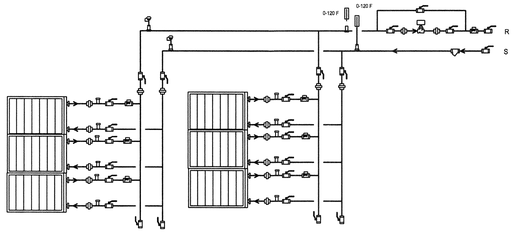


PREHEAT COIL BANK PIPING DETAIL

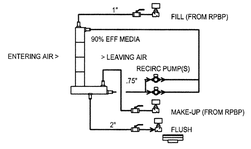
COOLING COILS TO BE PIPED IN COUNTERFLOW ARRANGEMENT SUCH THAT THE COLDEST FLUID CONTACTS THE COLDEST AIR.



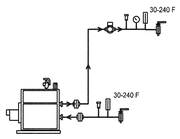
INDIRECT COOLING COIL BANK PIPING DETAIL



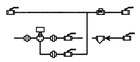
CHILLED WATER COOLING COIL BANK PIPING DETAIL



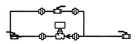
AIR WASHER DETAIL



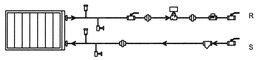
HOT WATER BOILER DETAIL



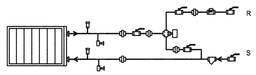
3-WAY CONTROL VALVE DETAIL



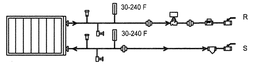
2-WAY CONTROL VALVE DETAIL



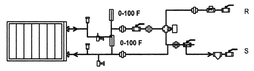
VAV/CV REHEAT BOX WITH 2-WAY VALVE DETAIL



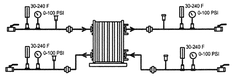
VAV/CV REHEAT BOX WITH 3-WAY VALVE DETAIL



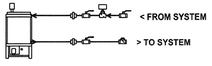
FAN COIL/UNIT HEATER WITH 2-WAY VALVE DETAIL



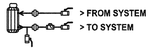
FAN COIL/DUCT COIL WITH 3-WAY VALVE DETAIL



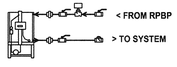
HEAT EXCHANGER DETAIL



CHEMICAL FEEDER DETAIL



BYPASS FEEDER DETAIL



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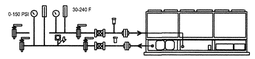
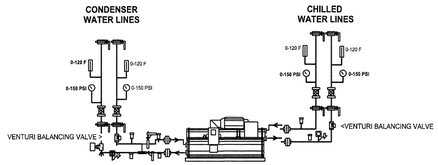
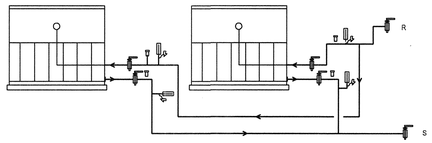


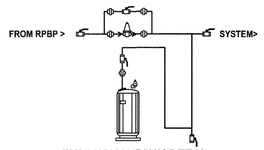
AIR COOLED CHILLER DETAIL



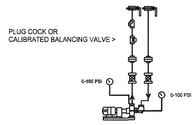
WATER COOLED CHILLER DETAIL



DUAL CELL COOLING TOWER DETAIL



EXPANSION TANK DETAIL



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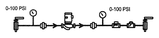
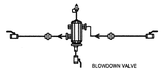
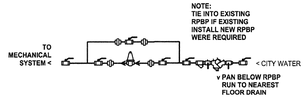


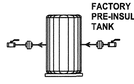
INLINE PUMP DETAIL



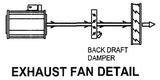
AIR SEPARATOR TANK DETAIL



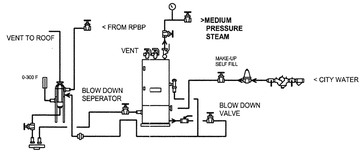
MAKE-UP WATER DETAIL



STORAGE TANK DETAIL



EXHAUST FAN DETAIL



STEAM BOILER DETAIL

PARTIAL LEGEND

- VALVE (<2"=BALL, >2"=BUTTERFLY)
- GATE VALVE
- PLUG COCK
- BUTTERFLY VALVE
- GLOBE VALVE
- CHECK VALVE
- TEMPERATURE AND PRESSURE TEST PORT - TTE, PTE
- FLANGE
- UNION
- STRAINER WITH BLOWDOWN VALVE
- BALANCING VALVE
- PRESSURE RELIEF VALVE
- VACUUM RELIEF VALVE
- MANUAL AIR VENT
- 3-WAY CONTROL VALVE - CV
- 2-WAY CONTROL VALVE - CV
- PRESSURE GUAGE WITH SHUT-OFF COCK
- TEMPERATURE INDICATOR
- FLEXIBLE CONNECTOR
- RPBP
- EQUIPMENT
- DRAIN VALVE
- RELIEF VALVE
- PUMP W/ SUCTION DIFFUSER
- MAKE-UP — MAKE-UP WATER SELF FILL VALVE
- DRAIN VALVE WITH HOSE END
- THERMAL WELL
- RELIEF VALVE
- FLEXIBLE CONNECTION
- MANUAL BALANCING DAMPER
- REMOVABLE FLEXIBLE CONNECTION FOR QUICK FILL
- FLOOR DRAIN/SINK
- ATC DAMPER
- WINTER AIRFLOW / SUMMER AIRFLOW / STATIC PRESSURE
- EQUIPMENT ID
- LEAVING AIR TEMPERATURE
- F&T TRAP
- PRESSURE REDUCING VALVE

COIL BRANCH PIPE SIZES (SEE SCHEDULE FOR FLOW):

.5"	=	<	1.6 GPM
.75"	= 0.6	TO	3.5 GPM
1"	= 3.6	TO	6.3 GPM
1.25"	= 6.7	TO	14 GPM
1.5"	= 14.1	TO	21 GPM
2"	= 21.1	TO	42 GPM
2.5"	= 42.1	TO	66 GPM
3"	= 66.1	TO	120 GPM
4"	= 120.1	TO	240 GPM
6"	= 240.1	TO	600 GPM
8"	= 600.1	TO	1000 GPM

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MECHANICAL PIPING SCHEMATICS

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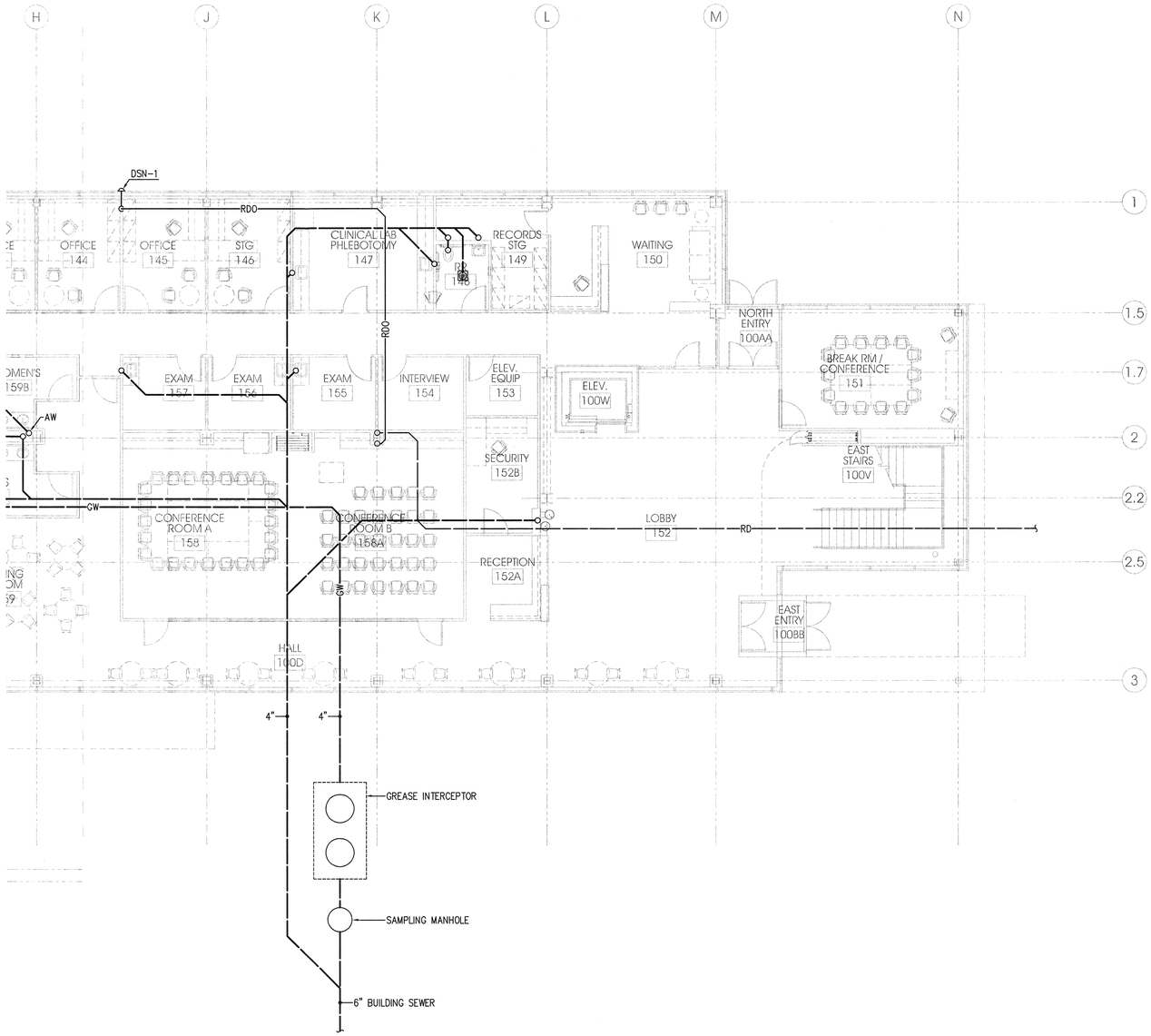

PLAN
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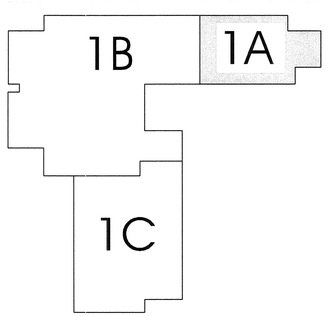
8' 0' 8'
scale = 1/8" = 1'-0"

LEVEL 1 AREA A PLUMBING WASTE & VENT PLAN

A4
PW101A

KEY PLAN



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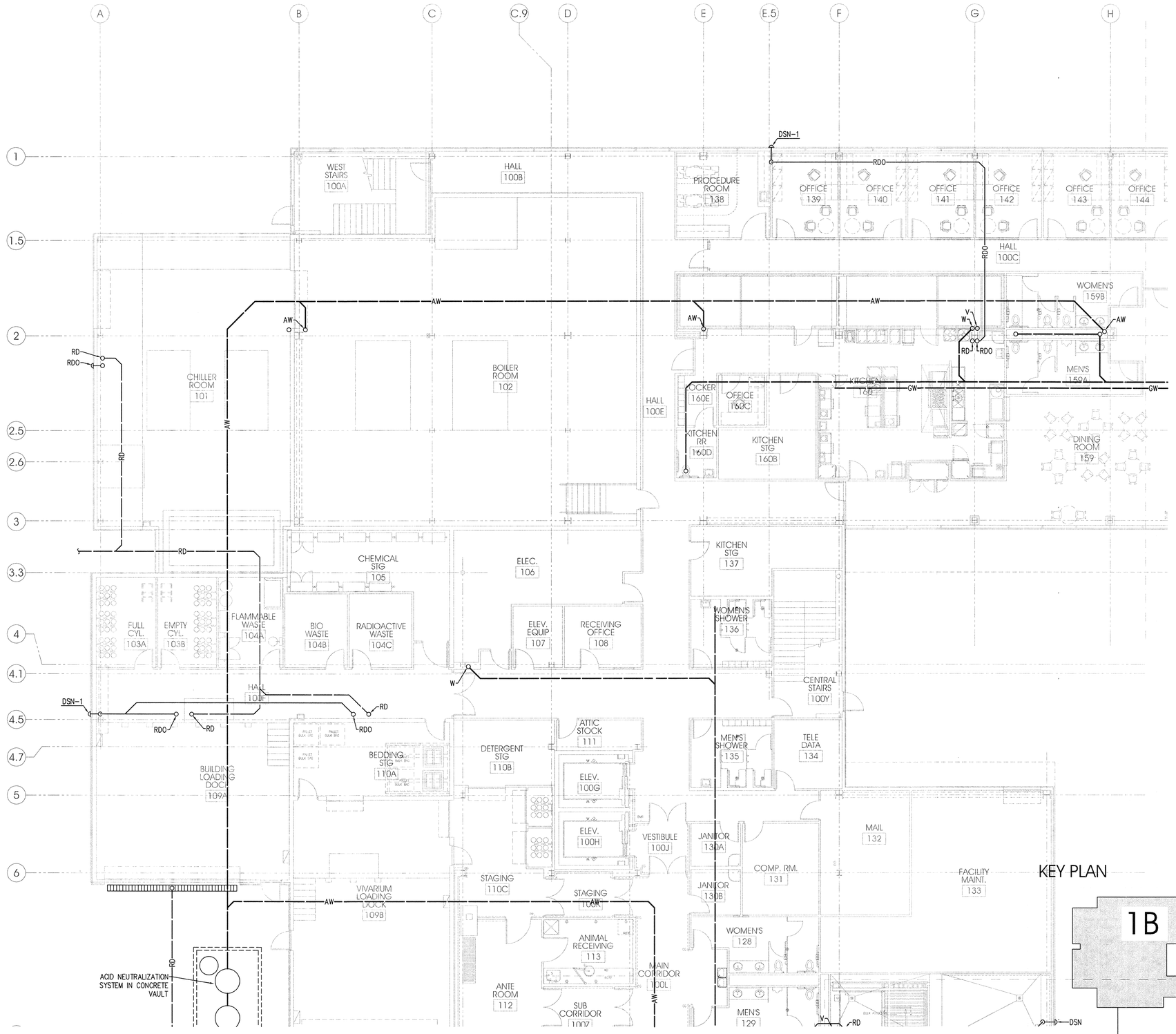


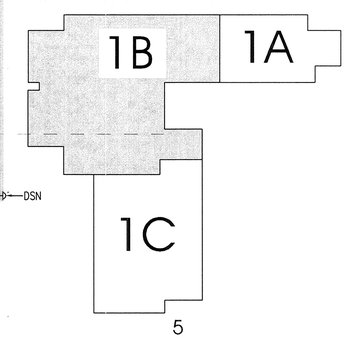
PLAN

scale = 1/8" = 1'-0"

LEVEL 1 AREA B PLUMBING WASTE & VENT PLAN

A4 / PW101B

KEY PLAN



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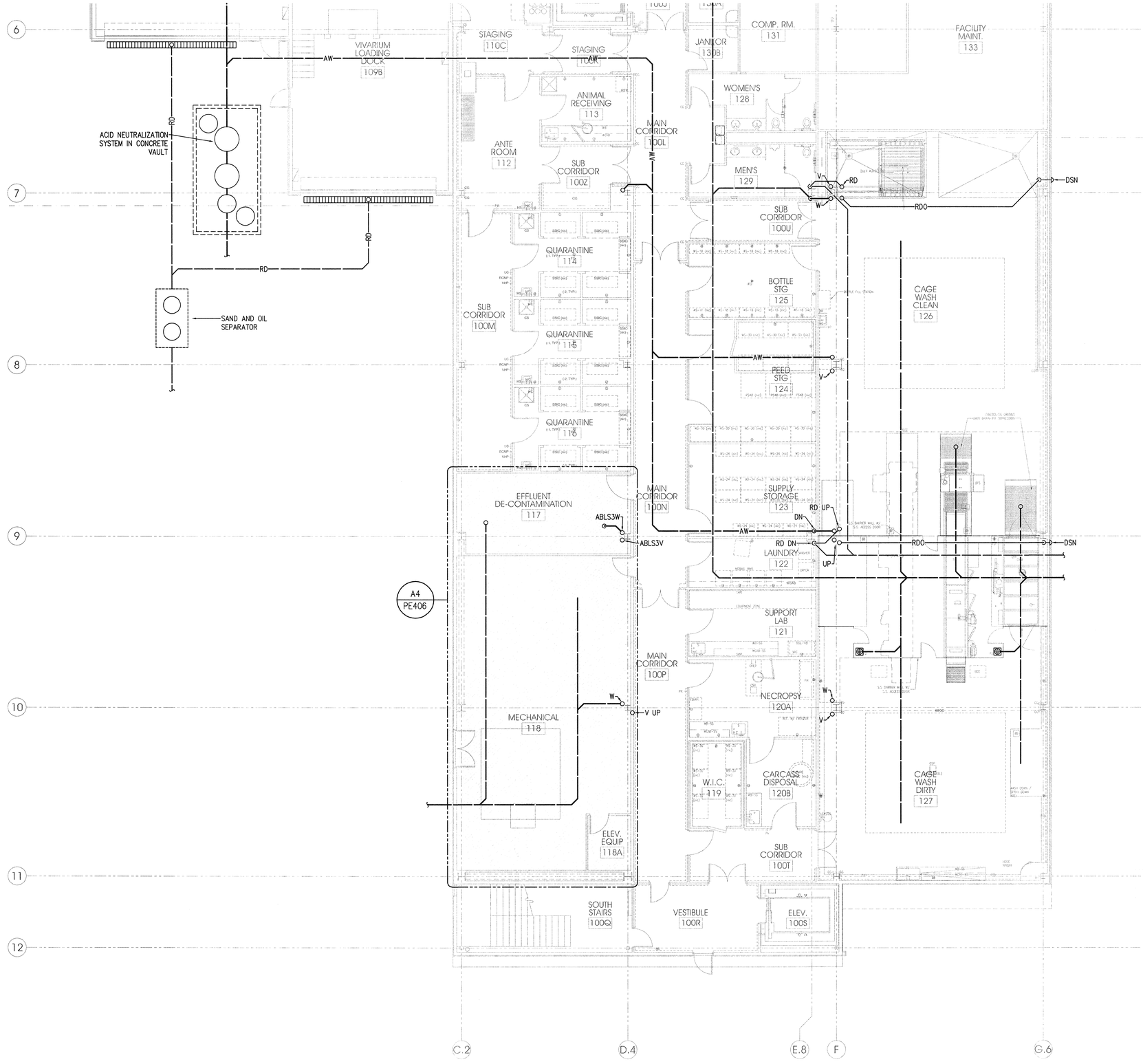


PLAN

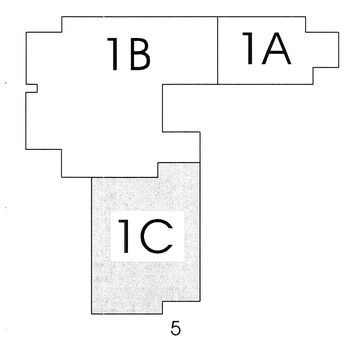
8' 0' 8'

scale = 1/8" = 1'-0"

LEVEL 1 AREA C PLUMBING WASTE & VENT PLAN

A4 PW101C

KEY PLAN



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LEVEL 1 AREA C PLUMBING WASTE & VENT PLAN

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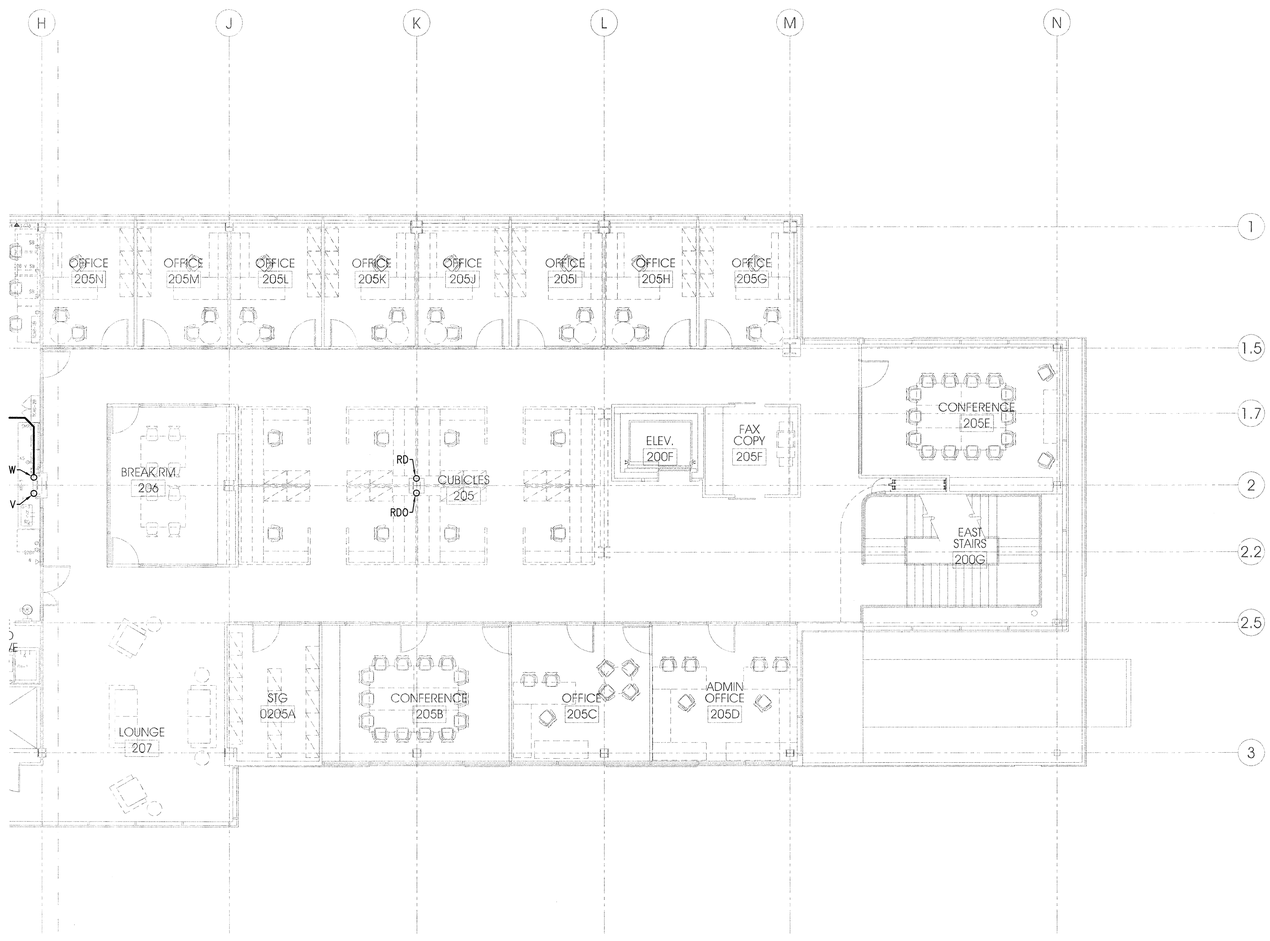

PLAN
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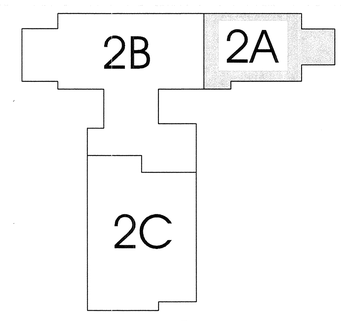
8' 0' 8'
scale = 1/8" = 1'-0"

LEVEL 2 AREA A PLUMBING WASTE & VENT PLAN

A4
PW102A

KEY PLAN



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LEVEL 2 AREA A
PLUMBING WASTE
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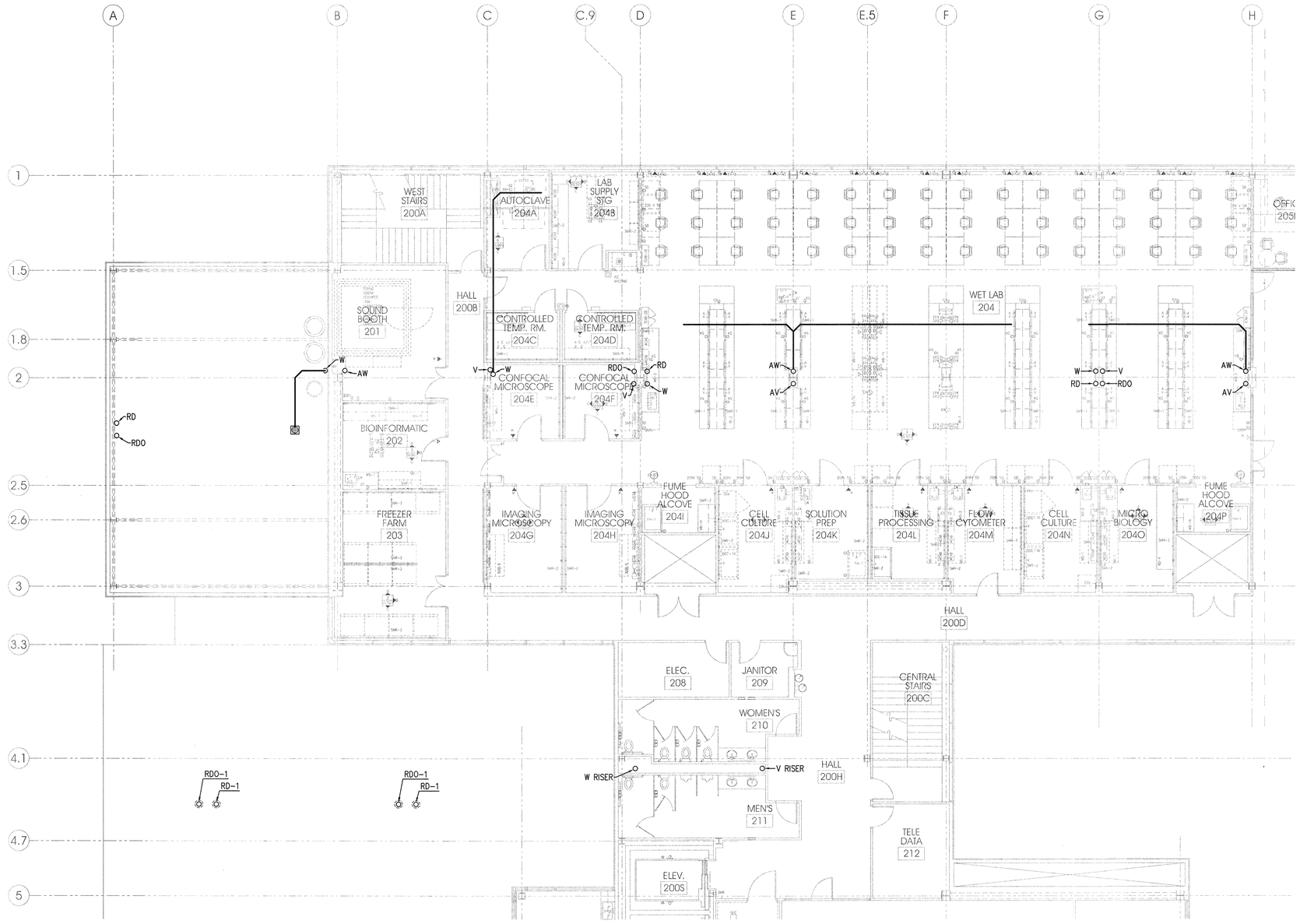

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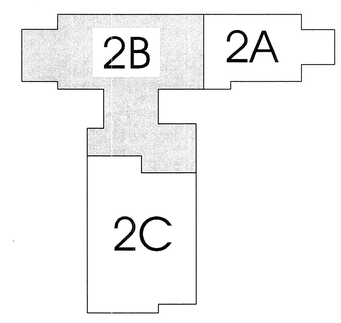

PLAN
n

8' 0' 8'
scale = 1/8" = 1'-0"

LEVEL 2 AREA B PLUMBING WASTE & VENT PLAN

A4
PW102B

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PW102B

PLAN N

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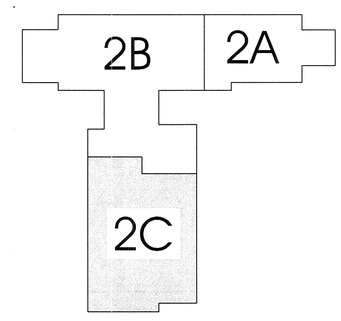
scale = 1/8" = 1'-0"

LEVEL 2 AREA C PLUMBING WASTE & VENT PLAN

A4 / PW102C

KEY PLAN



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LEVEL 2 AREA C
PLUMBING WASTE
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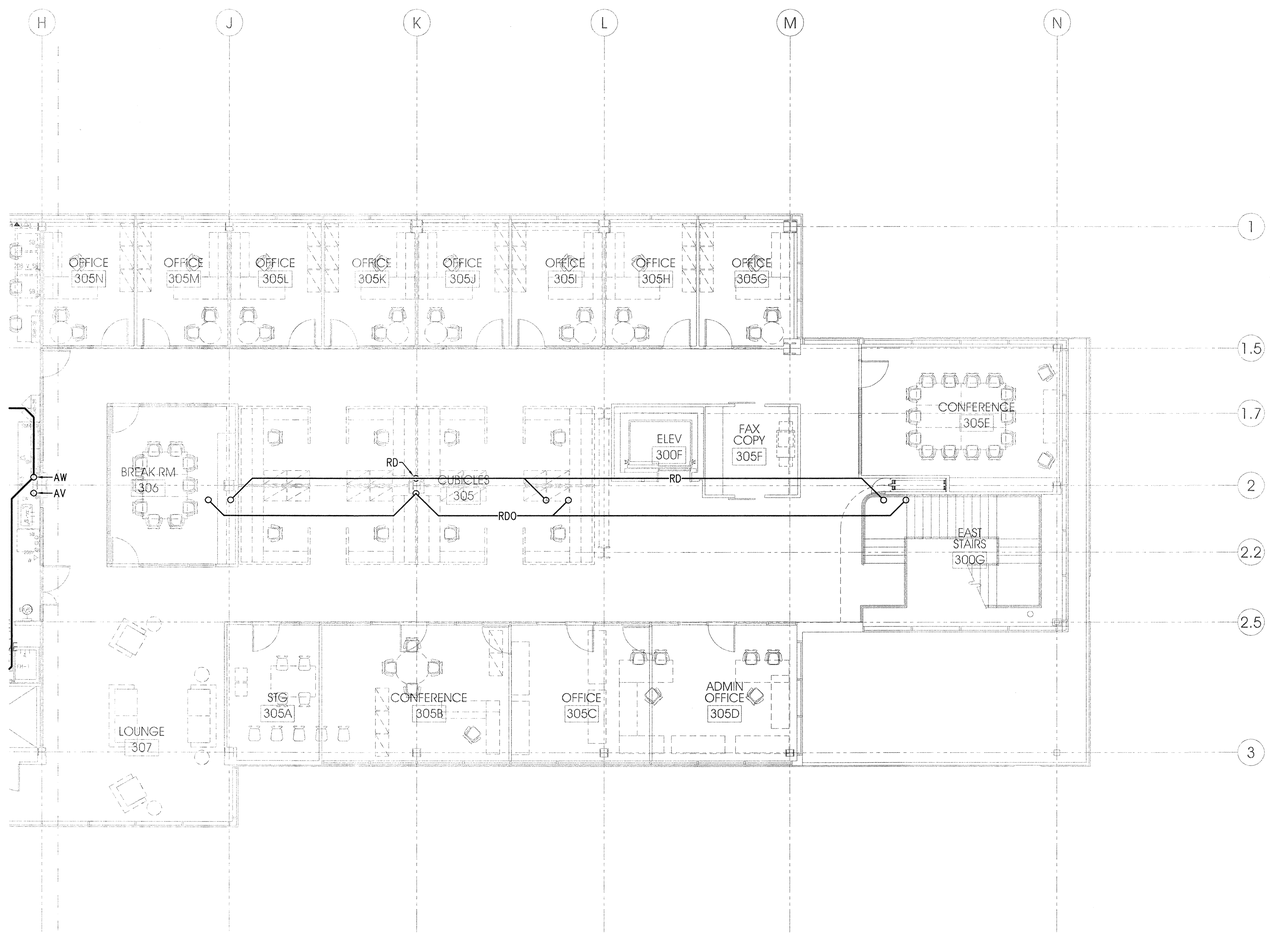

PLAN
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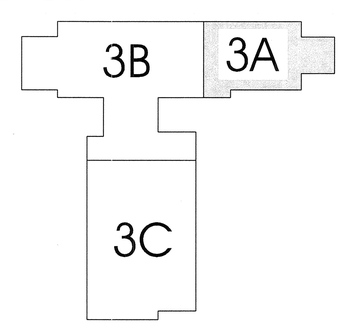
LEVEL 3 AREA A PLUMBING WASTE & VENT PLAN

A4
PW103A

KEY PLAN



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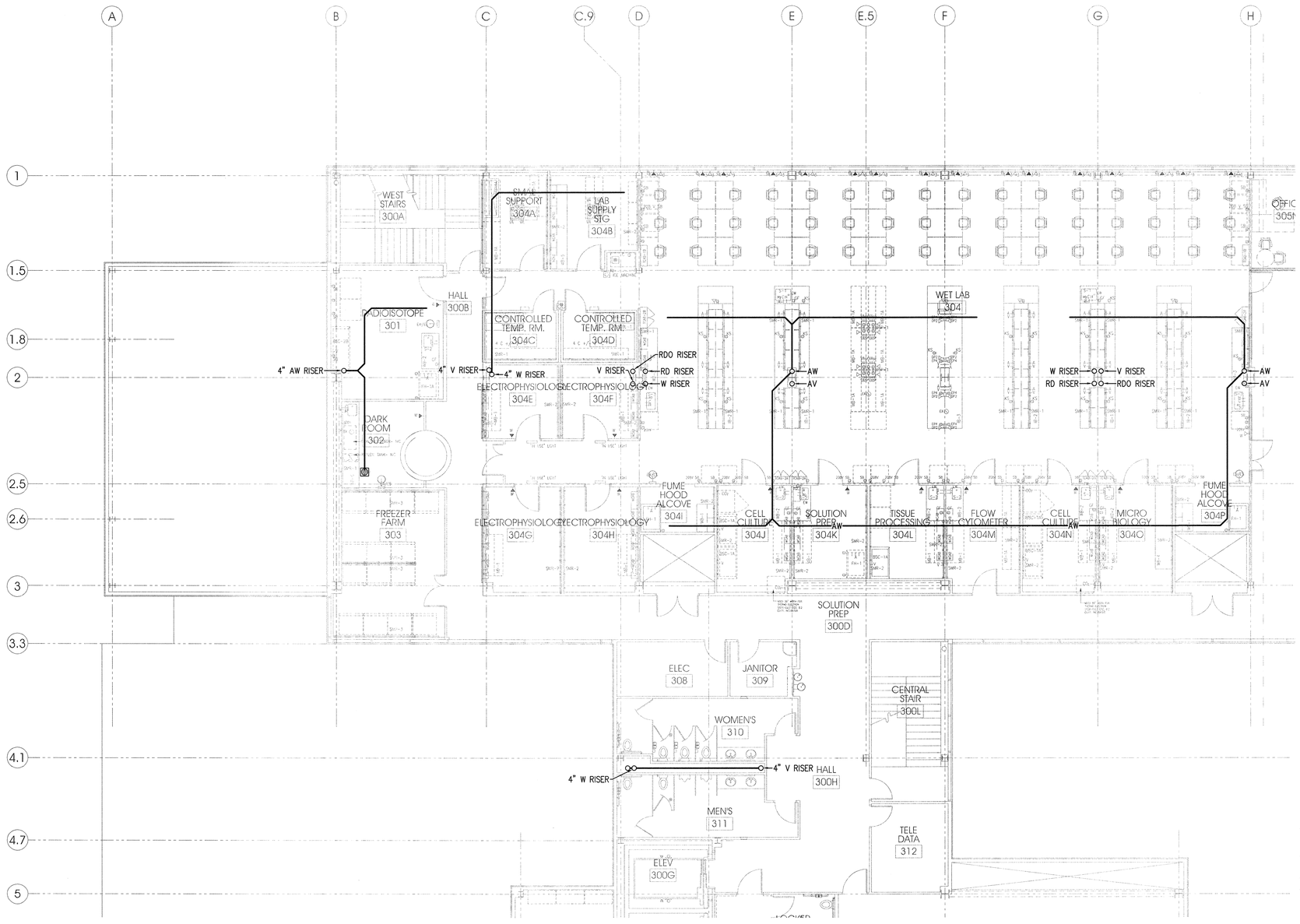

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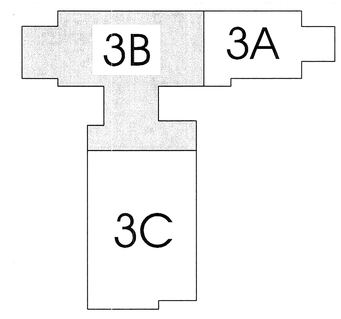

PLAN n

8' 0' 8'
scale = 1/8" = 1'-0"

LEVEL 3 AREA B PLUMBING WASTE & VENT PLAN

A4
PW103B

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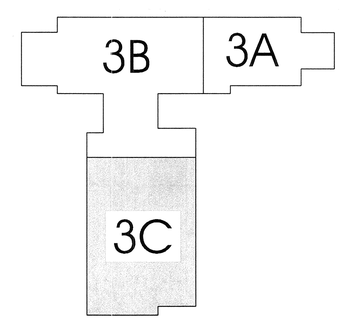
PW103B

LEVEL 3 AREA C PLUMBING WASTE & VENT PLAN

A4
PW103C

KEY PLAN



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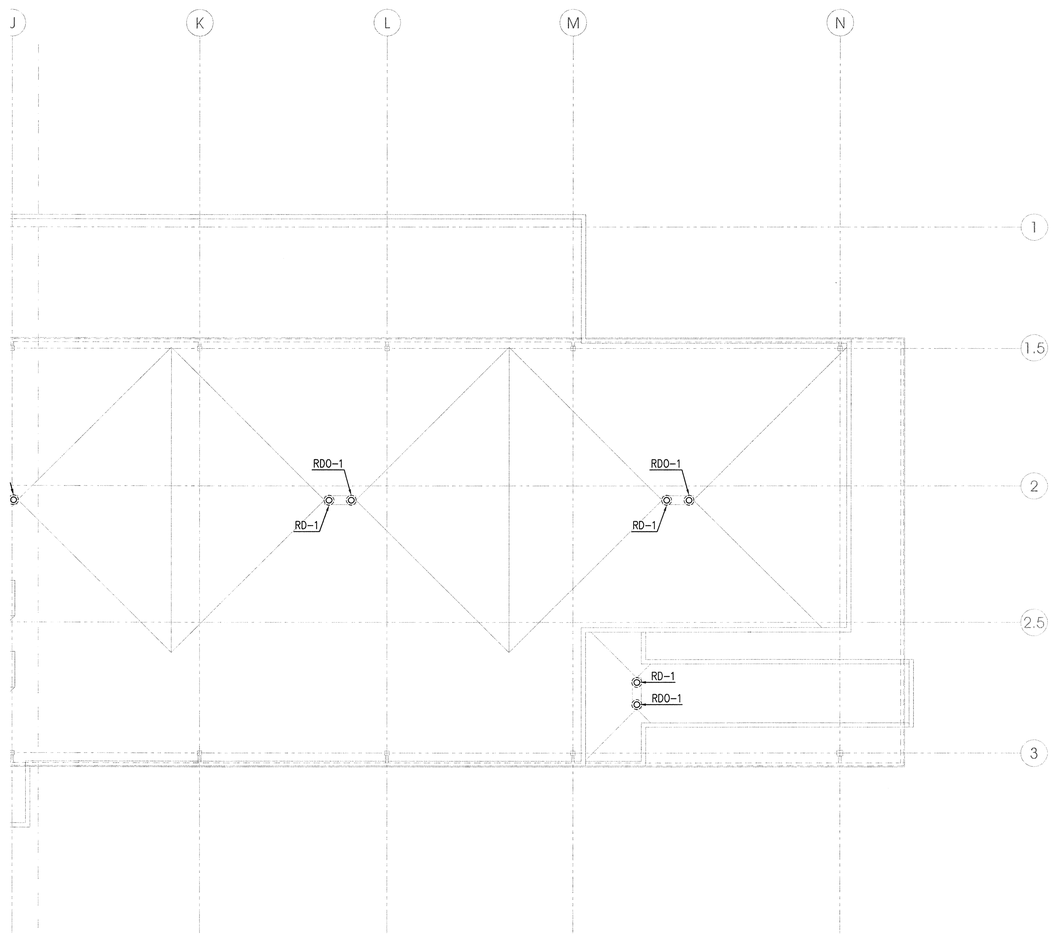


PLAN

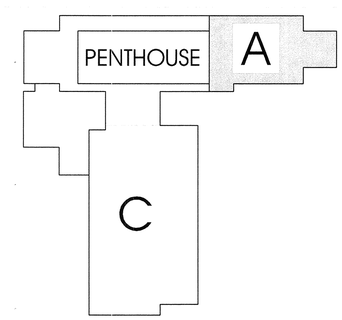
8' 0' 8'

scale = 1/8" = 1'-0"

LEVEL 4 AREA A PLUMBING ROOF PLAN

A4
PW104A

KEY PLAN



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Internet: http://www.dfcm.utah.gov

PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
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USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

LEVEL 4 AREA A
PLUMBING
ROOF PLAN

REVISIONS

MARK	DATE	DESCRIPTION

ISSUE DATA

ISSUE DATE:	DEC. 9, 2008
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CHECKED BY:	N. SPENCER
CAD FILE NAME:	
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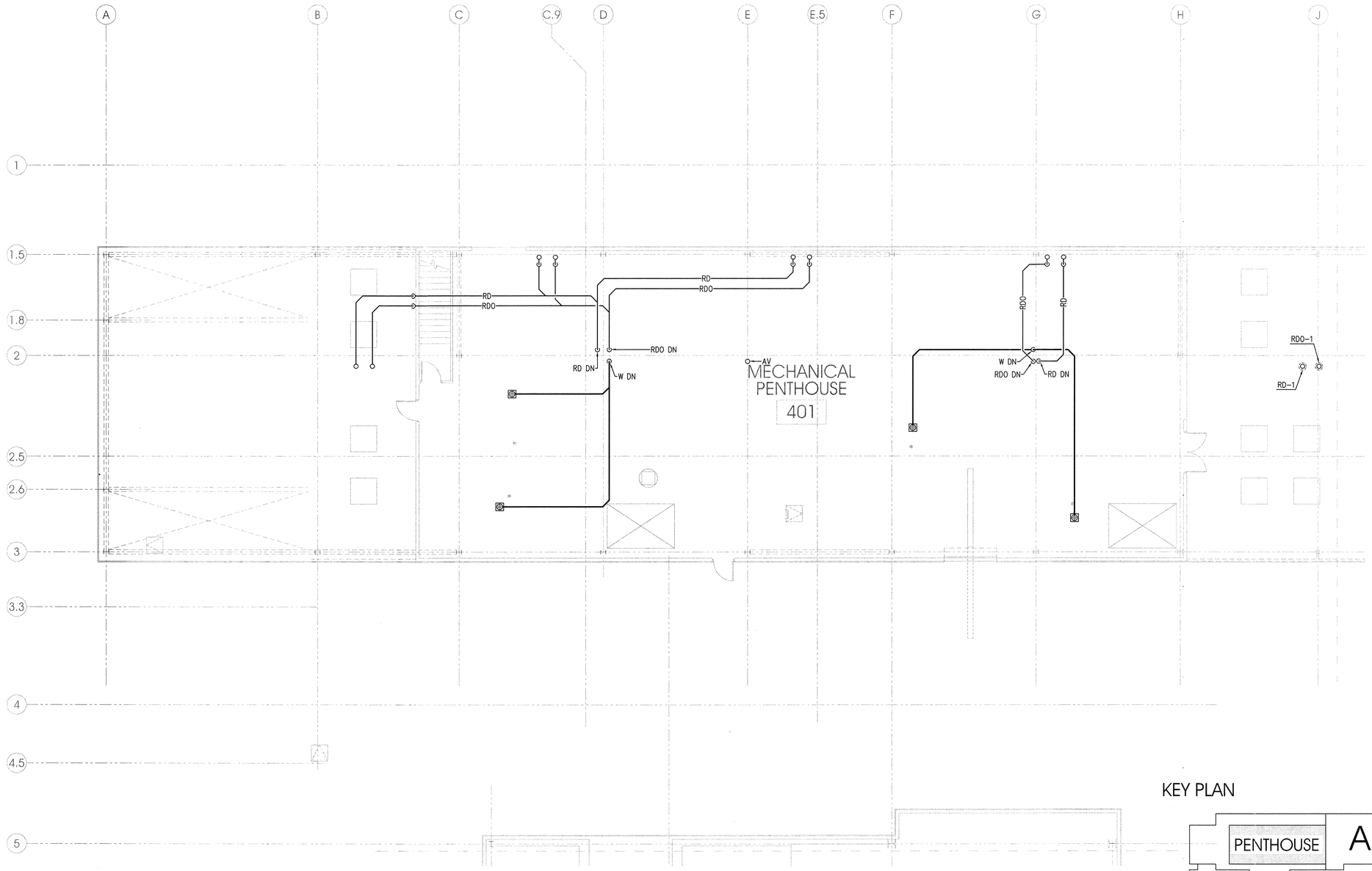
PW104A



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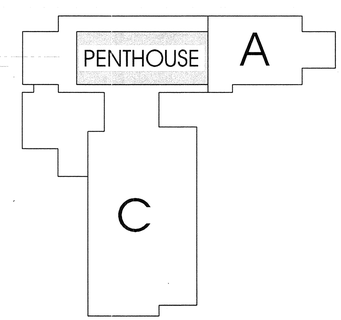

PLAN
n

8' 0' 8'
scale = 1/8" = 1'-0"

LEVEL 4 AREA B PLUMBING WASTE & VENT PLAN

A4
PW104B

ARCHITECT 0818

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LEVEL 4 AREA B
PLUMBING WASTE
& VENT PLAN

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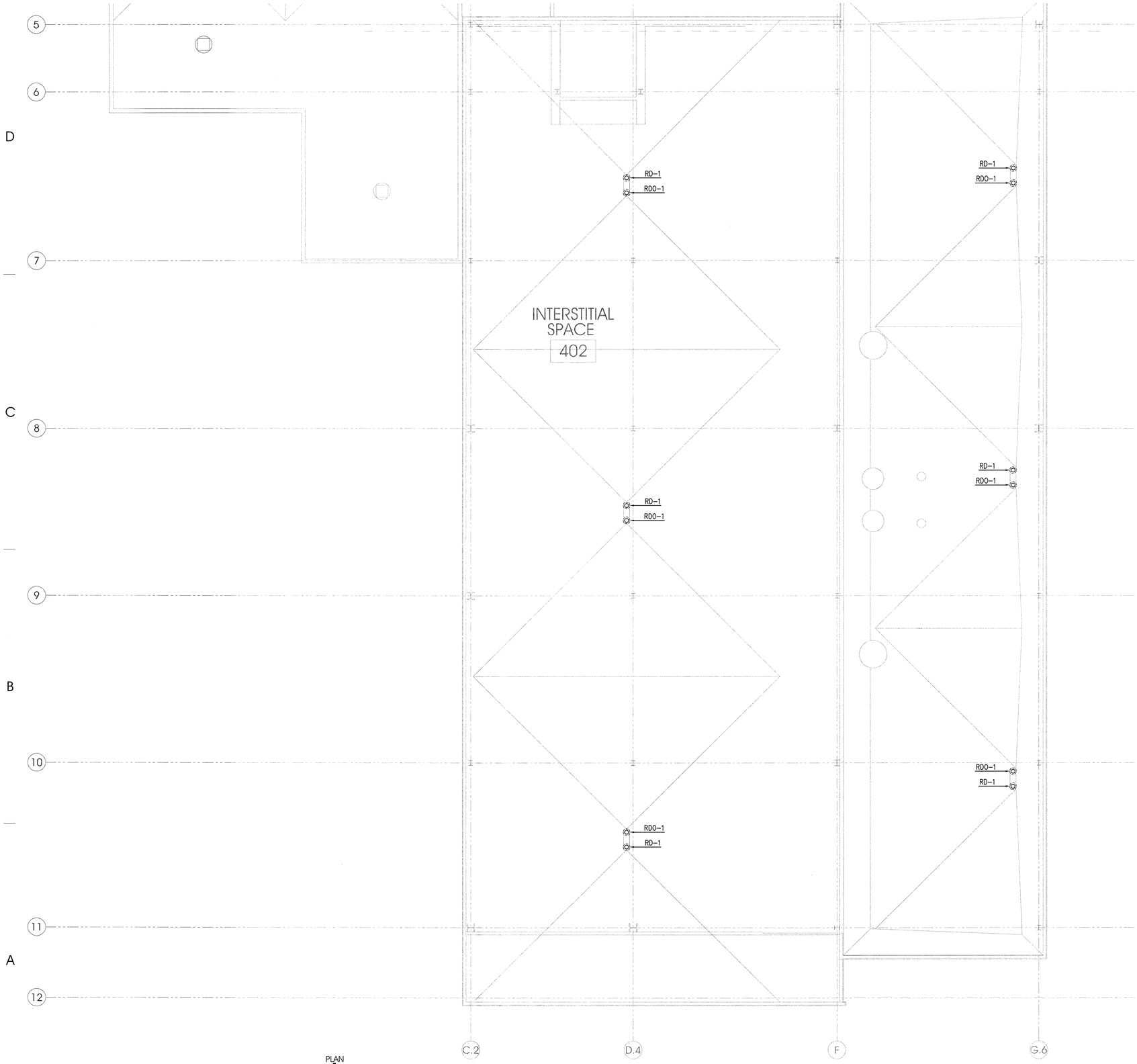

PLAN

scale = 1/8" = 1'-0"

LEVEL 4 AREA C PLUMBING ROOF PLAN

A4
PW104C

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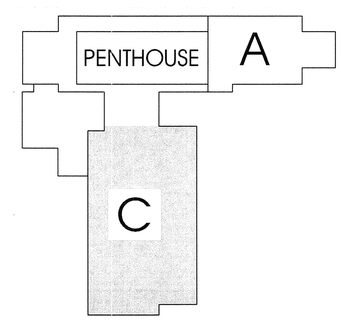

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LEVEL 4 AREA C
PLUMBING
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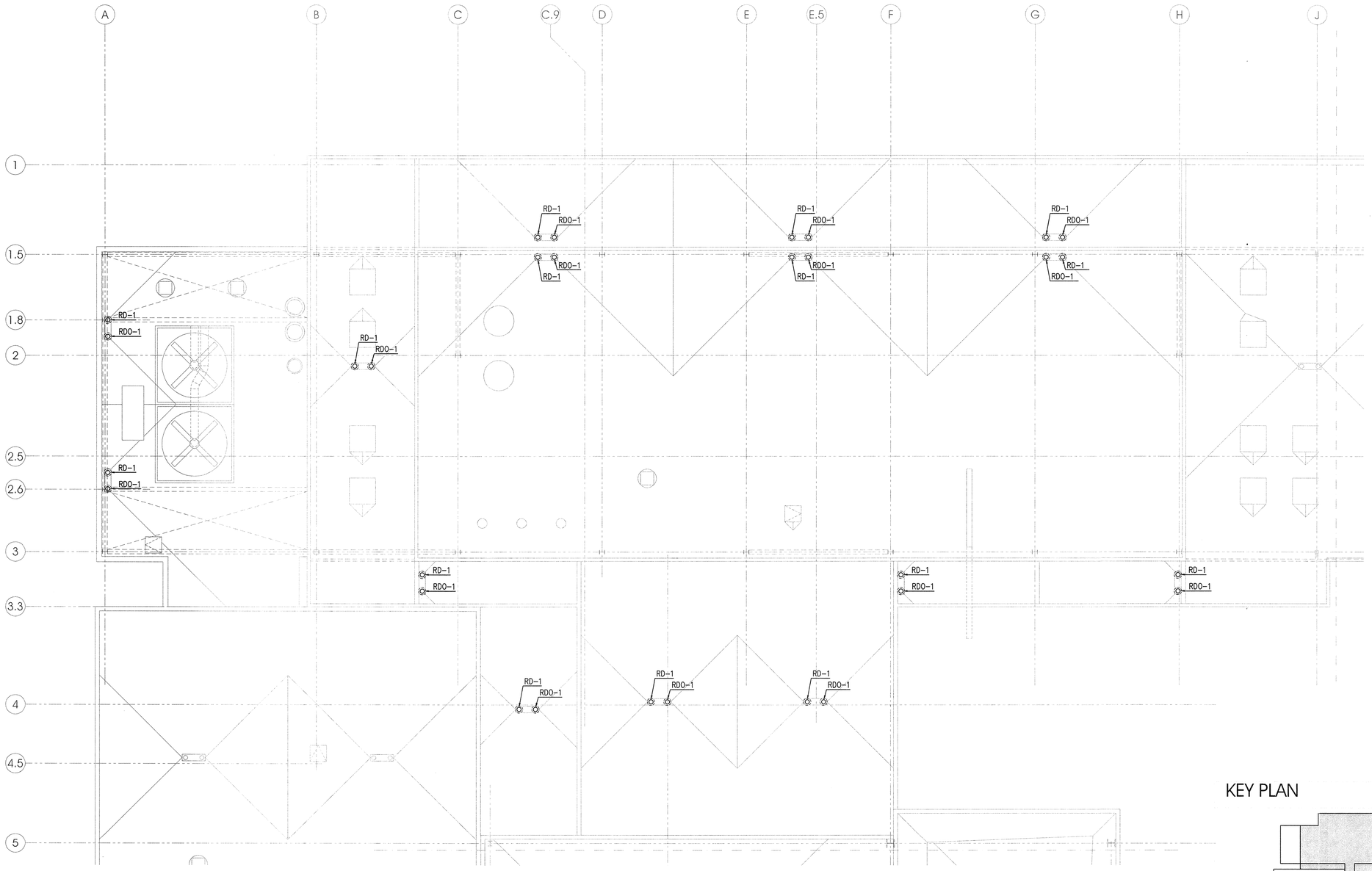

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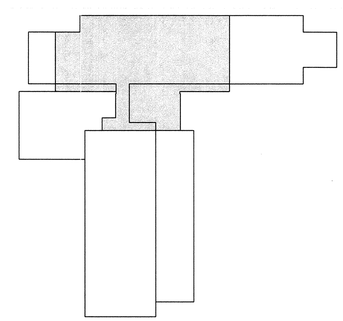

PLAN

8' 0' 8'

scale = 1/8" = 1'-0"

LEVEL 5 AREA B PLUMBING WASTE & VENT ROOF PLAN

A4
PW105B

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LEVEL 5 AREA B
PLUMBING WASTE
& VENT ROOF PLAN

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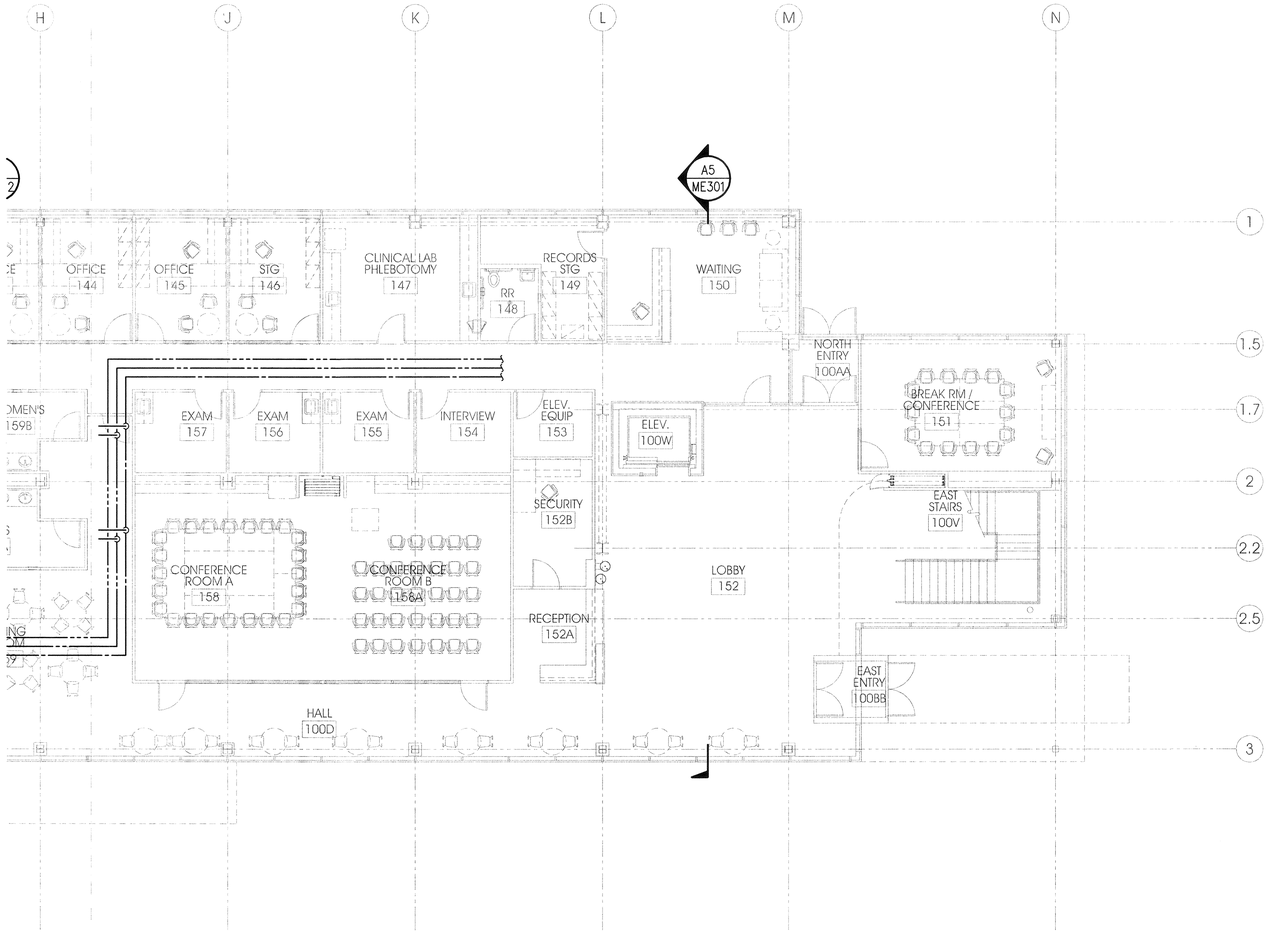

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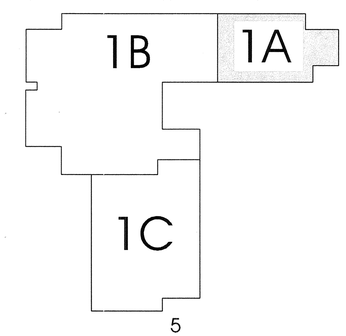

PLAN
n

8' 0' 8'
scale = 1/8" = 1'-0"

LEVEL 1 AREA A PLUMBING PIPING PLAN A4 PP101A

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LEVEL 1 AREA A
PLUMBING PIPING
PLAN

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PP101A

PLAN
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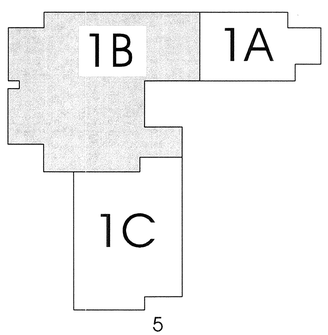
8' 0' 8'
scale = 1/8" = 1'-0"

LEVEL 1 AREA B PLUMBING PIPING PLAN

A4
PP101B

KEY PLAN



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LEVEL 1 AREA B PLUMBING PIPING PLAN

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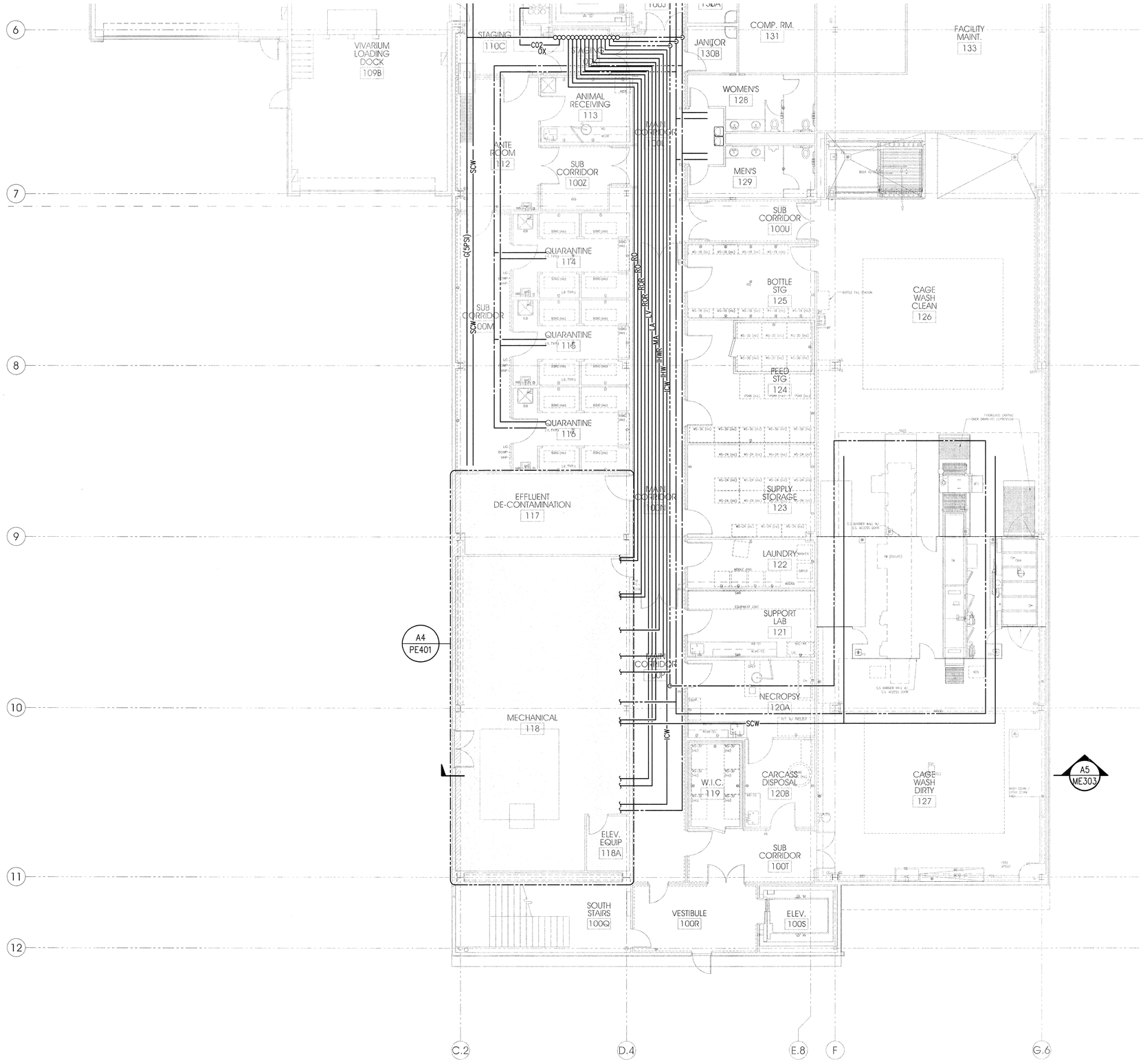


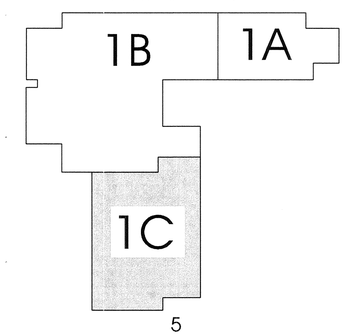
PLAN n

8' 0' 8'

scale = 1/8" = 1'-0"

LEVEL 1 AREA C PLUMBING PIPING PLAN A4 PP101C

KEY PLAN



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LEVEL 1 AREA C PLUMBING PIPING PLAN

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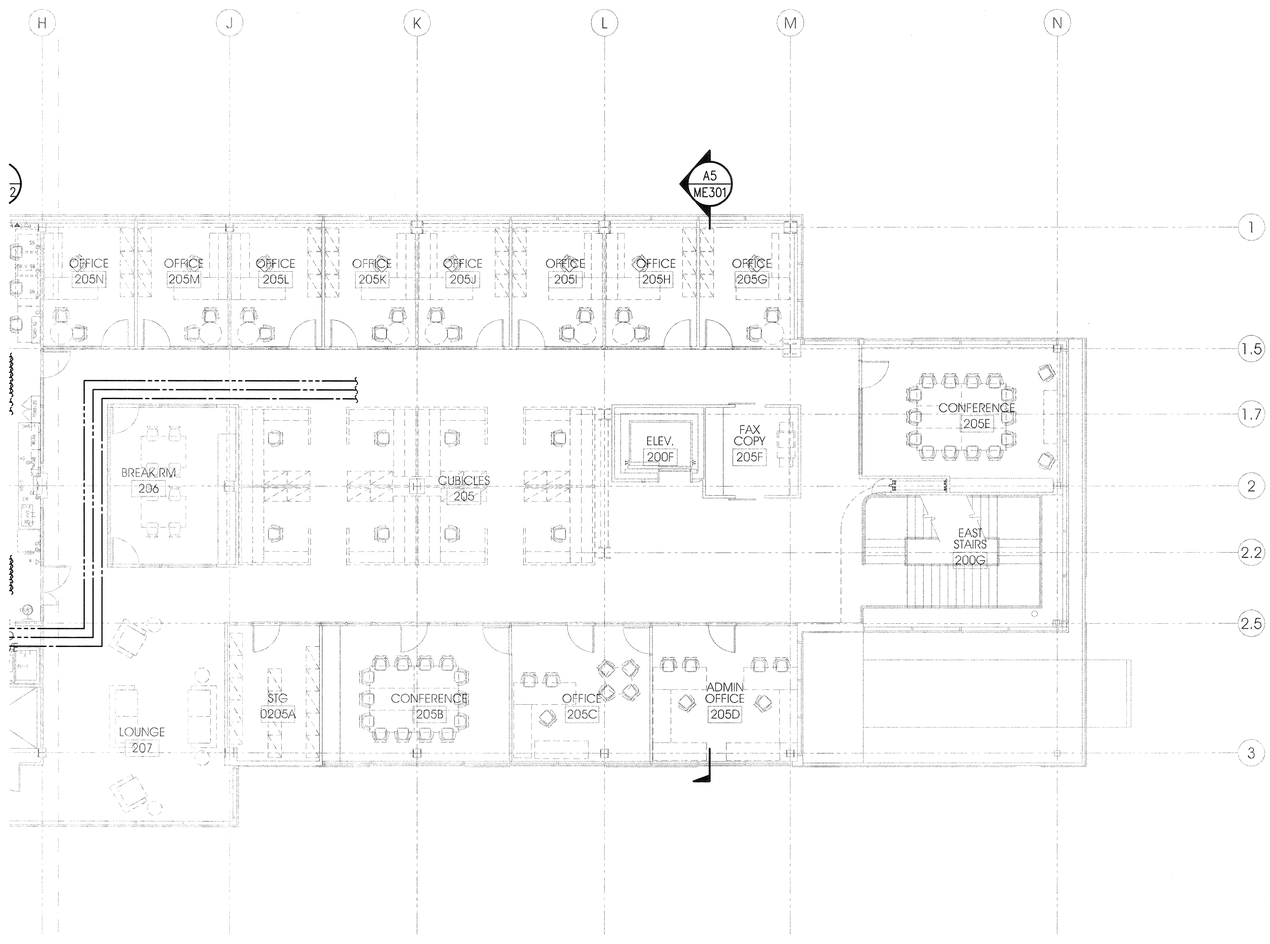

PLAN
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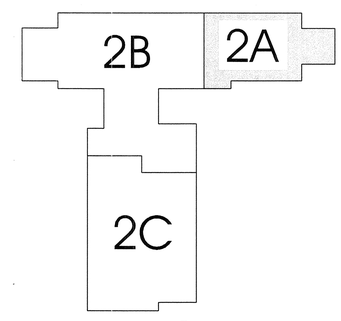
8' 0' 8'
scale= 1/8" = 1'-0"

LEVEL 2 AREA A PLUMBING PIPING PLAN

A4
PP102A

KEY PLAN



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LEVEL 2 AREA A PLUMBING PIPING PLAN

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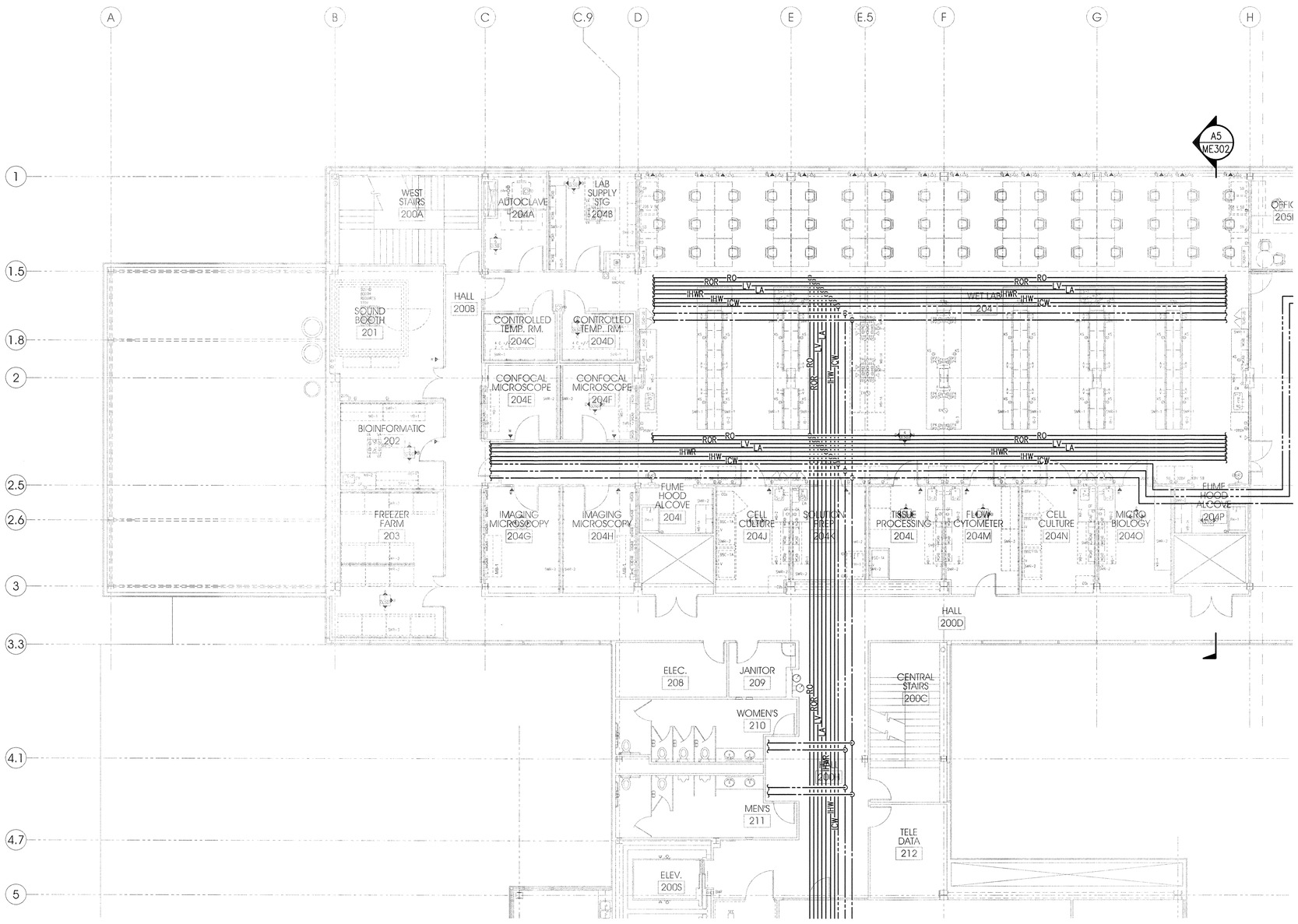

PLAN
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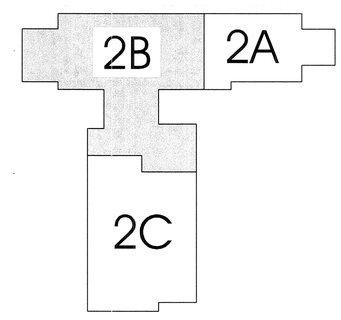
LEVEL 2 AREA B PLUMBING PIPING PLAN

A4
PP102B

KEY PLAN



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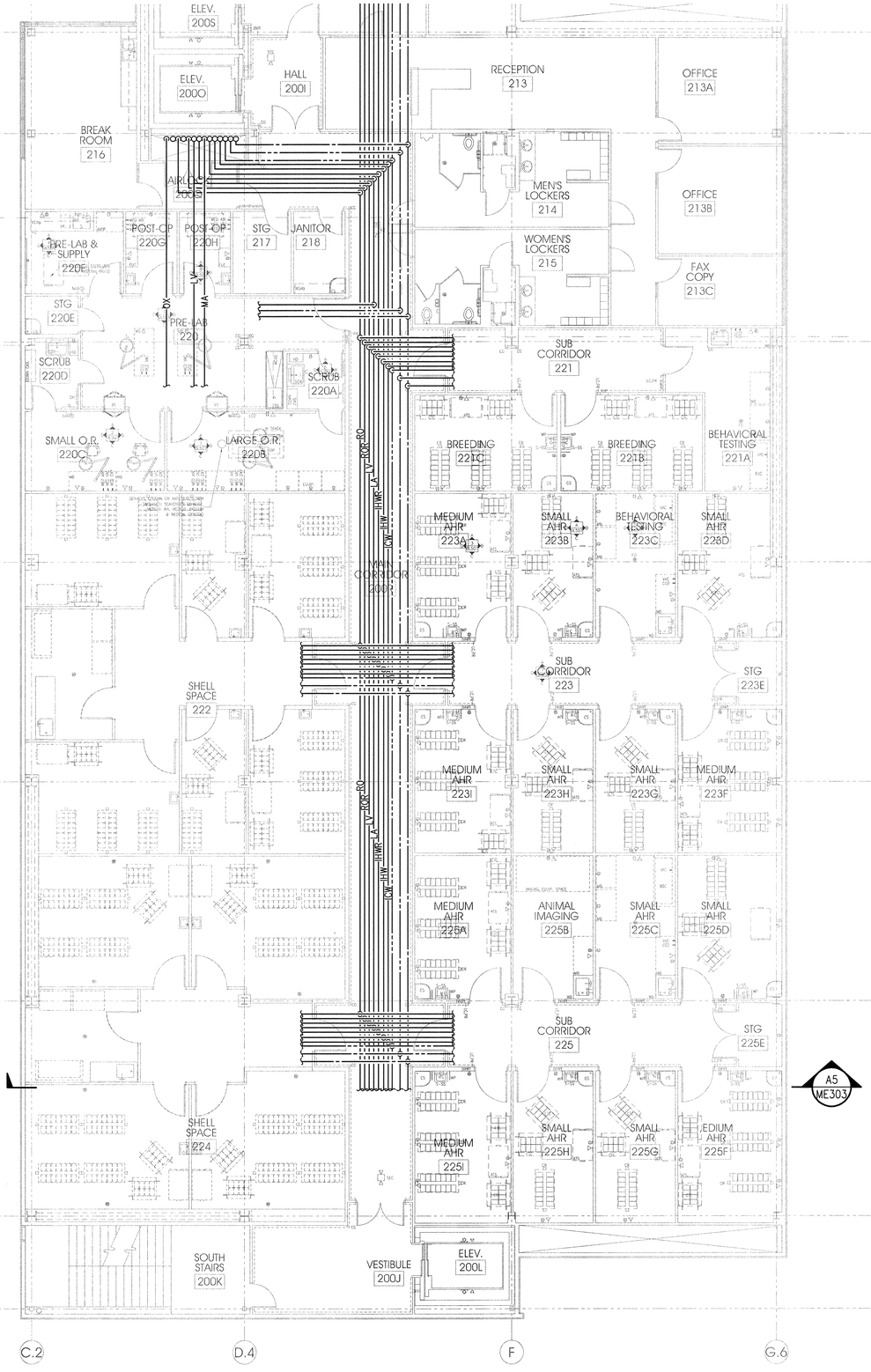

PLAN
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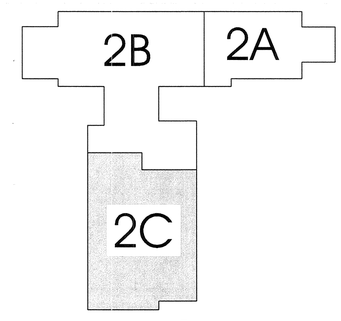
LEVEL 2 AREA C PLUMBING PIPING PLAN A4 PP102C

KEY PLAN



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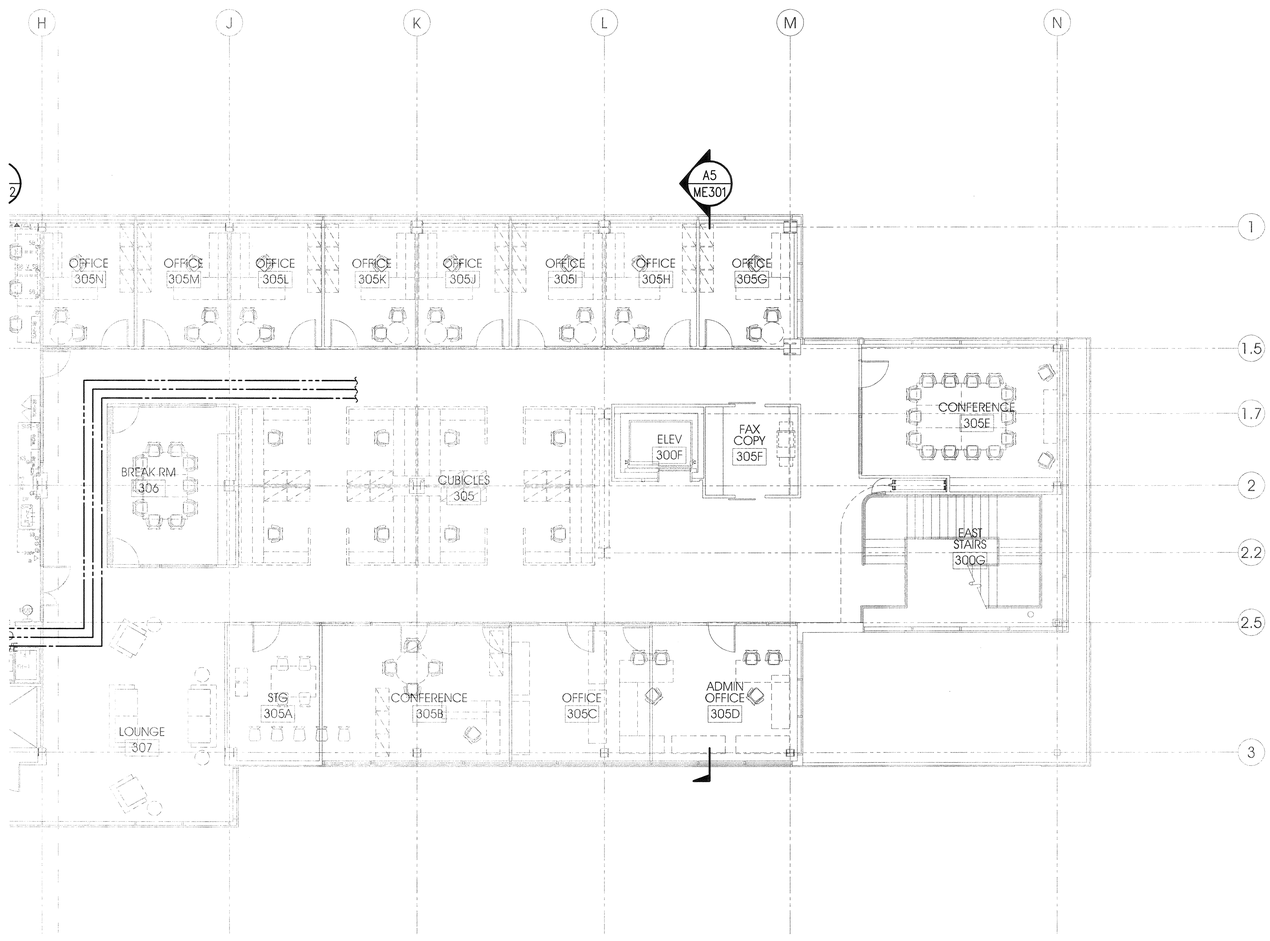

PLAN
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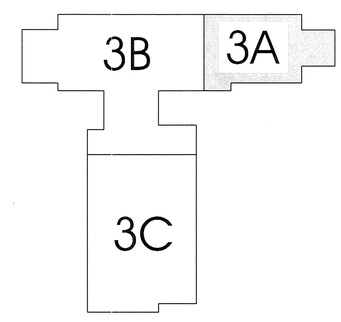
scale= 1/8" = 1'-0"

LEVEL 3 AREA A PLUMBING PIPING PLAN

A4
PP103A

KEY PLAN



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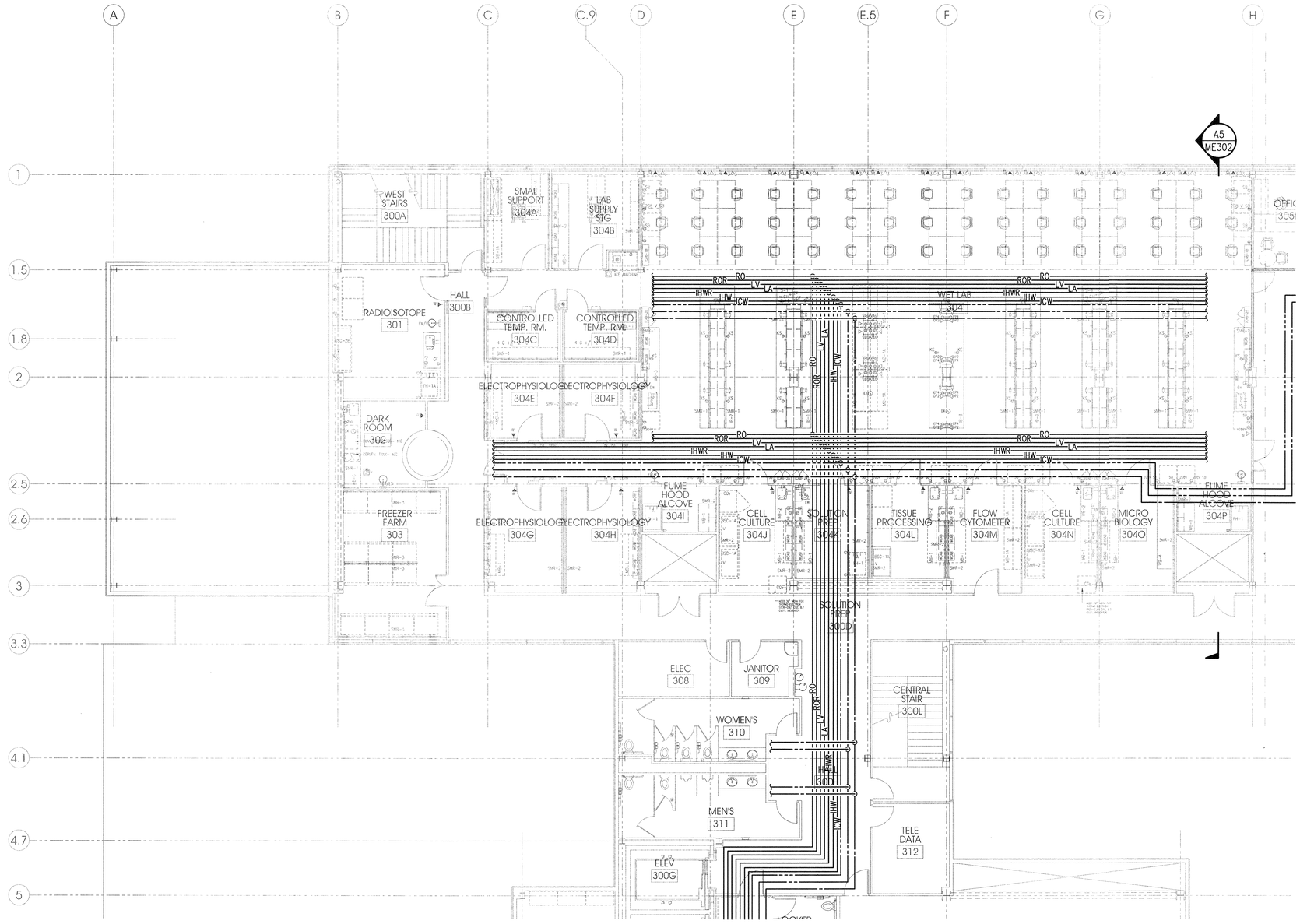
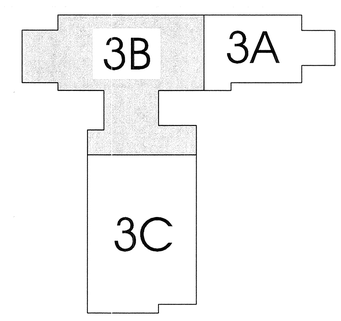
PP103A



KEY PLAN



PLAN
n

8' 0' 8'
scale= 1/8" = 1'-0"

LEVEL 3 AREA B PLUMBING PIPING PLAN (A4 / PP103B)

ARCHITECT 0818

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VBFA Project Number:8142_

OWNER INFORMATION

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PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:
LEVEL 3 AREA B PLUMBING PIPING PLAN

REVISIONS

MARK	DATE	DESCRIPTION

ISSUE DATA

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ISSUE TYPE:	DESDEV
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CHECKED BY:	N. SPENCER
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STATE PROPERTY #	-
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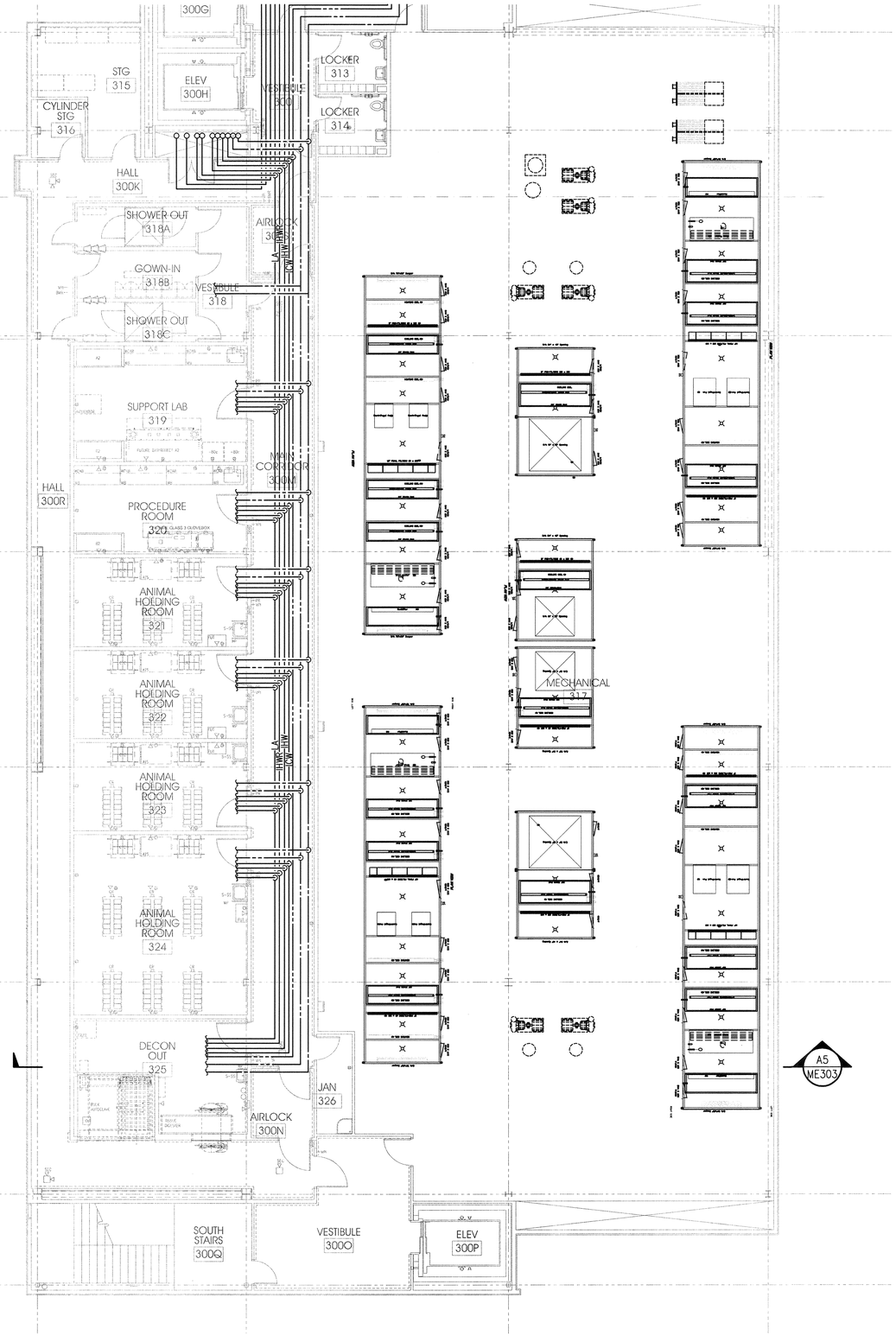
SHEET NUMBER:
PP103B



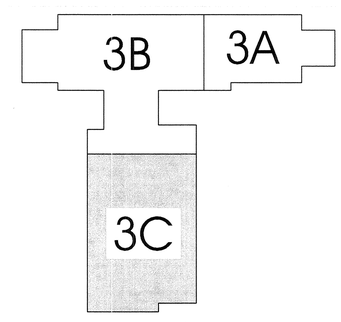
PLAN n

8' 0' 8'

scale = 1/8" = 1'-0"

LEVEL 3 AREA C PLUMBING PIPING PLAN A4

KEY PLAN



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SHEET NAME:

LEVEL 3 AREA C
PLUMBING PIPING
PLAN

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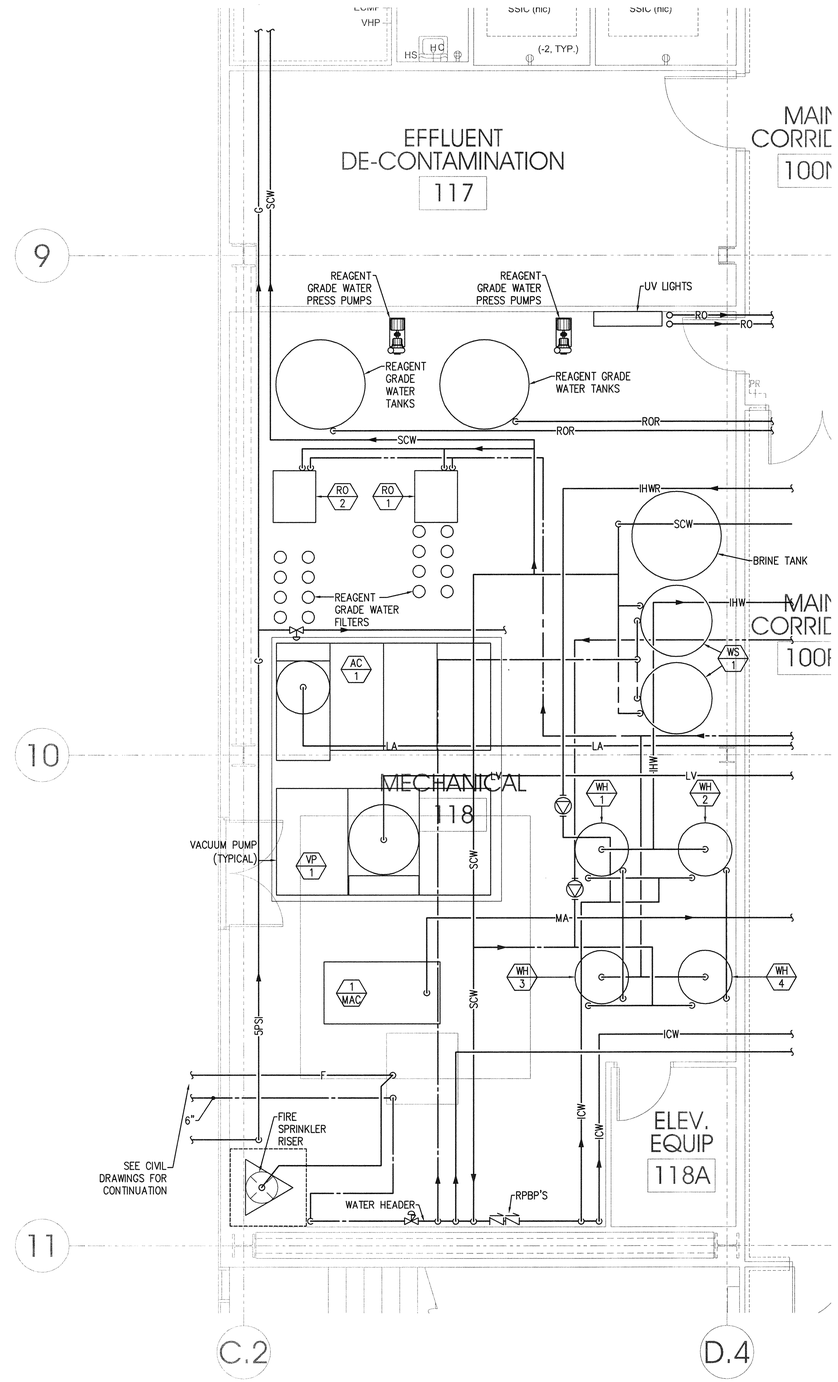
PP103C



PLAN

4' 0' 4'

scale= 1/4" = 1'-0"

LARGE SCALE MECHANICAL ROOM PLUMBING PLAN

A4
PE401

KEYED NOTES

1. –

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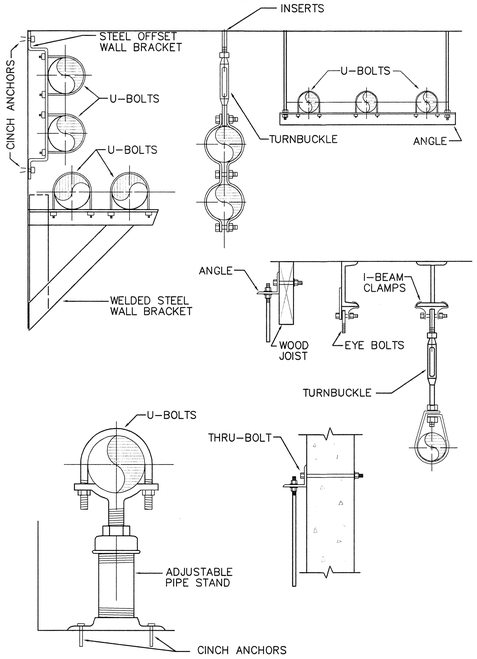
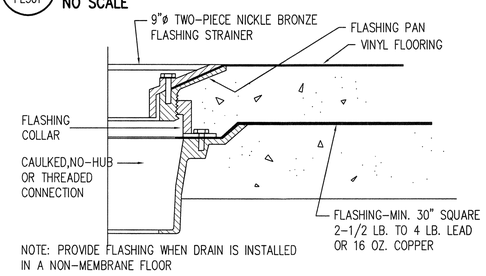


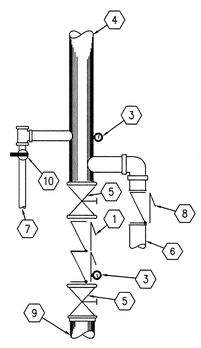
C2 PE501 **TYPICAL PIPE SUPPORT DETAIL**

NO SCALE



B2 PE501 **FLOOR DRAIN**

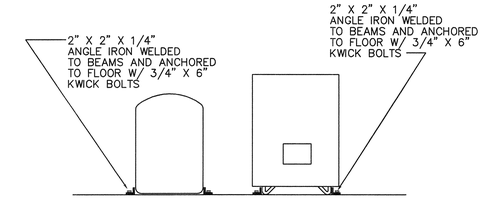
NO SCALE



1. DOUBLE CHECK VALVE ASSEMBLY
2. NOT USED.
3. WATER PRESSURE GAGE
4. TO WET SYSTEM.
5. CONTROL VALVE WITH TAMPER SWITCH, WIRING BY DIVISION 16.
6. TO FIRE DEPARTMENT CONNECTION.
7. MAIN DRAIN PIPED TO EXTERIOR.
8. CHECK VALVE
9. FIRE LINE FROM SUPPLY. PROVIDE GALVANIZED PIPING UP TO VALVE ASSEMBLY. PROVIDE RESTRAINTS, FLEXIBLE COUPLINGS, AND ANNULAR CLEARANCE AS REQUIRED BY NFPA.
10. MAINTENANCE VALVE

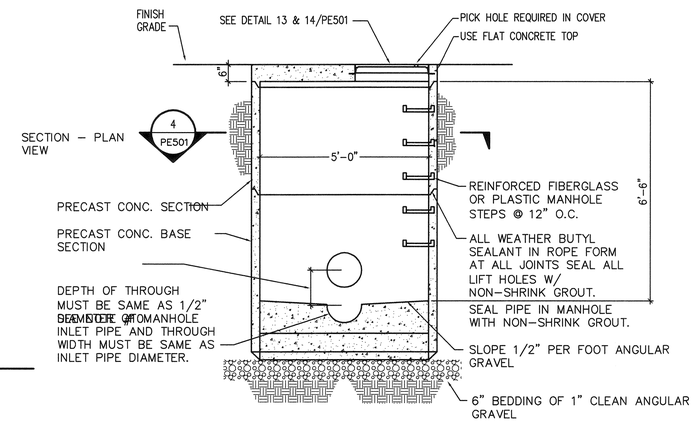
A2 PE501 **FIRE SPRINKLER RISER DETAIL**

NO SCALE



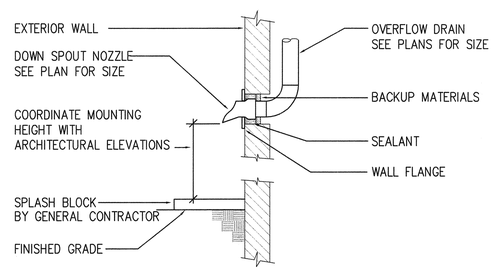
D3 PE501 **WATER SOFTENER ANCHORAGE DETAIL**

NO SCALE



C3 PE501 **SECTION-MANHOLE**

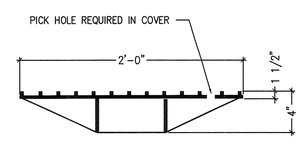
NO SCALE



B3 PE501 **DOWNSPOUT NOZZLE DETAIL**

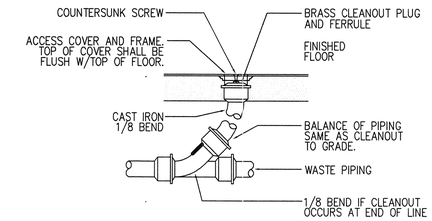
NO SCALE

NOTE: IF CONCRETE GRADE RINGS ARE USED ON A SAMPLING MANHOLE INSTALLATION, THE TOTAL HEIGHT OF STACKED RINGS MUST NOT EXCEED 12".



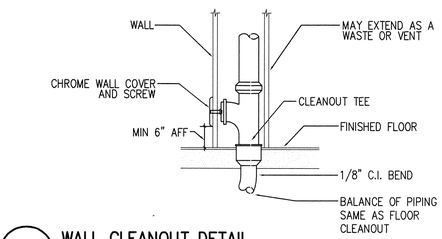
A3 PE501 **MANHOLE COVER**

NO SCALE



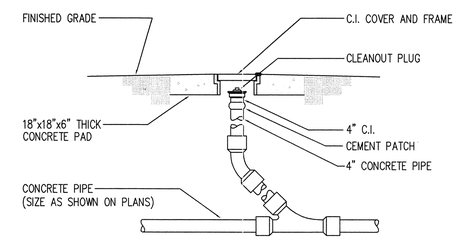
D4 PE501 **FLOOR CLEANOUT DETAIL**

NO SCALE



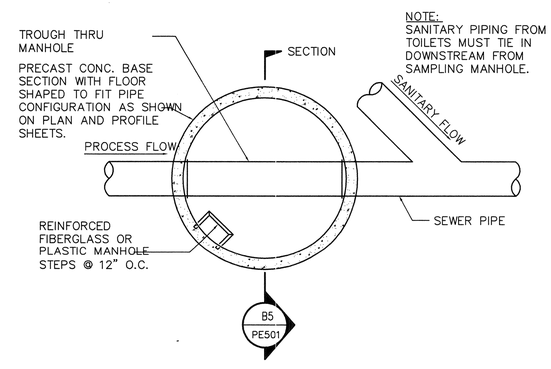
C4 PE501 **WALL CLEANOUT DETAIL**

NO SCALE



B4 PE501 **CLEANOUT TO GRADE DETAIL (COTG)**

NO SCALE



A4 PE501 **PLAN-MANHOLE**

NO SCALE

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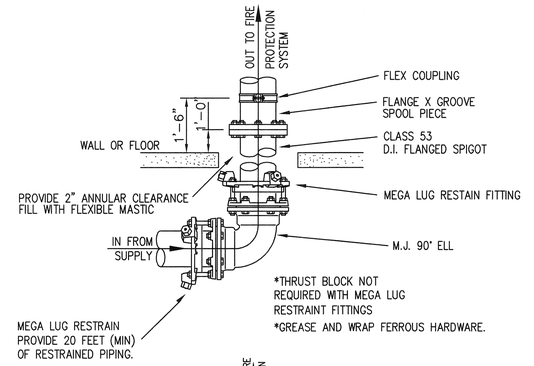
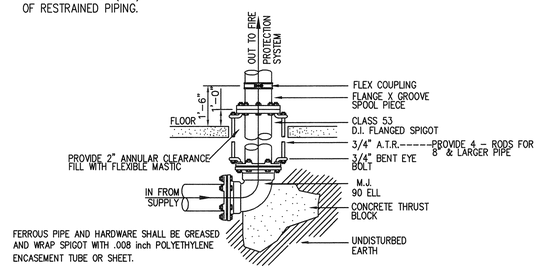
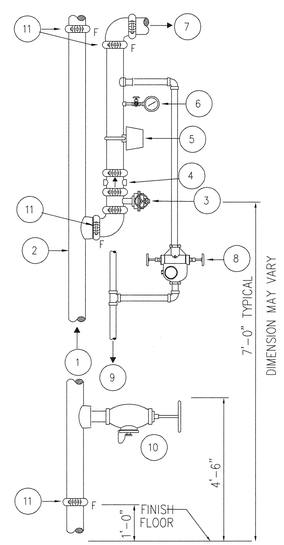




C3 / PE502 **FLANGED SPIGOT THRU FLOOR**

NO SCALE



FLOOR CONTROL ASSEMBLY & HOSE VALVE

DETAIL LEGEND

1. FROM SUPPLY
2. VERTICAL RISER
3. INDICATING TYPE FLOOR CONTROL VALVE WITH SUPERVISORY SWITCH
4. CHECK VALVE
5. VANE TYPE WATERFLOW SWITCH WIRING BY DIVISION 16
6. PRESSURE GAUGE, AND 3 WAY VALVE WITH PLUG AND NIPPLES.
7. TO SPRINKLER SYSTEM
8. DRAIN/TEST VALVE WITH ORIFICE, SIZED AS REQUIRED
9. EXPRESS DRAIN
10. 2 1/2" HOSE VALVE, WITH 1 1/2" REDUCER AND CAP
11. FLEXIBLE COUPLINGS AS REQUIRED FOR SEISMIC PROTECTION OF PIPING

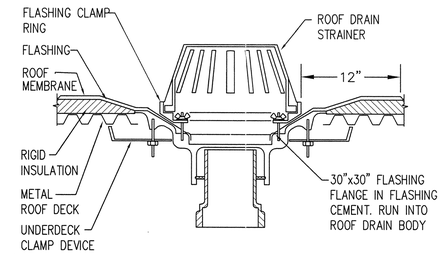
A3 / PE502 **COMBINED STANDPIPE & FLOOR CONTROL ASSEMBLY**

NO SCALE

BRANCH WATER LINE SCHEDULE

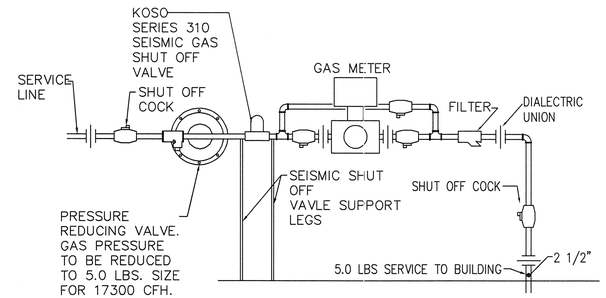
FIXTURE	FIXTURE UNITS	QUANTITY OF FIXTURES SERVED BY					
		1/2"	3/4"	1"	1-1/4"	1-1/2"	2"
WATER CLOSET (FLUSH VALVE)	10	---	---	1	3	5	15
WATER CLOSET (TANK TYPE)	3	1	2	4	10	---	---
N. GAS	---	5	10	20	40	---	---
LA OUTLET	---	---	2	5	9	14	---
HLA OUTLET	---	3	6	10	---	---	---
URINAL	5	---	1	2	6	10	30
LAVATORY	2	1	3	6	15	25	---
LAB SINK	4	1	3	6	---	---	---
CUP SINK	1	2	6	---	---	---	---
QUANTITY OF FIXTURE UNITS SERVED BY	---	3	6	1	30	55	110

NOTE:
WHERE PIPING IS SIZED ON DRAWINGS IT SHALL BE FOLLOWED. OTHERWISE INSTALL ACCORDING TO TABLE. WHERE FIXTURES ON A BRANCH ARE MIXED. TAKE THE SUM OF FIXTURE UNITS TO DETERMINE SIZING. THE BRANCHES SHALL BE REDUCED AS THE LOAD IS TAKEN OFF. MINIMUM SIZE TO ONE (1) FIXTURE SHALL BE 1/2".



C4 / PE502 **ROOF DRAIN**

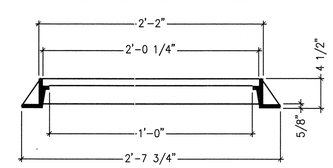
NO SCALE



B4 / PE502 **GAS METER DETAIL**

NO SCALE

NOTE: IF CONCRETE GRADE RINGS ARE USED ON A SAMPLING MANHOLE INSTALLATION, THE TOTAL HEIGHT OF STACKED RINGS MUST NOT EXCEED 12".



A4 / PE502 **MANHOLE RING**

NO SCALE

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PE502

PURE WATER SYSTEM SCHEDULE

		RO UNIT		STORAGE			FILTER				DEIONIZERS (2)				ULTRA VIOLET STERILIZERS				
ID	MANUFACTURER AND MODEL NUMBER	CAPACITY @ 77 F FEED WATER (GPD)	HP/ VOLT/PH	SYMBOL	TOTAL FLUID CAPACITY (GAL)	DIA./ HEIGHT (IN)	SYMBOL	TYPE	MICRON RATING	FLOW RATE (GPM)	SYMBOL	CAPACITY (FT^3)	FLOW RATE/ PRESS DROP (GPM/PSI)	SIZE (IN)	SYMBOL	FLOW (GPM)	AMPS/ WATTS	VOLT/PH	NOTES
RO-1	CULLIGAN A-3 PLUS	5800	1/230/1	ST-1	585	48/91	CF-1	CART.	5	25	DI-1to12	3.8	12/10	14X44	UV-1	66	3.2/0.38	120/1	1,2,3
							CF-2	CART.	1	25					-.-	-.-	-.-	-.-	
							CF-3	CANISTER	0.2	25					-.-	-.-	-.-	-.-	
							CF-4	CANISTER	0.2	25					-.-	-.-	-.-	-.-	
							ACF-1	CARBON (1)	-.-	25	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	
RO-2	CULLIGAN A-3 PLUS	5800	1/230/1	ST-1	585	48/91	CF-5	CART.	5	25	DI-1to12	3.8	12/10	14X44	UV-1	66	3.2/0.38	120/1	1,2,3
							CF-6	CART.	1	25					-.-	-.-	-.-	-.-	
							CF-7	CANISTER	0.2	25					-.-	-.-	-.-	-.-	
							CF-8	CANISTER	0.2	25					-.-	-.-	-.-	-.-	
							ACF-2	CARBON (1)	-.-	25	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	

1. 4 FT3 ACTIVATED CARBON. REQUIRES 120V POWER.
2. MIX BED TYPE DEIONIZERS. PROVIDE A PLUG-IN POWER OUTLET FOR EACH.
3. SEE PUMP SCHEDULE FOR REPRESSURE PUMPS.

DOMESTIC EXPANSION TANK SCHEDULE

SYMBOL	MANUF. AND MODEL NO.	LOCATION	SYSTEM SERVED	TYPE	TANK SIZE (GAL)	WORKING FLUID	RELIEF VALVE (PSI)	DIA/ HEIGHT (IN)	NPTM FITTING (IN)	REMARKS
DET-1	AMTROL ST-42-C	MECHANICAL ROOM	DOMESTIC HOT WATER	DIAPHRAM	17.5	WATER	150	16.5/24.5	3/4	
DET-2	AMTROL ST-80-C	MECHANICAL ROOM	INDUSTRIAL HOT WATER	DIAPHRAM	53	WATER	150	24/40.5	1-1/4	

VACUUM PUMP SCHEDULE

									RECEIVER			MOTOR			SIZE	
SYMBOL	MANUF. AND MODEL NO.	LOCATION	SERVICE	TYPE	MAXIMUM FLOW EA. PUMP @ 19" HG (SCFM)	MAXIMUM FLOW EA. PUMP @ 23" HG (SCFM)	SEAL WATER (GPM)	COOLANT WATER (GPM)	RECEIVER SIZE (GAL)	RECEIVER TYPE	HEIGHT/ DIA. (IN)	HP EACH MOTOR	RPM	VOLT/PH	LENGTH/ WIDTH/ HEIGHT (IN)	REMARKS
VP-1	BEACON LPV25T-L240	MECH. RM.	LAB	LUB ROTRY	159	115	-.-	-.-	250	VERT.	30X84	3@25	1740	460/3	153/78/96	1,2

1. LUBRICATED ROTARY VANE TRIPLEX PUMP PACKAGE, SINGLE POINT CONNECTION, SKID MOUNTED, CONTROL PANEL, STARTERS AND DISCONNECT.
2. PUMP SELECTION BASED ON SEA LEVEL VALUES AS SHOWN.

AIR COMPRESSOR SCHEDULE

							RECEIVER			MOTOR			SIZE	
SYMBOL	MANUF. AND MODEL NO.	LOCATION	SERVICE	MAXIMUM FLOW (ACFM)	MAXIMUM PUMP PRESS. (PSIG)	TYPE	RECEIVER SIZE (GAL)	RECEIVER TYPE	HEIGHT/ DIA. (IN)	HP EACH MOTOR	RPM	VOLT/PH	LENGTH/ WIDTH/ HEIGHT (IN)	REMARKS
AC-1	BEACON LPS-20T-D240	MECHANICAL ROOM	LAB AIR SYSTEM	132.6	100	RECIP OIL-LESS	240	VERTICAL	30X84	3@20	1750	460/3	138/84/96	1,2
MAC-1	BEACON LTM-3D-GD80	MECHANICAL ROOM	MEDICAL AIR	12.3	50	RECIP OIL-LESS	80	HORIZ		2@3		460/3	78/32/71	1,2

1. OIL-LESS RECIPRICATING TRIPLEX UNIT WITH SINGLE POINT POWER CONNECTION, CONTROL PANEL, STARTERS AND DISCONNECT.
2. PUMP SELECTION BASED ON SEA LEVEL VALUES AS SHOWN.

CIRCULATION PUMP SCHEDULE

				PUMP					MOTOR				SIZE	
SYMBOL	MANUF. AND MODEL NO.	LOCATION	SYSTEM SERVED	FLOW RATE (GPM)	HEAD (FT)	WORKING FLUID	% EFF.	PUMP TYPE	BHP	HP	RPM	VOLT/PH	LENGTH/ WIDTH (IN)	REMARKS
P-20	TACO 1615	MECH. RM.	DOMESTIC WATER	12	40	WATER	-.-	CIRCULATOR	-.-	3/4	1725	460/3		
P-21	TACO 1615	MECH. RM.	INDUSTRIAL WATER	24.5	40	WATER	-.-	CIRCULATOR	-.-	3/4	1725	460/3		
P-22	TACO IL133	MECH. RM.	DOMESTIC WATER	26	30	WATER	-.-	CIRCULATOR	-.-	3/4	1725	460/3		
P-23	TACO IL138	MECH. RM.	INDUSTRIAL WATER	87	30	WATER	-.-	CIRCULATION	-.-	1	1725	460/3		
CP-1	GOULD 3SVD 10 STAGE	MECH. RM.	R.O. WATER	66	363	WATER	-.-	VERT MULT S.S.	-.-	10	3500	460/3		
CP-2	GOULD 3SVD 10 STAGE	MECH. RM.	R.O. WATER	66	363	WATER	-.-	VERT MULT S.S.	-.-	10	3500	460/3		

GAS FIRED WATER HEATER SCHEDULE

											ELECTRICAL		
ID	MANUFACTURER AND MODEL NUMBER	LOCATION	SERVICE	INPUT LOAD (BTUH)	EFFICIENCY (%)	TYPE	RECOVERY RATE @ 100 F DELTA T	TANK SIZE (GAL)	FLUE SIZE (IN)	HEIGHT/ DIAMETER (IN)	(KW)	V/PH	NOTES
WH-1	A. O. SMITH BTH 300	SEE PLANS	DOM HW	300,000	96	COND		120	12			120/1	
WH-2	A. O. SMITH BTH 300	SEE PLANS	DOM HW	300,000	96	COND		120	12			120/1	
WH-3	A. O. SMITH BTH 300	SEE PLANS	IND HW	300,000	96	COND		120	12			120/1	
WH-4	A. O. SMITH BTH 300	SEE PLANS	IND HW	300,000	96	COND		120	12			120/1	

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UTAH STATE UNIVERSITY

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LOGAN, UTAH

SHEET NAME:
PLUMBING SCHEDULES

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PLUMBING FIXTURE SCHEDULE

ID	FIXTURE	CW (IN)	HW (IN)	ICW (IN)	IHW (IN)	RO (IN)	ES (IN)	LA (IN)	LV (IN)	W (IN)	V (IN)	AW (IN)	AV (IN)	NOTES
WC-1	WATER CLOSET	1	-.-	-.-	-.-	-.-	-.-	-.-	-.-	4	2	-.-	-.-	WALL HUNG, DUAL FLUSH SENSOR VALVE, ADA
WC-2	WATER CLOSET	1	-.-	-.-	-.-	-.-	-.-	-.-	-.-	4	2	-.-	-.-	WALL HUNG, DUAL FLUSH SENSOR VALVE
U-1	URINAL	3/4	-.-	-.-	-.-	-.-	-.-	-.-	-.-	2	2	-.-	-.-	WALL HUNG, FLUSH VALVE, ADA
L-1	LAVATORY	1/2	1/2	-.-	-.-	-.-	-.-	-.-	-.-	1 1/2	1 1/2	-.-	-.-	WALL HUNG, ADA
L-2	LAVATORY	1/2	1/2	-.-	-.-	-.-	-.-	-.-	-.-	1 1/2	1 1/2	-.-	-.-	COUNTER MOUNTED
L-3	LAVATORY	1/2	1/2	-.-	-.-	-.-	-.-	-.-	-.-	1 1/2	1 1/2	-.-	-.-	WALL HUNG, ADA
S-1	SINK	-.-	-.-	1/2	1/2	-.-	-.-	-.-	-.-	-.-	-.-	1 1/2	1 1/2	WALL HUNG HAND WASH
S-2	BREAK ROOM SINK	1/2	1/2	-.-	-.-	-.-	-.-	-.-	-.-	2	1 1/2	-.-	-.-	COUNTER MOUNTED, DOUBLE COMPARTMENT
SS-1	SERVICE SINK	3/4	3/4	-.-	-.-	-.-	-.-	-.-	-.-	3	2	-.-	-.-	FLOOR MOUNTED, CORNER MOP SINK
SH-1	SHOWER	1/2	1/2	-.-	-.-	-.-	-.-	-.-	-.-	2	2	-.-	-.-	ADA
FA-1	LAB SINK	-.-	-.-	1/2	1/2	-.-	-.-	-.-	-.-	-.-	-.-	1 1/2	1 1/2	FURNISHED BY OTHERS
FA-2	LAB SINK	-.-	-.-	1/2	1/2	-.-	-.-	-.-	-.-	-.-	-.-	1 1/2	1 1/2	FURNISHED BY OTHERS
FA-3	LAB SINK	-.-	-.-	1/2	1/2	1/2	-.-	-.-	-.-	-.-	-.-	1 1/2	1 1/2	FURNISHED BY OTHERS
FA-4	LAB SINK	-.-	-.-	1/2	1/2	1/2	1/2	-.-	-.-	-.-	-.-	1 1/2	1 1/2	FURNISHED BY OTHERS
FA-5	LAB SINK	-.-	-.-	1/2	1/2	1/2	1/2	-.-	-.-	-.-	-.-	1 1/2	1 1/2	FURNISHED BY OTHERS
FA-6	LAB SINK	-.-	-.-	-.-	-.-	1/2	-.-	-.-	-.-	-.-	-.-	1 1/2	1 1/2	FURNISHED BY OTHERS
FA-7	LAB SINK	-.-	-.-	1/2	1/2	-.-	1/2	-.-	-.-	-.-	-.-	1 1/2	1 1/2	FURNISHED BY OTHERS
EWC-1	ELECTRIC WATER COOLER	1/2	-.-	-.-	-.-	-.-	-.-	-.-	-.-	1 1/2	1 1/2	-.-	-.-	-.-
ESH-1	EMERGENCY SHOWER/EYEWASH	-.-	-.-	-.-	-.-	-.-	1 1/4	-.-	-.-	-.-	-.-	-.-	-.-	FURNISHED BY OTHERS
HB-1	HOSE BIB	1/2	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-
NFH-1	NON FREEZE WALL HYDRANT	3/4	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-
AR-1	ARGON WALL OUTLET	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	CONNECTION SIZE: 1/2"
LA-1	LAB AIR WALL OUTLET	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	CONNECTION SIZE: 1/2"
LV-1	LAB VAC WALL OUTLET	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	CONNECTION SIZE: 3/4"
HE-1	HELIUM WALL OUTLET	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	CONNECTION SIZE: 1/2"
H-1	HYDROGEN WALL OUTLET	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	CONNECTION SIZE: 1/2"
N-1	NITROGEN WALL OUTLET	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	CONNECTION SIZE: 1/2"
ST-1	SEDIMENT TRAP	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	4	-.-	-.-	-.-	-.-
FD-1	FLOOR DRAIN	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	2	2	-.-	-.-	RESTROOM
FD-2	FLOOR DRAIN	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	3	2	-.-	-.-	MECHANICAL ROOM
FD-3	FLOOR DRAIN	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	3	2	EMERGENCY SHOWER DRAIN
FD-4	FLOOR DRAIN	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	4	2	-.-	-.-	RPBP SUMP DRAIN
FS-1	FLOOR SINK	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	3	2	-.-
RD-1	ROOF DRAIN	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	SEE PLANS FOR SIZE
RDO-1	ROOF DRAIN OVERFLOW	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	SEE PLANS FOR SIZE
DSN-1	DOWN SPOUT NOZZLE	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	SEE PLANS FOR SIZE

1. ALL UNDER GROUND WASTE AND VENT SHALL BE 2" OR GREATER.

DOMESTIC PRV SCHEDULE

SYMBOL	MANUF. AND MODEL NO.	LOCATION	SERVICE	TYPE	CAPACITY (GPM)	INLET PRESSURE (PSIG)	OUTLET PRESSURE (PSIG)	SIZE (IN)	REMARKS
PRV-1	WATTS ACV-115	MECH. RM.	DOMESTIC COLD WATER	PILOT	85	110	80	1-1/4	1
PRV-2	WATTS ACV-115	MECH. RM.	DOMESTIC COLD WATER	PILOT	170	110	80	2-1/2	2

1. PRV SIZED FOR 1/3 TOTAL SYSTEM CAPACITY.
2. PRV SIZED FOR 2/3 TOTAL SYSTEM CAPACITY.

WATER SOFTENER SCHEDULE

SYMBOL	MANUF. AND MODEL NO.	LOCATION	TYPE	TOTAL (GRAINS)	WATER FLOW @ 15 PSI LOSS (GPM)	WATER FLOW @ 25 PSI LOSS (GPM)	RESIN EACH (FT^3)	RESIN TANK HGHT/DIA (IN)	REMARKS
WS-1	CULLIGAN CSM 600-2	MECH. RM.	DUPLEX PROGRESSIVE	1,310,400	183	252	20	36/60	1,2,3

1. PROVIDE INDOOR BRINE HOLDING TANK WITH LEVEL CONTROL.
2. PROVIDE 115V CONTROL POWER TO UNIT.
3. PRESENTLY DUPLEX, PROVIDE FOR FUTURE TRIPLEX SET UP.

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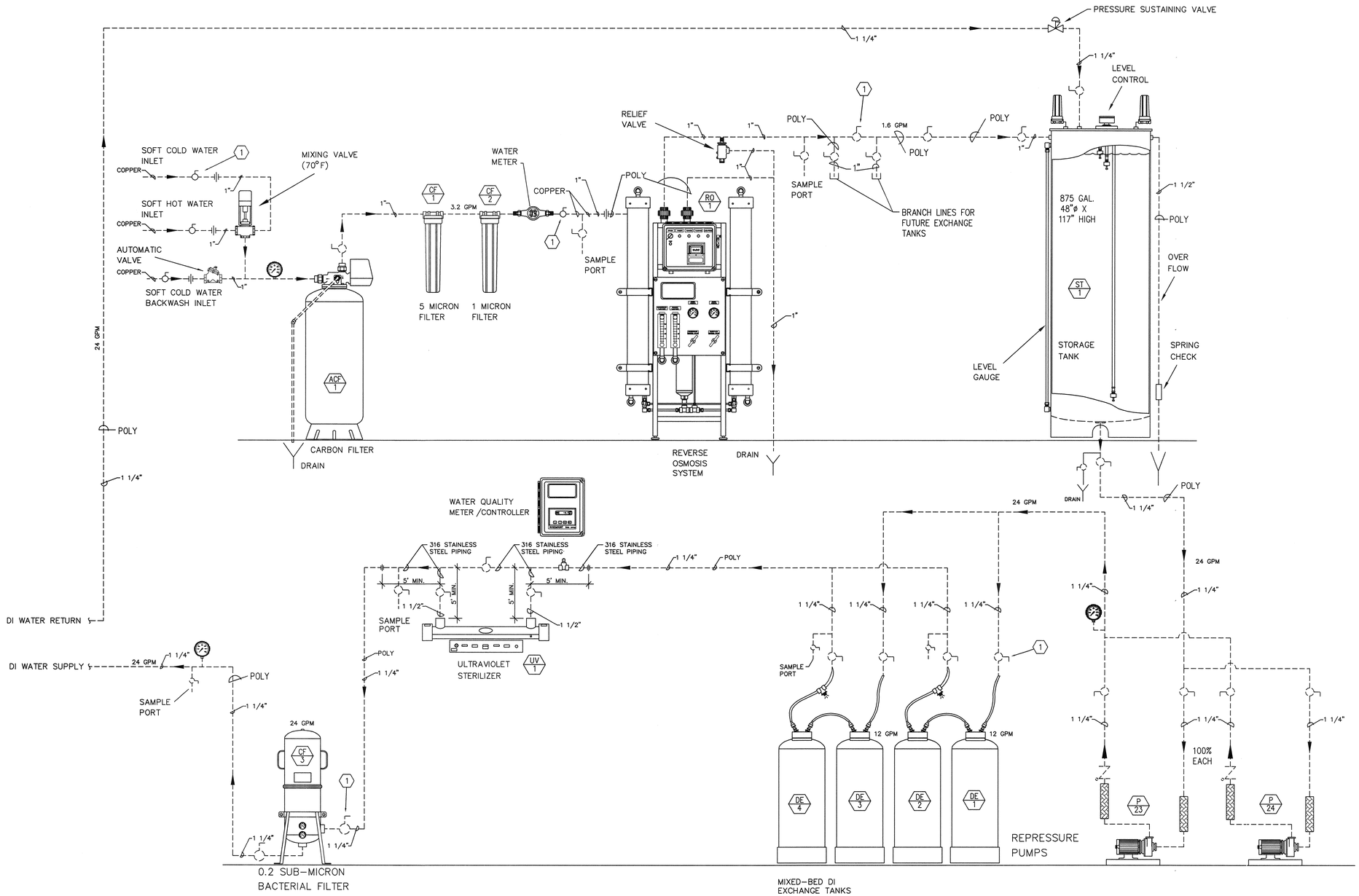
PE602

KEYED NOTES

1. PROVIDE SHUT OFF VALVES WHERE SHOWN, TYPICAL



PURE WATER PIPING SCHEMATIC

NO SCALE

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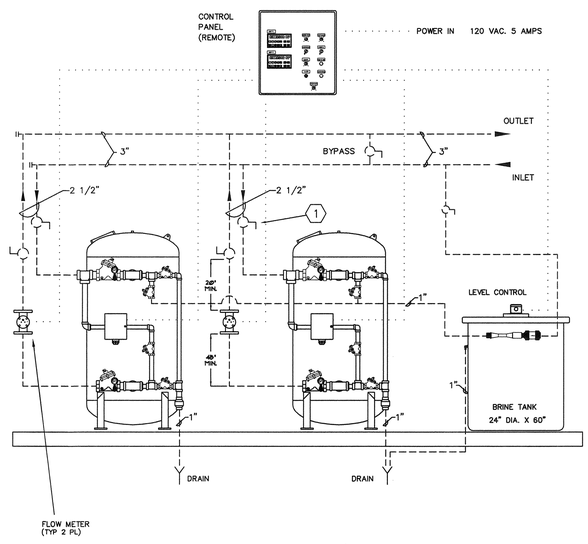

WATER SOFTENER SYSTEM SCHEMATIC

NO SCALE

KEYED NOTES

1. PROVIDE SHUT OFF VALVES WHERE SHOWN, TYPICAL

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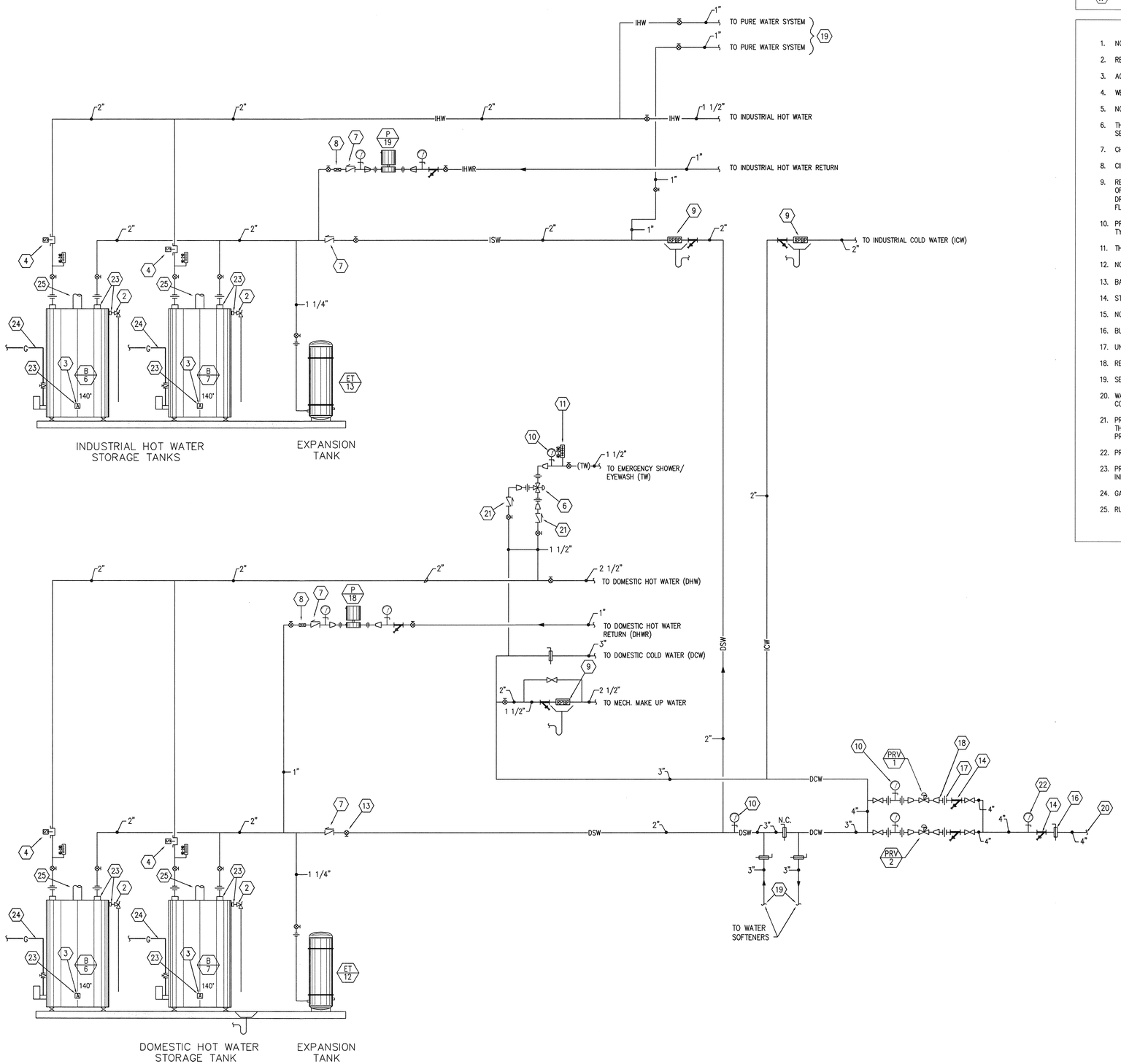

TYPICAL PLUMBING WATER SCHEMATIC

NO SCALE

KEYED NOTES

1. NOT USED.
2. RELIEF VALVE, TYPICAL.
3. AQUASTAT, TYPICAL.
4. WELL TYPE TEMPERATURE SENSOR, TYPICAL.
5. NOT USED.
6. THERMOSTATIC MIXING VALVE SIZED FOR 35 GPM AND SET FOR 108°F.
7. CHECK VALVE, TYPICAL.
8. CIRCUIT BALANCING VALVE, TYPICAL.
9. REDUCED PRESSURE BACK FLOW PREVENTOR WITH SHUT OFFS. PROVIDE DRIP PAN AND PIPE TO NEAREST FLOOR DRAIN. RPBP TO BE MAXIMUM OF 5'-0" OFF OF FLOOR, TYPICAL.
10. PRESSURE GAUGE WITH GAUGE COCK, 0-100 PSI, TYPICAL.
11. THERMOSTAT. PROVIDE RANGE AS INDICATED, TYPICAL.
12. NORMALLY CLOSED BYPASS, TYPICAL.
13. BAL. VALVE, TYPICAL ON PIPE SIZES 2" AND BELOW.
14. STRAINER WITH BLOW OFF VALVE, TYPICAL.
15. NOT USED.
16. BUTTERFLY VALVE, TYPICAL
17. UNION, TYPICAL.
18. REDUCER, TYPICAL
19. SEE SHEET P701 FOR CONTINUATION.
20. WATER ENTERING BUILDING. SEE SITE PLAN FOR CONTINUATION.
21. PROVIDE INLINE CHECK VALVE ON SUPPLIES TO THERMOSTATIC MIXING VALVE, IN ADDITION TO THOSE PROVIDED ON THERMOSTATIC MIXING VALVE.
22. PRESSURE GAUGE WITH COCK, 0-150 PSI.
23. PROVIDE SEPARATE TAPPS TO WATER HEATER AS INDICATED FOR EACH PIPE OR SENSOR.
24. GAS LINE TO GAS MAIN.
25. RUN FLUE THROUGH A

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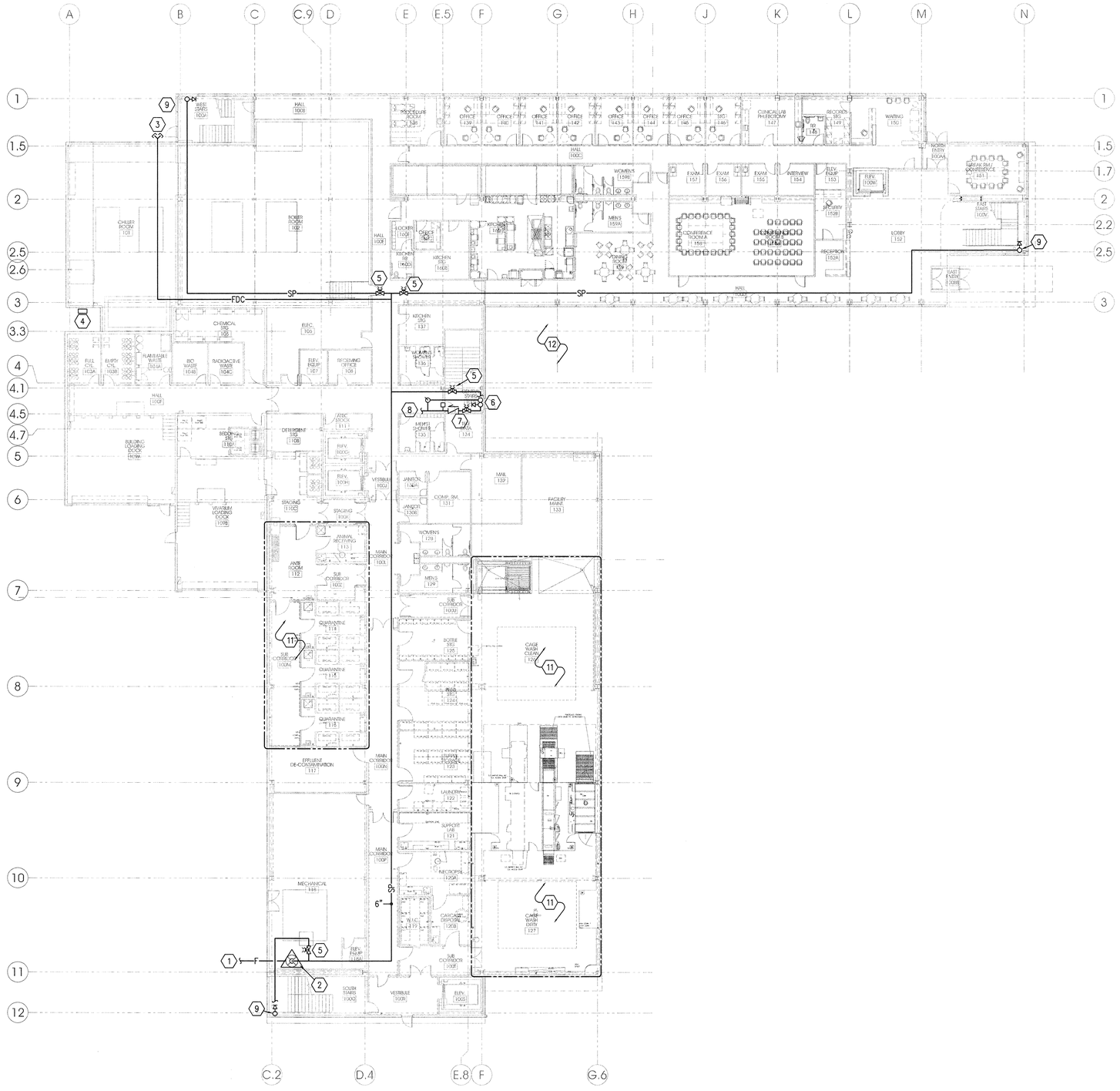

KEYED NOTES

1. 8" FIRE MAIN AND FLANGED SPIGOT. SEE DETAIL.
2. FIRE SPRINKLER RISER. SEE DETAIL.
3. FIRE DEPARTMENT CONNECTION.
4. ELECTRONIC BELL FROM FIRE ALARM PANEL. COORDINATED WIRING WITH ELECTRICAL.
5. STANDPIPE ISOLATION CONTROL VALVE.
6. CLASS I COMBINED STANDPIPE WITH HOSE VALVE AND EXPRESS DRAIN. SEE DETAIL.
7. FLOOR CONTROL ASSEMBLY. SEE DETAIL.
8. TO FIRE SPRINKLERS ON THIS FLOOR.
9. CLASS I STANDPIPE WITH HOSE VALVE. SEE DETAIL.
10. INSTALL VALVE IN A HOSE VALVE CABINET.
11. PROVIDE GASKETED-TYPE SPRINKLER HEADS IN NEGATIVE-PRESSURE AREAS.
12. PROVIDE DRY-TYPE SPRINKLER HEADS FOR SPRINKLER COVERAGE BELOW OCCUPIED OVERHANG ABOVE.

PLAN n

16' 0' 16'

scale = 1/16" = 1'-0"

LEVEL 1 FIRE PROTECTION PLAN A4 / FP101

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LEVEL 1
FIRE PROTECTION PLAN

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PLAN
n
16' 0' 16'
scale = 1/16" = 1'-0"

LEVEL 2 FIRE PROTECTION PLAN A4 FP102

KEYED NOTES

1. CLASS I COMBINED STANDPIPE WITH HOSE VALVE AND EXPRESS DRAIN. SEE DETAIL.
2. FLOOR CONTROL ASSEMBLY. SEE DETAIL.
3. TO FIRE SPRINKLERS ON THIS FLOOR.
4. CLASS I STANDPIPE WITH HOSE VALVE. SEE DETAIL.
5. INSTALL VALVE IN A HOSE VALVE CABINET.
6. PROVIDE GASKETED-TYPE SPRINKLER HEADS IN NEGATIVE-PRESSURE AREAS.

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LEVEL 2
FIRE PROTECTION PLAN

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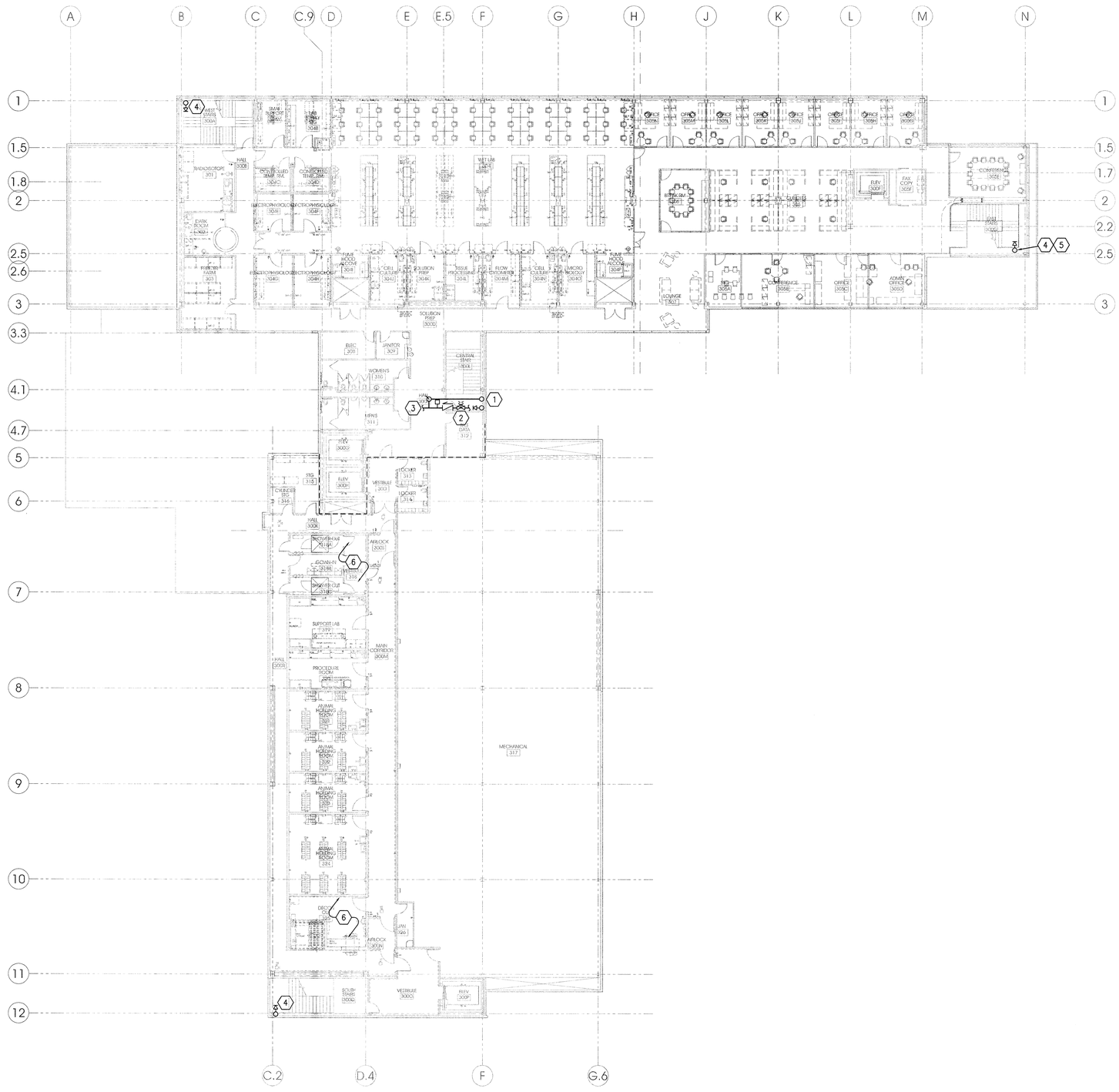

PLAN
n

16' 0' 16'
scale = 1/16" = 1'-0"

LEVEL 3 FIRE PROTECTION PLAN A4 / FP103

KEYED NOTES

1. CLASS I COMBINED STANDPIPE WITH HOSE VALVE AND EXPRESS DRAIN. SEE DETAIL.
2. FLOOR CONTROL ASSEMBLY. SEE DETAIL.
3. TO FIRE SPRINKLERS ON THIS FLOOR.
4. CLASS I STANDPIPE WITH HOSE VALVE. SEE DETAIL.
5. INSTALL VALVE IN A HOSE VALVE CABINET.
6. PROVIDE GASKETED-TYPE SPRINKLER HEADS IN NEGATIVE-PRESSURE AREAS.

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PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:
LEVEL 3
FIRE PROTECTION PLAN

REVISIONS

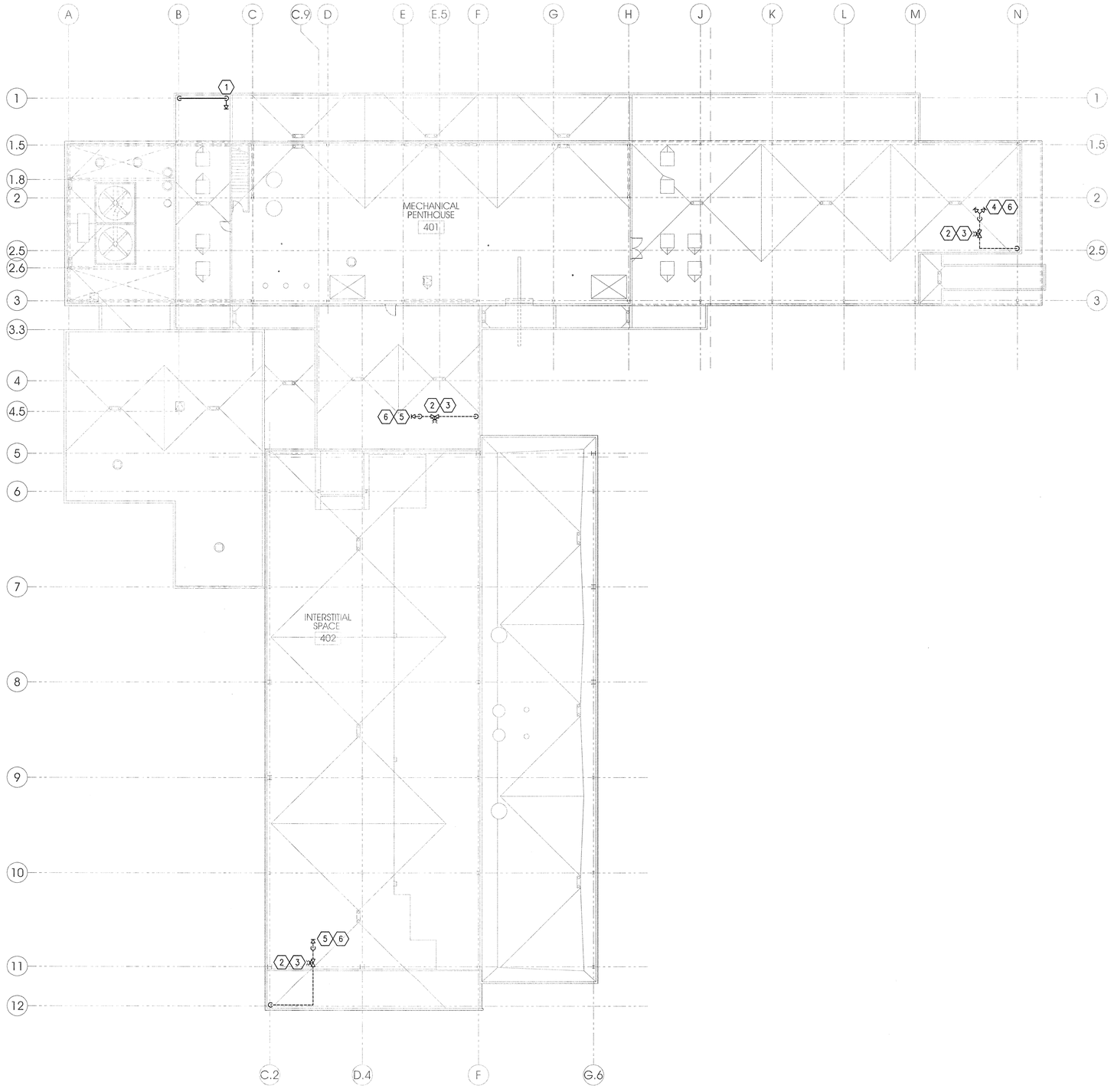
MARK	DATE	DESCRIPTION

ISSUE DATA

ISSUE DATE:	DEC. 9, 2008
ISSUE TYPE:	DESDEV
DRAWN BY:	P. COOPER
CHECKED BY:	N. SPENCER
CAD FILE NAME:	
DFCM PROJECT #	06292770
STATE PROPERTY #	-
COPYRIGHT:	STATE OF UTAH

SHEET NUMBER:

FP103



KEYED NOTES

1. CLASS I STANDPIPE WITH HOSE VALVE ON THE HIGHEST LANDING. SEE DETAIL.
2. POST INDICATOR VALVE WITH TAMPER SWITCH INSTALLED IN STANDPIPE BELOW THE ROOF-NORMALLY CLOSED POSITION. OPERATOR LOCATED ON THE ROOF.
3. BALL DRIP VALVE INSTALLED BEYOND INDICATOR VALVE. PIPE DRAIN TO BUILDING EXTERIOR.
4. STANDPIPE RISES TO THE HOSE VALVES ON THE ROOF ABOVE. PROVIDE DOUBLE 2-1/2" HOSE VALVES WITH 1-1/2" REDUCERS.
5. STANDPIPE RISES TO THE HOSE VALVE ON THE ROOF ABOVE. PROVIDE SINGLE 2-1/2" HOSE VALVE WITH 1-1/2" REDUCER.
6. LOCATE HOSE VALVE AT LEAST 10 FEET FROM THE EDGE OF THE ROOF.

PLAN
n
16' 0' 16'
scale = 1/16" = 1'-0"

LEVEL 4 / ROOF FIRE PROTECTION PLAN A4 FP104

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ELECTRICAL BASIS OF DESIGN

Design Development Phase

Codes & Standards:

- International Building Code (IBC) 2006
- International Fire Code (IFC) 2006
- National Electrical Code 2008
- International Energy Conservation Code (IECC) 2006
- Utah State Fire Marshall's Regulations
- IESNA, Illuminating Engineering Society of North America
- NFPA, National Fire Protection Association
- Division of Facilities Construction and Management Design Criteria
- Utah State University Design Standards for Electrical Engineering
- CDC/NIH BMBL 5th Edition (Best practices)

SITE ELECTRICAL:

Power Utilities:

Rocky Mountain Power (RMP) will provide two (2) transformers, one at 120/208 volt and the other at 277/480 volt, to feed electrical power to the new USU USTAR Life Sciences Building. There is an existing RMP ground sleeve on the west side of the site that will provide medium voltage service to the two (2) transformers, which will be located within a screened enclosure situated at the far west side of the project site, adjacent to the enclosure that is currently part of the existing 620 building. This location was selected due to space constraints and to provide separation from sensitive electronic lab equipment. The transformers will feed the two (2) building services, 'MS1' (277/480 volt) and 'MS2' (120/208 volt). The building services (CT cabinet/main disconnect) cabinets will be located within the same screened enclosure as the transformers. The estimated sizes of the transformers are as follows:

277/480 volt service	2000 KVA
120/208 volt service	500 KVA

The main building disconnects (breakers) shall be electronic type with long, short, and instantaneous pick-up settings in addition to ground fault provision. This will allow for easier breaker coordination, which is important in a facility of this nature, as reliability of the electrical distribution system is necessary for proper operations. The 277/480 volt service will have ground fault protection for the 277/480 volt service, as required by the National Electrical Code (NEC).

Communication Utilities:

The new USTAR Life Sciences building #2 will connect into the USU campus distribution network. A new duct bank will tie into the existing USU campus network system along 600 East via a new communication vault that will be set over the existing conduit system. A total of four (4) 4" conduits will extend from the manhole east along the south side of 1550 North to just past the new building where an additional communication vault will be installed. Two (2) 4" conduits will extend out of the new communication manhole and run north and then back west into the new USTAR Life Sciences building. Telecommunications work shall comply with USU's telecommunications design standards and all work will be coordinated with the campus IT department, which will be installing the cables to the building.

Site Lighting:

Full cut-off, pulse-start metal halide luminaries on 25' poles and 2'-0" round concrete pole bases will be used to provide illumination to the parking lot areas. Poles will be placed in landscape areas to the greatest extent possible to minimize obstructions in parking lot areas, thus facilitating snow removal. The illumination levels for parking lot areas shall be a minimum 1.0 foot candle with a uniformity ratio of 20:1. Poles will be located to ensure that light trespass onto adjacent properties meets LEED requirements. All exterior site light fixtures will conform to Innovation Campus and USU design standards. Additional pole lights space 148' on center will be provided for street lighting as required by Innovation Campus standards. All pole fixtures will be supplied with break-away fuse holders at the pole base.

Secure Parking Lot Access System:

120 volt power and data will be provided for secure access to the dock area. The security gate to the dock area will be tied into the card access security system that is used in the building. Detection loops (two per lane) will be placed in the asphalt as part of the system.

BUILDING LIGHTING:

Interior Lighting:

In order to keep energy usage to an absolute minimum, several strategies will be applied to the interior lighting of the life sciences building. These strategies include:

1. Ballast/Lamp combination: High-lumen (3100), T8 lamps with 0.71 ballast factor ballasts will be used throughout the building. The lamps will be specified as TCLP-compliant. The ballast that will be specified are required for Rocky Mountain Power's energy savings program. All ballasts will be specified to have a THD <10%.
2. High efficient fixtures will be utilized to the greatest extent possible where they are available and meet the application.

For comfort levels, the fluorescent lamp color will be specified as 3500K unless there are other requirements for specific spaces. The uniformity of the light shall be no higher than a 4:1 maximum-to-minimum illumination levels.

The illumination levels that will be used for each of the defined spaces are as follows:

Defined Space	Illumination Level	Control Method
Offices	50 fc	Occupancy Sensor
Open Laboratories	75 fc	Lighting Control System
Lab Support Areas	70 fc	Occupancy Sensor
General Circulation Corridors	15 fc	Lighting Control System
Vivarium Sub Corridors	30 fc	Watchdog
Locker/Restrooms	30 fc	Occupancy Sensors
Conference Rooms	Variable 30 fc - 70 fc.	Lighting control system
Animal Holding Rooms	15 fc for Human Red 30 fc for Animal white 60 fc for Human cleaning	Watchdog
Bio-level 3 Labs	70 fc	Watchdog
Lobbies	30 fc	Lighting control system
Kitchen	50 fc	Lighting control system
Operating Suites	75 fc (ambient levels)	Watchdog
Stairways	15 fc	Light Level Sensor

Lighting for enclosed offices will consist of indirect/direct linear fluorescent steel pendant lights, mounted at 2' of the ceiling with a 70% up light and 30% down light distribution. For those office areas that are adjacent to exterior windows, light fixtures with dimming ballasts and integral light level sensors will be used for daylight harvesting. Additionally, lights shall be oriented perpendicular to the exterior windows to minimize light trespass from the building, thus satisfying LEED requirements. Open offices will utilize 2'x2' indirect, recess fixtures.

Lighting in general lab areas will consist of indirect/direct linear fluorescent steel pendant lights, mounted at 2' from the ceiling with a 60% up light and 40% down light distribution. Lights will be centered between lab benches. For lab support areas, fluorescent acrylic lens recessed fixtures will be used. For those labs that are adjacent to exterior windows, light fixtures with dimming ballasts and integral light level sensors will be used for daylight harvesting. For the large lab areas, the general lighting control system will turn the fixtures on and off. There will be local switches in the spaces to allow for individual occupant control. Individual lab support areas will employ an occupancy sensor and switch for control of the lights.

Large conference rooms will have linear fluorescent pendant fixtures and linear wall wash fixtures for whiteboard high-lighting. Control for this type of space shall be a Crestron-type lighting control system, which will control lights (on/off and dimming) and motorized shades, in addition to interfacing with a ceiling-mounted audio/video system. USU currently uses the Crestron system processor for their A/V applications.

In vivarium support areas (first floor vivarium wing), including dirty cage wash, clean cage wash, necroscopy, quarantine space, corridors, and associated support spaces, fluorescent recessed 1'X4' 2-lamp and 2'X4' 3&4-lamp, waterproof sealed fixtures will be used. In most individual rooms, both an occupancy sensor and switch will be used to control the lights. Corridor lighting and larger open areas will be tied to the lighting control system, with local switches for control.

In vivarium areas (second floor vivarium wing), including animal holding rooms, support spaces, surgery spaces, associated corridors, feed storage rooms, and other associated spaces, fluorescent recessed 1'X4' 2&3-lamp and 2'X4' 3&4-lamp, waterproof sealed fixtures will be used. For animal holdrooms and breeding areas, the lights shall have a high white, low white, and red light level illumination with associated controls that allow for the different lighting modes. The controls for lighting shall be handled using the Edstrom Watchdog system or approved equivalent system. The building management system shall monitor the Watchdog system for information and alarm indication. Lights within animal holding room shall be connected to emergency power.

In the bio-level 3 containment areas, 1'X4' 2&3-lamp and 2'X4' 3 & 4-lamp, surface mounted fixtures that are rated for bio-level 3 areas shall be used. As with the vivarium, the same Watchdog system will be used to control lighting.

Mechanical and control spaces will have 4' channel, fluorescent strip lights with wire guards.

Lobby areas specifically in the north lab wing will employ more decorative fluorescent lighting such as linear recess lights and some wall sconces.

Vapor-tight, surface-mounted fluorescent fixtures will be used in all walk-in coolers and freezers.

Exterior Lighting:

All exterior lighting will be designed to meet IESNA RP-33-99 guide lines. A full cut-off metal halide wall mounted light fixture will be used at all entrances and exits in the building. These fixtures will be controlled by a lighting control system to run during the night and to be shut off during daytime hours. These fixtures will be specified with a quartz re-strike component and tied to the emergency system to allow the fixture to be used for the emergency egress lighting that is required at all entrances and exits. Minimal up-lighting will be used on the building in order to meet LEED requirements.

ELECTRICAL SERVICE AND DISTRIBUTION (NORMAL POWER):

277/480 Volt Electrical Service and Distribution:

The main service disconnect for the 277/480 volt service will be located in the screened enclosure that will be located west of the building, as described earlier in the Basis of Design. This service will be used to provide power primarily to building lighting, mechanical systems, and some of the larger lab equipment. The size of the main service disconnect will be 3,000 amps based on the following calculation:

Lighting load	3.5 watts/square foot
Mechanical load	15.0 watts/square foot
Large lab equipment	5.0 watts/square foot
Total Load	23.5 watts/square

A 3,000 amp branch feeder will extend from the CT/MS1 cabinet in the west enclosure to the 277/480 volt, free standing main distribution panel 'HMDP' located in the main electrical room on level 1 of the building. A power multi-meter that meets USU requirements will be provided with this switchgear. There will be one (1) 225 amp lighting panel on each level of the building. Motor control centers will be provided as necessary to provide power to typical motor loads and other mechanical equipment. The motor control centers will be located within mechanical spaces. The four (4) elevators found in the building will also receive power from 'HMDP'. A Bussman-type elevator switch will be used for the disconnecting means at each elevator equipment room. The tunnel washers and large autoclaves will also be fed from this service.

120/208 Volt Electrical Service and Distribution:

The main service disconnect for the 120/208 volt service will also be located in the screened enclosure that will be located west of the building, as described in the power utilities section of this narrative. This service will be used to provide power to general convenience outlets, in addition to the lab and office equipment. The size of the main service disconnect will be 2,500 amps based on the following calculation:

General convenience outlet load	1.0 watt/square foot
Lab equipment load	10.0 watts/square foot
Total Load	11.0 watts/square foot

A 2,500 amp branch feeder will extend from the CT/MS2 cabinet in the west screened enclosure to the 120/208 volt, free standing main distribution panel 'LMDP' located in the main electrical room on level 1 of the building. A power multi-meter that meets USU requirements will be provided with this switchgear. This main distribution panel will provide power to individual lighting and appliance panelboards on level one and distribution panels on the other two (2) levels of the building which then feed lighting and appliance panelboards. Branch panelboards will be located at various locations throughout the building mainly in electrical rooms and corridors. There will be approximately six(6) electrical panels per each level and wing. Every two (2) panels will cover 1/3 of the wing. Isolated grounding will be provided for some of these panelboards to feed computers and other electronic equipment.

Transient voltage surge suppressors will be provided for all 120/208 volt and 277/480 volt main distribution switchboards and for branch panelboards that supply power to computer and other sensitive electronic equipment.

ELECTRICAL SERVICE AND DISTRIBUTION (EMERGENCY POWER):

An emergency generator with an under-skid mounted fuel tank will be provided and located in the screened enclosure at the west of the site as described earlier. The sizing of the generator is currently based on taking one half of the total building load. As more load information is determined, the size of the generator will be dialed in. The generator will be sized to include 25% spare capacity. The fuel tank will be sized for 48 hours of back-up at full load.

Loads Connected to the Building Generator

1. Life safety loads (egress lights, fire alarm, etc.)
2. All animal hold rooms and support spaces
3. All loads within the Bio-level 3 suite.
4. Required mechanical systems associated with the vivarium
5. Required mechanical systems associated with the Bio-level 3 suite
6. 60 to 75% of the supply and exhaust systems for the laboratory wing
7. Fume hood airflow monitor/audible-visual alarm.
8. Dedicated exhaust from radio-chemical fume hoods.
9. Select outlets in the lab and lab support spaces
10. All refrigerators and freezers
11. Mechanical control systems (ATC)
12. Telephone rooms.

Total building load:	3,623 KVA.
½ Building load:	1,811 KVA.
Preliminary generator size:	1500 - 1750 KW

The generator will feed a free standing, 3,000 amp emergency distribution panel 'EMDP' which will be located in the main electrical room. The 'EMDP' will be provided with four (4) fused switches that will feed the following branches:

1. Life Safety
2. Legally Required Standby
3. Optional Standby (277/480 volt)
4. Optional Standby (120/208 volt)

Based on the branches described above, there will be a total of four (4) automatic transfer switches located in the main electrical room that will feed emergency and standby electrical distribution throughout the building. On each level of the building, there will be approximately six (6) electrical panelboards tied to the optional Standby (120/208 volt) branch to feed lab equipment. There will be three (3) electrical panelboards, one per level that will be tied to the Optional Standby (277/480 volt) branch. This will be used to feed mostly lighting for the vivarium areas and other support areas. Additionally, the emergency distribution system will be designed to allow for a portable generator to be temporarily connected to the system in the event that the primary generator is not functioning. Approved generator manufacturers:

- Kohler
- Caterpiller
- Onan

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PROJECT DESCRIPTION

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UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

ELECTRICAL BASIS OF DESIGN

REVISIONS

MARK	DATE	DESCRIPTION

ISSUE DATA

ISSUE DATE:	DEC. 9, 2008
ISSUE TYPE:	DESDEV
DRAWN BY:	J. HARWARD
CHECKED BY:	D. WHITTON

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SHEET NUMBER:

EG001

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BUILDING POWER:

All conductors will be copper. Conductors will be sized to prevent voltage drop exceeding 3% at the farthest point with 80% of circuit breaker demand load (duplex outlets, equipment, etc.) The total voltage drop on both feeders and branch circuits will not exceed 5%.

All conductors will be installed in conduit. The minimum size that will be used is ¾". MC cable will not be used; manufactured flex whips will be used for wiring of light fixtures. Normal power and emergency power will be run in separate conduit systems as required by the NEC.

There are a total of three (3) electrical rooms that are located central to the building (Knuckle). Electrical rooms have been stacked on top of each other (floor to floor) to reduce the length of feeder runs and to allow for easy accessibility and conveyance.

Mechanical equipment requiring variable frequency drives (VFDs) will comply with DFCM and USU standards. The following manufactures are approved:

Energy Management Corporation (Mitsubishi)
Long Building Environments (Yaskawa)
Midgley-Huber (ABB)
TMS (Danfoss)

Starters for fans and pumps shall have hand-off auto switches.

A small UPS (50KVA) system will be provided to supply UPS power to the computer room and the telephone rooms.

A lightning and grounding system will be provided for the building. Ground bars will be located in all electrical and communication rooms. A counterpoise ground system will be part of the lightning protection system. Every other column shall be connected to the grounding system. A ground bus shall be provided in each wet lab. All building electrical services will be connected to the building wide grounding and lightning protection system.

Power Quality

A fault current and breaker coordination study shall be performed to indicate the available fault current at all points in the distribution system. New switchboards, panelboards, etc. will be adequately rated for the available fault current. Fuses and circuit breakers will be selected to ensure minimum system power outages due to overloads and faults. Circuit breakers with adjustable long time, short time, instantaneous and/or ground fault setting will be set at levels for optimum system coordination. This work will be provided by the electrical contractor on the project.

Fluorescent light fixtures and electronic equipment (such as computers, electronic lab equipment, and VFDs) produce harmonic currents that may have an influence on system operation. In order to mitigate these currents, fluorescent ballasts will be specified with a THD <10%. Distribution equipment that feeds computer equipment will be supplied with 200% neutrals. VFDs will be specified with input filters to ensure that harmonic currents will not get back into the system.

Receptacle Requirements

The location and number of outlets will be coordinated for each space, with the needs of the users in mind. The following is a guide to the type of outlets that will be provided:

Offices: For all individual offices, two (2) outlets will be installed for computer use, with additional outlets installed for every 6' of wall space. For open office areas, power will be provided for systems furniture.

Countertops (in general): One outlet for every 4' of counter space.

Conference rooms: One outlet for every 6' of wall space. A dedicated outlet will be provided for computer terminal. A floor box or poke-through device will be provided under the table.

Large wet labs: For fixed lab benches, wiremold raceway, with outlets spaced 2' O.C., will be provided For movable lab benches, power connections, in the ceiling, that can connect to the movable, prewired lab benches that will be prewired will be provided. Both normal and standby power will be provided in the labs.

Lab support spaces: Outlets to meet the users' needs and surface wiremold, where required.

Corridors/Hallways/Stairs/Lobbies: One outlet every 25' along corridors. One duplex at each stairway landing, and one duplex outlet every 6' on alternating sides of the lobby.

Electrical/Mechanical: One outlet on normal power and one outlet on emergency power for all electrical rooms and mechanical spaces. Additional outlets will be installed in large mechanical areas.

Communication room: One outlet on normal power. Multiple outlets on UPS/emergency power, as needed, to support the required equipment located in the communications room.

Bio-containment Suites: Outlets will be provided as required by the user. All outlets shall be installed with wash-down, weather-proof in-use covers.

FIRE ALARM SYSTEM:
A building-wide addressable fire alarm system will be supplied. The manufacture of the system will be Notifier, which is USU's campus standard. This system will be networked to the campus system to allow for remote monitoring. The main fire alarm panel will be located in the main electrical room, with a remote annunciator panel located near the main entrance to the building. A minimum of two (2) notification appliance circuit panelboards (NACs) will be located on each level in the electrical rooms to provide power for horn/strobes on those levels. Style D initiating circuits, Style Z notification circuits, and Style 6 and 7 signaling line circuits shall be used. All conduits used for the system shall be colored red.
Horn/Strobes will be provided for all public spaces, including corridors, meeting rooms, break rooms, restrooms, large open office areas, large lab spaces, large mechanical spaces, and library spaces. Weatherproof horns will also be provided at all entrances into the building.
Smoke detectors will be provided in all egress corridors, elevator lobbies for capture and recall, elevator machine rooms, and control spaces. Heat detectors will be located in all mechanical spaces, elevator shaft, elevator machine room, kitchens and break rooms.
Pull stations will be provided at all exits from the building and all stair exits on upper floors. Pull stations shall also be provide at exits from mechanical spaces.

COMMUNICATION/DATA SYSTEM:
Each level of the building has one (1) communication room (MDF & IDF rooms). The rooms are stacked and located central to the building. Four (4) 4" conduit sleeves are provided between levels for conveyance of communication/data cabling. On each level, an 18" wide x 4" deep flex tray style, cable tray shall be provided down the main corridors for conveyance of communication/data cables from the work station. In each communication room, Chatsworth ladder rack will ring the room for data cabling support. Two (2) empty data racks will be provided in each telephone room. USU's information technology division will provide all data cabling, fiber optic cable, patch panels, head-end equipment, work station device, and all terminations. However, the cost for this work shall be included within the projects total budget.
A computer room will be provided on the main level for use by the users and their data storage needs. This room will be provided with UPS power. The UPS system will also be located within this room.

All communication/data cabling will run in conduit and or cable tray. All conduits that extend to the cable tray shall be physically secured to the cable tray. The cable tray shall be properly grounded per NEC and EIA/TIA standards. The length of the communication/data cables, based on the location of the communication rooms, shall be kept to under 300 feet in length. Two (2) Cat 6 communication/data cables will be ran to each work station.

Communication outlets will be provided at various locations throughout the building to allow for a wireless network. The wireless system is based on power over Ethernet and therefore, no power is required at those locations.

ACCESS CONTROL SYSTEM

An access control system will be provided for the building to limit access both to the main entrance, and locations within, the building. Doors requiring card access will be closely coordinated with the users and USU. The manufacturer of the access control system will be TAC, which is USU's standard. The head end equipment for this system will be located in the computer server room and will be wall mounted.

For access into the vivarium wing and bio-containment suite, a biometric reader will be used. Once inside the vivarium wing, card readers with key pads will be used. The keypads within the vivarium and bio-containment suite will be part of the Watchdog system.

CCTV SYSTEM:

A closed circuit television system will be provided for the building for enhanced security. Location of cameras will be closely coordinated with the users and USU. The manufacturer of the system may be Pelco or equivalent and the system shall utilize power over Ethernet technoloby. The head end equipment for this system will be located in the computer server room and will be rack mounted. As a minimum, cameras will be provided at all entrances/exits to the building, lobbies, entrance and exits from the vivarium wing, docks, bio-containment suites and entrance and exits from the bio-containment suite. Cameras will also be located outside the building to watch the building site and surrounding areas. Control and viewing equipment will be supplied in the security office in the main building lobby. USU will provide a cost for this work and should be included in the Project's total budget. USU isn't the only group that can provide the camera system.

AUDIO/VISUAL SYSTEM:

In each of the four (4) smaller conference rooms, a lighting control system will be provided to control lights, motorized shades and overhead projection screens. This system will connect to a Crestron process which will interface the system with the overhead projector. Four (4) sound system speakers will be provide to provide sound amplification. For these rooms, USU will provide all overhead projectors, Plasma screens, Crestron processors, amplifier for sound, all head-end equipment and associated wiring and cables. All lighting control, shade control, overhead screen and control shall be provided by the contractor. All equipment and labor provided by USU shall be include in the projects total budget.

The small conference room on the 2nd level south side shall include all systems listed above and in addition, include video/conferencing equipment. This equipment will be provided by USU.

The two (2) large conference rooms on the main level will include audio/visual system typical to the four (4) smaller conference rooms listed above. However, only one process will be provided and the system shall function as two independent systems when the movable partition is closed and or one system when to movable partition is open.

LEED

Sustainable Sites - Credit 8. Light Pollution (1 point available):

Under this strategy, interior lighting shall be located so that the maximum candela from each fixture does not exit through the windows. Furthermore, all non-emergency interior light fixtures shall turn off during non-business hours, with manual override. As part of this strategy, the long axis of the light fixture shall be oriented perpendicular to the window. This point is achievable.

Exterior area, landscaping, and building lighting should be selected and employed so as not to exceed 80% of the lighting power densities for the exterior area and 50% for the building facades and landscaping features, as defined in ASHRAE/IESNA Standard 90.1-2004.

Energy & Atmosphere - Prereq. 1. Fundamental Building System Commissioning (Requirement):

The electrical systems of the building shall be commissioned to ensure that the systems are operating and performing as designed. This will be done by the commissioning agent.

Energy & Atmosphere - Prereq. 2. Minimum Energy Performance (Requirement):

The electrical systems shall comply with the minimum requirements of ASHRAE 90.1-2004. The electrical systems will be designed to meet the minimum energy performance.

Energy & Atmosphere - Credit 1. Optimize Energy Performance (1 to 10 points are available):

By using lighting control systems, occupancy sensors, dimming, the amount of electrical energy usage can be reduced. Dimming of light fixtures can also help reduce the overall heating load into the building so that energy used by the mechanical systems will also be reduced. A lighting control system will be used to help decrease to building energy usage. Coordination will take place with the mechanical engineer to determine what the total energy reduction is for the building.

Energy & Atmosphere - Credit 2. On-site Renewable Energy (1 to 3 points are available):

Under this strategy, the use of alternative energy sources should be explored. There are several technologies available, including wind, photovoltaic, hydro, wave, tidal, and bio-fuel based electrical production systems. Although these systems can be cost prohibitive, they should be considered, as one or more may be required in order to achieve the goal of LEED Gold certification. The use of one or more of these technologies may, in fact, enhance the acceptance and use of this facility. The use of photovoltaic cells integrated into the building glazing system is becoming more and more popular and can really enhances and define a building. This credit is the responsibility of the building owner.

Energy & Atmosphere - Credit 5. Measurement & Verification (1 point available):

This credit provided for ongoing accountability and optimization of building energy and water consumption performance over time. Caution should be taken when pursuing this credit. If the measured energy and water consumptions fall short of the expected goad, changes to building system may be required to bring those systems into compliance. Lighting control systems are available with provisions to allow for energy measurements. If this credit is pursued, systems of that type should be considered.

Energy & Atmosphere - Credit 6. Green Power (1 point available):

Encourage the development and use of grid-source energy technologies on a net-zero pollution basis, 35% of the building's "regulated" electricity for two years. Rocky Mountain Power's Blue Sky program offers wind power at a relatively low cost of $.0195/kWh above the standard rate. Although this is related to the electrical systems of the building, the owner DFCM/USU will need to determine whether this is something they want to pursue. This credit is the responsibility of the building owner.

Indoor Environmental Quality - Credit 6.1. Controllability of Systems (1 point available):

Provide lighting controls for 90% of occupants and controllability for all shared spaces that meets group needs or preferences both for perimeter spaces as well as non-perimeter spaces. This point is achievable.

DFCM - High Performance Building Standard (Relevant to the electrical design)

1. Design and Technology Charrette - Shielded or reduced parking and façade lighting to reduce night sky pollution will be discussed. This is a requirement that will be done.
3. Life-Cycle Cost Analysis - Under this requirement, photovotaics may be considered and the life cycle cost for that system would be calculated.
8. Fundamental Lighting Design - The lighting systems of the project will be design based on the IESNA Lighting Handbook.
12. Energy Performance - energy efficiency measures will be described and calculations made. Energy efficiency measures as they pertain to electrical would include lighting control system, lighting products such as high efficient fixtures, lamp and ballast combinations, etc.
28. System Performance Monitoring - measurement equipment will be specified to allow measurement and verification of lighting control systems, variable speed drive operation, motor loads >20 hp, Process loads.

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PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

ELECTRICAL BASIS OF DESIGN

REVISIONS

MARK	DATE	DESCRIPTION

ISSUE DATA

ISSUE DATE:	DEC. 9, 2008
ISSUE TYPE:	DESDEV
DRAWN BY:	J. HARWARD
CHECKED BY:	D. WHITTON

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EG002

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WIRING DEVICE SYMBOLS

SYMBOL	DESCRIPTION	MOUNTING	REMARKS
$	SINGLE-POLE TOGGLE SWITCH	+48"	
$^{\alpha}	SINGLE-POLE TOGGLE SWITCH	+48"	SUBSCRIPT KEYS SWITCH TO FIXTURES CONTROLLED.
$2	DOUBLE-POLE TOGGLE SWITCH	+48"	
$3	THREE-WAY TOGGLE SWITCH	+48"	
$4	FOUR-WAY TOGGLE SWITCH	+48"	
$K	KEY-OPERATED SINGLE-POLE TOGGLE SWITCH	+48"	
$P	SINGLE-POLE TOGGLE SWITCH WITH PILOT LIGHT	+48"	
$DIM	DIMMER SWITCH	+48"	RATE DIMMER SWITCH FOR MAXIMUM POSSIBLE WATTAGE
$TIM	TIMER SWITCH	+48"	
$$	(2) SINGLE-POLE TOGGLE SWITCH	+48"	DUAL LEVEL SWITCH OUTBOARD LAMPS SEPARATELY FROM INBOARD LAMPS.
$LV	LOW VOLTAGE MOMENTARY CONTACT SWITCH	+48"	
$3PM	3-POSITION MOMENTARY CONTACT SWITCH	+48"	REFER TO DETAIL UP-ON; CENTER-NEUTRAL; DOWN-OFF
$3PN	3-POSITION MAINTAINED CONTACT SWITCH	+48"	UP-ON; CENTER-OFF; DOWN-ON
OCM	OCCUPANCY SENSOR	AS NOTED	CEILING MOUNTED WITH SUBSCRIPT 'C'; WALL-MOUNTED WITH SUBSCRIPT 'W'
	SPLIT-WIRED DUPLEX RECEPTACLE	+18"	
	SIMPLEX RECEPTACLE	+18"	
	DUPLEX RECEPTACLE	+18"	
	FOURPLEX RECEPTACLE	+18"	
	125/250V RECEPTACLE	+18"	RANGE -- NEMA 14-50R DRYER -- NEMA 14-30R
	GROUND FAULT CIRCUIT INTERRUPTER DUPLEX RECEPTACLE	+18"	
	GROUND FAULT CIRCUIT INTERRUPTER FOURPLEX RECEPTACLE	+18"	
	EMERGENCY DUPLEX RECEPTACLE	+18"	
	EMERGENCY FOURPLEX RECEPTACLE	+18"	
	MULTI-OUTLET ASSEMBLY	4" ABOVE BACKSPLASH	
	POWER / TELEPHONE POLE	FLOOR/CEILING	
	CORD DROP WITH DUPLEX RECEPTACLE	+18"	REFER TO DETAIL
(5-20R)	SPECIAL PURPOSE OUTLET	+18"	SUBSCRIPT IN PARENTHESIS INDICATES NEMA CONFIGURATION IF SHOWN. REFER TO DRAWINGS AND/OR EQUIPMENT SCHEDULES. CONFIRM EXACT CONFIGURATION WITH OWNER PRIOR TO INSTALLATION.

GEAR AND CONTROL SYMBOLS

SYMBOL	DESCRIPTION	MOUNTING	REMARKS
$T	MANUAL STARTER WITH THERMAL OVERLOAD(S)	AT EQUIPMENT	
	ELECTRIC MOTOR		
	NON-FUSED DISCONNECT SWITCH	+60"	
	FUSED DISCONNECT SWITCH	+60"	
	CIRCUIT BREAKER AND ENCLOSURE	+60"	
	MAGNETIC STARTER	+60"	
	COMBINATION MAGNETIC STARTER / NON-FUSED DISCONNECT	+60"	
	COMBINATION MAGNETIC STARTER / FUSED DISCONNECT	+60"	
	COMB. MAGNETIC STARTER / MOTOR CIRCUIT PROTECTOR (MCP)	+60"	
VFD	COMB. VARIABLE FREQUENCY DRIVE / MOTOR CIRCUIT PROTECTOR (MCP)	FLOOR OR WALL AS SPECIFIED	TOP AT +72" IF WALL MOUNTED
RVS	REDUCED VOLTAGE STARTER	FLOOR OR WALL AS SPECIFIED	TOP AT +72" IF WALL MOUNTED
	LOAD CENTER (SURFACE-MOUNTED)	TOP AT +72"	14"H X 3"D
	LOAD CENTER (FLUSH-MOUNTED)	TOP AT +72"	14"H X 3"D
	LIGHTING AND APPLIANCE PANELBOARD (SURFACE-MOUNTED)	TOP AT +72"	20"H X 6"D
	LIGHTING AND APPLIANCE PANELBOARD (FLUSH-MOUNTED)	TOP AT +72"	20"H X 6"D
	POWER DISTRIBUTION PANELBOARD	WALL	THESE SYMBOLS ARE GENERAL IN NATURE AND MAY VARY IN SIZE AND SHAPE TO SUIT APPLICATION.
	SWITCHBOARD	FLOOR	CROSS HATCHING INDICATES "MAIN PANELBOARD OR SWITCHBOARD" NAME IS INDICATED IN SEMI-QUOTES (I.E. "L2A", "MDP")
	METER BASE	TOP AT +72"	
	OPEN - STOP - CLOSE SWITCH	+60"	FURNISH SWITCH UNLESS FURNISHED BY ANOTHER DIVISION. INSTALL AND CONNECT COMPLETE. REFER TO RELATED SPECIFICATION SECTIONS.
T	HVAC THERMOSTAT	+60"	PROVIDED BY DIVISION 15000 U.N.O.
	HAND - OFF - AUTO SWITCH	+60"	
GFP	GROUND FAULT PROTECTION		

LIGHTNING PROTECTION SYMBOLS

SYMBOL	DESCRIPTION	MOUNTING	REMARKS
	UNIVERSAL AIR TERMINAL		
	MECHANICAL TYPE CABLE TO CABLE CONNECTION		
	EXOTHERMIC TYPE CABLE TO CABLE CONNECTION		
	EXOTHERMIC TYPE CABLE TO GROUND ROD CONNECTION		
	BOND TO TYPICAL BODY OF INDUCTANCE		
TR	THRU-ROOF PENETRATION		

CLOSED CIRCUIT TELEVISION SYMBOLS

SYMBOL	DESCRIPTION	MOUNTING	REMARKS
FX	CLOSED CIRCUIT TELEVISION CAMERA (FIXED)	CEILING	
PTZ	CLOSED CIRCUIT TELEVISION CAMERA (PAN/TILT/ZOOM)	CEILING	
PTZ	CLOSED CIRCUIT TELEVISION CAMERA (HIGH SPEED DOME WITH PAN / TILT / ZOOM HEAD)	CEILING	
TV	CLOSED CIRCUIT TELEVISION MONITOR	DESK	
MATRIX	MATRIX SWITCHER	DESK	
FJ	FIBER JUNCTION BOX	72" TO TOP OF BOX	

LIGHTING SYMBOLS

1. LIGHT FIXTURE SYMBOLS ARE GENERAL IN NATURE AND MAY BE SHOWN ON THE DRAWINGS IN VARIOUS SIZES AND SHAPES. REFER TO THE LIGHT FIXTURE SCHEDULE FOR SPECIFICATION INFORMATION.
2. ARROWS INDICATE AIMING DIRECTION.

SYMBOL	DESCRIPTION	MOUNTING	REMARKS
	ARM-MOUNTED SINGLE-HEAD LIGHT FIXTURE AND POLE	AS SPECIFIED OR DETAILED	
	ARM-MOUNTED DOUBLE-HEAD LIGHT FIXTURE AND POLE	AS SPECIFIED OR DETAILED	
	POST-TOP SINGLE-HEAD, LIGHT FIXTURE AND POLE	AS SPECIFIED OR DETAILED	
	WALL-MOUNTED FIXTURE	AS SPECIFIED OR DETAILED	REFER TO ARCHITECTURAL EXTERIOR ELEVATIONS FOR MOUNTING HEIGHT
	LIGHT BOLLARD	AS SPECIFIED OR DETAILED	
	FLOOD LIGHT	AS SPECIFIED OR DETAILED	
	RECESSED WALL FIXTURE OR STEP LIGHT	AS SPECIFIED OR DETAILED	REFER TO ARCHITECTURAL EXTERIOR ELEVATIONS FOR MOUNTING HEIGHT
	FLUORESCENT LIGHT FIXTURES	AS SPECIFIED OR DETAILED	
	PARABOLIC - LOUVERED LIGHT FIXTURES	AS SPECIFIED OR DETAILED	
	RECESSED INDIRECT FLUORESCENT LIGHT FIXTURES	AS SPECIFIED OR DETAILED	
	WALL-MOUNTED LINEAR FLUORESCENT LIGHT FIXTURE	AS SPECIFIED OR DETAILED	
	FLUORESCENT LINEAR WALL WASHER	AS SPECIFIED OR DETAILED	
	RECESSED DOWN LIGHT	AS SPECIFIED OR DETAILED	
	RECESSED WALL-WASHER OR DIRECTIONAL DOWNLIGHT	AS SPECIFIED OR DETAILED	IF SHOWN, ARROW INDICATES AIMING DIRECTION
	SURFACE OR PENDANT-MOUNTED LIGHT FIXTURE	AS SPECIFIED OR DETAILED	
	WALL-MOUNTED LIGHT FIXTURE	AS SPECIFIED OR DETAILED	REFER TO ARCHITECTURAL EXTERIOR ELEVATIONS FOR MOUNTING HEIGHT
	TRACK OR MONO-POINT LIGHT FIXTURE	AS SPECIFIED OR DETAILED	IF SHOWN, ARROW INDICATES AIMING DIRECTION
	WALL SCONCE	AS SPECIFIED OR DETAILED	
	FLUORESCENT EGRESS LIGHT FIXTURE	AS SPECIFIED OR DETAILED	THIS IS AN EXAMPLE OF AN EGRESS LIGHT FIXTURE. EGRESS LIGHT FIXTURES ARE HALF-SHADED DIAGONALLY.
	FLUORESCENT EMERGENCY (NON-EGRESS) LIGHT FIXTURE	AS SPECIFIED OR DETAILED	THIS IN AN EXAMPLE OF AN EMERGENCY (NON-EGRESS) LIGHT FIXTURE. EMERGENCY FIXTURES ARE FULLY-SHADED.
	CEILING MOUNTED EXIT SIGN	CEILING	DARKENED PORTION OF SIGN INDICATES FACE(S); ARROW(S) INDICATE CHEVRON DIRECTION(S)
	WALL-MOUNTED EXIT SIGN	WALL ABOVE DOOR	
	WALL-MOUNTED EXIT SIGN W/ EMERGENCY LIGHT FIXTURE	WALL ABOVE DOOR	
TC	TIME CLOCK		
	EMERGENCY LIGHT FIXTURE	AS NOTED	
P	ELECTRIC PHOTOCELL	N/A	MOUNT ON ROOF FACING NORTH SKY
XX	LIGHT FIXTURE CALLOUT (LETTER DENOTES FIXTURE TYPE)		

SIGNAL BELL SYMBOLS

SYMBOL	DESCRIPTION	MOUNTING	REMARKS
B	BELL/CHIME	+90"	
	BUZZER	+90"	
	SIGNAL BELL PUSH BUTTON	+48"	

TELEVISION SYSTEM SYMBOLS

SYMBOL	DESCRIPTION	MOUNTING	REMARKS
	TELEVISION OUTLET	+18"	
	ANTENNA	ROOF	

ACCESS CONTROL SYMBOLS

SYMBOL	DESCRIPTION	MOUNTING	REMARKS
REX	REQUEST-TO-EXIT MOTION DETECTOR	CEILING	
	ELECTROMAGNETIC DOOR STRIKE	DOOR	
	MAGNETIC DOOR CONTACT SWITCH	DOOR	
	MAGNETIC LOCK	DOOR	
K	KEYPAD	+48"	
PK	PROXIMITY CARD READER / KEYPAD	+48"	
MK	MAGNETIC STRIP CARD READER / KEYPAD	+48"	
PR	PROXIMITY CARD READER	+48"	
MR	MAGNETIC STRIP CARD READER	+48"	

ELECTRICAL SYMBOL SCHEDULE GENERAL NOTES

1. MOUNT ALL OUTLETS, DEVICES, AND EQUIPMENT AT HEIGHTS INDICATED BELOW, UNLESS NOTED OTHERWISE ON THE DRAWINGS. UNLESS NOTED OTHERWISE, HEIGHTS ARE GIVEN FROM FINISHED FLOOR TO CENTER OF OUTLET BOX.
2. WHERE OUTLETS, DEVICES, AND EQUIPMENT ARE NOTED BY SUBSCRIPTS, REFER TO ABBREVIATION SCHEDULE FOR DEFINED REQUIREMENTS.
3. WHERE OUTLETS, DEVICES AND EQUIPMENT ARE NOTED BY THE SUBSCRIPT 'A', MOUNT AT 4" ABOVE COUNTER. IF COUNTER HAS A BACK SPLASH, MOUNT AT 4" ABOVE BACK SPLASH. REFER TO ARCHITECTURAL INTERIOR ELEVATIONS AND COORDINATE WITH CASEWORK SUPPLIER.
4. NOT ALL ELECTRICAL SYMBOLS MAY BE USED.

GENERAL SYMBOLS

SYMBOL	DESCRIPTION	REMARKS
XX	KEYED NOTE	
1 E-1	DETAIL REFERENCE	TOP NUMBER INDICATES DETAIL NUMBER; BOTTOM LETTER-NUMBER INDICATES DRAWING SHEET WHERE DETAIL IS SHOWN; WHERE NOT SPECIFICALLY REFERENCED, DETAIL IS GENERAL IN NATURE AND SHALL APPLY WHERE APPLICABLE.
2 E-2	ELEVATION REFERENCE	TOP NUMBER INDICATES ELEVATION NUMBER; BOTTOM LETTER-NUMBER INDICATES WHERE ELEVATION IS SHOWN.
3 E-3	SECTION REFERENCE	TOP NUMBER INDICATES SECTION NUMBER; BOTTOM LETTER NUMBER INDICATES WHERE SECTION IS SHOWN.
100	ARCHITECTURAL ROOM NUMBER	
AHU 1	EQUIPMENT NAME / NUMBER	TOP NUMBER ABBREVIATES EQUIPMENT NAME OR TYPE; BOTTOM NUMBER INDICATES EQUIPMENT NUMBER. REFER TO EQUIPMENT SCHEDULE.
1	REVISION NUMBER	USED TO DENOTE CHANGES EITHER ISSUED BY ADDENDUM OR DURING CONSTRUCTION AND TO DENOTE RECORD DRAWING CHANGES.
	BREAKLINE	USED TO BREAK DRAWINGS.

BRANCH CIRCUITING SYMBOLS

SYMBOL	DESCRIPTION	REMARKS
	1 CIRCUIT, 2 WIRE BRANCH CIRCUIT HOME RUN TO PANEL	ARROWS: NUMBER OF ARROWS INDICATES NUMBER OF CIRCUITS REQUIRED. SHORT CROSS LINES: NUMBER OF SHORT CROSS LINES INDICATES NUMBER OF PHASE, TRAVELER, AND/OR SWITCHED CONDUCTORS REQUIRED IF GREATER THAN 1 (ONE). LONG CROSS LINES: NUMBER OF LONG CROSS LINES INDICATES NUMBER OF NEUTRAL CONDUCTORS REQUIRED FOR MULTI-WIRE HOME RUNS. EQUIPMENT GROUND AND ISOLATED GROUND CONDUCTORS: EQUIPMENT GROUND AND ISOLATED GROUND CONDUCTORS ARE NOT SHOWN, BUT ARE REQUIRED AS NOTED ON THE DRAWINGS OR IN THE SPECIFICATIONS.
	2 CIRCUIT, 3 WIRE BRANCH CIRCUIT HOME RUN TO PANEL	
	3 CIRCUIT, 4 WIRE BRANCH CIRCUIT HOME RUN TO PANEL	
	MULTIPLE WIRE BRANCH CIRCUITING BETWEEN FIXTURES, SWITCHES, DEVICES, ETC.	
	BRANCH CIRCUITING (U.N.O.) TURNED UP OR TOWARDS OBSERVER.	
	BRANCH CIRCUITING (U.N.O.) TURNED DOWN OR AWAY FROM OBSERVER.	
	BRANCH CIRCUITING (U.N.O.) CONTINUATION	
	CONDUIT STUB-IN	CAP AND MARK
	INCOMING SERVICE	
J	JUNCTION BOX	MOUNT AS NOTED. SUBSCRIPT 'F' INDICATES TO PROVIDE A FLOOR BOX WITH BLANK COVERPLATE

ELECTRONIC SYSTEM GENERAL SYMBOLS

SYMBOL	DESCRIPTION	MOUNTING	REMARKS
PANEL NAME	ELECTRONIC SYSTEM PANELBOARD (SURFACE MOUNT)	TOP AT 72"	ELECTRONIC SYSTEMS MAY INCLUDE BUT ARE NOT SPECIFICALLY LIMITED TO, TELEPHONE, DATA, TELEVISION, LIGHTING CONTROL, CLOCKS, FIRE ALARM, ACCESS CONTROL, SECURITY, CCTV, SOUND SYSTEM, NURSE CALL, OR INTERCOM.
PANEL NAME	ELECTRONIC SYSTEM PANELBOARD (FLUSH MOUNT)	TOP AT 72"	
	ELECTRONIC SYSTEM TERMINAL BOARD	TOP AT 72"	

TELEPHONE / DATA SYMBOLS

SYMBOL	DESCRIPTION	MOUNTING	REMARKS
	TELEPHONE OUTLET	+18"	
	DATA OUTLET	+18"	
	COMBINATION TELEPHONE/DATA OUTLET	+18"	
	TELEPHONE TERMINAL BOARD	TOP AT 72"	

OCCUPANCY SENSOR SCHEDULE

DEVICE	MOUNTING	DESCRIPTION	MANUFACTURER/MODEL NO.
A	CEILING	180° PATTERN	HUBBELL MYTEC OMNI-DT (OR APPROVED EQUIVALENT)
B	CEILING	360° PATTERN	HUBBELL MYTEC OMNI-DT (OR APPROVED EQUIVALENT)

OCCUPANCY SENSOR NOTES:

1. THE OCCUPANCY SENSOR SUPPLIER SHALL MAKE SURE OCCUPANCY SENSOR THAT IS SUPPLIED IS ADEQUATELY SIZED FOR ROOM SERVED. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

ELECTRICAL SHEET INDEX

EG001-02	ELECTRICAL BASIS OF DESIGN
EG003-04	SYMBOL SCHEDULES
ES101	SITE PLAN
ES102	SITE PHOTOMETRIC PLAN
ES401	SITE ENLARGED PLANS
EL1011A-C	LEVEL 1 LIGHTING PLANS
EL102A-C	LEVEL 2 LIGHTING PLANS
EL103A-C	LEVEL 3 LIGHTING PLANS
EL104B-C	LEVEL 4 LIGHTING PLANS
EL401	LEVEL 2 ENLARGED LIGHTING PLANS
EL501	LIGHTING DETAILS
EL601-602	LIGHT FIXTURE SCHEDULES
EL603-605	LIGHTING SYSTEM RISER DIAGRAMS
EL1101	INTERIOR ENERGY CODE COMCHECK
EP101A-C	LEVEL 1 POWER PLANS
EP102A-C	LEVEL 2 POWER PLANS
EP103A-C	LEVEL 3 POWER PLANS
EP104B-C	LEVEL 4 POWER PLANS
EP106B-C	LEVEL 1 LAB EQUIPMENT POWER PLANS
EP107B-C	LEVEL 2 LAB EQUIPMENT POWER PLANS
EP108B-C	LEVEL 3 LAB EQUIPMENT POWER PLANS
EP109	LEVEL 4 LIGHTNING PROTECTION PLAN
EP110	LEVEL 1 GROUNDING PLAN
EP401	LEVEL 1 ENLARGED POWER PLANS
EP402	LEVEL 1 ENLARGED TELE/DATA PLANS
EP403	LEVEL 2 ENLARGED TELE/DATA PLANS
EP404	LEVEL 2 ENLARGED POWER PLAN
EP405	LEVEL 3 ENLARGED TELE/DATA PLANS
EP501-503	POWER DETAILS
EP601-603	EQUIPMENT SCHEDULES
EP604-605	RISER DIAGRAMS
EP606	ELEVATIONS
EP1101-1106	ONE-LINE DIAGRAMS
EP1107	POWER DETAILS AND SCHEDULES
EY1011A-C	LEVEL 1 AUXILIARY PLANS
EY102A-C	LEVEL 2 AUXILIARY PLANS
EY103A-C	LEVEL 3 AUXILIARY PLANS
EY104B-C	LEVEL 4 AUXILIARY PLANS
EY501-502	AUXILIARY SYSTEMS DETAILS
EY1101	VOICE AND DATA AND FIRE ALARM RISER DIAGRAMS
EY1102	FIBER OPTIC DISTRIBUTION AND CCTV RISER DIAGRAMS

ABBREVIATION SCHEDULE

NOTE: NOT ALL ABBREVIATIONS MAY BE USED.

A	ABOVE COUNTER	ISO	ISOLATED
A	AMP OR AMPS	KVA	KILO VOLT AMPERES
ADJ	ADJACENT	KW	KILOWATTS
AFF	ABOVE FINISHED FLOOR	LFMC	LIQUID-TIGHT METAL CONDUIT
AHJ	AUTHORITY HAVING JURISDICTION	LFNC	LIQUID-TIGHT NONMETAL CONDUIT
AL	ALUMINUM	MCA	MINIMUM CIRCUIT AMPS
C	CONDUIT	MLO	MAIN LUGS ONLY
CB	CIRCUIT BREAKER	N.C.	NORMALLY CLOSED
CKT	CIRCUIT	N.I.C.	NOT IN CONTRACT
C.O.'S	CONVENIENCE OUTLETS	N.L.	NIGHT LIGHT
CU	COPPER	N.O.	NORMALLY OPEN
EA	EACH	O.C.	ON CENTER(S)
ELEC	ELECTRICAL	OCP	OVER CURRENT PROTECTION
EM	EMERGENCY	QTY	QUANTITY
EMT	ELECTRIC METALLIC TUBING	R	REMOVE
ENT	ELECTRIC NONMETALLIC TUBING	REQ.	REQUIREMENTS
EQUIP	EQUIPMENT	RMC	RIGID METAL CONDUIT
EWC	ELECTRIC WATER COOLER	RNC	RIGID NONMETALLIC CONDUIT
E. EX	EXISTING	RR	REMOVE AND RELOCATE
EXP	EXPLOSION PROOF	SS	SURGE SUPPRESSION
FA	FIRE ALARM	SCP	SECURITY CONTROL PANEL
FACP	FIRE ALARM CONTROL PANEL	TR	TAMPER RESISTANT
FLA	FULL LOAD AMPS	TYP	TYPICAL
FMC	FLEXIBLE METAL CONDUIT	TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
FOB	FREIGHT ON BOARD	UF	UNDER FLOOR
GND	GROUND CONDUCTOR	UG	UNDERGROUND
H.O.A.	HAND-OFF-AUTO	U.N.O.	UNLESS NOTED OTHERWISE
HP	HORSE POWER	W/	WITH
IG	ISOLATED GROUND	WP	WEATHER PROOF
IMC	INTERMEDIATE METAL CONDUIT	XFMR	TRANSFORMER
INS	INSULATED		

GENERAL PROJECT NOTES:

1. DIVISION 16000 CONTRACTOR IS RESPONSIBLE FOR READING AND APPLYING WHAT IS IN THE SPECIFICATIONS TO THIS PROJECT. ANYTHING THAT IS NOT INCLUDED ON THE PROJECT THAT IS CALLED OUT IN THE SPECIFICATION SHALL BE LISTED ON THE SUBSTANTIAL COMPLETION PUNCHLIST. THE CONTRACTOR WILL BE REQUIRED TO REMEDY THESE DEFICIENCIES WITHOUT ADDITIONAL COSTS TO OWNER. THERE WILL BE NO EXCEPTIONS.
2. THE CONTRACTOR MAY SCHEDULE A PRE-CONSTRUCTION MEETING , AT THEIR DISCRETION, WITH THE ELECTRICAL ENGINEER TO REVIEW THE DRAWINGS AND SPECIFICATIONS. THE MEETING SHALL BE A MAXIMUM OF ONE HOUR AND SHALL TAKE PLACE AT THE ENGINEER'S OFFICE.
3. THE FOLLOWING ITEMS ARE SOME OF THE REQUIREMENTS THAT ARE LISTED IN THE SPECIFICATIONS. THESE ITEMS ARE NOT ALL INCLUSIVE, AND THE CONTRACTOR IS RESPONSIBLE FOR COMPLIANCE TO ALL REQUIREMENTS OF THE SPECIFICATIONS.
   A. INSULATED THROAT CONNECTORS OR PLASTIC BUSHINGS SHALL BE UTILIZED FOR ALL CONDUIT SIZES USED ON THIS PROJECT.
   B. A #10 AWG NEUTRAL CONDUCTOR WILL BE PROVIDED FOR ALL FLUORESCENT LIGHTING CIRCUITS.
   C. THE CONTRACTOR IS RESPONSIBLE FOR UPSIZING CONDUCTORS FOR VOLTAGE DROP PER THE NEC REGARDLESS OF WHETHER IT IS SHOWN ON THE PLANS OR NOT.
   D. THE CONTRACTOR SHALL LABEL ALL ELECTRICAL EQUIPMENT AS IT IS CALLED OUT IN THE SPECIFICATIONS.
   E. THE CONTRACTOR SHALL PROVIDE SEISMIC SUPPORT AND BRACING FOR ALL LIGHT FIXTURES AND ELECTRICAL EQUIPMENT AS REQUIRED BY APPLICABLE LOCAL AND NATIONAL CODES.
4. THE CONTRACTOR SHALL FOLLOW THE PANELBOARD SCHEDULES AS INDICATED IN THE DRAWINGS. EACH CIRCUIT BREAKER HAS BEEN ASSIGNED TO A SPECIFIC AREA OF THE BUILDING. NO DEVIATION WILL BE ALLOWED WITHOUT WRITTEN APPROVAL FROM THE ELECTRICAL ENGINEER.
5. AT A MINIMUM THE CONTRACTOR SHALL INSTALL THE WIRE SIZE AS CALLED OUT ON THE PANELBOARD SCHEDULES. HOWEVER, THE CONTRACTOR IS RESPONSIBLE TO ENSURE THE WIRE IS SIZED LARGE ENOUGH TO ALLOW FOR VOLTAGE DROP.
6. THE CONTRACTOR SHALL VERIFY ALL MECHANICAL OVERCURRENT DEVICES FOR THE ACTUAL MECHANICAL EQUIPMENT SUPPLIED ON THE JOB, PRIOR TO RELEASE OF ANY ELECTRICAL DISTRIBUTION EQUIPMENT. CONTACT THE ELECTRICAL ENGINEER WITH ANY DISCREPANCIES.
7. THE CONTRACTOR SHALL VISIT THE SITE BEFORE SUBMITTING THE BID, AND SHALL EXAMINE ALL PHYSICAL CONDITIONS WHICH MAY BE MATERIAL TO THE PERFORMANCE OF HIS WORK. NO ADDITIONAL PAYMENTS WILL BE ALLOWED TO THE CONTRACTOR AS A RESULT OF EXTRA WORK MADE NECESSARY BY HIS FAILURE TO DO SO. ANY CASE OF DISCREPANCY OR LACK OF CLARITY SHALL BE PROMPTLY IDENTIFIED TO THE OWNER'S REPRESENTATIVE AND THE ENGINEER FOR CLARIFICATION.

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PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

SYMBOL SCHEDULE

REVISIONS

MARK	DATE	DESCRIPTION

ISSUE DATA

ISSUE DATE:	DEC. 9, 2008
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CHECKED BY:	D. WHITTON

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SHEET NUMBER:

EG003

FLOOR BOX & POKE THRU SYMBOLS

SYMBOL	DESCRIPTION	MOUNTING	REMARKS
	SINGLE-GANG FLOOR BOX WITH DEVICE	FLOOR	DEVICES SHOWN ARE EXAMPLES OF WHAT MAY BE SHOWN ON DRAWINGS. REFER TO WIRING DEVICE SCHEDULE FOR SYMBOL DESCRIPTIONS
	DOUBLE-GANG FLOOR BOX WITH DEVICES	FLOOR	
	TRIPLE-GANG FLOOR BOX WITH DEVICES	FLOOR	
IG	MULTI-SERIVCE FLOOR BOX WITH DEVICES	FLOOR	
	FLUSH MULTI-SERVICE POKE-THRU WITH DUPLEX RECEPTACLE & COMMUNICATIONS PORTS	FLOOR	
	MULTI-SERVICE POKE-THRU WITH FURNITURE FEED CONNECTIONS. (POWER & COMMUNICATIONS)	FLOOR	PROVIDE ELECTRICAL CONNECTIONS TO SYSTEMS FURNITURE. COORDINATE PLACEMENT OF OUTLETS WITH SYSTEM FURNITURE INSTALLER PRIOR TO ROUGH-IN.
P	POKE-THRU WITH FURNITURE FEED CONNECTIONS. (POWER ONLY)	FLOOR	
C	POKE-THRU WITH FURNITURE FEED CONNECTIONS. (COMMUNICATIONS ONLY)	FLOOR	
P	OUTLET BOX WITH FURNITURE FEED CONNECTIONS. (POWER ONLY)	+18"	
C	OUTLET BOX WITH FURNITURE FEED CONNECTIONS. (COMMUNICATIONS ONLY)	+18"	
P	UNDERFLOOR DISTRIBUTION BOX WITH FURNITURE FEED CONNECTIONS. (POWER ONLY)	BELOW RAISED FLOOR	
C	UNDERFLOOR DISTRIBUTION BOX WITH FURNITURE FEED CONNECTIONS. (COMMUNICATIONS ONLY)	BELOW RAISED FLOOR	
	MULTI-SERVICE FLOOR BOX WITH FURNITURE FEED CONNECTIONS	FLOOR	
	POWER POLE WITH FURNITURE FEED CONNECTIONS	FLOOR/CEILING	

FIRE ALARM SYMBOLS

SYMBOL	DESCRIPTION	MOUNTING	REMARKS
BDT	BEAM DETECTOR - TRANSMITTER	4" BELOW CEILING TO TOP OF DETECTOR	
BDR	BEAM DETECTOR - RECEIVER	4" BELOW CEILING TO TOP OF DETECTOR	
EOL	END OF LINE DEVICE	PER MANUFACTURER RECOMMENDATIONS	
T	TAMPER SWITCH	AT VALVE	
F	WATER FLOW INDICATOR	ON FIRE RISER	
FSD	FIRE/SMOKE DAMPER	TOP AT 72"	
H	HEAT DETECTOR	CEILING	
S	SMOKE DETECTOR	CEILING	
S D	DUCT SMOKE DETECTOR	SIDE OF DUCT	
F	FIRE ALARM MANUAL STATION	+48"	
Z	CONTROL MODULE	AT DEVICE(S) TO BE CONTROLLED	
I	MONITOR MODULE	AT DEVICE(S) TO MONITOR	
R	FAN SHUTDOWN RELAY	AT FAN CONTROL PANEL	
D	MAGNETIC DOOR HOLDER	COORDINATE WITH DOOR INSTALLER	COORDINATE WITH DOOR INSTALLER; SUBSCRIPT 'F' INDICATES TO MOUNT AT FLOOR LEVEL
	WATER FLOOD INDICATOR	FLOOR	
	AUDIO HORN	MOUNT AT LESSOR OF EITHER 80" AFF OR 6" BELOW CEILING.	SUBSCRIPT 'WP' INDICATES THAT A WEATHER PROOF BACK BOX IS REQ. SUBSCRIPT 'C' INDICATES CEILING MOUNTING. NUMERIC SUBSCRIPT INDICATES CANDELLA RATING OF STROBE (I.E. - 15, 75, 110)
	MINI AUDIO HORN		
	FIRE ALARM VISUAL STROBE		
	FIRE ALARM AUDIO/VISUAL HORN/STROBE		
	MINI AUDIO/VISUAL HORN/STROBE		
	FIRE ALARM AUDIO SPEAKER		
	FIRE ALARM AUDIO/VISUAL SPEAKER/STROBE		
	CEILING MOUNTED HORN / STROBE	CEILING	
	FIRE PROTECTION SPRINKLER RISER BELL	+90"	FURNISHED BY FIRE PROTECTION CONTRACTOR AND INSTALLED AND CONNECTED BY DIV. 16000

SECURITY SYMBOLS

SYMBOL	DESCRIPTION	MOUNTING	REMARKS
MD	MOTION DETECTOR	CEILING	SUBSCRIPT DENOTES DEGREES OF MONITORED AREA
D	DURESS PUSH-BUTTON	BELOW DESK	
OHS	OVERHEAD MAGNETIC CONTACT DOOR SWITCH	DOOR	
D	MAGNETIC CONTACT DOOR SWITCH	DOOR	
G	GLASS BREAK DETECTOR	CEILING	
S	SIREN	+90"	

SOUND SYSTEM SYMBOLS

SYMBOL	DESCRIPTION	MOUNTING	REMARKS
	RECESSED SPEAKER	CEILING	IF SHOWN, SUBSCRIPT INDICATES TYPE.
	SURFACE-MOUNTED SPEAKER	CEILING	
	WALL-MOUNTED SPEAKER	+90"	
SM	SENSING MICROPHONE	CEILING	
V	VOLUME CONTROL SWITCH	+48"	
	SOUND SYSTEM EQUIPMENT CABINET	+72" TO TOP OF CABINET	
M	MICROPHONE OUTLET	+18"	SUBSCRIPT 'F' INDICATES TO MOUNT OUTLET IN FLOOR BOX
PANEL NAME	SOUND SYSTEM CABINET (WALL MOUNT)	TOP AT 72"	

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PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

SYMBOL SCHEDULE

REVISIONS

MARK	DATE	DESCRIPTION

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EG004

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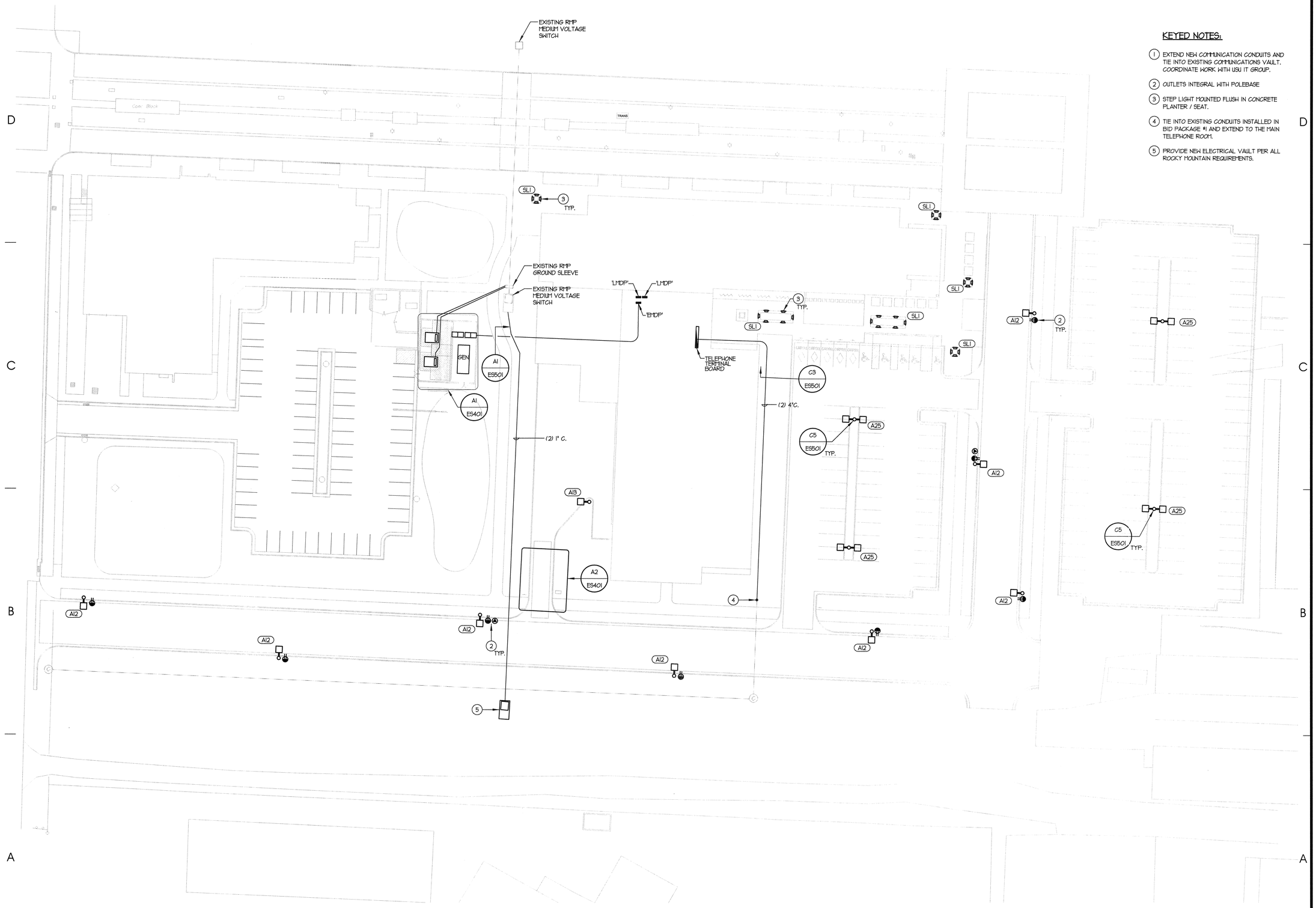

KEYED NOTES:

1. EXTEND NEW COMMUNICATION CONDUITS AND TIE INTO EXISTING COMMUNICATIONS VAULT. COORDINATE WORK WITH USU IT GROUP.
2. OUTLETS INTEGRAL WITH POLEBASE
3. STEP LIGHT MOUNTED FLUSH IN CONCRETE PLANTER / SEAT.
4. TIE INTO EXISTING CONDUITS INSTALLED IN BID PACKAGE #1 AND EXTEND TO THE MAIN TELEPHONE ROOM.
5. PROVIDE NEW ELECTRICAL VAULT PER ALL ROCKY MOUNTAIN REQUIREMENTS.

PLAN
n
30' 0' 30'
scale = 1" = 30'-0"

ELECTRICAL SITE PLAN A4 ES101

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ELECTRICAL SITE PLAN

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ES101

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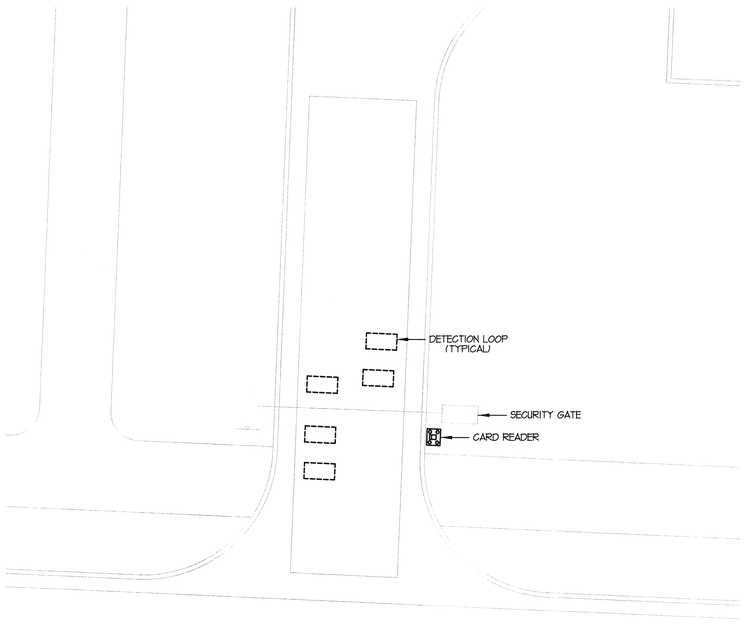
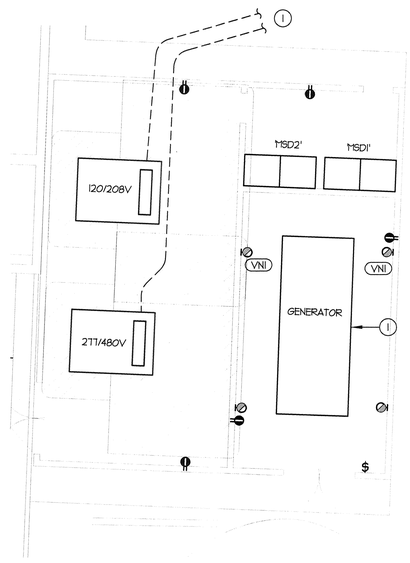
KEYED NOTES:

1. PROVIDE CATWALK PLATFORM FOR GENERATOR ACCESS AND MAINTENANCE.



A2 ENLARGED SERVICE YARD SECURITY GATE
SCALE: 1/8" = 1'-0"



A4 ENLARGED GENERATOR / TRANSFORMER ENCLOSURE
SCALE: 1/8" = 1'-0"

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USTAR BUILDING #2
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SITE ENLARGED PLANS

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STATISTICS

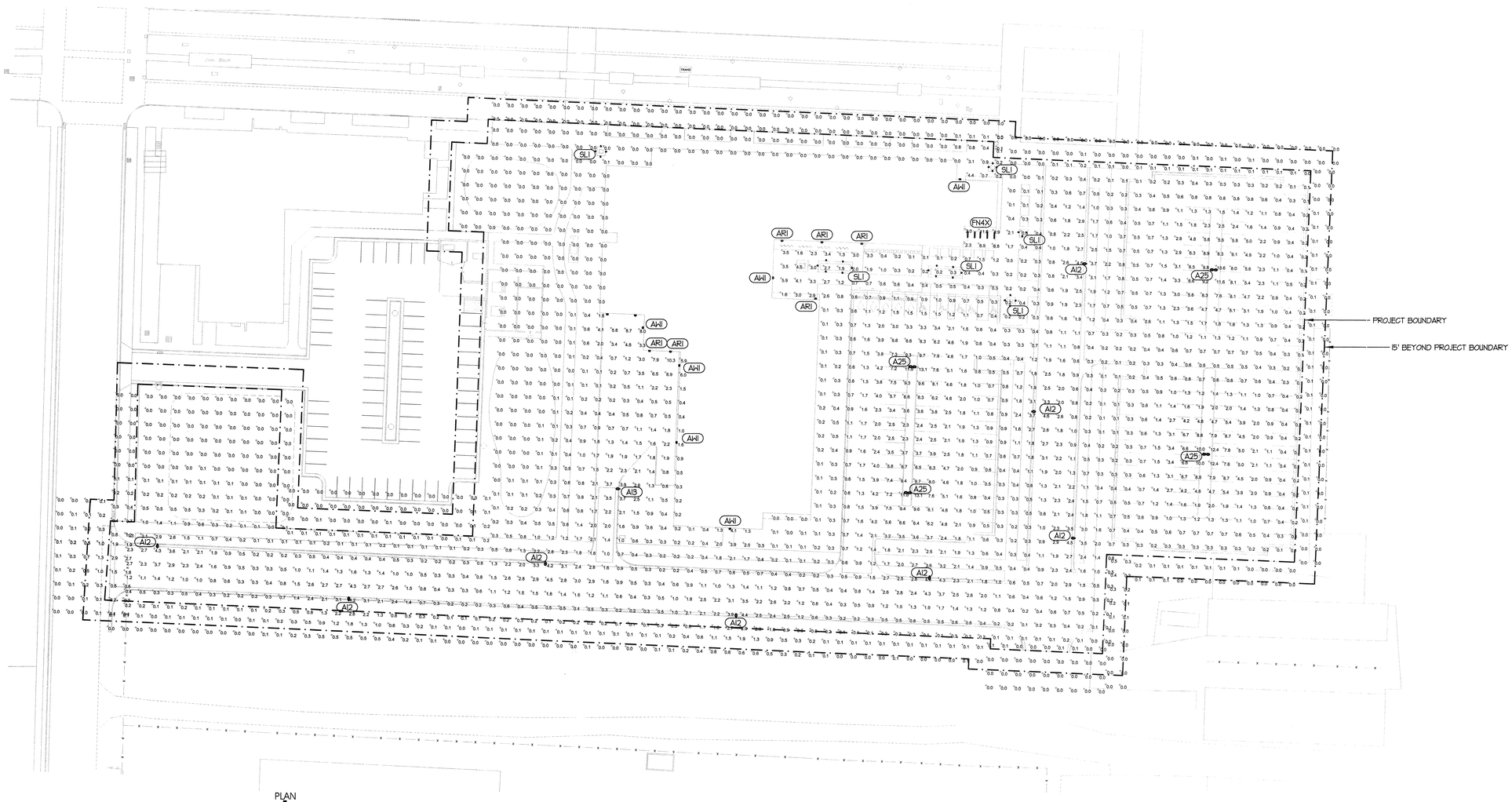
Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min	Avg/Max
Calc Zone #1	+	1.3 fc	13.6 fc	0.0 fc	N / A	N / A	0.1:1
Calc Zone #2	+	-1.0 fc	0.0 fc	0.0 fc	N / A	N / A	N / A
Calc Zone #5	+	0.0 fc	0.2 fc	0.0 fc	N / A	N / A	0.0:1
Calc Zone #7	+	0.0 fc	0.1 fc	0.0 fc	N / A	N / A	0.0:1
Calc Zone #9	+	0.1 fc	0.5 fc	0.0 fc	N / A	N / A	0.2:1
Calc Zone #10	+	0.1 fc	0.2 fc	0.0 fc	N / A	N / A	0.5:1
Calc Zone #11	+	0.0 fc	0.1 fc	0.0 fc	N / A	N / A	0.0:1
Calc Zone #12	+	0.0 fc	0.1 fc	0.0 fc	N / A	N / A	0.0:1
Calc Zone #13	+	0.0 fc	0.1 fc	0.0 fc	N / A	N / A	0.0:1
Calc Zone #15	+	0.2 fc	1.9 fc	0.0 fc	N / A	N / A	0.1:1
Calc Zone #16	+	0.6 fc	2.9 fc	0.0 fc	N / A	N / A	0.2:1
Calc Zone #17	+	0.2 fc	1.2 fc	0.0 fc	N / A	N / A	0.2:1
Calc Zone #18	+	0.2 fc	1.0 fc	0.0 fc	N / A	N / A	0.2:1

LUMINAIRE SCHEDULE

Symbol	Label	Qty	Catalog Number	Description	Lamp	File	Lumens	LLF	Watts
	AI2	8	UCL-H2/250M4	ENTABLATURE CUTOFF LUMINAIRE DIE CAST ALUM HOUSING & LENS FRAME FABRICATED SPECULAR ALZAK REFLECTOR	250 WATT M4 BT-28 CLEAR MOG. BASE HORZ.	H2-250M.IES	15000	1.00	250
	AI3	1	UCL-H3/250M4	ENTABLATURE CUTOFF LUMINAIRE DIE CAST ALUM HOUSING & LENS FRAME FABRICATED SPECULAR ALZAK REFLECTOR	250 WATT M4 BT-28 CLEAR MOG. BASE HORZ.	H3-250M.IES	15000	1.00	250
	A25	4	ET5/250M4	ENTABLATURE CUTOFF LUMINAIRE DIE CAST ALUM HOUSING & LENS FRAME FABRICATED SPECULAR ALZAK REFLECTOR	250 WATT M4 BT-28 CLEAR MOG. BASE HORZ.	ET5-250M.IES	23000	1.00	500
	FN4X	5	S23DR-IT8-4-1-EB-S92	SPECULAR REFLECTOR w/.0625"THICK WHITE ACRYLIC DIFFUSER		23DR-IT8-S92-4FT.ies	3100	1.00	32
	AWI	10	WST 70M FT	ARCHITECTURAL SCONCE WITH FORWARD THROW DISTRIBUTION WITH CLEAR, FLAT GLASS LENS. CLEAR LAMP. MEETS THE "NIGHTTIME FRIENDLY" CRITERIA	ONE 70-WATT CLEAR ED-17 METAL HALIDE, HORIZONTAL POSITION.	WST-70M-FT.ies	5200	1.00	95
	ARI	4	WST 50M FT	ARCHITECTURAL SCONCE WITH FORWARD THROW DISTRIBUTION WITH CLEAR, FLAT GLASS LENS. CLEAR LAMP. MEETS THE "NIGHTTIME FRIENDLY" CRITERIA	ONE 50-WATT CLEAR ED-17 METAL HALIDE, HORIZONTAL POSITION.	WST-50M-FT.ies	3450	1.00	72
	SLI	27	2035LED	RECTANGULAR RECESSED LUMINAIRE DIFFUSE INTERIOR AND FROSTED FLAT GLASS LENS WITH LOUVERS	16 LEDS	2035LED.ies	4	1.00	10.5

KEYED NOTES:

1. EXTEND NEW COMMUNICATION CONDUITS AND TIE INTO EXISTING COMMUNICATIONS VAULT. COORDINATE WORK WITH USU IT GROUP.



PLAN
n
40' 0' 40'
scale = 1" = 40'-0"

SITE ILLUMINATION PLAN
A4
ES102

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PROJECT DESCRIPTION
LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:
SITE ILLUMINATION PLAN

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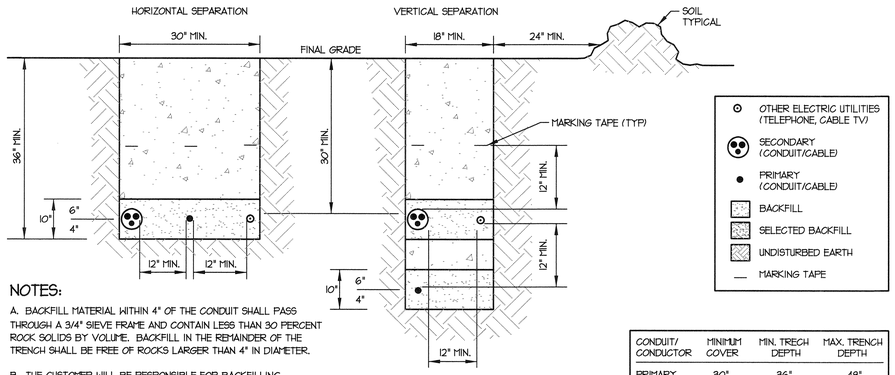


NOTES:

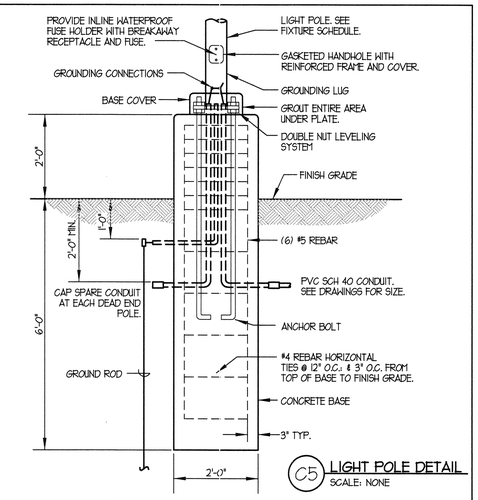
A. BACKFILL MATERIAL WITHIN 4" OF THE CONDUIT SHALL PASS THROUGH A 3/4" SIEVE FRAME AND CONTAIN LESS THAN 30 PERCENT ROCK SOLIDS BY VOLUME. BACKFILL IN THE REMAINDER OF THE TRENCH SHALL BE FREE OF ROCKS LARGER THAN 4" IN DIAMETER.

B. THE CUSTOMER WILL BE RESPONSIBLE FOR BACKFILLING TRENCHES AND SITE RESTORATION.

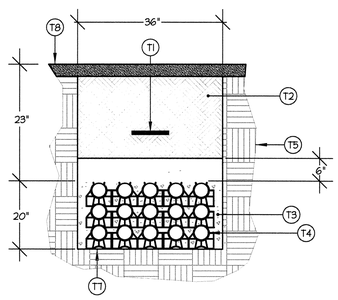
C. THE POWER COMPANY WILL NOT ENERGIZE CONDUCTORS UNTIL THE CUSTOMER COMPLETES BACKFILL TO POWER COMPANY SATISFACTION.

CONDUIT/ CONDUCTOR	MINIMUM COVER	MIN. TRENCH DEPTH	MAX. TRENCH DEPTH
PRIMARY	30"	36"	48"
SECONDARY	30"	36"	48"

C3 JOINT USE TRENCH DETAIL
SCALE: NONE



C5 LIGHT POLE DETAIL
SCALE: NONE



TRENCHING KEYED NOTES:

(T1) MARKER TAPE WITH THE WORDS, "CAUTION BURIED ELECTRIC CONDUITS BELOW" DIRECTLY OVER POWER CONDUITS 6" MINIMUM BELOW GRADE.

(T2) CLEAN BACKFILL CONTAINING NO ROCKS LARGER THAN 4" DIA.

(T3) PROVIDE CONCRETE WITH RED DYE FOR CONDUIT ENCASEMENT. THERE SHALL BE A MINIMUM OF 6" OF COVERAGE.

(T4) ALL CONDUITS SHOWN SHALL BE SCHEDULE 40 PVC.

(T5) UNDISTURBED EARTH.

(T6) TRENCHES SHALL BE A UNIFORM DEPTH FOR ENTIRE LENGTH OF TRENCH SO CONDUITS CAN SIT FLAT (HORIZONTAL) WITH THE GROUND.

(T7) FINISHED GRADE.

(T8) PROVIDE DUCT BANK SPACER UNDERGROUND DEVICES INC. P/N WINPEECE 4X20-2 OR APPROVED EQUIVALENT.

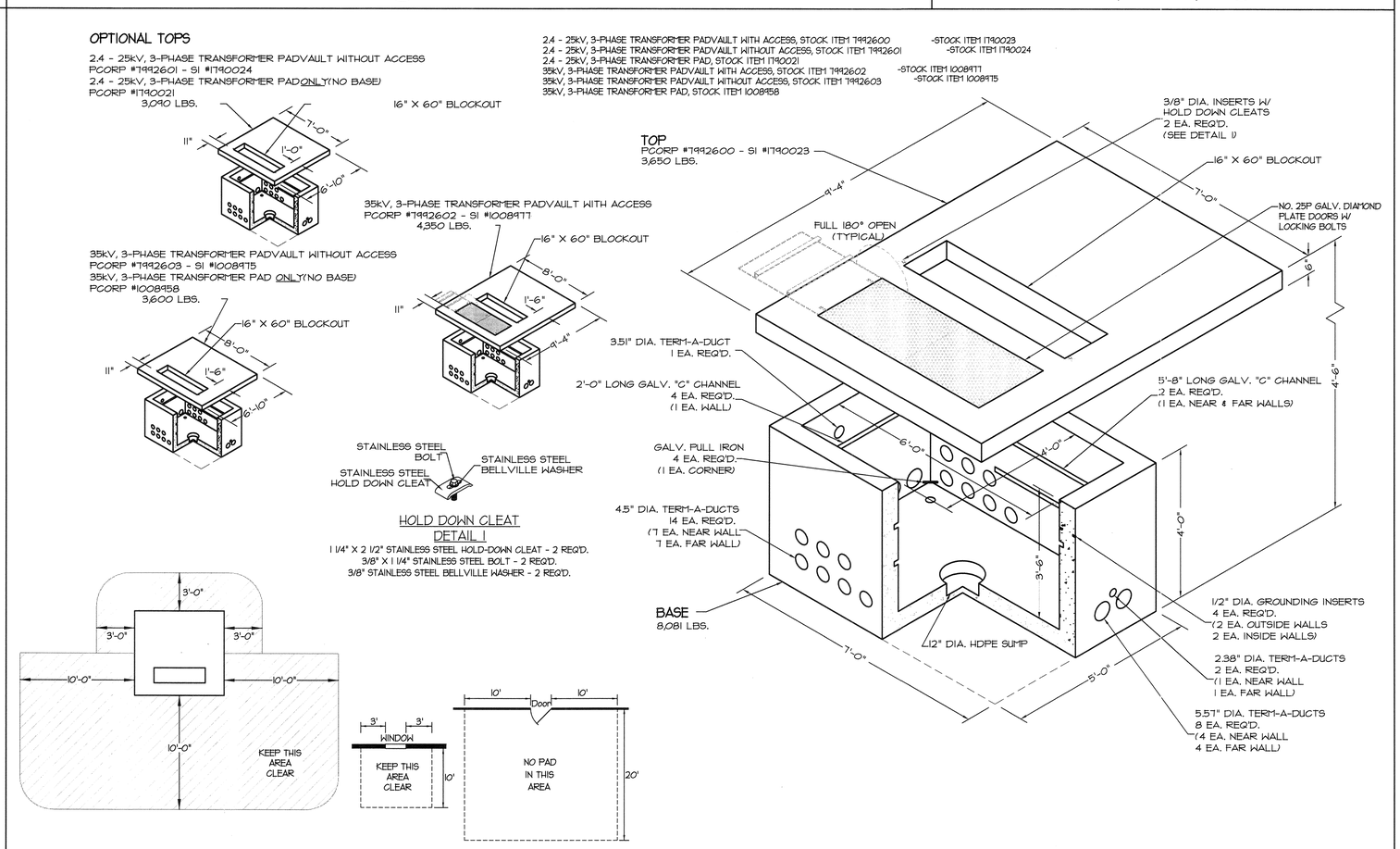
(T9) EXISTING DRAIN PIPE. PROTECT FROM DAMAGE DURING CONSTRUCTION.

(T10) NEW ROCY MOUNTAIN POWER PRIMARY FEED TO TRANSFORMER.

TRENCHING GENERAL NOTES:

1. PROVIDE PULL ROPES IN ALL CONDUITS.
2. HORIZONTAL AND VERTICAL SEPARATION BETWEEN CONDUIT SHALL BE MAINTAINED BY INSTALLING HIGH IMPACT SPACERS WITH HORIZONTAL INTERVALS OF EIGHT FEET.
3. ALL MARKER TAPE SHALL CONTAIN #10 TRACER WIRE.
4. VERIFY AND COMPLY WITH ALL ROCKY MOUNTAIN POWER AND QWEST REQUIREMENTS.

A1 DUCTBANK DETAIL
SCALE: NONE
RMP SECONDARY CONDUITS



A3 ROCKY MOUNTAIN POWER TRANSFORMER PAD VAULT DETAIL
SCALE: NONE

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PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

SITE DETAILS

REVISIONS

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ES501

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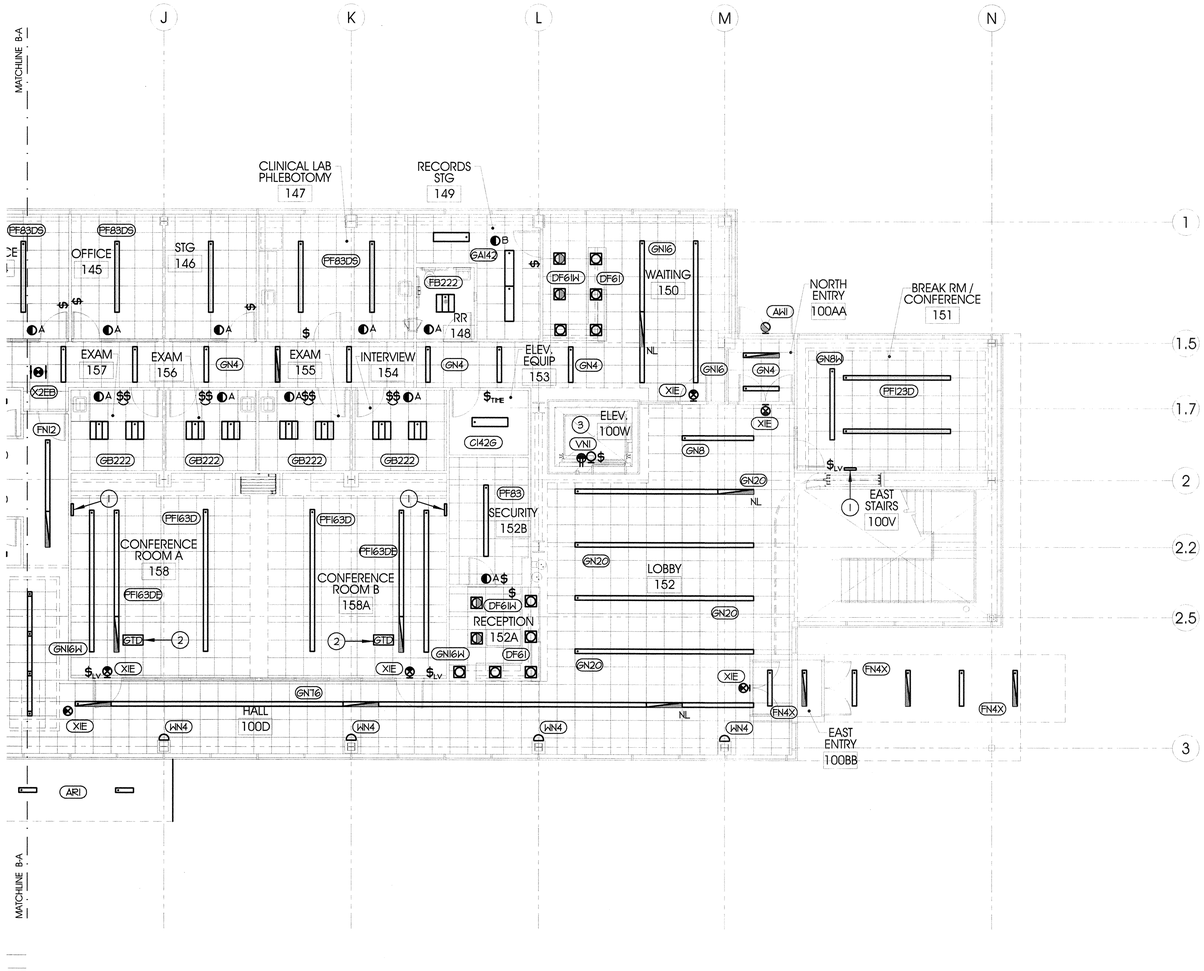


KEYED NOTES:

1. PROVIDE LIGHTING CONTROL SYSTEM PANEL AT THIS LOCATION. REFER TO THE RISER DIAGRAMS ON SHEET EL501 FOR ADDITIONAL INFORMATION.
2. PROVIDE BODINE GENERATOR TRANSFER DEVICE #GTD (OR APPROVED EQUIVALENT) IN THE EVENT OF POWER LOSS, THE GENERATOR TRANSFER DEVICE WILL SWITCH FROM NORMAL POWER TO EMERGENCY POWER.
3. COORDINATE WITH THE GENERAL CONTRACTOR AND ELEVATOR SUPPLIER THE MOUNTING OF THESE WIRING DEVICES WITHIN THE ELEVATOR PIT. INSTALL DEVICE PER ELEVATOR SUPPLIER RECOMMENDATIONS.

GENERAL NOTES:

1. THE CONTRACTOR SHALL COORDINATE ALL REQUIREMENTS FOR THE EDGE-LIT EXIT SIGNS. ENSURE THAT WALL MOUNT AND CEILING MOUNT SIGNS ARE COORDINATED. ENSURE THAT RIGHT AND LEFT CHEVRONS ARE COORDINATEATED.

OCCUPANCY SENSOR SCHEDULE

DEVICE	MOUNTING	DESCRIPTION	MANUFACTURER/MODEL NO.
A	CEILING	180° PATTERN	HUBBELL MYTEC OMNI-DT (OR APPROVED EQUIVALENT)
B	CEILING	360° PATTERN	HUBBELL MYTEC OMNI-DT (OR APPROVED EQUIVALENT)

OCCUPANCY SENSOR NOTES:

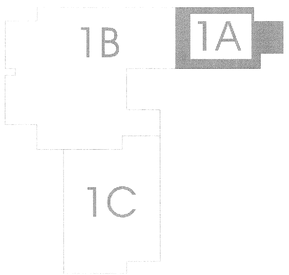
1. THE OCCUPANCY SENSOR SUPPLIER SHALL MAKE SURE OCCUPANCY SENSOR THAT IS SUPPLIED IS ADEQUATELY SIZED FOR ROOM SERVED. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

PLAN n

8' 0' 8'
scale = 1/8" = 1'-0"

LEVEL 1 LIGHTING PLAN - 1A (A4 / EL101A)

KEY PLAN



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UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

LEVEL 1
LIGHTING PLAN - 1A

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KEYED NOTES:

1. COORDINATE WITH THE GENERAL CONTRACTOR AND ELEVATOR SUPPLIER THE MOUNTING OF THESE WIRING DEVICES WITHIN THE ELEVATOR PIT. INSTALL DEVICE PER ELEVATOR SUPPLIER RECOMMENDATIONS.
2. PROVIDE TWO (2) POWER PACKS FOR THIS ROOM ONE TO CONTROL THE NORMAL LIGHTING AND ONE TO CONTROL THE EMERGENCY LIGHTING. THIS OCCUPANCY SENSOR SHALL CONTROL BOTH POWER PACKS.
3. THE CONTRACTOR SHALL COORDINATE EXACT LIGHT FIXTURE LOCATIONS WITH THE MECHANICAL EQUIPMENT IN THIS ROOM. ADJUST LIGHT FIXTURE LOCATIONS AS NECESSARY TO MISS PIPE RACKS, FLUES, ELECTRICAL CONDUITS, ETC. ENSURE THAT FINAL LIGHT LAYOUT IN THIS SPACE PROVIDES EVEN ILLUMINATION OVER THE ENTIRE SPACE.
4. ALL WIRING DEVICES AND METHODS IN THIS SPACE SHALL BE INSTALLED FOR A CLASS I DIVISION 2 HAZARDOUS AREA.
5. PROVIDE A LIGHT LEVEL SENSOR IN THIS STAIRWAY TO ALLOW FOR LIGHT FIXTURES TO BE DIMMED TO A LOWER LEVEL WHEN THERE IS AVAILABLE DAYLIGHTING. THE LIGHT LEVEL SENSOR SHALL BE TIED INTO THE BUILDING LIGHTING CONTROL SYSTEM. REFER TO THE RISER DIAGRAM ON SHEET EL501 FOR ADDITIONAL INFORMATION.

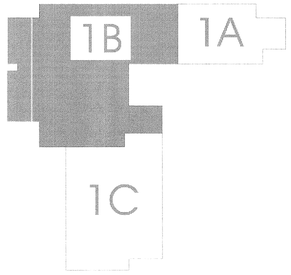
OCCUPANCY SENSOR SCHEDULE

DEVICE	MOUNTING	DESCRIPTION	MANUFACTURER/MODEL NO.
A	CEILING	180° PATTERN	HUBBELL MYTEC OMNI-DT (OR APPROVED EQUIVALENT)
B	CEILING	360° PATTERN	HUBBELL MYTEC OMNI-DT (OR APPROVED EQUIVALENT)

OCCUPANCY SENSOR NOTES:

1. THE OCCUPANCY SENSOR SUPPLIER SHALL MAKE SURE OCCUPANCY SENSOR THAT IS SUPPLIED IS ADEQUATELY SIZED FOR ROOM SERVED. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

KEY PLAN



LEVEL 1 LIGHTING PLAN - 1B (A4 / EL101B)

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PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

LEVEL 1
LIGHTING PLAN - 1B

REVISIONS

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EL101B

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KEYED NOTES:

1. COORDINATE WITH THE GENERAL CONTRACTOR AND ELEVATOR SUPPLIER THE MOUNTING OF THESE WIRING DEVICES WITHIN THE ELEVATOR PIT. INSTALL DEVICE PER ELEVATOR SUPPLIER RECOMMENDATIONS.
2. THIS ROOM SHALL BE CONTROLLED BY THE ANGSTROM WATCHDOG CONTROL SYSTEM (OR APPROVED EQUIVALENT).
3. THE CONTRACTOR SHALL COORDINATE EXACT LIGHT FIXTURE LOCATIONS WITH THE MECHANICAL EQUIPMENT IN THIS ROOM. ADJUST LIGHT FIXTURE LOCATIONS AS NECESSARY TO MISS PIPE RACKS, FLUES, ELECTRICAL CONDUITS, ETC. ENSURE THAT FINAL LIGHT LAYOUT IN THIS SPACE PROVIDES EVEN ILLUMINATION OVER THE ENTIRE SPACE.

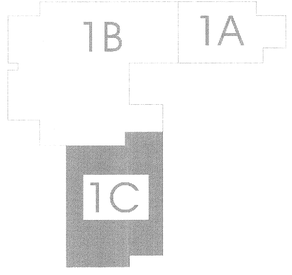
OCCUPANCY SENSOR SCHEDULE

DEVICE	MOUNTING	DESCRIPTION	MANUFACTURER/MODEL NO.
A	CEILING	180° PATTERN	HUBBELL MYTEC OMNI-DT (OR APPROVED EQUIVALENT)
B	CEILING	360° PATTERN	HUBBELL MYTEC OMNI-DT (OR APPROVED EQUIVALENT)

OCCUPANCY SENSOR NOTES:

1. THE OCCUPANCY SENSOR SUPPLIER SHALL MAKE SURE OCCUPANCY SENSOR THAT IS SUPPLIED IS ADEQUATELY SIZED FOR ROOM SERVED. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

KEY PLAN



PLAN n

8' 0' 8'
scale = 1/8" = 1'-0"

LEVEL 1 LIGHTING PLAN - 1C (A4 / EL101C)

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PROJECT DESCRIPTION
LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:
LEVEL 1
LIGHTING PLAN -1C

REVISIONS

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DRAWN BY:	J. HARWARD
CHECKED BY:	D. WHITTON

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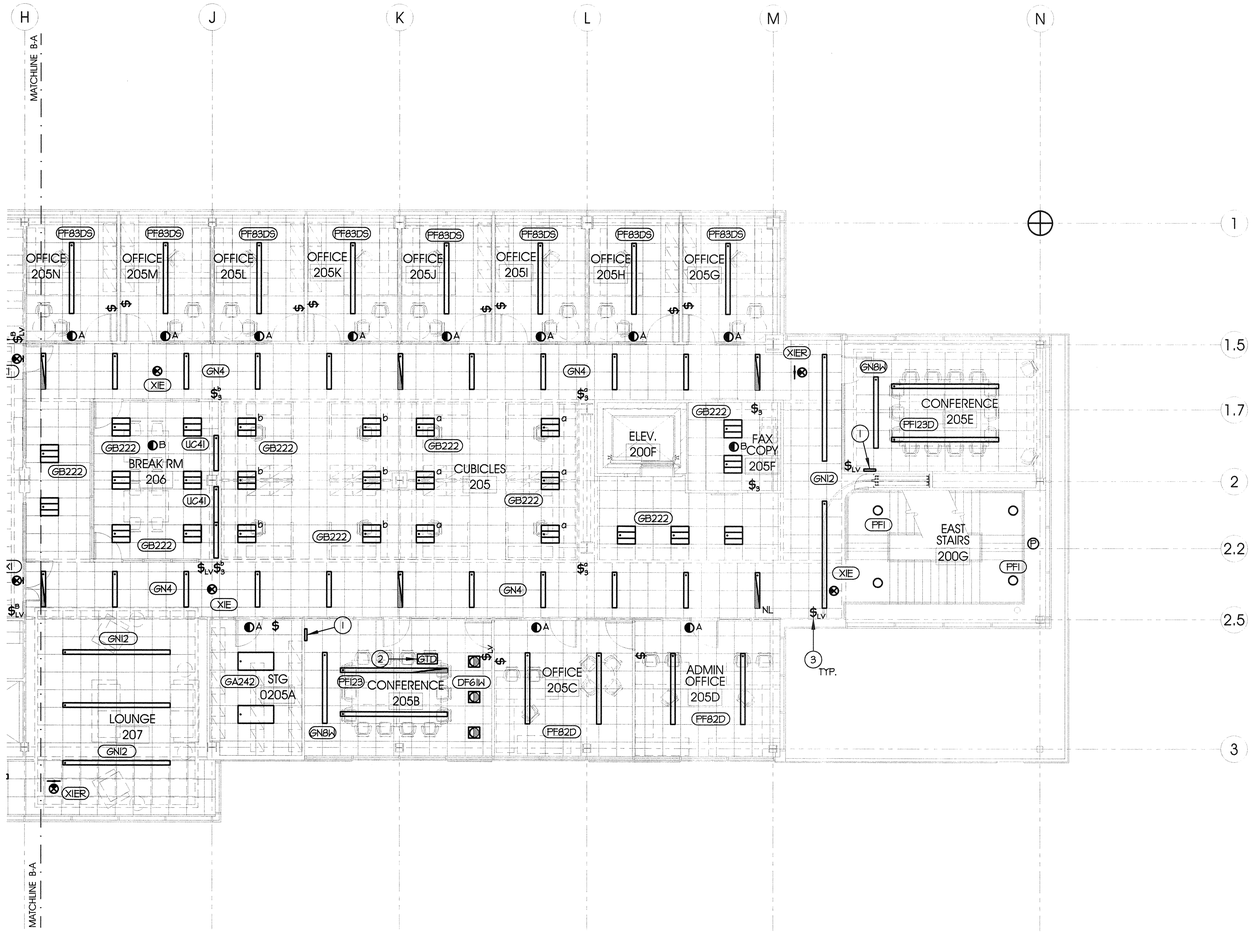

KEYED NOTES:

1. PROVIDE LIGHTING CONTROL SYSTEM PANEL AT THIS LOCATION. REFER TO THE RISER DIAGRAMS ON SHEET EL501 FOR ADDITIONAL INFORMATION.
2. PROVIDE BODINE GENERATOR TRANSFER DEVICE #STD (OR APPROVED EQUIVALENT) IN THE EVENT OF POWER LOSS, THE GENERATOR TRANSFER DEVICE WILL SWITCH FROM NORMAL POWER TO EMERGENCY POWER.
3. LOW VOLTAGE OVERRIDE SWITCH. REFER TO LOW VOLTAGE SWITCH SCHEDULE ON SHEET EL603.

GENERAL NOTES:

1. THE CONTRACTOR SHALL COORDINATE ALL REQUIREMENTS FOR THE EDGE-LIT EXIT SIGNS. ENSURE THAT WALL MOUNT AND CEILING MOUNT SIGNS ARE COORDINATED. ENSURE THAT RIGHT AND LEFT CHEVRONS ARE COORDINATEATED.

OCCUPANCY SENSOR SCHEDULE

DEVICE	MOUNTING	DESCRIPTION	MANUFACTURER/MODEL NO.
A	CEILING	180° PATTERN	HUBBELL MYTEC OMNI-DT (OR APPROVED EQUIVALENT)
B	CEILING	360° PATTERN	HUBBELL MYTEC OMNI-DT (OR APPROVED EQUIVALENT)

OCCUPANCY SENSOR NOTES:

1. THE OCCUPANCY SENSOR SUPPLIER SHALL MAKE SURE OCCUPANCY SENSOR THAT IS SUPPLIED IS ADEQUATELY SIZED FOR ROOM SERVED. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

PLAN n

8' 0' 8'
scale = 1/8" = 1'-0"

LEVEL 2 LIGHTING PLAN - 2A (A4 / EL102A)

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PROJECT DESCRIPTION
LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:
LEVEL 2
LIGHTING PLAN - 2A

REVISIONS
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KEY PLAN
2B 2A 2C

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EL102A

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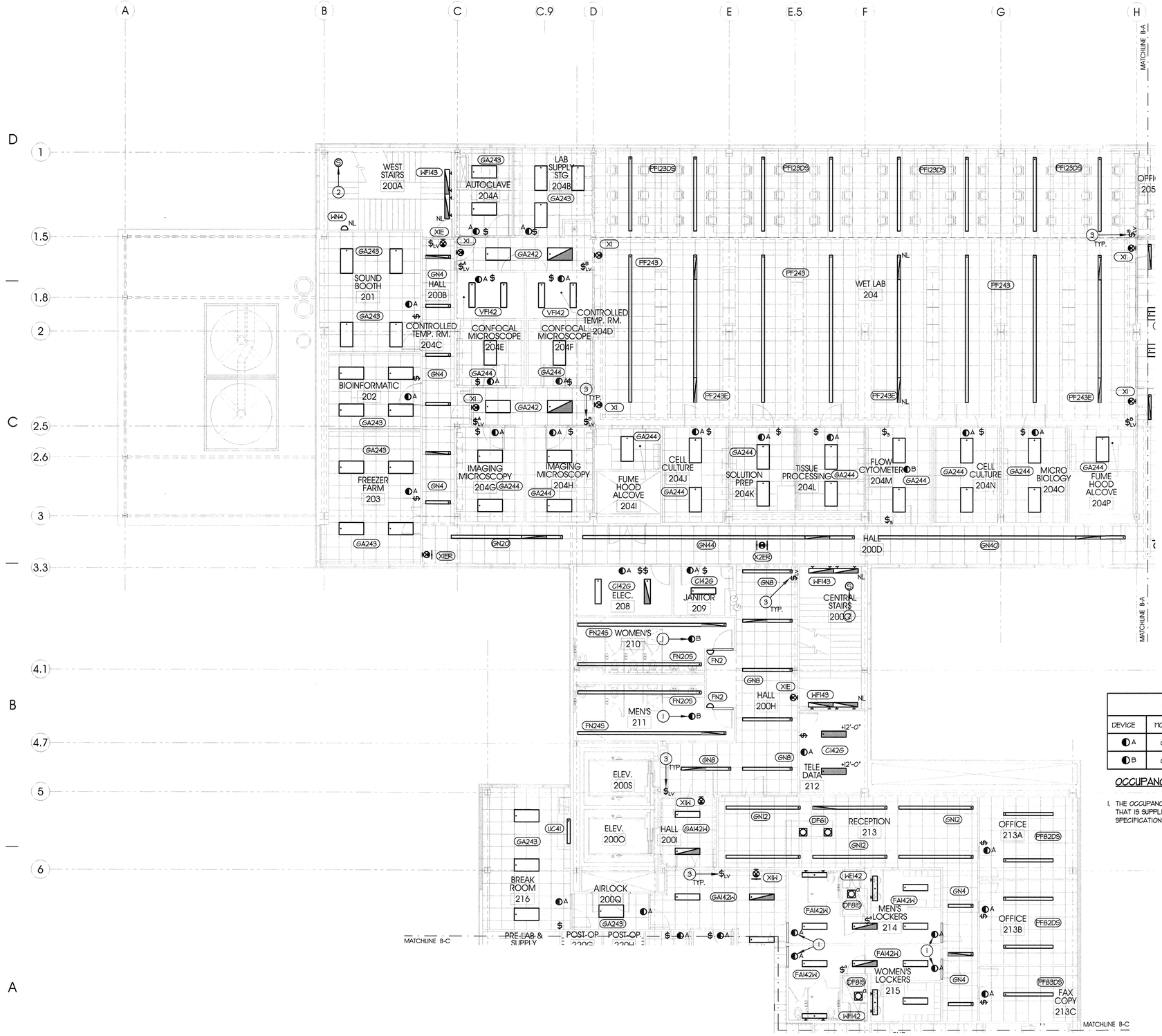


KEYED NOTES:

1. PROVIDE TWO (2) POWER PACKS FOR THIS ROOM ONE TO CONTROL THE NORMAL LIGHTING AND ONE TO CONTROL THE EMERGENCY LIGHTING. THIS OCCUPANCY SENSOR SHALL CONTROL BOTH POWER PACKS.
2. PROVIDE A LIGHT LEVEL SENSOR IN THIS STAIRWAY TO ALLOW FOR LIGHT FIXTURES TO BE DIMMED TO A LOWER LEVEL WHEN THERE IS AVAILABLE DAYLIGHTING. THE LIGHT LEVEL SENSOR SHALL BE TIED INTO THE BUILDING LIGHTING CONTROL SYSTEM. REFER TO THE RISER DIAGRAM ON SHEET EL501 FOR ADDITIONAL INFORMATION.
3. LOW VOLTAGE OVERRIDE SWITCH. REFER TO LOW VOLTAGE SWITCH SCHEDULE ON SHEET EL603.

GENERAL NOTES:

1. THE CONTRACTOR SHALL COORDINATE ALL REQUIREMENTS FOR THE EDGE-LIT EXIT SIGNS. ENSURE THAT WALL MOUNT AND CEILING MOUNT SIGNS ARE COORDINATED. ENSURE THAT RIGHT AND LEFT CHEVRONS ARE COORDINATEATED.

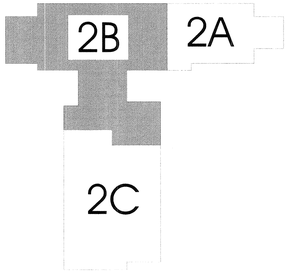
OCCUPANCY SENSOR SCHEDULE

DEVICE	MOUNTING	DESCRIPTION	MANUFACTURER/MODEL NO.
A	CEILING	180° PATTERN	HUBBELL MYTEC OMNI-DT (OR APPROVED EQUIVALENT)
B	CEILING	360° PATTERN	HUBBELL MYTEC OMNI-DT (OR APPROVED EQUIVALENT)

OCCUPANCY SENSOR NOTES:

1. THE OCCUPANCY SENSOR SUPPLIER SHALL MAKE SURE OCCUPANCY SENSOR THAT IS SUPPLIED IS ADEQUATELY SIZED FOR ROOM SERVED. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

KEY PLAN



PLAN

scale = 1/8" = 1'-0"

LEVEL 2 LIGHTING PLAN - 2B

A4 EL102B

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PROJECT DESCRIPTION
LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:
LEVEL 2
LIGHTING PLAN - 2B

REVISIONS

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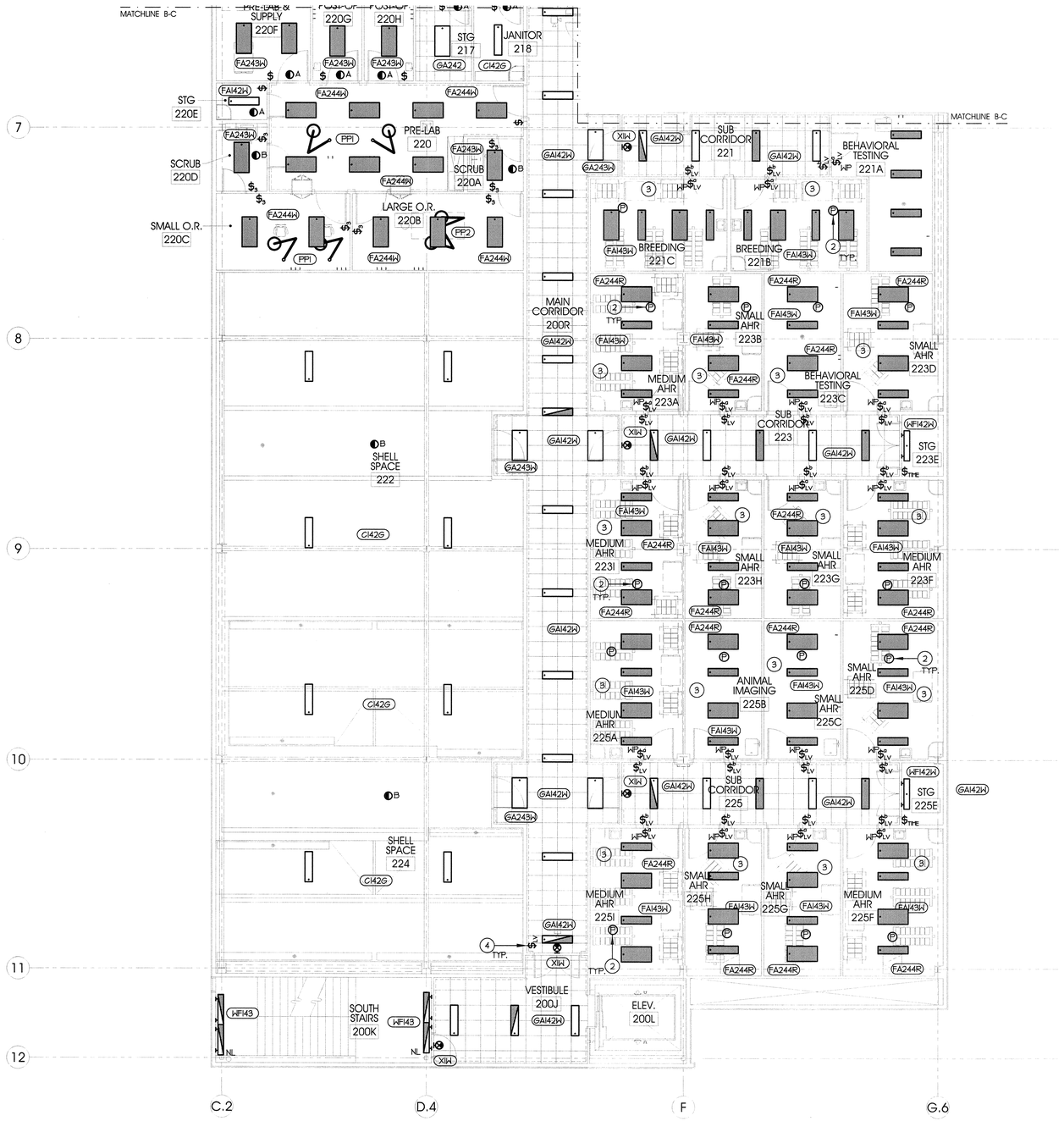


KEYED NOTES:

1. PROVIDE TWO (2) POWER PACKS FOR THIS ROOM ONE TO CONTROL THE NORMAL LIGHTING AND ONE TO CONTROL THE EMERGENCY LIGHTING. THIS OCCUPANCY SENSOR SHALL CONTROL BOTH POWER PACKS.
2. PROVIDE AN ANALOG LIGHT LEVEL SENSOR IN THIS ROOM TO ALLOW FOR LIGHT LEVELS TO BE MONITORED BY THE LIGHT CONTROL SYSTEM.
3. THE LIGHTING IN THIS ROOM SHALL BE CONTROLLED BY THE ANGSTROM WATCHDOG SYSTEM. REFER TO THE RISER DIAGRAM ON SHEET EL501 FOR ADDITIONAL INFORMATION.
4. LOW VOLTAGE OVERRIDE SWITCH. REFER TO LOW VOLTAGE SWITCH SCHEDULE ON SHEET EL601.

GENERAL NOTES:

1. ALL WIRING DEVICE COVERPLATES LOCATED WITHIN THE ANIMAL HOLD ROOM SHALL BE WATERPROOF WHILE IN-USE COVERS UNLESS NOTED OTHERWISE.
2. ALL ELECTRICAL DEVICES WITHIN THE ANIMAL HOLD ROOMS SHALL BE WATERPROOF AND INSTALLED USING METHODS TO ENSURE A WATERPROOF SEAL AT THE WALL ENVELOPE.

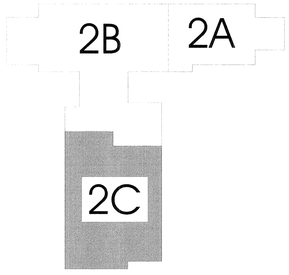
OCCUPANCY SENSOR SCHEDULE

DEVICE	MOUNTING	DESCRIPTION	MANUFACTURER/MODEL NO.
A	CEILING	180° PATTERN	HUBBELL MYTEC OMNI-DT (OR APPROVED EQUIVALENT)
B	CEILING	360° PATTERN	HUBBELL MYTEC OMNI-DT (OR APPROVED EQUIVALENT)

OCCUPANCY SENSOR NOTES:

1. THE OCCUPANCY SENSOR SUPPLIER SHALL MAKE SURE OCCUPANCY SENSOR THAT IS SUPPLIED IS ADEQUATELY SIZED FOR ROOM SERVED. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

KEY PLAN



PLAN N

8' 0' 8'
scale = 1/8" = 1'-0"

LEVEL 2 LIGHTING PLAN - 2C A4 EL102C

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PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

LEVEL 2
LIGHTING PLAN - 2C

REVISIONS

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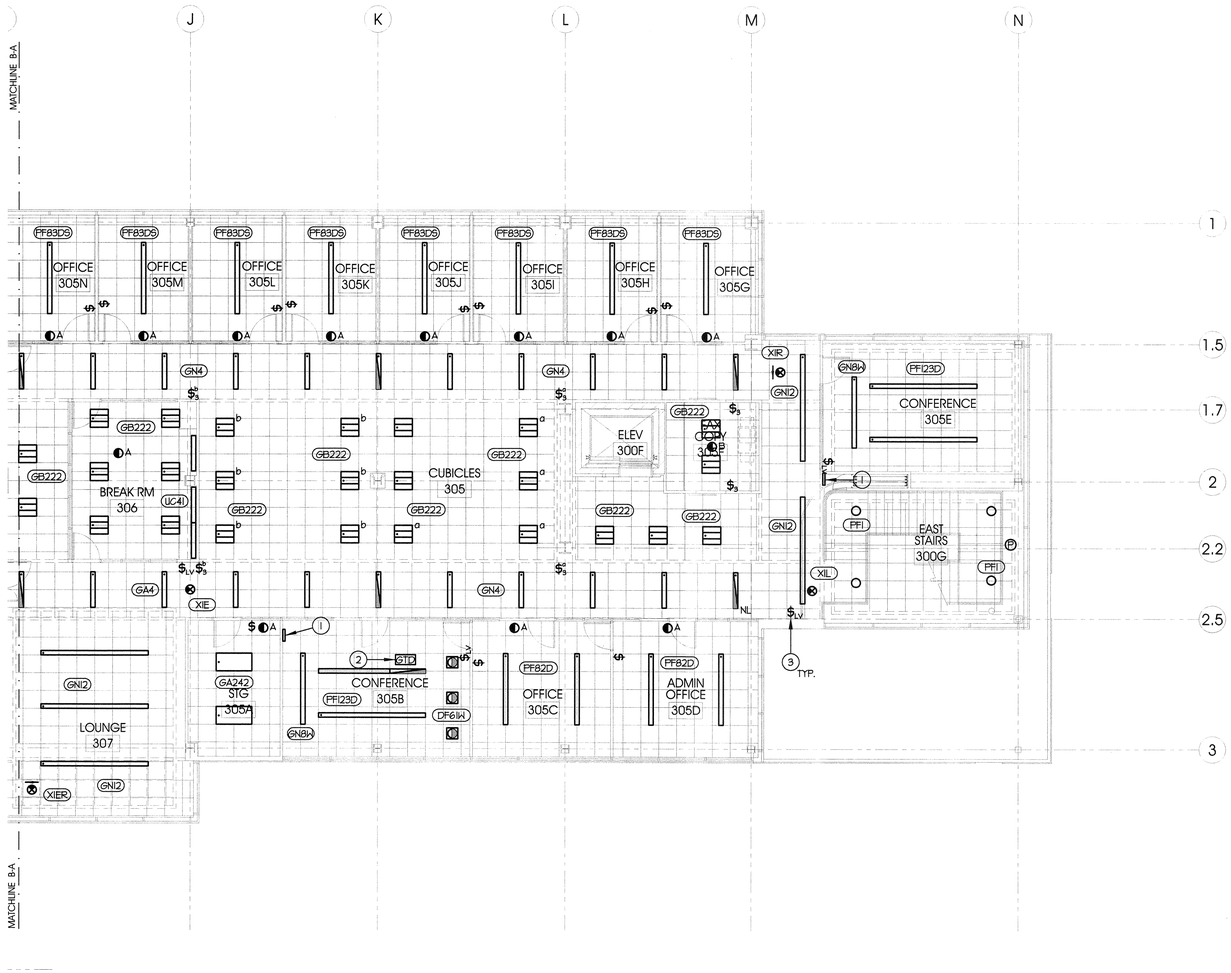


KEYED NOTES:

1. PROVIDE LIGHTING CONTROL SYSTEM PANEL AT THIS LOCATION. REFER TO THE RISER DIAGRAMS ON SHEET EL501 FOR ADDITIONAL INFORMATION.
2. PROVIDE BODINE GENERATOR TRANSFER DEVICE #GTD (OR APPROVED EQUIVALENT) IN THE EVENT OF POWER LOSS, THE GENERATOR TRANSFER DEVICE WILL SWITCH FROM NORMAL POWER TO EMERGENCY POWER.
3. LOW VOLTAGE OVERRIDE SWITCH. REFER TO THE LOW VOLTAGE SWITCH SCHEDULE ON SHEET EL601.

GENERAL NOTES:

1. THE CONTRACTOR SHALL COORDINATE ALL REQUIREMENTS FOR THE EDGE-LIT EXIT SIGNS. ENSURE THAT WALL MOUNT AND CEILING MOUNT SIGNS ARE COORDINATED. ENSURE THAT RIGHT AND LEFT CHEVRONS ARE COORDINATEATED.

OCCUPANCY SENSOR SCHEDULE

DEVICE	MOUNTING	DESCRIPTION	MANUFACTURER/MODEL NO.
A	CEILING	180° PATTERN	HUBBELL MYTEC OMNI-DT (OR APPROVED EQUIVALENT)
B	CEILING	360° PATTERN	HUBBELL MYTEC OMNI-DT (OR APPROVED EQUIVALENT)

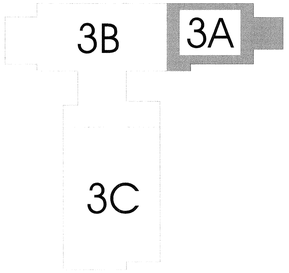
OCCUPANCY SENSOR NOTES:

1. THE OCCUPANCY SENSOR SUPPLIER SHALL MAKE SURE OCCUPANCY SENSOR THAT IS SUPPLIED IS ADEQUATELY SIZED FOR ROOM SERVED. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

PLAN
n
8' 0' 8'
scale = 1/8" = 1'-0"

LEVEL 3 LIGHTING PLAN - 3A (A4 / EL103A)

KEY PLAN



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PROJECT DESCRIPTION
LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:
LEVEL 3
LIGHTING PLAN - 3A

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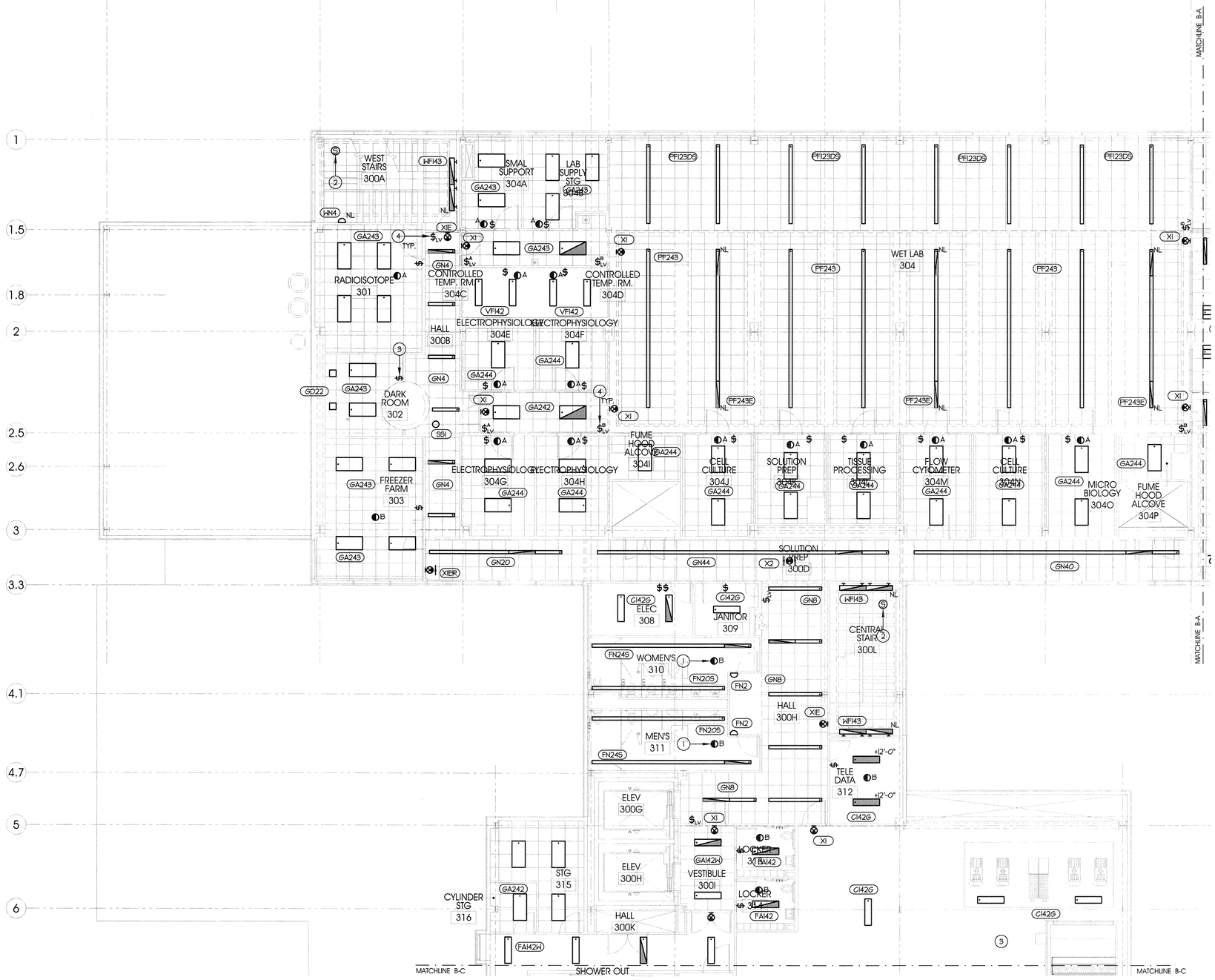


KEYED NOTES:

1. PROVIDE TWO (2) POWER PACKS FOR THIS ROOM ONE TO CONTROL THE NORMAL LIGHTING AND ONE TO CONTROL THE EMERGENCY LIGHTING. THIS OCCUPANCY SENSOR SHALL CONTROL BOTH POWER PACKS.
2. PROVIDE A LIGHT LEVEL SENSOR IN THIS STAIRWAY TO ALLOW FOR LIGHT FIXTURES TO BE DIMMED TO A LOWER LEVEL WHEN THERE IS AVAILABLE DAYLIGHTING. THE LIGHT LEVEL SENSOR SHALL BE TIED INTO THE BUILDING LIGHTING CONTROL SYSTEM. REFER TO THE RISER DIAGRAM ON SHEET EL501 FOR ADDITIONAL INFORMATION.
3. PROVIDE TWO POLE 3-POSITION SWITCH FOR DARK ROOM.
4. LOW VOLTAGE OVERRIDE SWITCH. REFER TO LOW VOLTAGE SWITCH SCHEDULE ON SHEET EL603.

GENERAL NOTES:

1. THE CONTRACTOR SHALL COORDINATE ALL REQUIREMENTS FOR THE EDGE-LIT EXIT SIGNS. ENSURE THAT WALL MOUNT AND CEILING MOUNT SIGNS ARE COORDINATED. ENSURE THAT RIGHT AND LEFT CHEVRONS ARE COORDINATEATED.

OCCUPANCY SENSOR SCHEDULE

DEVICE	MOUNTING	DESCRIPTION	MANUFACTURER/MODEL NO.
A	CEILING	180° PATTERN	HUBBELL MYTEC OMNI-DT (OR APPROVED EQUIVALENT)
B	CEILING	360° PATTERN	HUBBELL MYTEC OMNI-DT (OR APPROVED EQUIVALENT)

OCCUPANCY SENSOR NOTES:

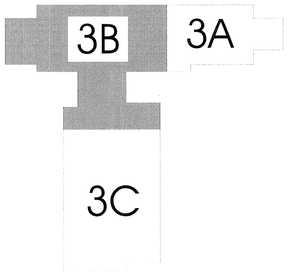
1. THE OCCUPANCY SENSOR SUPPLIER SHALL MAKE SURE OCCUPANCY SENSOR THAT IS SUPPLIED IS ADEQUATELY SIZED FOR ROOM SERVED. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

PLAN n

8' 0' 8'
scale = 1/8" = 1'-0"

LEVEL 3 LIGHTING PLAN - 3B (A4 / EL103B)

KEY PLAN



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UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:
LEVEL 3
LIGHTING PLAN - 3B

REVISIONS

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KEYED NOTES:

1. PROVIDE TWO (2) POWER PACKS FOR THIS ROOM ONE TO PROVIDE AN ANALOG LIGHT LEVEL SENSOR IN THIS ROOM TO ALLOW FOR LIGHT LEVELS TO BE MONITORED BY THE LIGHT CONTROL SYSTEM.
2. THE LIGHTING IN THIS ROOM SHALL BE CONTROLLED BY THE ANGSTROM WATCHDOG SYSTEM. REFER TO THE RISER DIAGRAM ON SHEET EL501 FOR ADDITIONAL INFORMATION.
3. THE CONTRACTOR SHALL COORDINATE EXACT LIGHT FIXTURE LOCATIONS WITH THE MECHANICAL EQUIPMENT IN THIS ROOM. ADJUST LIGHT FIXTURE LOCATIONS AS NECESSARY TO MISS PIPE RACKES, FLUES, ELECTRICAL CONDUITS, ETC. ENSURE THAT THE FINAL LIGHT FIXTURE LAYOUT IN THIS SPACE PROVIDES EVEN ILLUMINATION OVER THE ENTIRE SPACE.
4. LOW VOLTAGE OVERRIDE SWITCH. REFER TO THE LOW VOLTAGE SWITCH SCHEDULE ON SHEET EL601.

GENERAL NOTES:

1. ALL WIRING DEVICE COVERPLATES LOCATED WITHIN THE ANIMAL HOLD ROOM SHALL BE WATERPROOF WHILE IN-USE COVERS UNLESS NOTED OTHERWISE.
2. ALL WIRING DEVICE COVERPLATES LOCATED WITHIN THE BIO-CONTAINMENT SUITE OTHER THAN THE ANIMAL HOLD ROOMS SHALL BE WATERPROOF COVERS.
3. ALL ELECTRICAL DEVICES WITHIN THE ANIMAL HOLD ROOMS SHALL BE WATERPROOF AND INSTALLED USING METHODS TO ENSURE A GASPROOF SEAL AT THE WALL ENVELOPE.
4. ALL CONDUIT AND BOXES WITHIN THE BIO-CONTAINMENT SUITE SHALL BE GALVANIZED RIGID CONDUIT AND CAST IRON TYPE BOXES WITH THREADED HUBS. ALL CONDUITS THAT EXTEND OUT OF THE BIO-CONTAINMENT SUITE SHALL HAVE A SEAL-OFF INSTALLED TO ENSURE A GAS TIGHT SEAL.

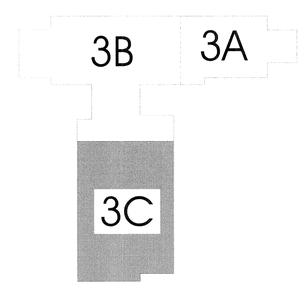
OCCUPANCY SENSOR SCHEDULE

DEVICE	MOUNTING	DESCRIPTION	MANUFACTURER/MODEL NO.
A	CEILING	180° PATTERN	HUBBELL MYTEC OMNI-DT (OR APPROVED EQUIVALENT)
B	CEILING	360° PATTERN	HUBBELL MYTEC OMNI-DT (OR APPROVED EQUIVALENT)

OCCUPANCY SENSOR NOTES:

1. THE OCCUPANCY SENSOR SUPPLIER SHALL MAKE SURE OCCUPANCY SENSOR THAT IS SUPPLIED IS ADEQUATELY SIZED FOR ROOM SERVED. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

KEY PLAN



PLAN n

8' 0' 8'

scale = 1/8" = 1'-0"

LEVEL 3 LIGHTING PLAN - 3C A4 EL103C

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PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

LEVEL 3
LIGHTING PLAN - 3C

REVISIONS

MARK	DATE	DESCRIPTION

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DRAWN BY:	J. HARWARD
CHECKED BY:	D. WHITTON

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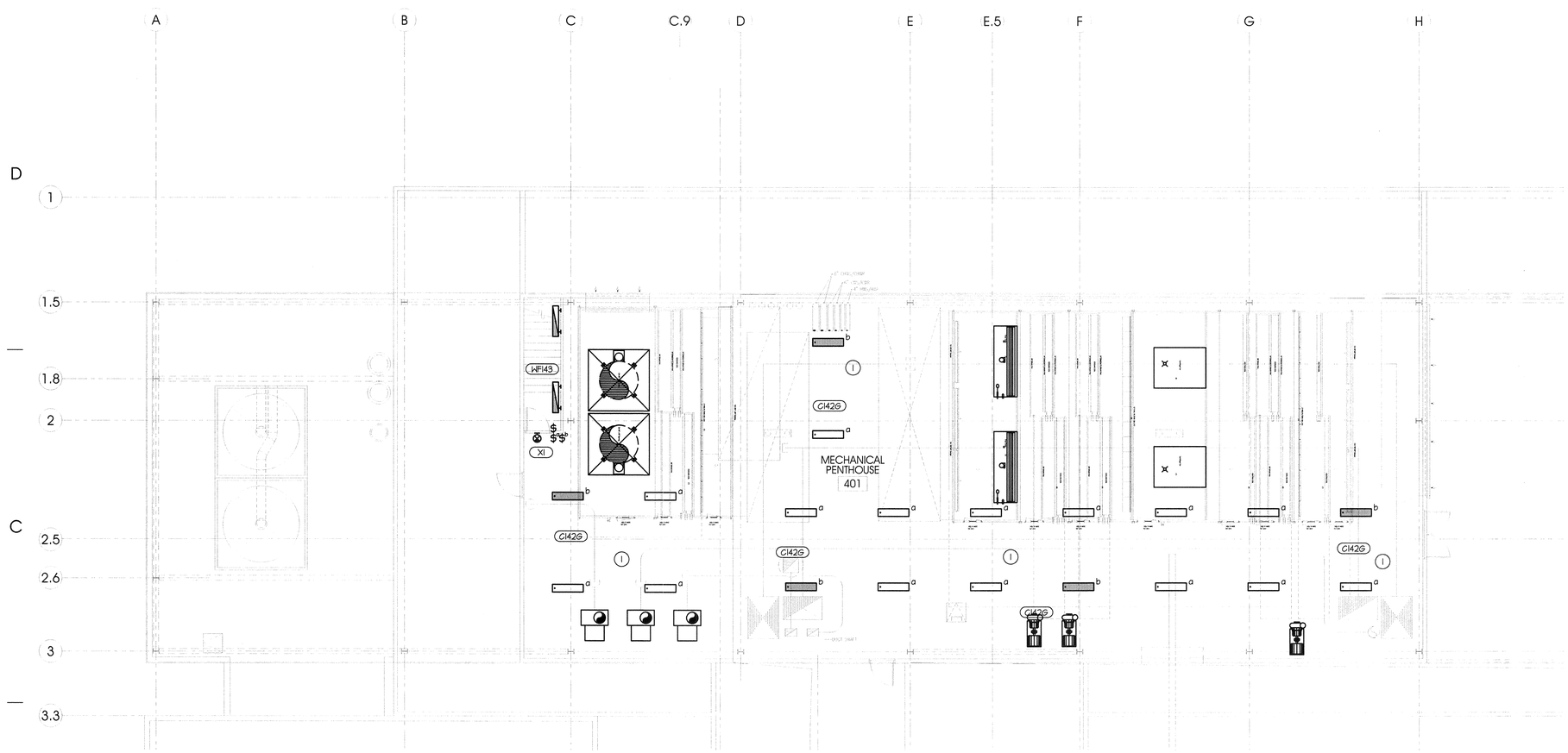
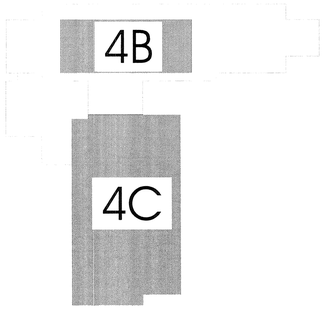


KEYED NOTES:

1. THE CONTRACTOR SHALL COORDINATE EXACT LIGHT FIXTURE LOCATIONS WITH THE MECHANICAL EQUIPMENT IN THIS ROOM. ADJUST LIGHT FIXTURE LOCATIONS AS NECESSARY TO MISS PIPE RACKES, FLUES, ELECTRICAL CONDUITS, ETC. ENSURE THAT THE FINAL LIGHT FIXTURE LAYOUT IN THIS SPACE PROVIDES EVEN ILLUMINATION OVER THE ENTIRE SPACE.

KEY PLAN



PLAN
n

8' 0' 8'
scale = 1/8" = 1'-0"

PENTHOUSE LIGHTING PLAN A4 EL105

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USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:
PENTHOUSE LIGHTING PLAN

REVISIONS

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CHECKED BY:	D. WHITTON

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EL104B

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Envision Engineering, P.C.

PLAN
n
8' 0' 8'
scale = 1/8" = 1'-0"

LEVEL 3 INTERSTITIAL SPACE LIGHTING PLAN (A4 / EL104C)

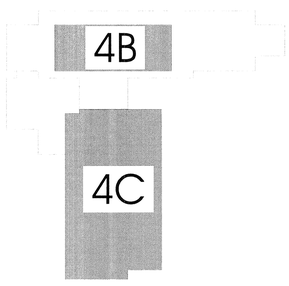
KEYED NOTES:

1. THE CONTRACTOR SHALL COORDINATE EXACT LIGHT FIXTURE LOCATIONS WITH THE MECHANICAL EQUIPMENT IN THIS ROOM. ADJUST LIGHT FIXTURE LOCATIONS AS NECESSARY TO MISS PIPE RACKES, FLUES, ELECTRICAL CONDUITS, ETC. ENSURE THAT THE FINAL LIGHT FIXTURE LAYOUT IN THIS SPACE PROVIDES EVEN ILLUMINATION OVER THE ENTIRE SPACE.

GENERAL NOTES:

1. .

KEY PLAN



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PROJECT DESCRIPTION
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USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:
LEVEL 3 INTERSTITIAL SPACE LIGHTING PLAN

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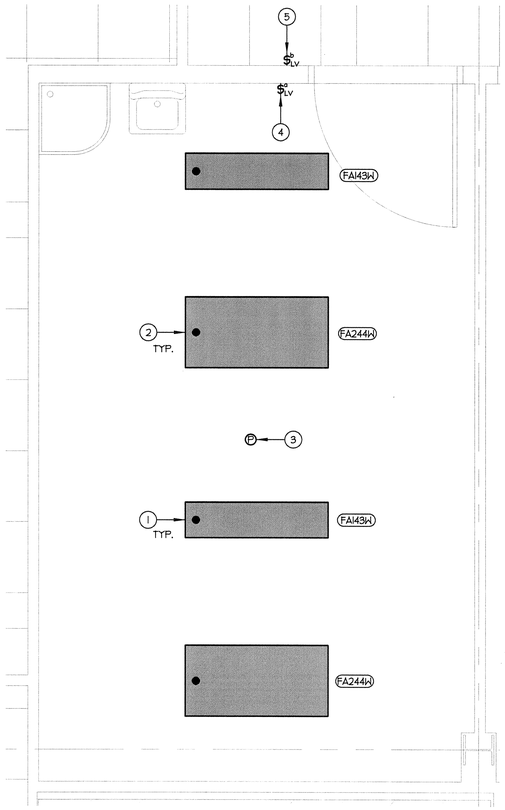


TYPICAL ANIMAL HOLDROOM LIGHTING CONTROL SCHEME (B1 / EL401)

scale = 1/2" = 1'-0"

GENERAL LIGHTING REQUIREMENTS FOR THE ANIMAL HOLD ROOMS:

1. ALL LIGHT SWITCHES AND LIGHTING CONTROLS LOCATED IN THIS ROOM SHALL BE INSTALLED USING WATERPROOF, SPRAYDOWN METHODES.
2. ELECTRICAL METALIC CONDUIT AND STAMPED STEEL ELECTRICAL JUNCTION BOXES MAY BE USED IN THIS AREA (VIVARIUM).
3. ALL LIGHTING IN THIS ROOM SHALL BE CONTROLLED BY THE EDSTROM WATCHDOG SYSTEM (OR SPECIFIED ALTERNATES. THIS SYSTEM WILL PROVIDE THE FOLLOWING FUNCTIONS:
   A. MONITOR ENVIRONMENTAL PARAMETERS OF EACH ROOM INDEPENDENT OF OTHER SPACES
   B. PROVIDE SECURE ACCESS INTO AND OUT OF THE ROOM
   C. PROVIDE LIGHTING CONTROL
   D. ALERT PERSONNEL OF POSSIBLE SYSTEM PROBLEMS
4. THE LIGHTING CONTROL SYSTEM FOR THIS SPACE WILL BE INDEPENDENT FROM THE BUILDING LIGHTING CONTROL SYSTSEM. HOWEVER, IT IS THE ENTENT TO HAVE THE BUILDING AUTOMATION SYSTEM MONITOR THE SYSTEM.
5. REFER TO THE SQUENCE OF OPERATION ON THIS PAGE FOR THE PERFORMANCE REQUIREMENT FOR THE LIGHTING CONTROL PORTION OF THE WATCHDOG SYSTEM.
6. THERE SHALL BE THREE (3) LEVELS OF LIGHT FOR THIS SPACE. THEY ARE AS FOLLOWS:
   A. RED LIGHT LEVEL (APPROX. 15 FC)
   B. DAWN/DUSK LIGHT LEVEL (APPROX. 15 FC)
   B. AMBIENT LIGHT LEVEL (APPROX. 30 FC)
   C. CLEANING LIGHT LEVEL (APPROX. 70 FC)
7. THERE SHALL BE TWO (2) 1X4 3-LAMP FIXTURES WITH T-8 FLUORESCENT LAMPS AND TWO (2) 2X4 4-LAMP FIXTURES WITH T-8 FLUORESCENT LAMPS. ONE (1) OF THE LAMPS IN THE 2X4 FIXTURE SHALL HAVE A RED FILTER SLEEVE FOR THE LAMP. THIS WILL PROVIDE THE RED LIGHT LEVEL THAT IS REQUIRED AS CALLED OUT IN NOTE 5 ABOVE.

LIGHTING CONTROL SYSTEM SEQUENCE OF OPERATION:

1. THERE SHALL BE FOUR (4) LEVELS OF OF LIGHTING CONTROL FOR THIS SPACE. THEY ARE AS FOLLOWS:
   A. ANIMAL WHITE LIGHT LOW - DAWN/DUSK LIGHT LEVEL (APPROX. 15 FC), 1-LAMP ON PER FIXTURE.
   B. ANIMAL WHITE LIGHT HIGH - AMBIENT LIGHT LEVEL (APPROX. 30 FC), 2-LAMPS ON PER FIXTURE.
   C. HUMAN WHITE LIGHT - CLEANING LIGHT LEVEL (APPOX. 70 FC), 3-LAMPS ON PER FIXTURE.
   D. HUMAN RED LIGHT - RED LIGHT LEVEL (APPROX. 15 FC), 1-LAMP WITH FILTER ON FOR 2X4 FIXTURE
2. ANIMAL LIGHTING SYSTEM: THIS SYSTEM SHALL PROVIDE A PROGAMMABLE, AUTOMATIC DAY/NIGHT CYCLE ON AN ADJUSTABLE TIME AND DURATION SCHEDULE WITH PHOTOCELL CONFIRMATION OF CYCLE.
3. THE ANIMAL DAY/NIGHT CYCLE SHALL OPERATE AS FOLLOWS:
   A. FROM AN OFF POSITION (NIGHT CYCLE), THE CONTROL SYSTEM SHALL SWITCH ONE LAMP ON IN EACH FIXTURE PROVIDING A LOW LEVEL OF LIGHTING TO SIMULATE LIGHTING LEVELS SIMILAR TO DAWN. THE DURATION OF THIS LEVEL SHALL BE 30 MINUTES.
   B. AFTER 30 MINUTES, A TOTAL OF TWO (2) LAMPS IN EACH FIXTURE SHALL SWITCH ON TO PROVIDE THE ANIMAL WHITE LIGHT HIGH LEVEL. THIS LEVEL WILL REMAIN ON FOR ELEVEN HOURS.
   C. AFTER ELEVEN HOURS, THE CONTROL SYSTEM SHALL SWITCH ONE LAMP ON IN EACH FIXTURE PROVIDING A LOW LIGHT LEVEL OF LIGHTING TO SIMULATE LIGHTING LEVELS SIMILAR TO DUSK. THE DURATION OF THIS LEVEL SHALL BE 30 MINUTES. AFTER THE 30 MINUTES IS EXPIRED, ALL LIGHTS SHALL SHUT OFF STARTING THE NIGHT CYCLE AGAIN.
4. THE HUMAN LIGHTING SYSTEM SHALL OPERATE AS FOLLOWS:
   A. A PROGRAMMABLE LIGHT SWITCH LOCATED INSIDE THE ROOM NEAR THE DOOR WILL ALLOW PERSONNEL TO OVERRIDE THE ANIMAL WHITE LIGHT HIGH LEVEL TO A CLEANING LIGHT LEVEL. THIS SWITCH WILL SWITCH THREE (3) LAMPS ON IN EACH FIXTURE PROVIDING THE CLEANING LIGHT LEVEL. THE DURATION OF THIS CYCLE SHALL BE ONE HOUR. FIVE MINUTES BEFORE THE LIGHTS SHUT OFF, THE LIGHTS SHALL FLICKER.
   B. A PROGRAMMABLE LIGHT SWITCH LOCATED OUTSIDE THE ROOM NEAR THE DOOR WILL ALLOW PERSONNEL TO TURN ON THE RED LIGHT SYSTEM DURING THE ANIMAL NIGHT CYCLE. THE LIGHTS SHALL REMAIN ON FOR ONE HOUR. FIVE MINUTES BEFORE THE LIGHTS SHUT OFF, THE LIGHTS SHALL FLICKER.
   C. THE HUMAN WHITE LEVEL CANNOT OVERRIDE THE ANIMAL NIGHT CYCLE.

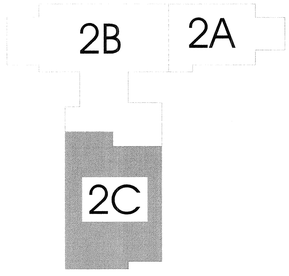
KEYED NOTES:

1. THIS FIXTURE CONTAINS A TOTAL OF 3 LAMPS. IT IS USED TO PROVIDE LIGHTING FOR THE ANIMAL WHITE LIGHT LOW, THE ANIMAL WHITE LIGHT HIGH, AND THE HUMAN WHITE LIGHT LEVEL FOR CLEANING. THIS FIXTURE SHALL CONTAIN THREE (3) BALLAST.
2. THIS FIXTURE CONTAINS A TOTAL OF 4 LAMPS. IT IS USED TO PROVIDE LIGHTING FOR THE ANIMAL WHITE LIGHT LOW, THE ANIMAL WHITE LIGHT HIGH, THE HUMAN WHITE LIGHT LEVEL, AND THE HUMAN RED LIGHT LEVEL. THIS FIXTURE SHALL CONTAIN FOUR (4) BALLAST.
3. THIS IS THE PHOTOCELL THAT WILL PROVIDE INFORMATION TO THE WATCHDOG SYSTEM TO ENSURE THAT DAY/NIGHT CYCLES ARE FUNCTIONING PROPERLY.
4. THIS SWITCH ALLOWS PERSONNEL TO SWITCH TO THE CLEANING LIGHT LEVEL.
5. THIS SWITCH ALLOWS PERSONNEL TO SWITCH ON THE RED LIGHT LEVEL DURING THE NIGHT CYCLE.

GENERAL NOTES:

1. ALL WIRING DEVICE COVERPLATES LOCATED WITHIN THE ANIMAL HOLD ROOM SHALL BE WATERPROOF WHILE IN-USE COVERS UNLESS NOTED OTHERWISE.
2. ALL ELECTRICAL DEVICES WITHIN THE ANIMAL HOLD ROOMS SHALL BE WATERPROOF AND INSTALLED USING METHODS TO ENSURE A WATERPROOF SEAL AT THE WALL ENVELOPE.

KEY PLAN



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PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

LEVEL 2 ENLARGED LIGHTING PLANS

REVISIONS

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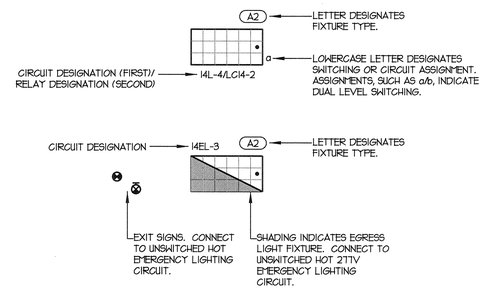
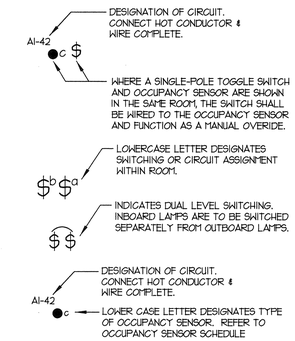
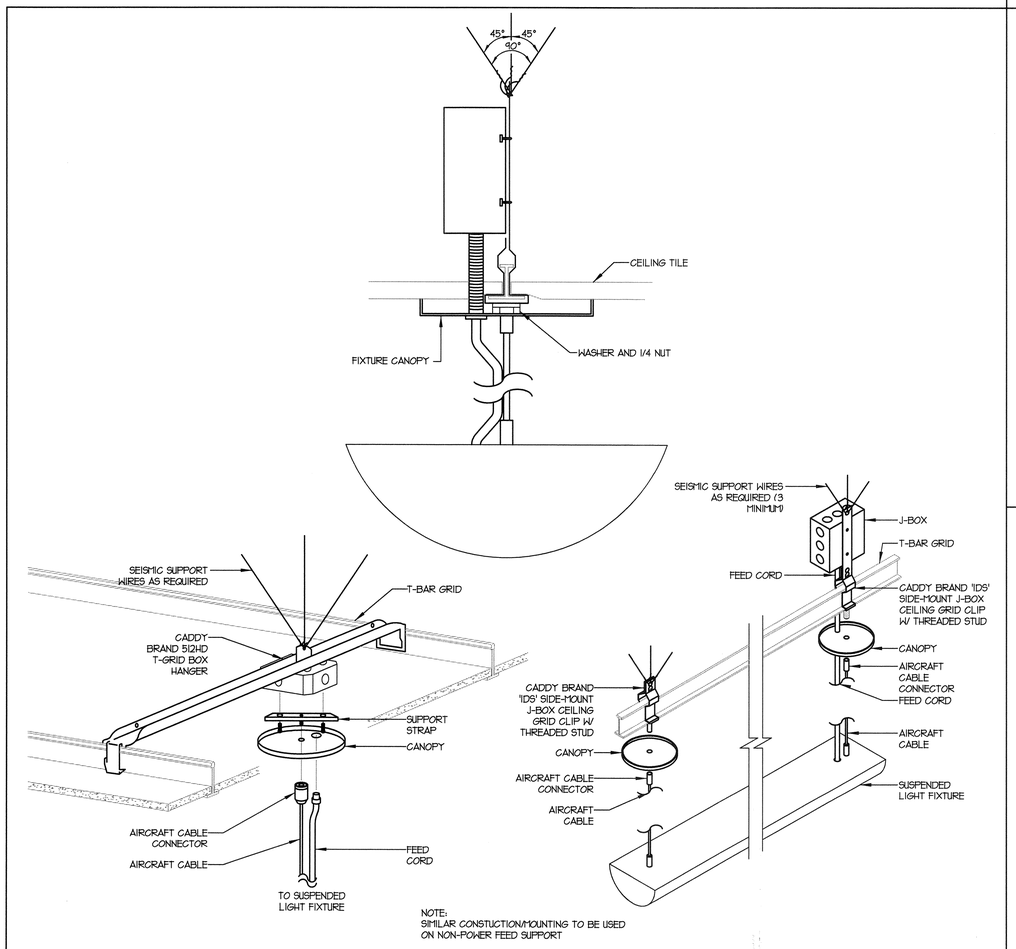


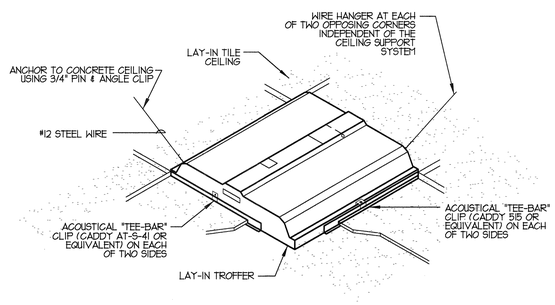
C4 TYPICAL LIGHT FIXTURE CONVENTION
SCALE: NONE



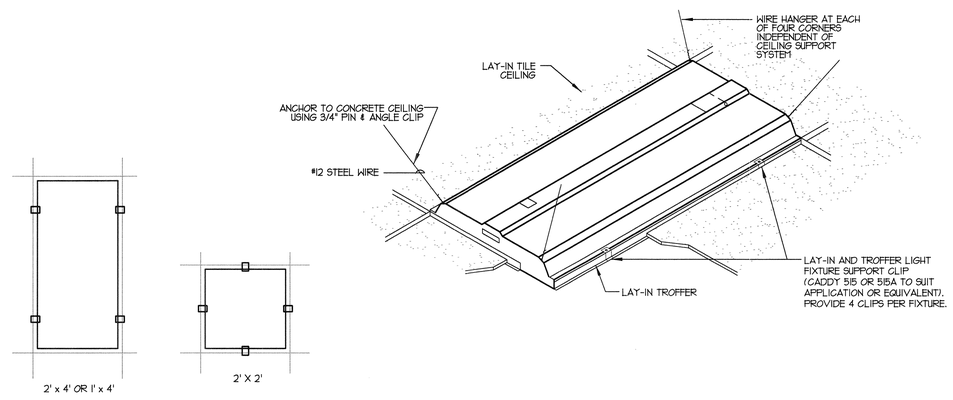
C5 TYPICAL SWITCHING CONVENTIONS
SCALE: NONE



A2 SUSPENDED FIXTURE MOUNTING DETAIL
SCALE: NONE



B4 2X2 LAY-IN TROFFER MOUNTING DETAIL
SCALE: NONE



A4 LIGHT FIXTURE SUPPORT DETAIL
SCALE: NONE

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PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
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USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

LIGHTING DETAILS

REVISIONS

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LIGHT FIXTURE SCHEDULE

TYPE	MANUFACTURER	SERIES	DESCRIPTION	VOLTAGE	LOAD (VA)	MOUNTING	LAMPS NO.	LAMPS TYPE	LAMPS WATTS	LAMPS COLOR (K)	LAMPS CRI	REMARKS
A12	AAL	UCL	SINGLE HEAD SHOE BOX LUMINAIRE UL LISTED FOR WET LOCATIONS IES DISTRIBUTION TYPE: II CUT OFF: FULL LUMINAIRE FINISH: EUROCOAT STEEL POLE HEIGHT: 25 SHAPE: STRAIGHT SQUARE WIND RATING: 100 MPH WIND LOAD WITH 1.3 GUST FACTOR POLE COLOR: SCBA	277	300	POLE	1	PULSE START METAL HALIDE	250	3100K	70	
A18	AAL	UCL	DOUBLE HEAD SHOE BOX LUMINAIRE UL LISTED FOR WET LOCATIONS IES DISTRIBUTION TYPE: III CUT OFF: FULL LUMINAIRE FINISH: EUROCOAT STEEL POLE HEIGHT: 25 SHAPE: STRAIGHT SQUARE WIND RATING: 100 MPH WIND LOAD WITH 1.3 GUST FACTOR POLE COLOR: SCBA	277	300	POLE	1	PULSE START METAL HALIDE	250	3100K	70	
A25	KIM	ET	DOUBLE HEAD SHOE BOX LUMINAIRE UL LISTED FOR WET LOCATIONS IES DISTRIBUTION TYPE: V CUT OFF: FULL LUMINAIRE COLOR: DARK BRONZE STEEL POLE HEIGHT: 25 SHAPE: STRAIGHT SQUARE WIND RATING: 100 MPH WIND LOAD WITH 1.3 GUST FACTOR POLE COLOR: SCBA	277	546	POLE	2	PULSE START METAL HALIDE	250	3100K	70	
AR1	LITHONIA	WSTM	FULL CUT-OFF TRAPEZOIDAL WALL PACK CAST ALUMINUM, COLOR BY ARCHITECT ELECTRONIC BALLAST	277	100	WALL	1	PULSE START METAL HALIDE	50	3100K	70	
AW1	LITHONIA	WSTM	FULL CUT-OFF TRAPEZOIDAL WALL PACK CAST ALUMINUM, COLOR BY ARCHITECT ELECTRONIC BALLAST	277	140	WALL	1	PULSE START METAL HALIDE	70	3100K	70	
C142G	COLUMBIA	CS4	4' FLUORESCENT OPEN CHANNEL 2 LAMPS, WIRE GUARD PROGRAM START ELECTRONIC BALLAST, BF= .71, THD: <10	277	47	CHAIN HUNG/ SURFACE	2	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
CR142G	COLUMBIA	CSR4	4' FLUORESCENT INDUSTRIAL STRIP TWO LAMPS, STEEL REFLECTOR, WIRE GUARD PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	47	SURFACE	2	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
DF61	IRIS	P406	VERTICAL COMPACT FLUORESCENT DOWNLIGHT W/ SQUARE TRIM APPERATURE: 6" ; WITH (2) T-BAR HANGERS REFLECTOR FINISH: SPECULAR CLEAR ALZAK, TRIM SCBA ELECTRONIC BALLAST: <10% THD	277	29	RECESSED	1	TRIPLE TUBE COMPACT FLUORESCENT	26	3500K	82	PROVIDE MULTI-VOLTAGE/ WATTAGE BALLAST
DF61D	IRIS	P406	VERTICAL COMPACT FLUORESCENT DOWNLIGHT W/ SQUARE TRIM APPERATURE: 6" ; WITH (2) T-BAR HANGERS REFLECTOR FINISH: SPECULAR CLEAR ALZAK, TRIM SCBA 0-10V ELECTRONIC DIMMING BALLAST DOWN TO 5%: <10% THD	277	45	RECESSED	1	TRIPLE TUBE COMPACT FLUORESCENT 4PIN BASE	42	3500K	82	REQUIRES 4-WIRE FOR DIMMING
DF81G9	PRESCOLITE	CFT8	LENSED COMPACT FLUORESCENT SHOWERLIGHT APPERATURE: 8" ; FLANGED MOUNTING REFLECTOR FINISH: SPECULAR CLEAR ALZAK ELECTRONIC BALLAST: <10% THD PRISMATIC LENS, WET LOCATION RATED	277	45	RECESSED	1	TRIPLE TUBE COMPACT FLUORESCENT	42	3500K	82	PROVIDE MULTI-VOLTAGE/ WATTAGE BALLAST
DF61W	IRIS	P406	WALL WASHER COMPACT FLUORESCENT DOWNLIGHT W/ SQUARE TRIM APPERATURE: 8" ; WITH (2) T-BAR HANGERS ASYMMETRIC SPECULAR CLEAR ALZAK REFLECTOR, TRIM SCBA ELECTRONIC BALLAST: <10% THD	277	26	RECESSED	1	TRIPLE TUBE COMPACT FLUORESCENT	26	3500K	82	PROVIDE MULTI-VOLTAGE/ WATTAGE BALLAST
FA142	COLUMBIA	ST8	1' X 4' - 2 LAMP RECESSED FLUORESCENT PATTERN 12 ACRYLIC PRISMATIC LENS .125" THICK PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	47	FLANGED	2	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
FA142H	COLUMBIA	WT	1' X 4' - 2 LAMP RECESSED FLUORESCENT - WASHDOWN SEALED AND GASKETED, WET LOCATION RATED PATTERN 12 ACRYLIC PRISMATIC LENS .125" THICK PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	47	FLANGED	2	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
FA142X	GUTH	BA	1' X 4' - 2 LAMP RECESSED FLUORESCENT - EXPLOSION PROOF CLASS I, DIVISION 2 PATTERN 12 ACRYLIC PRISMATIC LENS .125" THICK PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	47	FLANGED	2	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
FA143H	COLUMBIA	WT	1' X 4' - 3 LAMP FLUORESCENT SEALED AND GASKETED PATTERN 12 ACRYLIC PRISMATIC LENS .125" THICK PROGRAM START ELECTRONIC BALLASTS, BF= .71, QTY: 3, THD: <10	277	68	FLANGED	3	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
FA143BD	GUTH	BA	1' X 4' - 3 LAMP FLUORESCENT SEALED AND GASKETED PATTERN 12 ACRYLIC PRISMATIC LENS .125" THICK 0-10V ELECTRONIC DIMMING BALLAST DOWN TO 5%: <10% THD	277	92	FLANGED	3	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
FA243H	COLUMBIA	WT	2' X 4' - 3 LAMP FLUORESCENT - WASHDOWN SEALED AND GASKETED, WET LOCATION RATED PATTERN 12 ACRYLIC PRISMATIC LENS .125" THICK PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	68	FLANGED	3	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
FA244H	COLUMBIA	WT	2' X 4' - 4 LAMP FLUORESCENT - WASHDOWN SEALED AND GASKETED, WET LOCATION RATED PATTERN 12 ACRYLIC PRISMATIC LENS .125" THICK PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	88	FLANGED	4	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
FA244R	COLUMBIA	WT	2' X 4' - 4 LAMP FLUORESCENT - WASHDOWN - REDLIGHT SEALED AND GASKETED, WET LOCATION RATED PATTERN 12 ACRYLIC PRISMATIC LENS .125" THICK PROGRAM START ELECTRONIC BALLASTS, BF= .71, QTY: 3, THD: <10	277	88	FLANGED	3 1	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE 48" LINEAR T8 FLUORESCENT REDLIGHT	32	3500K	85	
FB222	LEDALITE	94	2' X 2' - 2 LAMP FLUORESCENT FULLY RECESSED INDIRECT ACRYLIC LENS PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	64	RECESSED	2	T5 BIAX COMPACT FLUORESCENT	40	3500K	82	
FN4X	NEORAY	23DR	4' X 4' - 1 LAMP NARROW RECESSED FLUORESCENT- EXTERIOR STEEL CONSTRUCTION, SATIN LENS PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10 DAMP LOCATION RATED	277	30	FLANGED	1	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
FN12	NEORAY	23DR	4' X 12' - 1 LAMP NARROW RECESSED FLUORESCENT STEEL CONSTRUCTION, SATIN LENS PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	120	FLANGED	4	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	PROVIDE REQUIRED ACCESSORIES FOR MULTIPLE CIRCUITS
FN16	NEORAY	23DR	4' X 16' - 1 LAMP NARROW RECESSED FLUORESCENT STEEL CONSTRUCTION, SATIN LENS PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	120	FLANGED	4	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	

LIGHT FIXTURE SCHEDULE

TYPE	MANUFACTURER	SERIES	DESCRIPTION	VOLTAGE	LOAD (VA)	MOUNTING	LAMPS NO.	LAMPS TYPE	LAMPS WATTS	LAMPS COLOR (K)	LAMPS CRI	REMARKS
FN16S	SETLIX	MIS	4' X 16' - 1 LAMP NARROW SEMI-RECESSED FLUORESCENT STEEL CONSTRUCTION, SATIN LENS PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	120	SEMI-RECESSED	4	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
FN20S	SETLIX	MIS	4' X 20' - 1 LAMP NARROW SEMI-RECESSED FLUORESCENT STEEL CONSTRUCTION, SATIN LENS PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	150	SEMI-RECESSED	5	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
FN20SE	SETLIX	MIS	4' X 20' - 1 LAMP NARROW SEMI-RECESSED FLUORESCENT STEEL CONSTRUCTION, SATIN LENS PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	150	SEMI-RECESSED	5	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	PROVIDE REQUIRED ACCESSORIES FOR MULTIPLE CIRCUITS
FN24S	SETLIX	MIS	4' X 24' - 1 LAMP NARROW SEMI-RECESSED FLUORESCENT STEEL CONSTRUCTION, SATIN LENS PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	180	SEMI-RECESSED	6	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
GA142	COLUMBIA	ST8	1' X 4' - 2 LAMP FLUORESCENT PATTERN 12 ACRYLIC PRISMATIC LENS .125" THICK PROGRAM START ELECTRONIC BALLAST, BF= .71, THD: <10	277	47	RECESSED	2	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
GA143H	COLUMBIA	WT	1' X 4' - 3 LAMP FLUORESCENT - WASHDOWN PATTERN 12 ACRYLIC PRISMATIC LENS .125" THICK SEALED AND GASKETED, WET LOCATION RATED PROGRAM START ELECTRONIC BALLAST, BF= .71, THD: <10	277	68	RECESSED	3	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
GA242	COLUMBIA	ST8	2' X 4' - 2 LAMP FLUORESCENT TROFFER PATTERN 12 ACRYLIC PRISMATIC LENS .125" THICK PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	47	RECESSED	2	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
GA242H	COLUMBIA	WT	2' X 4' - 2 LAMP FLUORESCENT - WASHDOWN SEALED AND GASKETED PATTERN 12 ACRYLIC PRISMATIC LENS .125" THICK PROGRAM START ELECTRONIC BALLAST, BF= .71, THD: <10	277	47	RECESSED	2	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
GA243	COLUMBIA	ST8	2' X 4' - 3 LAMP FLUORESCENT TROFFER PATTERN 12 ACRYLIC PRISMATIC LENS .125" THICK PROGRAM START ELECTRONIC BALLAST, BF= .71, THD: <10	277	68	RECESSED	3	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
GA243B	GUTH	BA	2' X 4' - 3 LAMP FLUORESCENT - BIOSEAL SEALED AND GASKETED ACRYLIC LENS PROGRAM START ELECTRONIC BALLAST, BF= .71, THD: <10	277	68	RECESSED	3	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
GA244	COLUMBIA	ST8	2' X 4' - 4 LAMP FLUORESCENT TROFFER PATTERN 12 ACRYLIC PRISMATIC LENS .125" THICK PROGRAM START ELECTRONIC BALLAST, BF= .71, THD: <10	277	88	RECESSED	4	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
GB222	LEDALITE	94	2' X 2' - 2 LAMP FLUORESCENT RECESSED INDIRECT ACRYLIC LENS PROGRAM START ELECTRONIC BALLAST, THD: <10	277	85	RECESSED	2	T5 BIAX COMPACT FLUORESCENT	40	3500K	82	
GD22	VISTA	1000	2' X 2' DARK ROOM TROFFER WITH FILTER STEEL CONSTRUCTION, NORMAL AND SAFE LIGHT MODES COORDINATE FILTER REQUIREMENTS WITH OWNER/ARCH	120 120	400 15	RECESSED RECESSED	2 1	INCANDESCENT A-23 INCANDESCENT A-19	200 15	- -	- -	
GN4	NEORAY	23DR	4' X 4' - 1 LAMP NARROW RECESSED FLUORESCENT STEEL CONSTRUCTION, SATIN LENS PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	30	RECESSED	1	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
GN8	NEORAY	23DR	4' X 8' - 1 LAMP NARROW RECESSED FLUORESCENT STEEL CONSTRUCTION, SATIN LENS PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	60	RECESSED	2	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
GN8W	ELLIPTIPAR	F210	8' - 1 LAMP NARROW RECESSED WALL WASHER ASYMMETRIC PARABOLIC REFLECTOR, WHITE FINISH PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	30	RECESSED	1	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
GN12	NEORAY	23DR	4' X 12' - 1 LAMP NARROW RECESSED FLUORESCENT STEEL CONSTRUCTION, SATIN LENS PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	90	RECESSED	3	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
GN16	NEORAY	23DR	4' X 16' - 1 LAMP NARROW RECESSED FLUORESCENT STEEL CONSTRUCTION, SATIN LENS PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	120	RECESSED	4	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
GN16H	NEORAY	23DR	4' X 16' - 1 LAMP NARROW RECESSED FLUORESCENT W/ HEADS STEEL CONSTRUCTION, SATIN LENS INTEGRAL ADJUSTIBLE ART MR16 HEADS PROGRAM START ELECTRONIC BALLAST, BF= .71, THD: <10	277 12	90 80	RECESSED INTEGRAL	3 4	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE INTEGRAL MR16	32 20	3500K 2900K	85 -	
GN16W	ALERA	MRA	16' - 1 LAMP NARROW RECESSED FLUORESCENT WALL WASHER ASYMMETRIC PARABOLIC REFLECTOR, WHITE FINISH PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	120	RECESSED	4	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
GN20	NEORAY	23DR	4' X 20' - 1 LAMP NARROW RECESSED FLUORESCENT STEEL CONSTRUCTION, SATIN LENS PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	150	RECESSED	5	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
GN24	NEORAY	23DR	4' X 24' - 1 LAMP NARROW RECESSED FLUORESCENT STEEL CONSTRUCTION, SATIN LENS PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	180	RECESSED	6	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	PROVIDE REQUIRED ACCESSORIES FOR MULTIPLE CIRCUITS
GN40	NEORAY	23DR	4' X 40' - 1 LAMP NARROW RECESSED FLUORESCENT STEEL CONSTRUCTION, SATIN LENS PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	300	RECESSED	10	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
GN44	NEORAY	23DR	4' X 44' - 1 LAMP NARROW RECESSED FLUORESCENT STEEL CONSTRUCTION, SATIN LENS PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	330	RECESSED	11	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
GN76	NEORAY	23DR	4' X 76' - 1 LAMP NARROW RECESSED FLUORESCENT STEEL CONSTRUCTION, SATIN LENS PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	510	RECESSED	19	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	PROVIDE REQUIRED ACCESSORIES FOR MULTIPLE CIRCUITS
PF1	TBD	TBD	DECORATIVE PENDANT - STAIRWELL	277		PENDANT						
PF82D	ALERA	CVPL	8' LINEAR INDIRECT/DIRECT 70% UP/ 30% DOWN OPTICS NUMBER OF LAMPS IN CROSS SECTION: 2 0-10V ELECTRONIC DIMMING BALLAST DOWN TO 5%: <10% THD	277	94	PENDANT	4	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	PROVIDE ALL PARTS AND PIECES FOR CONTINUOUS RUNS
PF82D9	ALERA	CVPL	8' LINEAR INDIRECT/DIRECT 70% UP/ 30% DOWN OPTICS NUMBER OF LAMPS IN CROSS SECTION: 2 DIMMING SYSTEM W/ INTEGRAL DAYLIGHT SENSOR 0-10V ELECTRONIC DIMMING BALLAST DOWN TO 5%: <10% THD	277	94	PENDANT	4	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
PF83	ALERA	CVPL	8' LINEAR INDIRECT/DIRECT 70% UP/ 30% DOWN OPTICS NUMBER OF LAMPS IN CROSS SECTION: 3 PROGRAM START ELECTRONIC BALLAST, BF= .71, THD: <10	277	184	PENDANT	6	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	

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PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

LIGHTING FIXTURE SCHEDULE

REVISIONS

MARK	DATE	DESCRIPTION

ISSUE DATA

ISSUE DATE: DEC. 9, 2008
ISSUE TYPE: DESDEV
DRAWN BY: J. HARWARD
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LIGHT FIXTURE ABBREVIATION SCHEDULE

NOTE: NOT ALL ABBREVIATIONS WILL NECESSARILY BE USED.

A.F.F.	ABOVE FINISHED FLOOR
WALL@CLG.	WALL MOUNT AT CORNER OF WALL AND CEILING
CCBA	CUSTOM PAINTED COLOR AS SELECTED BY THE ARCHITECT
SCBA	STANDARD PAINTED COLOR AS SELECTED BY THE ARCHITECT
CFBA	CUSTOM FINISH AS SELECTED BY THE ARCHITECT
SFBA	STANDARD FINISH AS SELECTED BY THE ARCHITECT
MOD	MODIFY STANDARD LIGHT FIXTURE AS INDICATED

LIGHT FIXTURE GENERAL NOTES

1. REFER TO THE ARCHITECTURAL REFLECTED CEILING PLANS FOR LOCATIONS OF LIGHT FIXTURES. BRING ALL DISCREPANCIES OF LOCATIONS AND QUANTITIES TO THE ATTENTION OF THE ARCHITECT AND ELECTRICAL ENGINEER PRIOR TO BIDDING.
2. REFER TO ARCHITECTURAL ELEVATIONS FOR MOUNTING HEIGHTS AND LOCATIONS OF LIGHT FIXTURES. BRING ALL DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT PRIOR TO BIDDING.
3. REFER TO THE SPECIFICATIONS FOR OTHER LIGHT FIXTURE, BALLAST, AND LAMP REQUIREMENTS AND ACCEPTABLE MANUFACTURERS.
4. REFER TO ARCHITECTURAL DRAWINGS FOR LOUVER REQUIREMENTS (IF ANY).
5. CONFIRM AVAILABLE MOUNTING DEPTHS OF ALL LIGHT FIXTURES AND COMPARE WITH DEPTHS SHOWN ON SHOP DRAWING. BRING ALL POTENTIAL CONFLICT AREAS TO THE ATTENTION OF THE ARCHITECT AND ELECTRICAL ENGINEER PRIOR TO RELEASE.

BIDDING REQUIREMENTS

1. BID ONLY PRODUCTS THAT ARE SPECIFIED OR APPROVED BY ADDENDUM.
2. PACKAGING OF LIGHT FIXTURES WITH OTHER SYSTEMS IS NOT ALLOWED.
3. WHEN ONLY ONE PRODUCT IS APPROVED FOR BIDDING, THE PRICE FOR THAT ITEM SHALL BE BROKEN OUT SEPARATELY WHEN SUBMITTING PRICING TO VARIOUS DISTRIBUTORS AND/OR CONTRACTORS.
4. WHEN A CONTRADICTION EXISTS BETWEEN A SPECIFIC MODEL NUMBER AND THE DESCRIPTION, THE DESCRIPTION SHALL GOVERN.

LIGHT FIXTURE PRIOR APPROVAL REQUIREMENTS

1. PRIOR APPROVAL IS REQUIRED BEFORE BIDDING THIS PROJECT.
2. PRIOR APPROVALS SHALL BE SUBMITTED TO THE ELECTRICAL ENGINEER'S OFFICE AT LEAST (8) EIGHT WORKING DAYS BEFORE THE BID. PRIOR APPROVALS RECEIVED AFTER THIS TIME PERIOD SHALL BE REJECTED.
3. PRIOR APPROVALS SHALL BE SIGNED BY A PRINCIPAL OF THE SUBMITTING ORGANIZATION STATING THAT THEY HAVE PREPARED AND/OR REVIEWED THE SUBMITTAL AND THAT THE PRODUCTS PROPOSED ARE EQUIVALENT TO THOSE SPECIFIED. ANY EXCEPTIONS SHALL BE SO NOTED.
4. ITEMS THAT ARE SUBMITTED AND HAVE BEEN APPROVED WILL BE LISTED IN THE ADDENDUM(S). VERBAL APPROVAL WILL NOT BE GIVEN ON ANY ITEM.
5. IT IS NOT THE RESPONSIBILITY OF THE ELECTRICAL ENGINEER TO NOTIFY THE SUBMITTING PARTY OF ERRORS IN THE SUBMITTAL. NOTIFICATION OF ERRORS BY THE ELECTRICAL ENGINEER PRIOR TO ISSUANCE OF THE ADDENDUM(S) MAY NOT BE GIVEN.
6. PRIOR APPROVALS SHALL CONSIST OF TWO SETS OF CUT SHEETS DESCRIBING THE PRODUCTS BEING SUBMITTED AS EQUIVALENTS. FAXES ARE NOT ACCEPTABLE. ALL SPECIFICATION INFORMATION SHALL BE CLEARLY MARKED, WITH NON-APPLICABLE INFORMATION CROSSED OUT. COMPLETE PHOTOMETRIC DATA SHALL BE PROVIDED. PRODUCTS WITHOUT PHOTOMETRIC DATA WILL BE NOT BE APPROVED.

LIGHT FIXTURE SCHEDULE KEYED NOTES

1. ---
2. ---

LIGHT FIXTURE SCHEDULE

TYPE	MANUFACTURER	SERIES	DESCRIPTION	VOLTAGE	LOAD (VA)	MOUNTING	LAMPS NO.	LAMPS TYPE	LAMPS WATTS	LAMPS COLOR (K)	LAMPS CRI	REMARKS
PF83DS	ALERA	CVPL	8' LINEAR INDIRECT/DIRECT 70% UP/ 30% DOWN OPTICS NUMBER OF LAMPS IN CROSS SECTION: 3 DIMMING SYSTEM W/ INTEGRAL DAYLIGHT SENSOR 0-10V ELECTRONIC DIMMING BALLAST DOWN TO 5%. <0% THD	277	184	PENDANT	6	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
PF123D	ALERA	CVPL	12' LINEAR INDIRECT/DIRECT 60% UP/ 40% DOWN OPTICS NUMBER OF LAMPS IN CROSS SECTION: 3 DIMMING SYSTEM W/ INTEGRAL DAYLIGHT SENSOR 0-10V ELECTRONIC DIMMING BALLAST DOWN TO 5%. <0% THD	277	276	PENDANT	9	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
PF163D	ALERA	CVPL	16' LINEAR INDIRECT/DIRECT 70% UP/ 30% DOWN OPTICS NUMBER OF LAMPS IN CROSS SECTION: 3 0-10V ELECTRONIC DIMMING BALLAST DOWN TO 5%. <0% THD	277	368	PENDANT	12	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
PF243	ALERA	CVPL	24' LINEAR INDIRECT/DIRECT 60% UP/ 40% DOWN OPTICS NUMBER OF LAMPS IN CROSS SECTION: 3 PROGRAM START ELECTRONIC BALLAST, BF= .71, THD: <10	277	408	PENDANT	18	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
PF243E	ALERA	CVPL	24' LINEAR INDIRECT/DIRECT 60% UP/ 40% DOWN OPTICS NUMBER OF LAMPS IN CROSS SECTION: 3 PROGRAM START ELECTRONIC BALLAST, BF= .71, THD: <10 EMERGENCY CIRCUIT	277	408	PENDANT	18	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	PROVIDE REQUIRED ACCESSORIES FOR MULTIPLE CIRCUITS
PP1	OWNER PROVIDED	-	SURGICAL PROCEDURE LIGHT - SINGLE HEAD	277								COORDINATE W/ OWNER
PP2	OWNER PROVIDED	-	SURGICAL PROCEDURE LIGHT - DUAL HEAD	277								COORDINATE W/ OWNER
SA142B	GUTH	BA	1' X 4' - 2 LAMP FLUORESCENT- BIOSEAL SEALED AND GASKETED PATTERN 12 ACRYLIC PRISMATIC LENS .125" THICK PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	47	SURFACE	2	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
SA143B	GUTH	BA	1' X 4' - 3 LAMP FLUORESCENT- BIOSEAL SEALED AND GASKETED PATTERN 12 ACRYLIC PRISMATIC LENS .125" THICK PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	68	SURFACE	3	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
SL1	BEGA	2035	LED STEP LIGHT	120	6.8	IN GRADE	1	LED	-	-	-	
SR1	TBD	TBD	ANIMAL RED LIGHT	277		WALL	1					
SR1B	TBD	TBD	ANIMAL RED LIGHT - BIOSEAL	277		WALL	1					
SW142X	LDPI	380	1' X 4' - 2 LAMP FLUORESCENT SURFACE WRAP- EXPLOSION PROOF PRISMATIC WRAP AROUND LENS PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	47	SURFACE	2	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
UC41	COLUMBIA	UC	FLUORESCENT SURFACE MOUNT VAPOR TIGHT ACRYLIC LENS, INTEGRAL TOGGLE SWITCH PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	30	SURFACE	1	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
VF142	TBD	TBD	FLUORESCENT SURFACE MOUNT VAPOR TIGHT ACRYLIC LENS PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	47	SURFACE	2	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
VN1	HUBBELL	VBGG	INCANDESCENT ELEVATOR PIT JELLY JAR WET LOCATION RATED, VAPORPROOF, CAST ALUMINUM LAMP GUARD	120	150	WALL	1	MEDIUM BASE INCANDESCENT	150	-	-	
WF142	ALERA	MDI	4' FLUORESCENT WALL BRACKET - RESTROOM WHITE POWDER COAT STEEL HOUSING, DUST COVER 2 LAMPS: 1 UPLIGHT, 1 DOWNLIGHT PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	47	WALL	2	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
WF142H	COLUMBIA	FNPV	4' FLUORESCENT WALL BRACKET- CLOSET LIGHT PRISMATIC ACRYLIC LENS WET LOCATION RATED FOR WALL MOUNT 2 LAMPS: 1 UPLIGHT, 1 DOWNLIGHT PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	47	WALL	2	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
WF143	ALERA	MSB	4' FLUORESCENT WALL BRACKET - STAIRS WHITE POWDER COAT STEEL HOUSING, DUST COVER 3 LAMPS: 1 UPLIGHT, 2 DOWNLIGHT PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	68	WALL	3	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	
WN2	TBD	TBD	4" X 2' - 1 LAMP NARROW RECESSED FLUORESCENT ALUMINUM CONTRUCTION, SATIN LENS PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	45	VERTICAL RECESSED FLANGED	1	T5 BIAX COMPACT FLUORESCENT	40	3500K	82	*MOUNT AT XX" TO CENTER A.F.F. FLUSH IN WALL
WN4	NEORAY	23DR	4" X 4' - 1 LAMP NARROW RECESSED FLUORESCENT ALUMINUM CONTRUCTION, SATIN LENS PROGRAM START ELECTRONIC BALLAST BF= .71, THD: <10	277	30	VERTICAL RECESSED FLANGED	1	48" LINEAR SUPER T8 FLUORESCENT 3100 LUMEN, 24000 HRS RATED LIFE	32	3500K	85	*MOUNT AT XX" TO CENTER A.F.F. FLUSH IN WALL
X1	DUAL-LITE	CVD	LED DIE-CAST ALUMINUM EXIT SIGN AC ONLY, LETTER COLOR: GREEN HOUSING COLOR: CBA ; NUMBER OF FACES: 1	277	5	UNIVERSAL	5	LED	-	-	-	
X1E	DUAL-LITE	LE	ALUMINUM HOUSING/MOUNT, CLEAR ACRYLIC EDGE LIT EXIT SIGN AC ONLY, LETTER COLOR: GREEN HOUSING COLOR: CBA ; NUMBER OF FACES: 1	277	5	REFER TO PLANS	5	LED	-	-	-	COORDINATE MOUNTING OPTIONS WITH DRAWINGS
X1EL	DUAL-LITE	LE	ALUMINUM HOUSING/MOUNT, CLEAR ACRYLIC EDGE LIT EXIT SIGN AC ONLY, LETTER COLOR: GREEN HOUSING COLOR: CBA ; NUMBER OF FACES: 1, LEFT CHEVRON	277	5	REFER TO PLANS	5	LED	-	-	-	COORDINATE MOUNTING OPTIONS WITH DRAWINGS
X1ER	DUAL-LITE	LE	ALUMINUM HOUSING/MOUNT, CLEAR ACRYLIC EDGE LIT EXIT SIGN AC ONLY, LETTER COLOR: GREEN HOUSING COLOR: CBA ; NUMBER OF FACES: 1, RIGHT CHEVRON	277	5	REFER TO PLANS	5	LED	-	-	-	COORDINATE MOUNTING OPTIONS WITH DRAWINGS
X1W	DUAL-LITE	LN4X	WATERPROOF LED DIE-CAST ALUMINUM EXIT SIGN AC ONLY, LETTER COLOR: GREEN HOUSING COLOR: CBA ; NUMBER OF FACES: 1 SPRAYDOWN IP RATED	277	5	UNIVERSAL	5	LED	-	-	-	
X2	DUAL-LITE	CVD	LED DIE-CAST ALUMINUM EXIT SIGN AC ONLY, LETTER COLOR: GREEN HOUSING COLOR: CBA ; NUMBER OF FACES: 2	277	5	UNIVERSAL	5	LED	-	-	-	
X2EB	DUAL-LITE	LE	ALUMINUM HOUSING/MOUNT, CLEAR ACRYLIC EDGE LIT EXIT SIGN AC ONLY, LETTER COLOR: GREEN HOUSING COLOR: CBA ; NUMBER OF FACES: 2, (1) LEFT & (1) RIGHT CHEVRON	277	5	REFER TO PLANS	5	LED	-	-	-	COORDINATE MOUNTING OPTIONS WITH DRAWINGS

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PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

LIGHTING FIXTURE SCHEDULE

REVISIONS

MARK	DATE	DESCRIPTION

ISSUE DATA

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EL602

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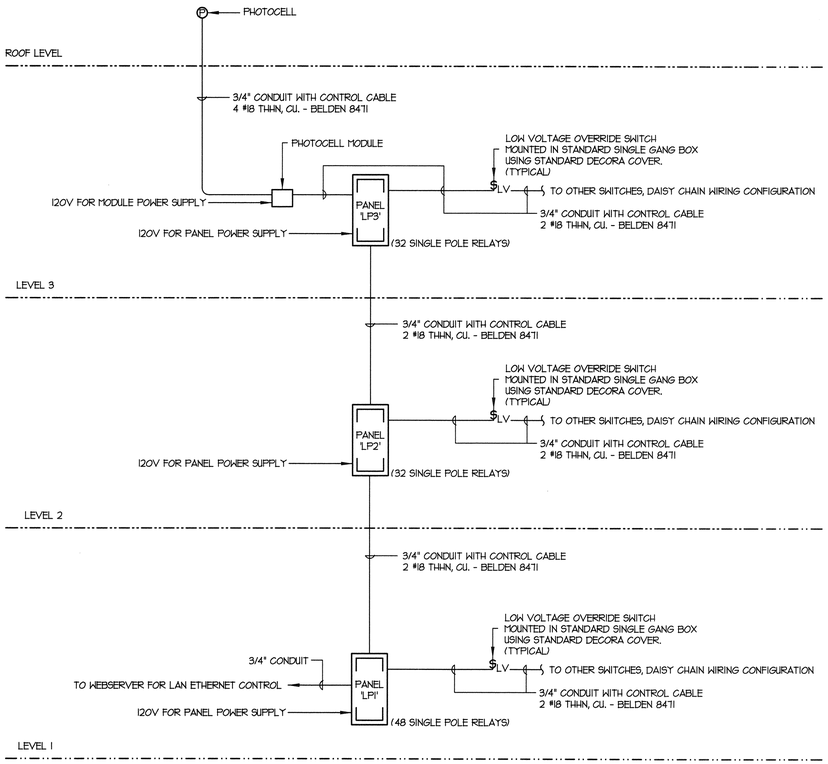

GENERAL BUILDING LIGHTING CONTROL SYSTMEM RISER DIAGRAM (A2 / EL605)

PANEL SCHEDULE - LP1

LCP ID: 1
Location:
Supply Circuit:

Relay	Circuit	Description	Switch/Sensor	Comment
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
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22				
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35				
36				
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38				
39				
40				
41				
42				
43				
44				
45				
46				
47				
48				

GROUP SWITCH SCHEDULE - LP1

LCP ID: 1
Location:

Channel	Description	Function	Loads Controlled
A		Unused	
B		Unused	
C		Unused	
D		Unused	
E		Unused	
F		Unused	
G		Unused	
H		Unused	
I		Unused	
J		Unused	
K		Unused	
L		Unused	
M		Unused	
N		Unused	
O		Unused	
P		Unused	

PANEL SCHEDULE - LP3

LCP ID: 1
Location:
Supply Circuit:

Relay	Circuit	Description	Switch/Sensor	Comment
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
32				
33				
34				
35				
36				

PANEL SCHEDULE - LP2

LCP ID: 1
Location:
Supply Circuit:

Relay	Circuit	Description	Switch/Sensor	Comment
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
32				
33				
34				
35				
36				

GROUP SWITCH SCHEDULE - LP2

LCP ID: 1
Location:

Channel	Description	Function	Loads Controlled
A		Unused	
B		Unused	
C		Unused	
D		Unused	
E		Unused	
F		Unused	
G		Unused	
H		Unused	
I		Unused	
J		Unused	
K		Unused	
L		Unused	
M		Unused	
N		Unused	
O		Unused	
P		Unused	

GROUP SWITCH SCHEDULE - LP3

LCP ID: 1
Location:

Channel	Description	Function	Loads Controlled
A		Unused	
B		Unused	
C		Unused	
D		Unused	
E		Unused	
F		Unused	
G		Unused	
H		Unused	
I		Unused	
J		Unused	
K		Unused	
L		Unused	
M		Unused	
N		Unused	
O		Unused	
P		Unused	

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PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

LIGHTING SYSTEM RISER DIAGRAMS

REVISIONS

MARK	DATE	DESCRIPTION

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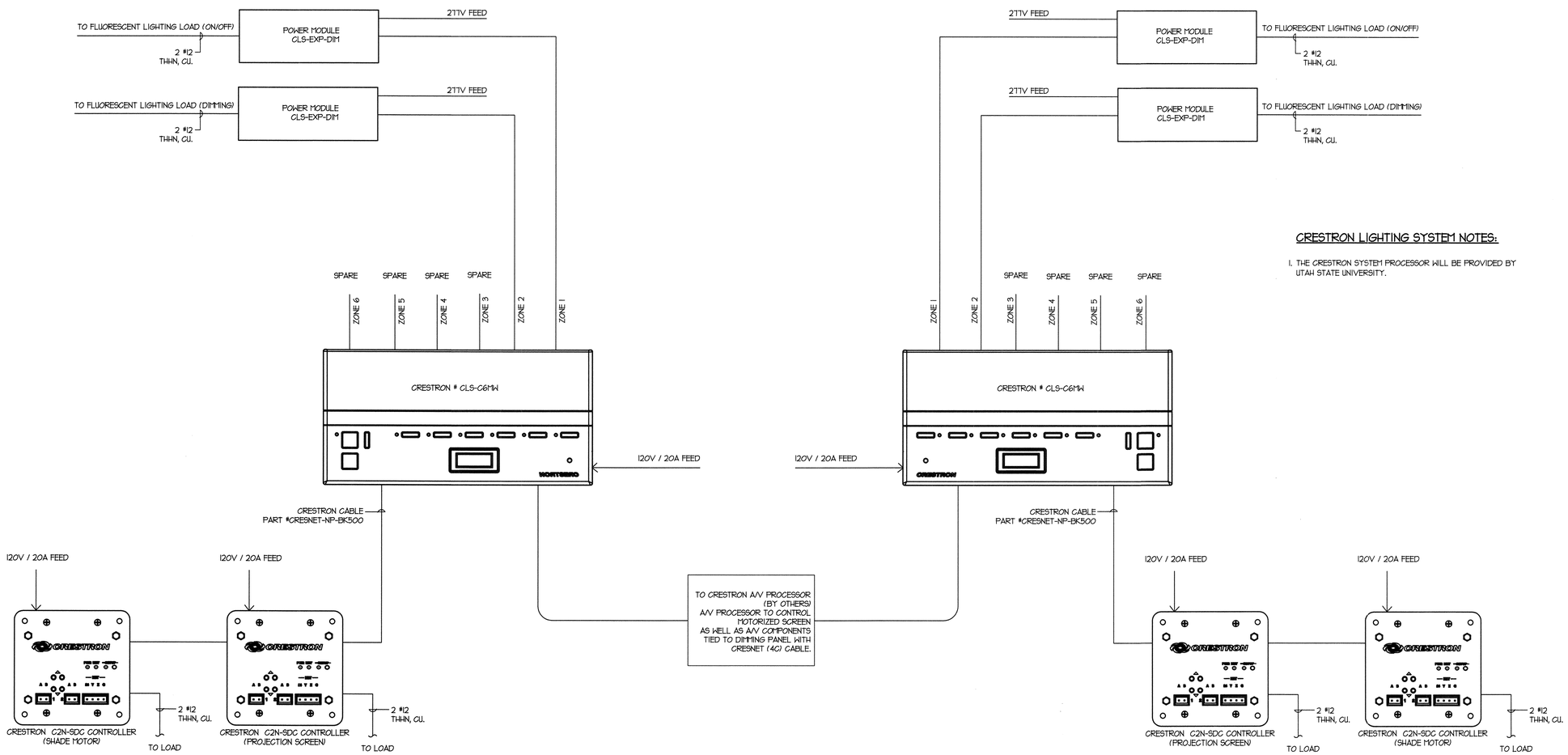

CRESTRON LIGHTING SYSTEM NOTES:

1. THE CRESTRON SYSTEM PROCESSOR WILL BE PROVIDED BY UTAH STATE UNIVERSITY.

CONFERENCE ROOM LIGHTING CONTROL SYSTEM RISER DIAGRAM

A5 / EL605

ROOMS 151, 158, 158A, 205B, 205E, 305B, 305E

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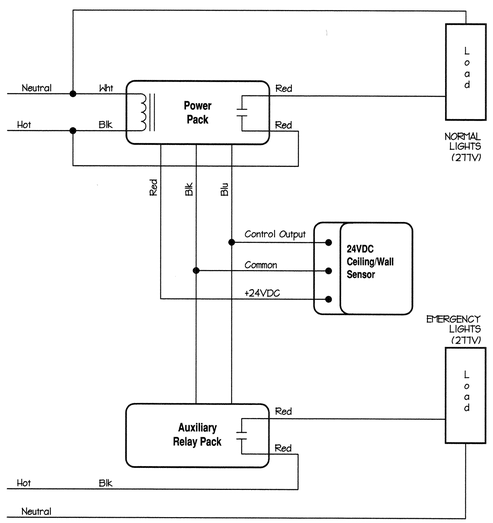
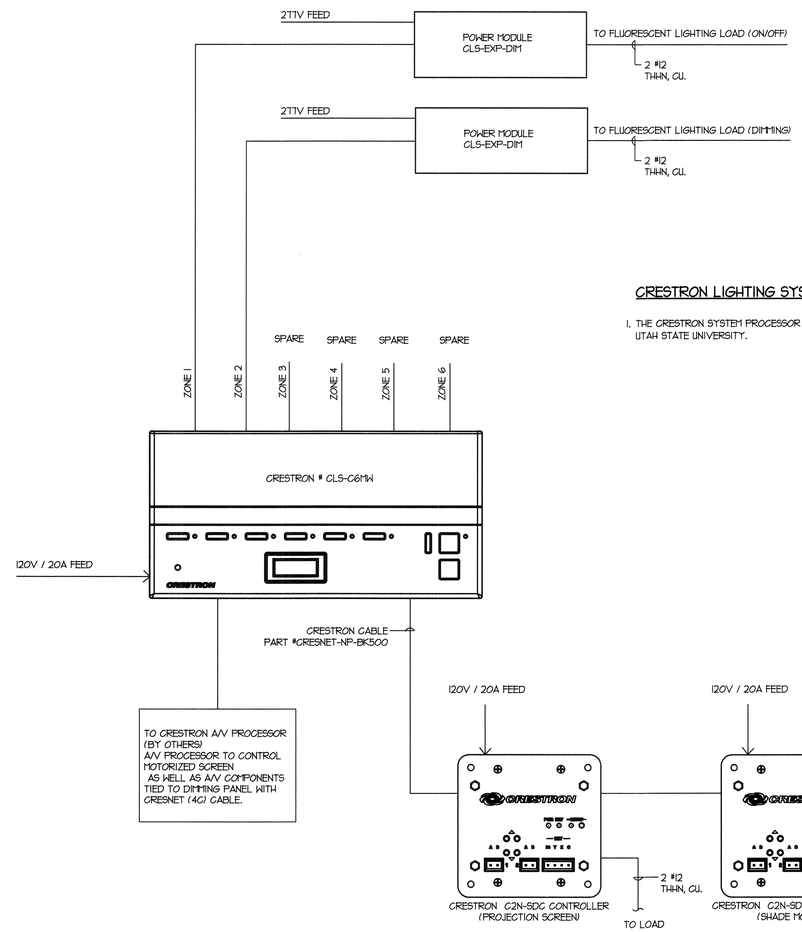


RESTROOM OCCUPANCY SENSOR DUAL CIRCUIT WIRING DIAGRAM

A2 / EL605

ROOMS 128, 129, 159A, 159B, 210, 211, 310, 311



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CONFERENCE ROOM LIGHTING CONTROL SYSTEM RISER DIAGRAM

A5 / EL605

ROOMS 151, 158, 158A, 205B, 205E, 305B, 305E

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Envision Engineering, PC

COM*check* Software Version 3.6.0

Interior Lighting and Power Compliance Certificate

90.1 (2004) Standard

Section 1: Project Information

Project Type: **New Construction**
Project Title : USU USTAR

Construction Site: Owner/Agent: Designer/Contractor:

Section 2: General Information

Building Use Description by: **Activity Type**

Activity Type(s)	Floor Area
Common Space Types:Office - Enclosed	10803
Common Space Types:Laboratory	32478
Common Space Types:Lobby	3962
Common Space Types:Conference/Meeting/Multipurpose	1350
Common Space Types:Corridor/Transition	17711
Common Space Types:Stairs-Active	4000
Common Space Types:Electrical/Mechanical	31631
Common Space Types:Restrooms	2918
Common Space Types:Active Storage	5516
Common Space Types:Dining Area - General	597
Common Space Types:Food Preparation	1785
Common Space Types:Inactive Storage	3811

Section 3: Requirements Checklist

Interior Lighting:

☐ 1. Total proposed watts must be less than or equal to total allowed watts.

Allowed Watts	Proposed Watts	Complies
133822	83160	YES

☐ 2. Exit signs 5 Watts or less per side.

Controls, Switching, and Wiring:

☐ 3. Independent manual or occupancy sensing controls for each space (remote switch with indicator allowed for safety or security).

☐ 4. Occupant sensing control in class rooms, conference/meeting rooms, and employee lunch and break rooms.
Exceptions:

Spaces with multi-scene control; shop classrooms, laboratory classrooms, and preschool through 12th grade classrooms.

☐ 5. Automatic shutoff control for lighting in >5000 sq.ft buildings by time-of-day device, occupant sensor, or other automatic control.
Exceptions:

24 hour operation lighting; patient care areas; where auto shutoff would endanger safety or security.

☐ 6. Master switch at entry to hotel/motel guest room.

☐ 7. Separate control device for display/accent lighting, case lighting, task lighting, nonvisual lighting, lighting for sale, and demonstration lighting.

☐ 8. Tandem wired one-lamp and three-lamp ballasted luminaires (No single-lamp ballasts).
Exceptions:

Electronic high-frequency ballasts;

Luminaires not on same switch;
Recessed luminaires 10 ft. apart or surface/pendant not continuous;
Luminaires on emergency circuits.

Voltage Drop:

☐ 9. Feeder conductors have been designed for a maximum voltage drop of 2 percent.

☐ 10. Branch circuit conductors have been designed for a maximum voltage drop of 3 percent.

Section 4: Compliance Statement

Compliance Statement: The proposed lighting design represented in this document is consistent with the building plans, specifications and other calculations submitted with this permit application. The proposed lighting system has been designed to meet the 90.1 (2004) Standard requirements in COM*check* Version 3.6.0 and to comply with the mandatory requirements in the Requirements Checklist.

Name - Title _____ Signature _____ Date _____

Section 5: Post Construction Compliance Statement

Record Drawings and Operating and Maintenance Manuals:

☐ 1. Construction documents with record drawings and operating and maintenance manuals provided to the owner.

Lighting Designer or Contractor Name _____ Signature _____ Date _____

COM*check* Software Version 3.6.0

Interior Lighting Application Worksheet

90.1 (2004) Standard

Section 1: Allowed Lighting Power Calculation

A Area Category	B Floor Area (ft2)	C Allowed Watts / ft2	D Allowed Watts (B x C)
Common Space Types:Office - Enclosed	10803	1.1	11883
Common Space Types:Laboratory	32478	1.4	45469
Common Space Types:Lobby	3962	1.3	5151
Common Space Types:Conference/Meeting/Multipurpose	1350	1.3	1755
Common Space Types:Corridor/Transition	17711	0.5	8856
Common Space Types:Stairs-Active	4000	0.6	2400
Common Space Types:Electrical/Mechanical	31631	1.5	47447
Common Space Types:Restrooms	2918	0.9	2626
Common Space Types:Active Storage	5516	0.8	4413
Common Space Types:Dining Area - General	597	0.9	537
Common Space Types:Food Preparation	1785	1.2	2142
Common Space Types:Inactive Storage	3811	0.3	1143
		Total Allowed Watts =	133822

Section 2: Proposed Lighting Power Calculation

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixtures	D Fixture Watt.	E (C X D)
Common Space Types:Office - Enclosed (10803 sq.ft.)				
Linear Fluorescent: PF82D: PENDANT INDIRECT- DIMMABLE / 48" T8 32W (Super T8) / Electronic	2	8	62	496
Linear Fluorescent: PF83: PENDANT INDIRECT / 48" T8 32W (Super T8) / Electronic	3	2	68	136
Linear Fluorescent: PF82DS: PENDANT INDIRECT- DAYLIGHTING / 48" T8 32W (Super T8) / Electronic	2	4	62	248
Linear Fluorescent: PF83DS: PENDANT INDIRECT- DAYLIGHTING / 48" T8 32W (Super T8) / Electronic	3	24	184	4416
Compact Fluorescent: GB222: GRID BASKET INDIRECT / BIAX 40W / Electronic	2	48	85	4080
Compact Fluorescent: DF61W: SQUARE DOWNLIGHT - WALL WASH / Triple 4-pin 26W / Electronic	1	6	26	156
Linear Fluorescent: PF123: PENDANT INDIRECT / 48" T8 32W (Super T8) / Electronic	3	4	68	272
Linear Fluorescent: GN8W: RECESSED ASYMMETRIC WALL WASH / 48" T8 32W (Super T8) / Electronic	2	2	60	120
Linear Fluorescent: GA242: PRISMATIC TROFFER / 48" T8 32W (Super T8) / Electronic	2	2	47	94
Linear Fluorescent: UC41: UNDERCABINET LIGHT / 48" T8 32W (Super T8) / Electronic	1	7	30	210
Linear Fluorescent: GA243: PRISMATIC TROFFER / 48" T8 32W (Super T8) / Electronic	3	3	68	204
Common Space Types:Laboratory (32478 sq.ft.)				
Linear Fluorescent: P123DS: PENDANT INDIRECT- DAYLIGHTING / 48" T8 32W (Super T8) / Electronic	3	16	276	4416
Linear Fluorescent: PF243: PENDANT INDIRECT / 48" T8 32W (Super T8) / Electronic	3	10	408	4080
Linear Fluorescent: PF243E: PENDANT INDIRECT / 48" T8 32W (Super T8) / Electronic	3	6	408	2448
Linear Fluorescent: GA244: PRISMATIC TROFFER / 48" T8 32W (Super T8) / Electronic	4	46	88	4048
Linear Fluorescent: PF83DS: PENDANT INDIRECT- DAYLIGHTING / 48" T8 32W (Super T8) / Electronic	3	4	184	736
Linear Fluorescent: GA142W: PRISMATIC TROFFER - WASHDOWN / 48" T8 32W (Super T8) / Electronic	2	21	47	987

Linear Fluorescent: GA243W: PRISMATIC TROFFER - WASHDOWN / 48" T8 32W (Super T8) / Electronic	3	48	68	3264
Linear Fluorescent: FA143W: PRISMATIC TROFFER - WASHDOWN / 48" T8 32W (Super T8) / Electronic	3	88	68	5984
Linear Fluorescent: GA142: PRISMATIC TROFFER / 48" T8 32W (Super T8) / Electronic	2	6	47	282
Linear Fluorescent: GA244W: PRISMATIC TROFFER - WASHDOWN / 48" T8 32W (Super T8) / Electronic	4	5	88	440
Linear Fluorescent: FA244W: PRISMATIC TROFFER - WASHDOWN / 48" T8 32W (Super T8) / Electronic	4	15	88	1320
Linear Fluorescent: VF142: VAPOR TIGHT COOLER LIGHT / 48" T8 32W (Super T8) / Electronic	2	2	47	94
Linear Fluorescent: GA243: PRISMATIC TROFFER / 48" T8 32W (Super T8) / Electronic	3	28	68	1904
Linear Fluorescent: FA243: PRISMATIC TROFFER / 48" T8 32W (Super T8) / Electronic	3	4	68	272
Incandescent: GD22: DARK ROOM LIGHT / Other	3	4	300	1200
Linear Fluorescent: WF142W: WALL BRACKET - WASHDOWN / 48" T8 32W (Super T8) / Electronic	2	2	47	94
Linear Fluorescent: FA243W: PRISMATIC TROFFER - WASHDOWN / 48" T8 32W (Super T8) / Electronic	3	6	68	408
Linear Fluorescent: GA242: PRISMATIC TROFFER / 48" T8 32W (Super T8) / Electronic	2	5	47	235
Linear Fluorescent: C142G: INDUSTRIAL STRIP W/ WIRE GUARD / 48" T8 32W (Super T8) / Electronic	2	1	47	47
Linear Fluorescent: FA142W: PRISMATIC TROFFER - WASHDOWN / 48" T8 32W (Super T8) / Electronic	2	1	47	47
Common Space Types:Lobby (3962 sq.ft.)				
Linear Fluorescent: GN8: NARROW RECESSED / 48" T8 32W (Super T8) / Electronic	1	1	60	60
Linear Fluorescent: GN16: RECESSED SATIN LENS NARROW / 48" T8 32W (Super T8) / Electronic	1	2	120	240
Linear Fluorescent: GN20: NARROW RECESSED / 48" T8 32W (Super T8) / Electronic	1	4	150	600
Linear Fluorescent: GA242W: PRISMATIC TROFFER- WASHDOWN / 48" T8 32W (Super T8) / Electronic	2	6	47	282
Linear Fluorescent: WN4: RECESSED VERTICAL NARROW / 48" T8 32W (Super T8) / Electronic	1	2	30	60
Compact Fluorescent: DF61: RECESSED DOWNLIGHT / Triple 4-pin 26W / Electronic	1	11	26	286
Compact Fluorescent: DF61W: RECESSED DOWNLIGHT / Triple 4-pin 26W / Electronic	1	4	26	104
Linear Fluorescent: GN12: RECESSED SATIN LENS NARROW / 48" T8 32W (Super T8) / Electronic	1	12	90	1080
Compact Fluorescent: GB222: GRID BASKET INDIRECT / BIAX 40W / Electronic	2	6	85	510
Common Space Types:Conference/Meeting/Multipurpose (1350 sq.ft.)				
Linear Fluorescent: PF83D: PENDANT INDIRECT- DIMMABLE / 48" T8 32W (Super T8) / Electronic	3	6	184	1104
Linear Fluorescent: GN8W: RECESSED ASYMMETRIC WALL WASH / 48" T8 32W (Super T8) / Electronic	2	6	60	360
Linear Fluorescent: PF163D: PENDANT INDIRECT- DIMMABLE / 48" T8 32W (Super T8) / Electronic	3	4	368	1472
Linear Fluorescent: GN16W: RECESSED ASYMMETRIC WALL WASH / 48" T8 32W (Super T8) / Electronic	2	2	188	376
Common Space Types:Corridor/Transition (17711 sq.ft.)				
Linear Fluorescent: GA242: PRISMATIC TROFFER / 48" T8 32W (Super T8) / Electronic	2	30	47	1410
Linear Fluorescent: GN4: RECESSED SATIN LENS NARROW / 48" T8 32W (Super T8) / Electronic	1	80	30	2400
Linear Fluorescent: GN20: RECESSED SATIN LENS NARROW / 48" T8 32W (Super T8) / Electronic	1	2	150	300
Linear Fluorescent: GN76: RECESSED SATIN LENS NARROW / 48" T8 32W (Super T8) / Electronic	1	1	570	570
Linear Fluorescent: GN24: RECESSED SATIN LENS NARROW / 48" T8 32W (Super T8) / Electronic	1	1	180	180
Linear Fluorescent: WN2: RECESSED VERTICAL NARROW / 48" T8 32W (Super T8) / Electronic	1	2	40	80
Linear Fluorescent: WN4: RECESSED VERTICAL NARROW / 48" T8 32W (Super T8) / Electronic	1	3	30	90
Linear Fluorescent: GN12: RECESSED SATIN LENS NARROW / 48" T8 32W (Super T8) -/ Electronic	1	4	90	360
Linear Fluorescent: FN12: RECESSED SATIN LENS NARROW / 48" T8 32W (Super T8) / Electronic	1	1	90	90

Linear Fluorescent: GA142W: PRISMATIC TROFFER - WASHDOWN / 48" T8 32W (Super T8) / Electronic	2	68	47	3196
Compact Fluorescent: GB222: GRID BASKET INDIRECT / BIAX 40W / Electronic	2	4	85	340
Linear Fluorescent: GN44: RECESSED SATIN LENS NARROW / 48" T8 32W (Super T8) / Electronic	1	2	330	660
Linear Fluorescent: GN40: RECESSED SATIN LENS NARROW / 48" T8 32W (Super T8) / Electronic	1	2	300	600
Linear Fluorescent: FN2: RECESSED VERTICAL NARROW / 48" T8 32W (Super T8) / Electronic	1	4	40	160
Linear Fluorescent: GN8: RECESSED SATIN LENS NARROW / 48" T8 32W (Super T8) / Electronic	1	12	60	720
Linear Fluorescent: GA243: PRISMATIC TROFFER / 48" T8 32W (Super T8) / Electronic	3	1	68	68
Linear Fluorescent: FA142W: PRISMATIC TROFFER / 48" T8 32W (Super T8) / Electronic	2	15	47	705
Linear Fluorescent: SA142B: PRISMATIC TROFFER - BIOSEAL / 48" T8 32W (Super T8) / Electronic	2	19	47	893
Linear Fluorescent.copy 1: SA143B: PRISMATIC TROFFER - BIOSEAL / 48" T8 32W (Super T8) / Electronic	3	41	68	2788
Common Space Types:Stairs-Active (4000 sq.ft.)				
Linear Fluorescent: WF143: WALL BRACKET / 48" T8 32W (Super T8) / Electronic	3	32	68	2176
Linear Fluorescent: WN4: RECESSED VERTICAL NARROW / 48" T8 32W (Super T8) / Electronic	1	2	30	60
Common Space Types:Electrical/Mechanical (31631 sq.ft.)				
Linear Fluorescent: C142G: INDUSTRIAL STRIP W/ WIRE GUARD / 48" T8 32W (Super T8) / Electronic	2	136	47	6392
Incandescent: VN1: ELEVATOR WELL EM LIGHT / Incandescent 100W	1	3	100	300
Linear Fluorescent: CR142G: INDUSTRIAL STRIP W/ WIRE GUARD / 48" T8 32W (Super T8) / Electronic	2	8	47	376
Linear Fluorescent: GA242: PRISMATIC TROFFER / 48" T8 32W (Super T8) / Electronic	2	4	47	188
Common Space Types:Restrooms (2918 sq.ft.)				
Linear Fluorescent: FN16S: NARROW FLANGED SEMI RECESSED / 48" T8 32W (Super T8) / Electronic	4	2	120	240
Compact Fluorescent: DF81S: LENSED SHOWER DOWNLIGHT / Triple 4-pin 32W / Electronic	1	6	36	216
Linear Fluorescent: FA142: FLANGED PRISMATIC / 48" T8 32W (Super T8) / Electronic	2	6	47	282
Linear Fluorescent: FN20S: NARROW FLANGED SEMI RECESSED / 48" T8 32W (Super T8) / Electronic	5	6	150	900
Compact Fluorescent: FB222: GRID BASKET INDIRECT / BIAX 40W / Electronic	1	1	85	85
Linear Fluorescent: WF142: WALL BRACKET / 48" T8 32W (Super T8) / Electronic	2	10	47	470
Linear Fluorescent: FN24S: NARROW FLANGED SEMI RECESSED / 48" T8 32W (Super T8) / Electronic	6	4	180	720
Linear Fluorescent: FA142W: FLANGED PRISMATIC -WASHDOWN / 48" T8 32W (Super T8) / Electronic	2	8	47	376
Common Space Types:Active Storage (5516 sq.ft.)				
Linear Fluorescent: GA142: PRISMATIC TROFFER / 48" T8 32W (Super T8) / Electronic	2	3	47	141
Linear Fluorescent: CR142G: INDUSTRIAL STRIP W/ WIRE GUARD / 48" T8 32W (Super T8) / Electronic	2	3	47	141
Linear Fluorescent: GA142W: PRISMATIC TROFFER - WASHDOWN / 48" T8 32W (Super T8) / Electronic	2	5	47	235
Linear Fluorescent: WF142W: WALL BRACKET - WASHDOWN / 48" T8 32W (Super T8) / Electronic	2	2	47	94
Linear Fluorescent: C142G: INDUSTRIAL STRIP W/ WIRE GUARD / 48" T8 32W (Super T8) / Electronic	2	31	47	1457
Linear Fluorescent: FA142W: FLANGED SEALED PRISMATIC / 48" T8 32W (Super T8) / Electronic	2	6	47	282
Linear Fluorescent: FA142X: FLANGED XPLOSION PROOF PRISMATI / 48" T8 32W (Super T8) / Electronic	2	8	47	376
Linear Fluorescent: GA242: PRISMATIC TROFFER / 48" T8 32W (Super T8) / Electronic	2	5	47	235
Common Space Types:Dining Area - General (597 sq.ft.)				
Linear Fluorescent: GN16H: NARROW GRID RECESSED W/ HEAD / 48" T8 32W (Super T8) / Electronic	1	4	220	880
Linear Fluorescent 35: WN4: RECESSED VERTICAL NARROW / 48" T8 32W (Super T8) / Electronic	1	1	30	30
Common Space Types:Food Preparation (1785 sq.ft.)				
Linear Fluorescent: GA242: PRISMATIC TROFFER / 48" T8 32W (Super T8) / Electronic	2	5	47	235

Linear Fluorescent: GA244: PRISMATIC TROFFER / 48" T8 32W (Super T8) / Electronic	4	11	88	968
Linear Fluorescent: WF142: WALL BRACKET / 48" T8 32W (Super T8) / Electronic	2	1	47	47
Common Space Types:Inactive Storage (3811 sq.ft.)				
Linear Fluorescent: C142G: INDUSTRIAL STRIP W/ WIRE GUARD / 48" T8 32W (Super T8) / Electronic	2	8	47	376
			Total Proposed Watts =	83160

Section 3: Compliance Calculation

If the Total Allowed Watts minus the Total Proposed Watts is greater than or equal to zero, the building complies.

Total Allowed Watts = 133822
Total Proposed Watts = 83160
Project Compliance = 50662

Interior Lighting PASSES: Design 38% better than code

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PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

INTERIOR ENERGY CODE COMCHECK

REVISIONS

MARK	DATE	DESCRIPTION

ISSUE DATA

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EL701

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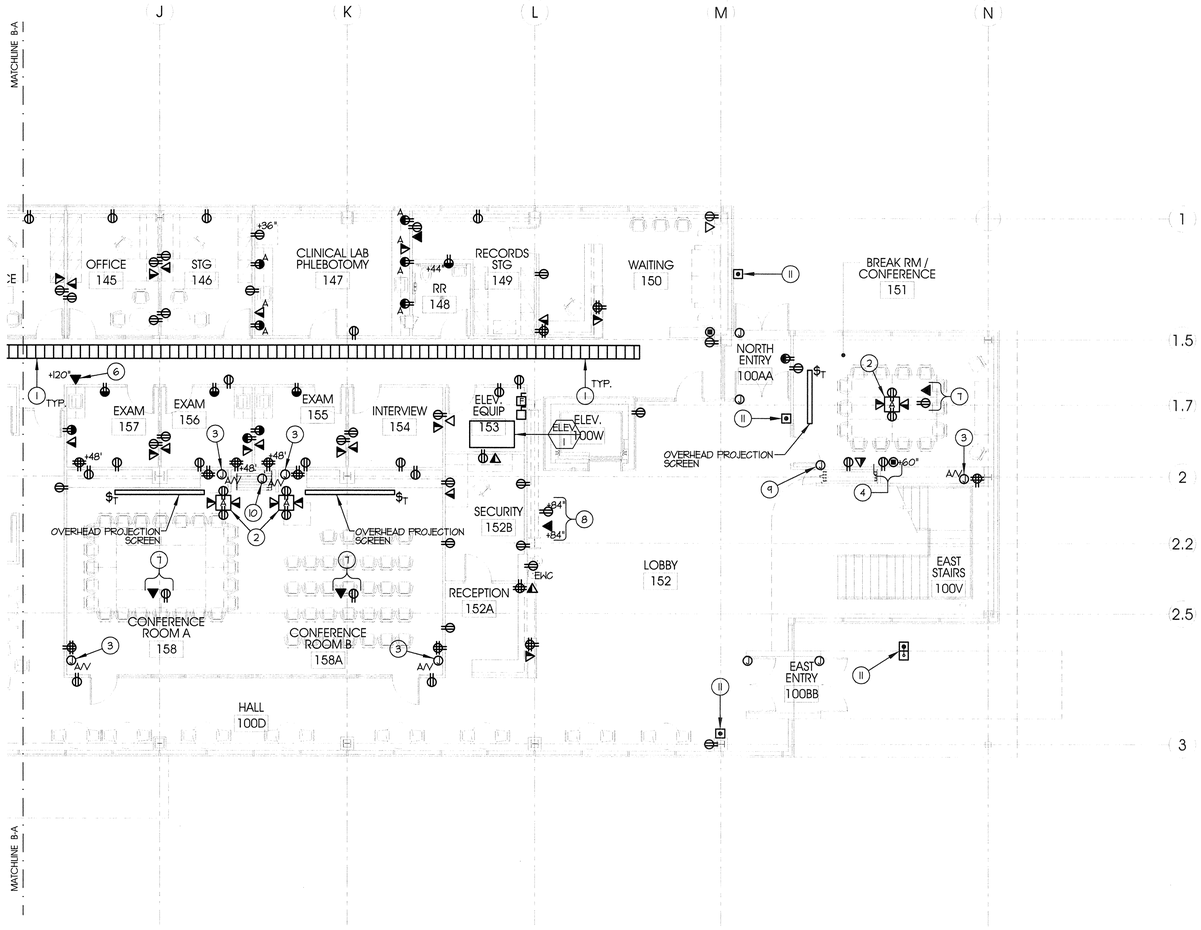
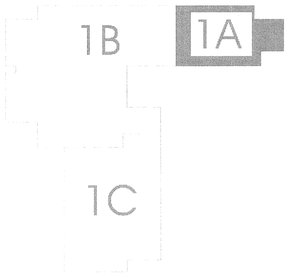


KEYED NOTES:

1. PROVIDE CABLE TRAY MOUNTED ABOVE CEILING FOR COMMUNICATION/DATA CABLING. REFER TO SPECIFICATIONS FOR CABLE TRAY REQUIREMENTS.
2. PROVIDE FLOOR BOX HUBBELL #HBLCFB50IBASE/LCFBCALC OR APPROVED EQUIVALENT. REFER TO DETAIL XX ON SHEET EP501 FOR ADDITIONAL INFORMATION.
3. PROVIDE AUDIO/VIDEO JUNCTION BOX HUBBELL #HBLWSCS61MO OR APPROVED EQUIVALENT.
4. ROUGH-IN FOR POWER AND DATA DEVICE FOR FUTURE LCD/PLASMA SCREEN. COORDINATE EXACT PLACEMENT OF DEVICES WITH MANUFACTURER'S RECOMMENDATIONS. COORDINATE PRIOR TO THE ROUGH-IN OF CONDUIT AND BOXES.
5. THIS COUNTER SHALL BE PROVIDED WITH GROMMETS IN TWO (2) LOCATIONS TO ALLOW FOR CORDS TO BE RAN DOWN TO THE WIRING DEVICES BELOW. COORDINATE WORK WITH CASEWORK INSTALLER.
6. LOCATION FOR A WIRELESS NETWORK PORT. COORDINATE WITH USU'S IT DEPARTMENT.
7. PROVIDE POWER AND DATA FOR OVERHEAD PROJECTOR. COORDINATE EXACT LOCATION WITH PROJECTOR INSTALLER PRIOR TO ROUGH-IN.
8. POWER AND DATA DEVICE FOR PLASMA SCREEN. COORDINATE EXACT PLACEMENT OF DEVICES WITH MANUFACTURER'S RECOMMENDATIONS. COORDINATE PRIOR TO THE ROUGH-IN OF CONDUIT AND BOXES.
9. PROVIDE 120V POWER FOR WON-DOOR.
10. PROVIDE 120V POWER TO DOOR.
11. HANDICAP PUSHBUTTON SYSTEM AND ASSOCIATE POWER.

KEY PLAN



PLAN
n
8' 0' 8'
scale = 1/8" = 1'-0"

LEVEL 1 POWER PLAN - 1A (A4 / EP101A)

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PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

LEVEL 1
POWER PLAN - 1A

REVISIONS

MARK	DATE	DESCRIPTION

ISSUE DATA

ISSUE DATE:	DEC. 9, 2008
ISSUE TYPE:	DESDEV
DRAWN BY:	J. HARWARD
CHECKED BY:	D. WHITTON

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EP101A

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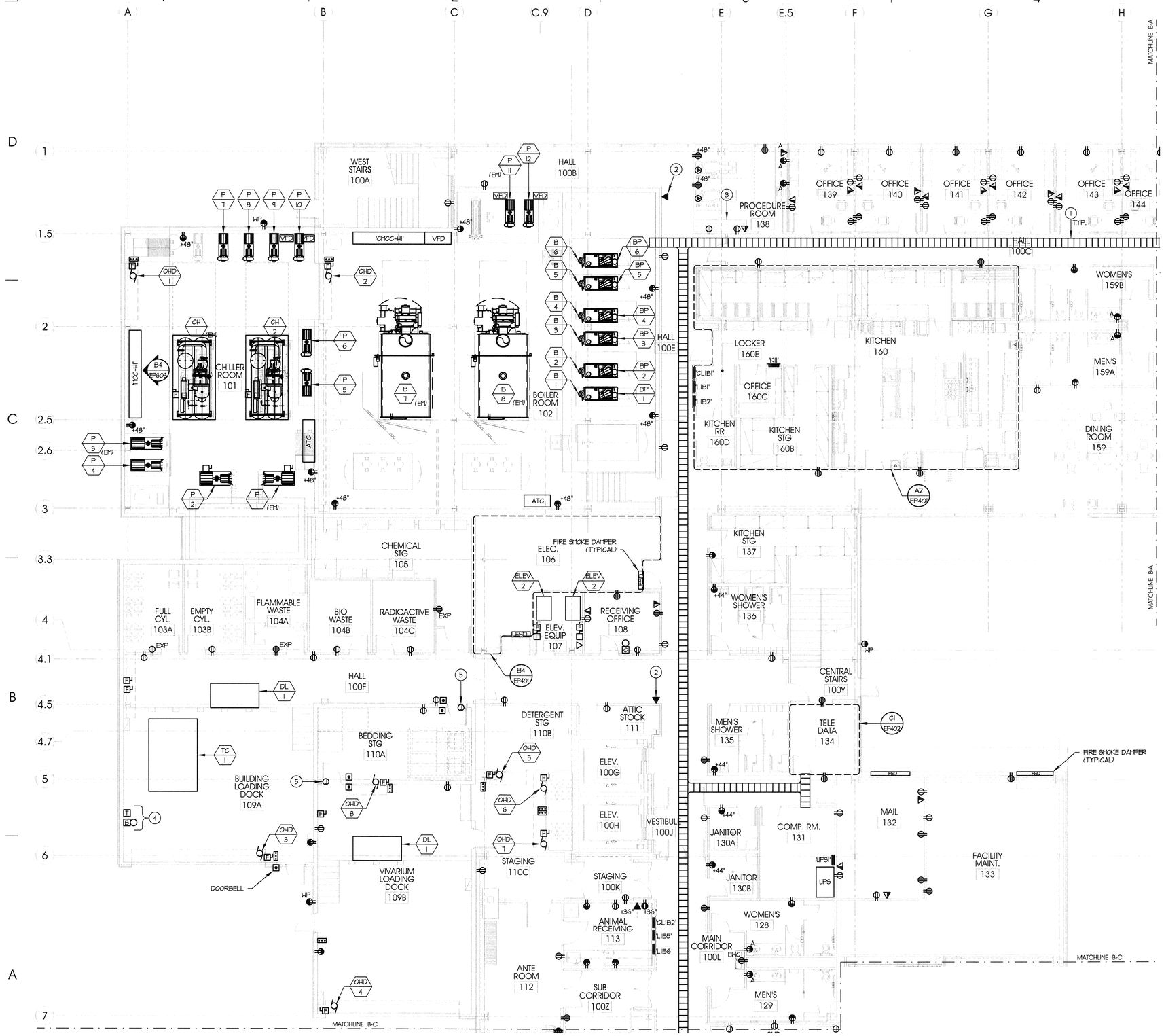
Envision Engineering, P.C.



KEYED NOTES:

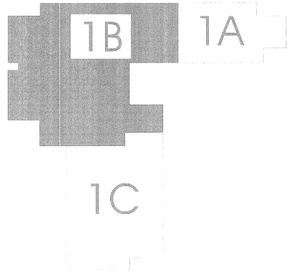
1. PROVIDE CABLE TRAY MOUNTED ABOVE CEILING FOR COMMUNICATION/DATA CABLING. REFER TO SPECIFICATIONS FOR CABLE TRAY REQUIREMENTS.
2. LOCATION FOR A WIRELESS NETWORK PORT. COORDINATE WITH USU'S IT DEPARTMENT.
3. THIS COUNTER SHALL BE PROVIDED WITH GROMMETS IN TWO (2) LOCATIONS TO ALLOW FOR CORDS TO BE RAN DOWN TO THE WIRING DEVICES BELOW. COORDINATE WORK WITH CASEWORK INSTALLER.
4. BELL AND TRANSFORMER FOR DOOR BELL SYSTEM.
5. AUTOMATIC DOOR. PROVIDE 120V POWER AND ALL BOXES, CONDUIT & WIRING FOR COMPLETE SYSTEM.

PLAN n

scale = 1/8" = 1'-0"

LEVEL 1 POWER PLAN - 1B (A4 / EP101B)

KEY PLAN



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PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

LEVEL 1
POWER PLAN - 1B

REVISIONS

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EP101B

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Envision Engineering, P.C.

KEYED NOTES:

1. PROVIDE CABLE TRAY MOUNTED ABOVE CEILING FOR COMMUNICATION/DATA CABLING. REFER TO SPECIFICATIONS FOR CABLE TRAY REQUIREMENTS.
2. LOCATION FOR A WIRELESS NETWORK PORT. COORDINATE WITH USU'S IT DEPARTMENT.
3. PROVIDE CORD REEL DANIEL WOODHEAD #92433-3080-3056 OR APPROVED EQUIVALENT.
4. ALL WIRING DEVICES COVERPLATES IN THIS ROOM SHALL BE WATERPROOF UNLESS NOTED OTHERWISE.
5. AUTOMATIC DOOR. PROVIDE 120V POWER AND ALL BOXES, CONDUIT & WIRING FOR COMPLETE SYSTEM.

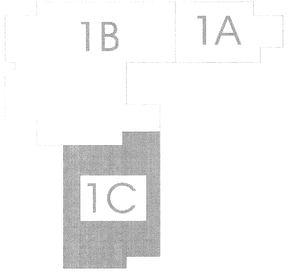
LAB WIREMOLD LEGEND	
TYPE	DESCRIPTION
A	PROVIDE 120V DUPLEX OUTLETS MOUNTED @ 24" O.C. PROVIDE 120V DUPLEX CONNECTED TO ESSENTIAL POWER MOUNTED @ 48" O.C. PROVIDE DUPLEX DATA JACKS LOCATIONS MOUNTED @ 48" O.C.
B	PROVIDE 120V DUPLEX OUTLETS MOUNTED @ 24" O.C. PROVIDE TWO (2) 120V DUPLEX & (1) 208V OUTLET CONNECTED TO ESSENTIAL POWER MOUNTED @ 72" O.C. PROVIDE DUPLEX DATA JACKS LOCATIONS MOUNTED @ 72" O.C.
C	PROVIDE 120V DUPLEX OUTLETS MOUNTED @ 24" O.C. PROVIDE 208V OUTLET CONNECTED TO ESSENTIAL POWER MOUNTED @ 48" O.C. PROVIDE DUPLEX DATA JACKS LOCATIONS MOUNTED @ 12" O.C.

PLAN n

8' 0' 8'
scale = 1/8" = 1'-0"

LEVEL 1 POWER PLAN - 1C (A4 / EP101C)

KEY PLAN



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Internet: http://www.dfcm.utah.gov

PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

LEVEL 1
POWER PLAN - 1C

REVISIONS

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EP101C

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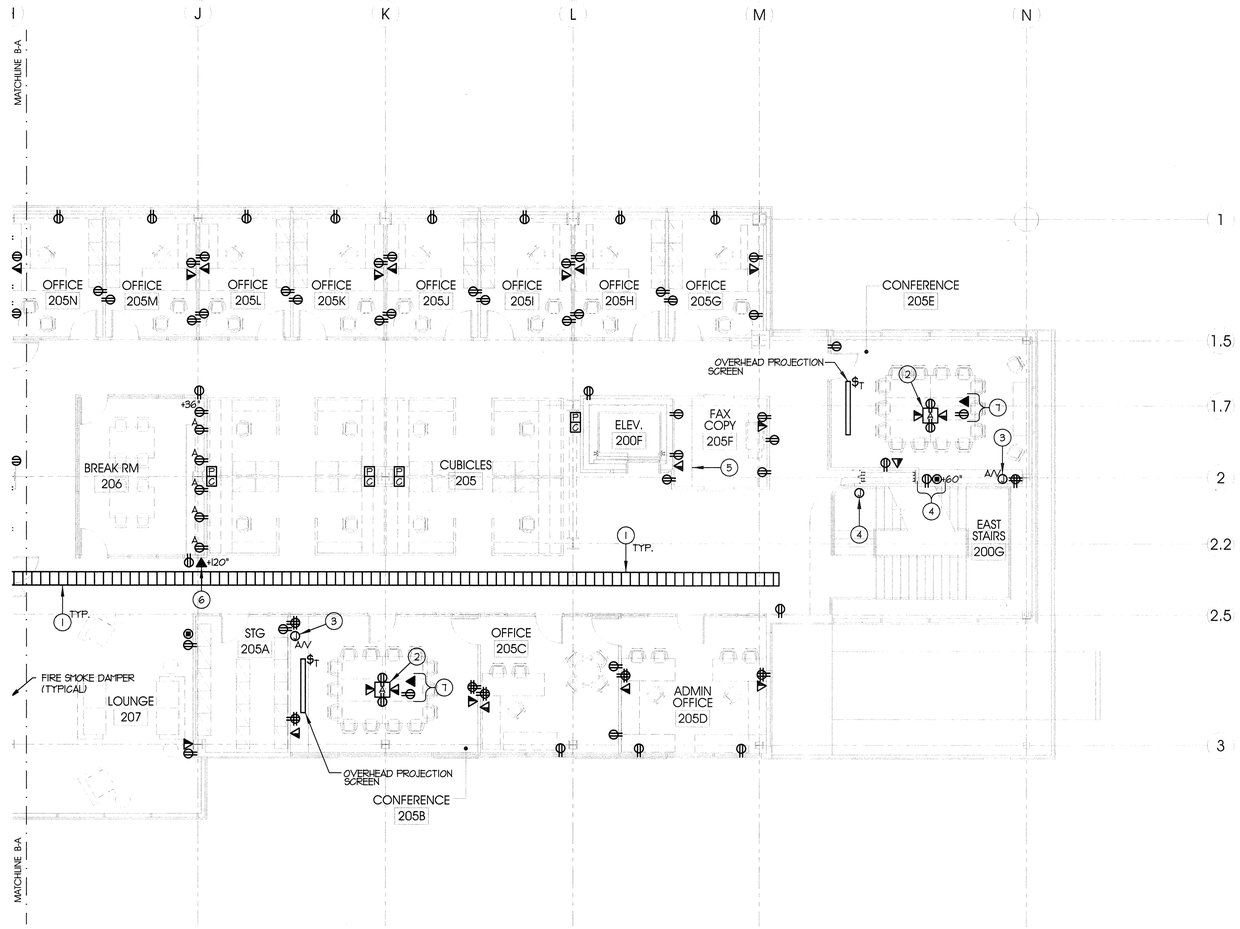
Envision Engineering, P.C.



KEYED NOTES:

1. PROVIDE CABLE TRAY MOUNTED ABOVE CEILING FOR COMMUNICATION/DATA CABLING. REFER TO SPECIFICATIONS FOR CABLE TRAY REQUIREMENTS.
2. PROVIDE FLOOR BOX HUBBELL #HBLCFB50IBASE/LCFBCALC OR APPROVED EQIVALENT. REFER TO DETAIL XX ON SHEET EP50I FOR ADDITIONAL INFORMATION.
3. PROVIDE AUDIO/VIDEO JUNCTION BOX HUBBELL #HBLWSC561110 OR APPROVED EQUIVALENT.
4. POWER AND DATA DEVICE FOR PLASMA SCREEN. COORDINATE EXACT PLACEMENT OF DEVICES WITH MANUFACTURER'S RECOMMENDATIONS. COORDINATE PRIOR TO THE ROUGH-IN OF CONDUIT AND BOXES.
5. THIS COUNTER SHALL BE PROVIDED WITH GROMMETS IN TWO (2) LOCATIONS TO ALLOW FOR CORDS TO BE RAN DOWN TO THE WIRING DEVICES BELOW. COORDINATE WORK WITH CASEWORK INSTALLER.
6. LOCATION FOR A WIRELESS NETWORK PORT. COORDINATE WITH USU'S IT DEPARTMENT.
7. PROVIDE POWER AND DATA FOR OVERHEAD PROJECTOR. COORDINATE EXACT LOCATION WITH PROJECTOR INSTALLER PRIOR TO ROUGH-IN.
8. PROVIDE 120V POWER FOR WON-DOOR.

P 4"X4"X1-1/2" DEEP OUTLET BOX AND ELECTRICAL CONNECTIONS TO SYSTEMS FURNITURE. COORDINATE SYSTEM FURNITURE WIRING REQUIREMENTS AND OUTLET BOX LOCATIONS WITH SYSTEM FURNITURE SUPPLIER/INSTALLER PRIOR TO ROUGH-IN. CONNECTION REQUIREMENTS ARE 4 CIRCUIT 8 WIRE. PROVIDE A TOTAL OF 8 CONDUCTORS TO EACH SYSTEM FURNITURE CONNECTION CONSISTING OF THREE CIRCUITS WITH SHARED EQUIPMENT GROUND AND SHARED OVERSIZE NEUTRAL; AND ONE DEDICATED CIRCUIT WITH DEDICATED ISOLATED GROUND AND DEDICATED NEUTRAL. SIZE THE SHARED NEUTRAL CONDUCTOR ONE SIZE (AWG) LARGER THAN THE LARGEST PHASE CONDUCTOR. WHIP FROM OUTLET BOX TO SYSTEMS FURNITURE TO BE PROVIDED BY SYSTEM FURNITURE INSTALLER.

C 4-11/16"X4-11/16"X2-1/8" DEEP OUTLET BOX WITH GROMMETTED COVER PLATE FOR COMMUNICATION CABLING. COORDINATE PLACEMENT OF OUTLET BOXES IN WALLS AND COLUMNS WITH SYSTEM FURNITURE SUPPLIER/INSTALLER PRIOR TO ROUGH-IN. EXTEND TWO (2) 1-1/4" CONDUIT WITH NYLON PULL ROPE TO THE CABLE TRAGY LOCATED ABOVE THE ACCESSIBLE CEILING SPACE. TERMINATE CONDUIT AT THE CABLE TRAY WITH A NYLON BUSHING. CABLE TO BE PROVIDED BY OWNER.

TYPICAL FURNITURE CONVENTION

SCALE: NONE

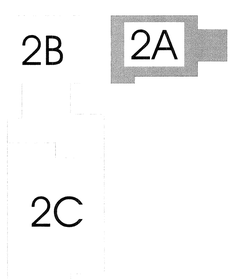
PLAN n

8' 0' 8'

scale = 1/8" = 1'-0"

LEVEL 2 POWER PLAN - 2B (A4 / EP102A)

KEY PLAN



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PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
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USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

LEVEL 2
POWER PLAN - 2A

REVISIONS

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EP102A

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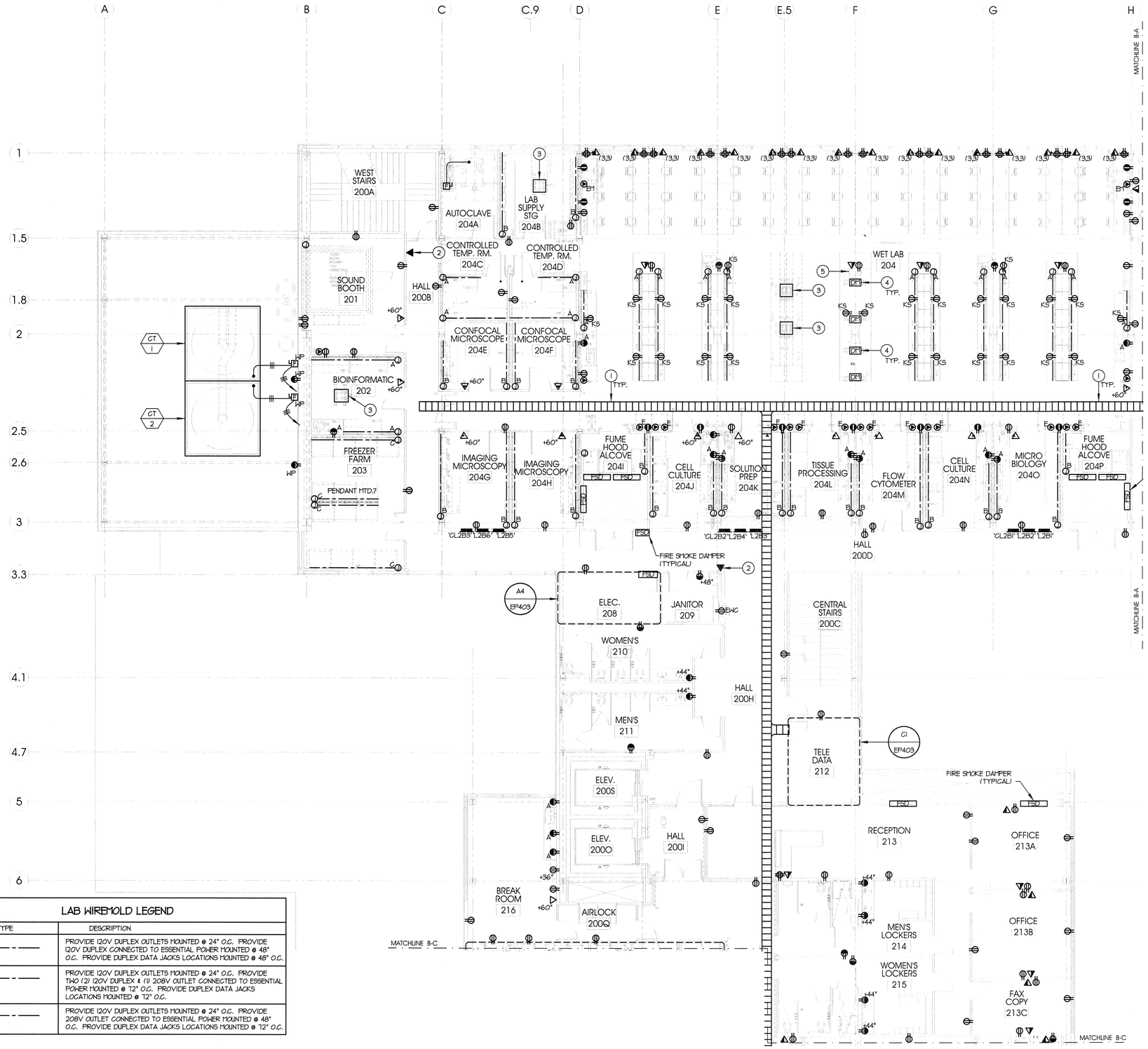
Envision Engineering, P.C.



LEVEL 2 POWER PLAN - 2C

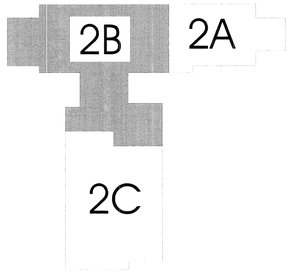
KEYED NOTES:

1. PROVIDE CABLE TRAY MOUNTED ABOVE CEILING FOR COMMUNICATION/DATA CABLING. REFER TO SPECIFICATIONS FOR CABLE TRAY REQUIREMENTS.
2. LOCATION FOR A WIRELESS NETWORK PORT. COORDINATE WITH USU'S IT DEPARTMENT.
3. OVERHEAD SERVICE PANEL FURNISHED AND INSTALLED BY OTHERS REQUIRING ELECTRICAL CONNECTIONS BY THE DIVISION 26 CONTRACTOR.
4. PROVIDE DEVICE MONUMENT ON LAB BENCH HUBBELL #
5. UTILIZE UTILITY CHASE IN LABORTORY CASEWORK TO EXTEND POWER AND COMMUNICATION/DATA UTILITIES TO THE LAB BENCH.

LAB WIREMOLD LEGEND

TYPE	DESCRIPTION
A	PROVIDE 120V DUPLEX OUTLETS MOUNTED @ 24" O.C. PROVIDE 120V DUPLEX CONNECTED TO ESSENTIAL POWER MOUNTED @ 48" O.C. PROVIDE DUPLEX DATA JACKS LOCATIONS MOUNTED @ 48" O.C.
B	PROVIDE 120V DUPLEX OUTLETS MOUNTED @ 24" O.C. PROVIDE TWO (2) 120V DUPLEX & (1) 208V OUTLET CONNECTED TO ESSENTIAL POWER MOUNTED @ 12" O.C. PROVIDE DUPLEX DATA JACKS LOCATIONS MOUNTED @ 12" O.C.
C	PROVIDE 120V DUPLEX OUTLETS MOUNTED @ 24" O.C. PROVIDE 208V OUTLET CONNECTED TO ESSENTIAL POWER MOUNTED @ 48" O.C. PROVIDE DUPLEX DATA JACKS LOCATIONS MOUNTED @ 12" O.C.

KEY PLAN



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PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

LEVEL 2
POWER PLAN - 2B

REVISIONS

MARK	DATE	DESCRIPTION

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CHECKED BY: D. WHITTON

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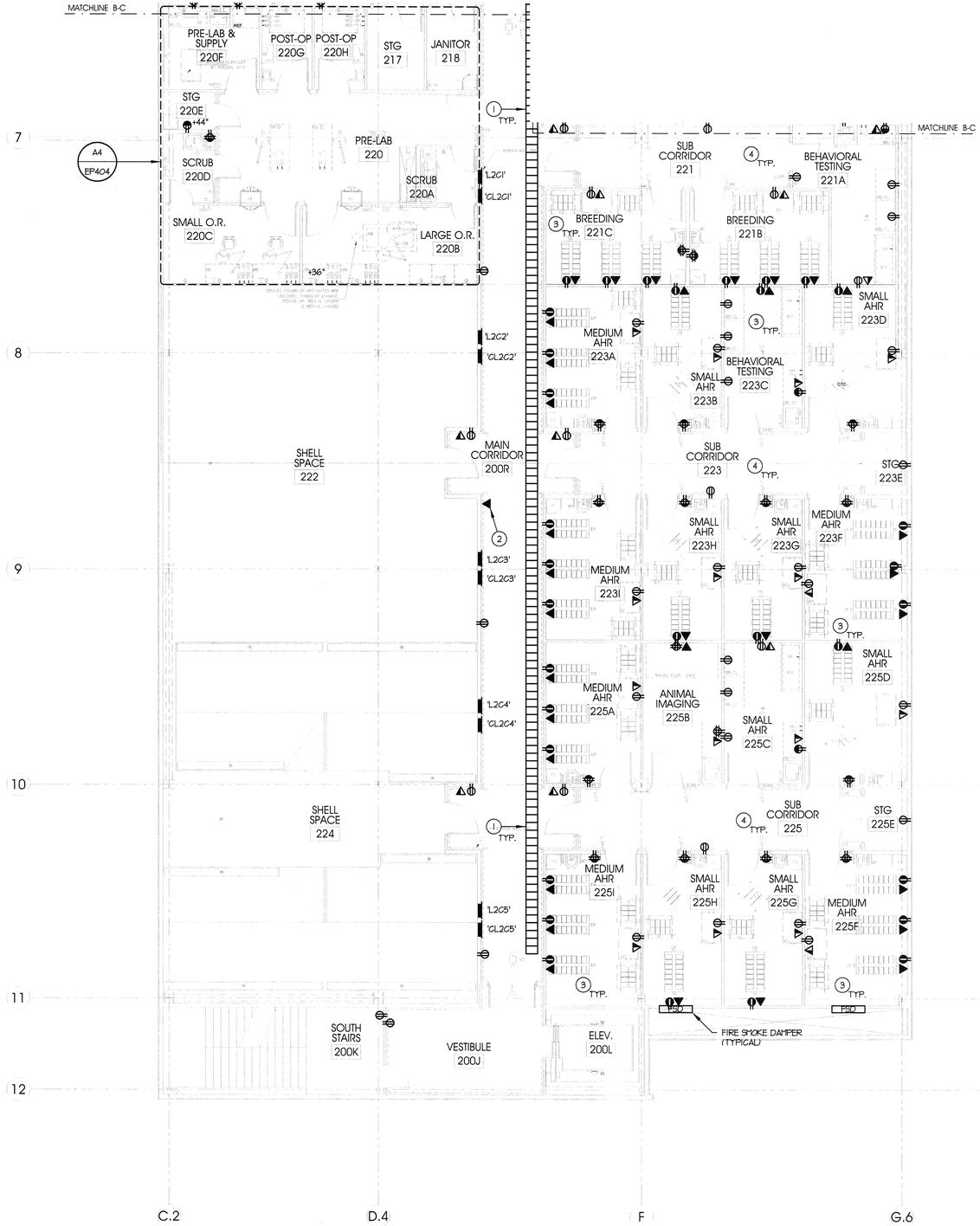


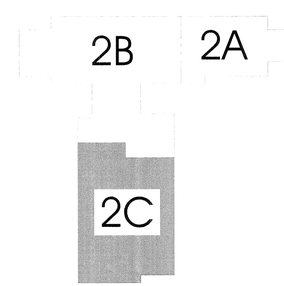
KEYED NOTES:

1. PROVIDE CABLE TRAY MOUNTED ABOVE CEILING FOR COMMUNICATION/DATA CABLING. REFER TO SPECIFICATIONS FOR CABLE TRAY REQUIREMENTS.
2. LOCATION FOR A WIRELESS NETWORK PORT. COORDINATE WITH USU'S IT DEPARTMENT.
3. ALL OUTLETS LOCATED IN THE ANIMAL HOLD ROOM SHALL HAVE SPRAY DOWN, WATERPROOF WHILE IN USE UNLESS, GASKETED COVERS UNLESS SPECIFICALLY NOTED OTHERWISE.
4. ALL OULETS LOCATED IN HALLWAYS THAT ARE ADJACENT TO ANIMAL HOLD ROOMS SHALL HAVE SPRAY DOWN, WATERPROOF GASKETED COVERS UNLESS SPECIFICALLY NOTED OTHERWISE.
5.

GENERAL NOTES:

1. ALL WIRING DEVICE COVERPLATES LOCATED WITHIN THE ANIMAL HOLD ROOM SHALL BE WATERPROOF WHILE IN-USE COVERS UNLESS NOTED OTHERWISE.
2. ALL ELECTRICAL DEVICES WITHIN THE ANIMAL HOLD ROOMS SHALL BE WATERPROOF AND INSTALLED USING METHODS TO ENSURE A WATERPROOF SEAL AT THE WALL ENVELOPE.

KEY PLAN



PLAN

scale = 1/8" = 1'-0"

LEVEL 2 POWER PLAN - 2C (A4 / EP102C)

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LEVEL 2
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REVISIONS

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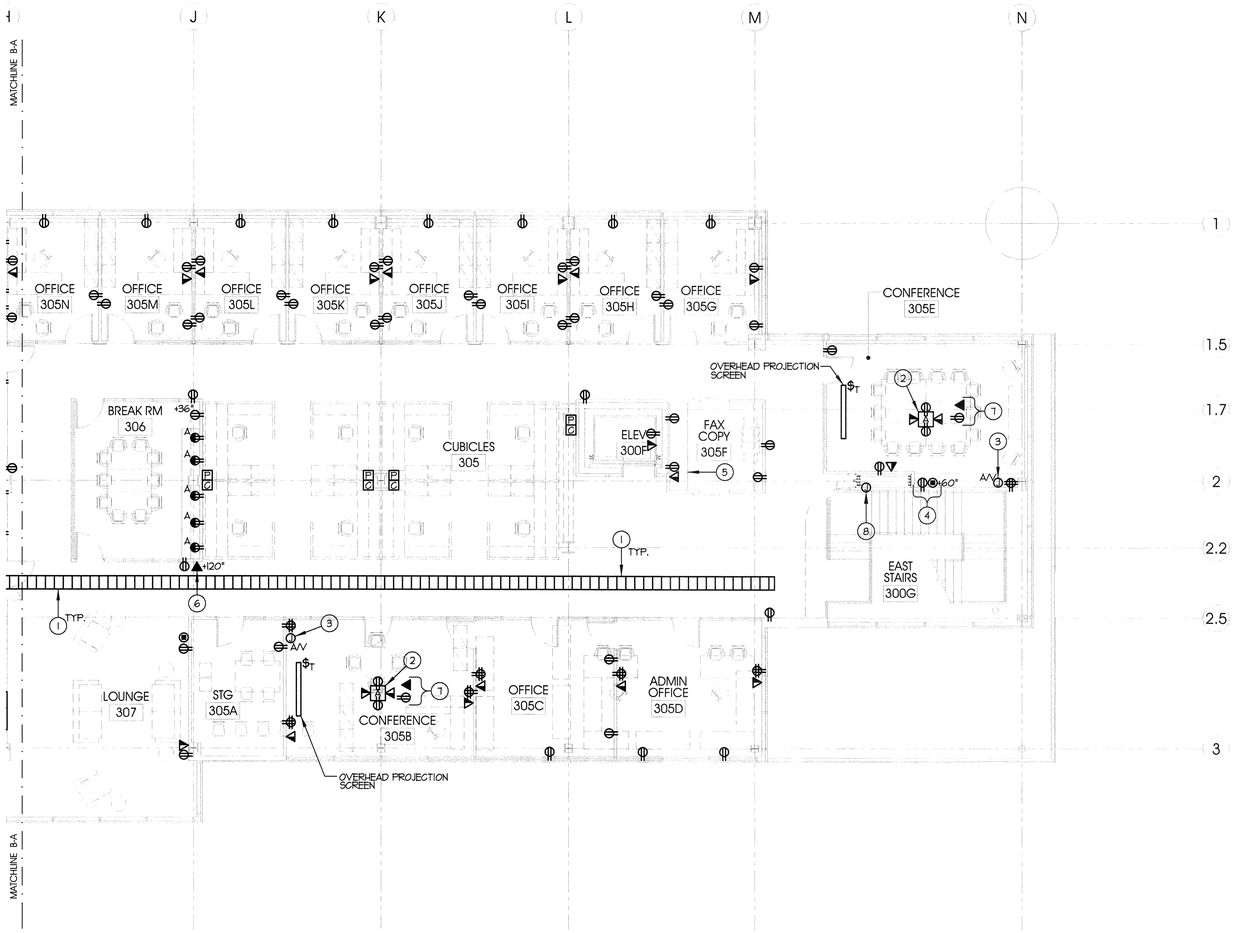
Envision Engineering, P.C.



KEYED NOTES:

1. PROVIDE CABLE TRAY MOUNTED ABOVE CEILING FOR COMMUNICATION/DATA CABLING. REFER TO SPECIFICATIONS FOR CABLE TRAY REQUIREMENTS.
2. PROVIDE FLOOR BOX HUBBELL #HBLCFB50IBASE/LCFBCALC OR APPROVED EQIVALENT. REFER TO DETAIL XX ON SHEET EP501 FOR ADDITIONAL INFORMATION.
3. PROVIDE AUDIO/VIDEO JUNCTION BOX HUBBELL #HBLHBCS6EM10 OR APPROVED EQUIVALENT.
4. POWER AND DATA DEVICE FOR PLASMA SCREEN. COORDINATE EXACT PLACEMENT OF DEVICES WITH MANUFACTURER'S RECOMMENDATIONS. COORDINATE PRIOR TO THE ROUGH-IN OF CONDUIT AND BOXES.
5. THIS COUNTER SHALL BE PROVIDED WITH GROMMETS IN TWO (2) LOCATIONS TO ALLOW FOR CORDS TO BE RAN DOWN TO THE WIRING DEVICES BELOW. COORDINATE WORK WITH CASEWORK INSTALLER.
6. LOCATION FOR A WIRELESS NETWORK PORT. COORDINATE WITH USU'S IT DEPARTMENT.
7. PROVIDE POWER AND DATA FOR OVERHEAD PROJECTOR. COORDINATE EXACT LOCATION WITH PROJECTOR INSTALLER PRIOR TO ROUGH-IN.
8. 120V POWER FOR NON-DOOR.

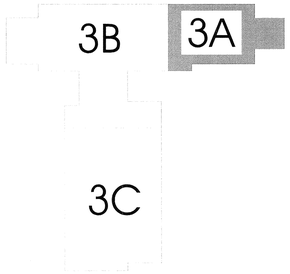
[P] 4"X4"X1-1/2" DEEP OUTLET BOX AND ELECTRICAL CONNECTIONS TO SYSTEMS FURNITURE. COORDINATE SYSTEM FURNITURE WIRING REQUIREMENTS AND OUTLET BOX LOCATIONS WITH SYSTEM FURNITURE SUPPLIER/INSTALLER PRIOR TO ROUGH-IN. CONNECTION REQUIREMENTS ARE 4 CIRCUIT 8 WIRE. PROVIDE A TOTAL OF 8 CONDUCTORS TO EACH SYSTEM FURNITURE CONNECTION CONSISTING OF THREE CIRCUITS WITH SHARED EQUIPMENT GROUND AND SHARED OVERSIZE NEUTRAL; AND ONE DEDICATED CIRCUIT WITH DEDICATED ISOLATED GROUND AND DEDICATED NEUTRAL. SIZE THE SHARED NEUTRAL CONDUCTOR ONE SIZE (AWG) LARGER THAN THE LARGEST PHASE CONDUCTOR. WHIP FROM OUTLET BOX TO SYSTEMS FURNITURE TO BE PROVIDED BY SYSTEM FURNITURE INSTALLER.

[C] 4-11/16"X4-11/16"X2-1/8" DEEP OUTLET BOX WITH GROMMETTED COVER PLATE FOR COMMUNICATION CABLING. COORDINATE PLACEMENT OF OUTLET BOXES IN WALLS AND COLUMNS WITH SYSTEM FURNITURE SUPPLIER/INSTALLER PRIOR TO ROUGH-IN. EXTEND TWO (2) 1-1/4" CONDUIT WITH NYLON PULL ROPE TO THE CABLE TRACY LOCATED ABOVE THE ACCESSIBLE CEILING SPACE. TERMINATE CONDUIT AT THE CABLE TRAY WITH A NYLON BUSHING. CABLE TO BE PROVIDED BY OWNER.

TYPICAL FURNITURE CONVENTION

SCALE: NONE

KEY PLAN



PLAN n

8' 0' 8'

scale = 1/8" = 1'-0"

LEVEL 3 POWER PLAN - 3A (A4 / EP103A)

ARCHITECT

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PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

LEVEL 3
POWER PLAN - 3A

REVISIONS

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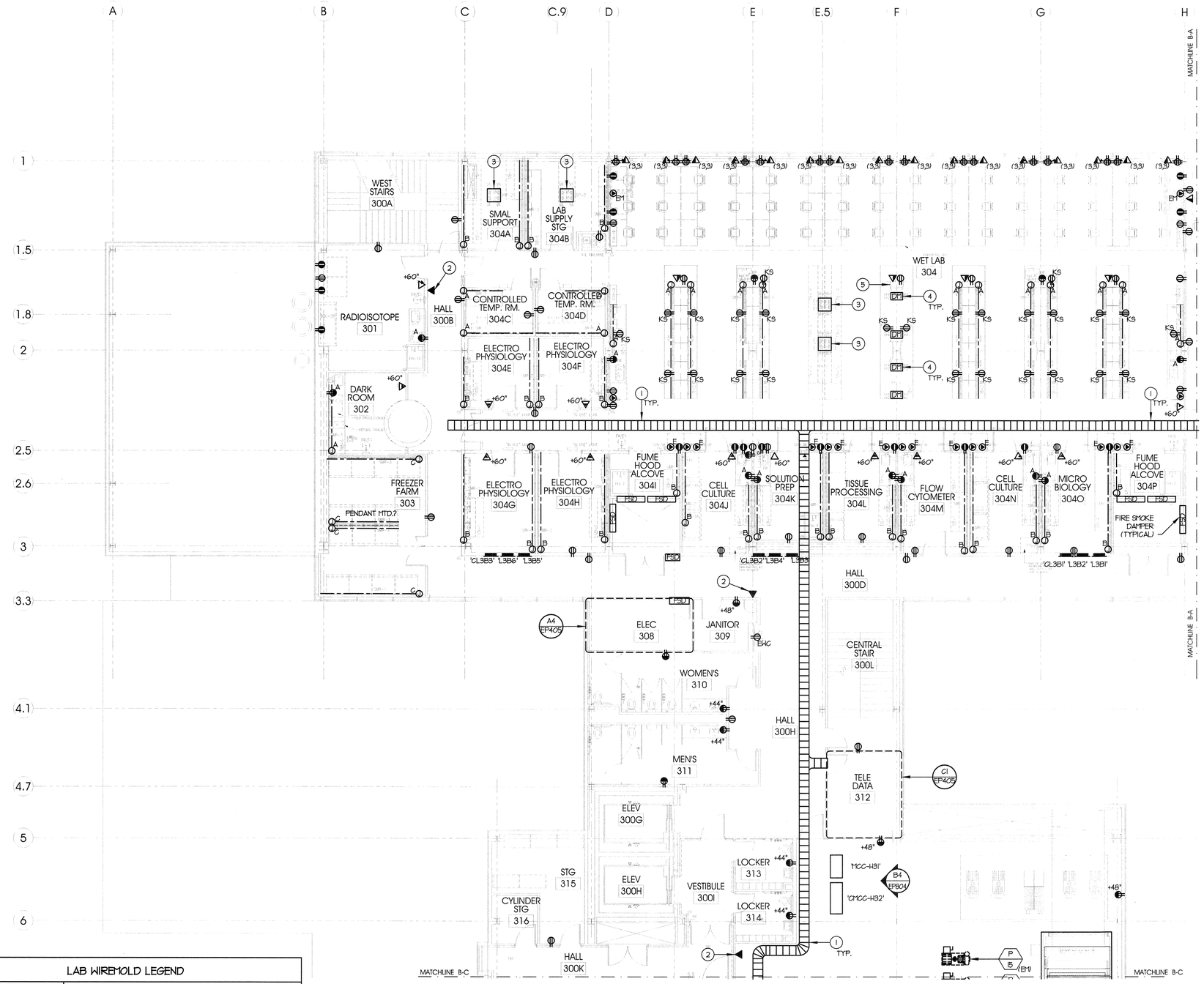


KEYED NOTES:

1. PROVIDE CABLE TRAY MOUNTED ABOVE CEILING FOR COMMUNICATION/DATA CABLING. REFER TO SPECIFICATIONS FOR CABLE TRAY REQUIREMENTS.
2. LOCATION FOR A WIRELESS NETWORK PORT. COORDINATE WITH USU'S IT DEPARTMENT.
3. OVERHEAD SERVICE PANEL FURNISHED AND INSTALLED BY OTHERS REQUIRING ELECTRICAL CONNECTIONS BY THE DIVISION 26 CONTRACTOR.
4. PROVIDE DEVICE MONUMENT ON LAB BENCH HUBBELL #
5. UTILIZE UTILITY CHASE IN LABORTORY CASEWORK TO EXTEND POWER AND COMMUNICATION/DATA UTILITIES TO THE LAB BENCH.

GENERAL NOTES:

1. ALL OUTLETS LOCATED WITHING THE BIO-LEVEL 3 ANIMAL SUITE SHALL BE MOUNTED AT +48" FROM FINISHED FLOOR UNLESS NOTED OTHERWISE.
2. ALL POWER OUTLETS LOCATED WITHIN THE BIO-LEVEL 3 ANIMAL SUITE SHALL BE PROVIDED WITH A WEATHERPROOF WHILE IN-USE COVER UNLESS NOTED OTHERWISE.

LAB WIREMOLD LEGEND

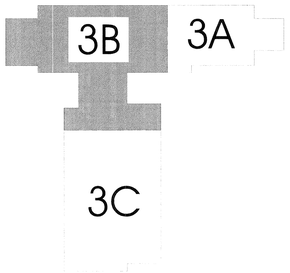
TYPE	DESCRIPTION
1 A	PROVIDE 120V DUPLEX OUTLETS MOUNTED @ 24" O.C. PROVIDE 120V DUPLEX CONNECTED TO ESSENTIAL POWER MOUNTED @ 48" O.C. PROVIDE DUPLEX DATA JACKS LOCATIONS MOUNTED @ 48" O.C.
1 B	PROVIDE 120V DUPLEX OUTLETS MOUNTED @ 24" O.C. PROVIDE TWO (2) 120V DUPLEX & (1) 208V OUTLET CONNECTED TO ESSENTIAL POWER MOUNTED @ 72" O.C. PROVIDE DUPLEX DATA JACKS LOCATIONS MOUNTED @ 72" O.C.
1 C	PROVIDE 120V DUPLEX OUTLETS MOUNTED @ 24" O.C. PROVIDE 208V OUTLET CONNECTED TO ESSENTIAL POWER MOUNTED @ 48" O.C. PROVIDE DUPLEX DATA JACKS LOCATIONS MOUNTED @ 72" O.C.

PLAN

scale = 1/8" = 1'-0"

LEVEL 3 POWER PLAN - 3B (A4 / EP103B)

KEY PLAN



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UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

LEVEL 3
POWER PLAN - 3B

REVISIONS

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CHECKED BY:	D. WHITTON

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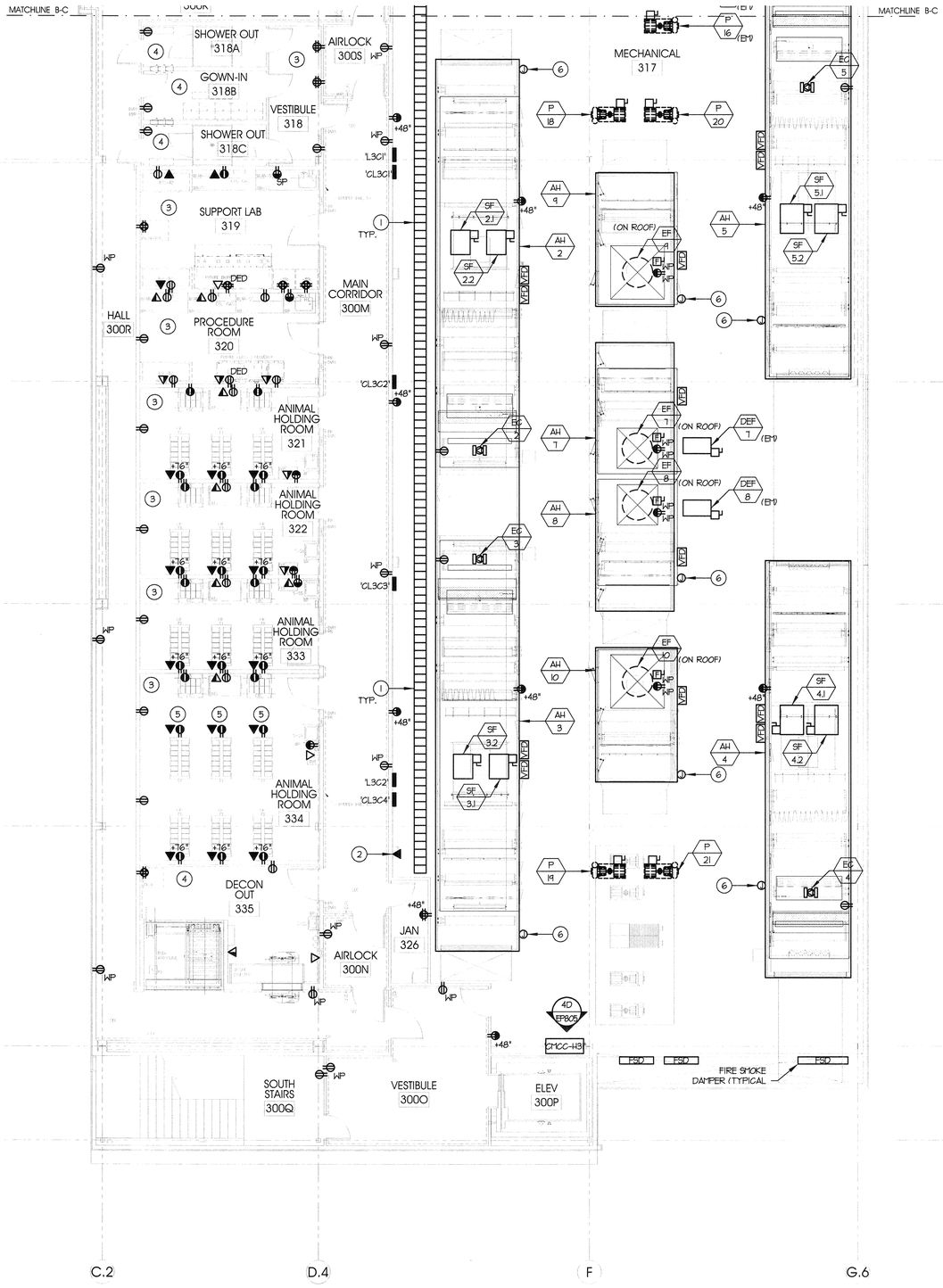


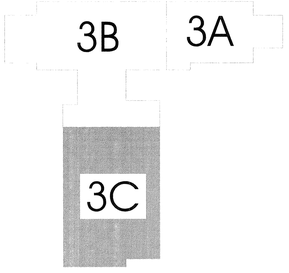
KEYED NOTES:

1. PROVIDE CABLE TRAY MOUNTED ABOVE CEILING FOR COMMUNICATION/DATA CABLING. REFER TO SPECIFICATIONS FOR CABLE TRAY REQUIREMENTS.
2. LOCATION FOR A WIRELESS NETWORK PORT. COORDINATE WITH USU'S IT DEPARTMENT.
3. ALL OUTLETS LOCATED IN THE ANIMAL HOLD ROOM SHALL HAVE SPRAY DOWN, WATERPROOF WHILE IN USE, GASKETED COVERS UNLESS SPECIFICALLY NOTED OTHERWISE.
4. ALL OULETS LOCATED IN HALLWAYS THAT ARE ADJACENT TO ANIMAL HOLD ROOMS SHALL HAVE SPRAY DOWN, WATERPROOF GASKETED COVERS UNLESS SPECIFICALLY NOTED OTHERWISE.
5. MOUNT OUTLETS IN CEILING.
6. PROVIDE 120V CIRCUIT FOR AIR HANDLER LIGHTS.

GENERAL NOTES:

1. ALL WIRING DEVICE COVERPLATES LOCATED WITHIN THE ANIMAL HOLD ROOM SHALL BE WATERPROOF WHILE IN-USE COVERS UNLESS NOTED OTHERWISE.
2. ALL WIRING DEVICE COVERPLATES LOCATED WITHIN THE BIO-CONTAINMENT SUITE OTHER THAN THE ANIMAL HOLD ROOMS SHALL BE WATERPROOF COVERS.
3. ALL ELECTRICAL DEVICES WITHIN THE ANIMAL HOLD ROOMS SHALL BE WATERPROOF AND INSTALLED USING METHODS TO ENSURE A GASFROOF SEAL AT THE WALL ENVELOPE.
4. ALL CONDUIT AND BOXES WITHIN THE BIO-CONTAINMENT SUITE SHALL BE GALVANIZED RIGID CONDUIT AND CAST IRON TYPE BOXES WITH THREADED HUBS. ALL CONDUITS THAT EXTEND OUT OF THE BIO-CONTAINMENT SUITE SHALL HAVE A SEAL-OFF INSTALLED TO ENSURE A GAS TIGHT SEAL.

KEY PLAN



PLAN n

8' 0' 8'

scale = 1/8" = 1'-0"

LEVEL 3 POWER PLAN - 3C (A4 / EP103C)

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UTAH STATE UNIVERSITY

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SHEET NAME:

LEVEL 3
POWER PLAN - 3C

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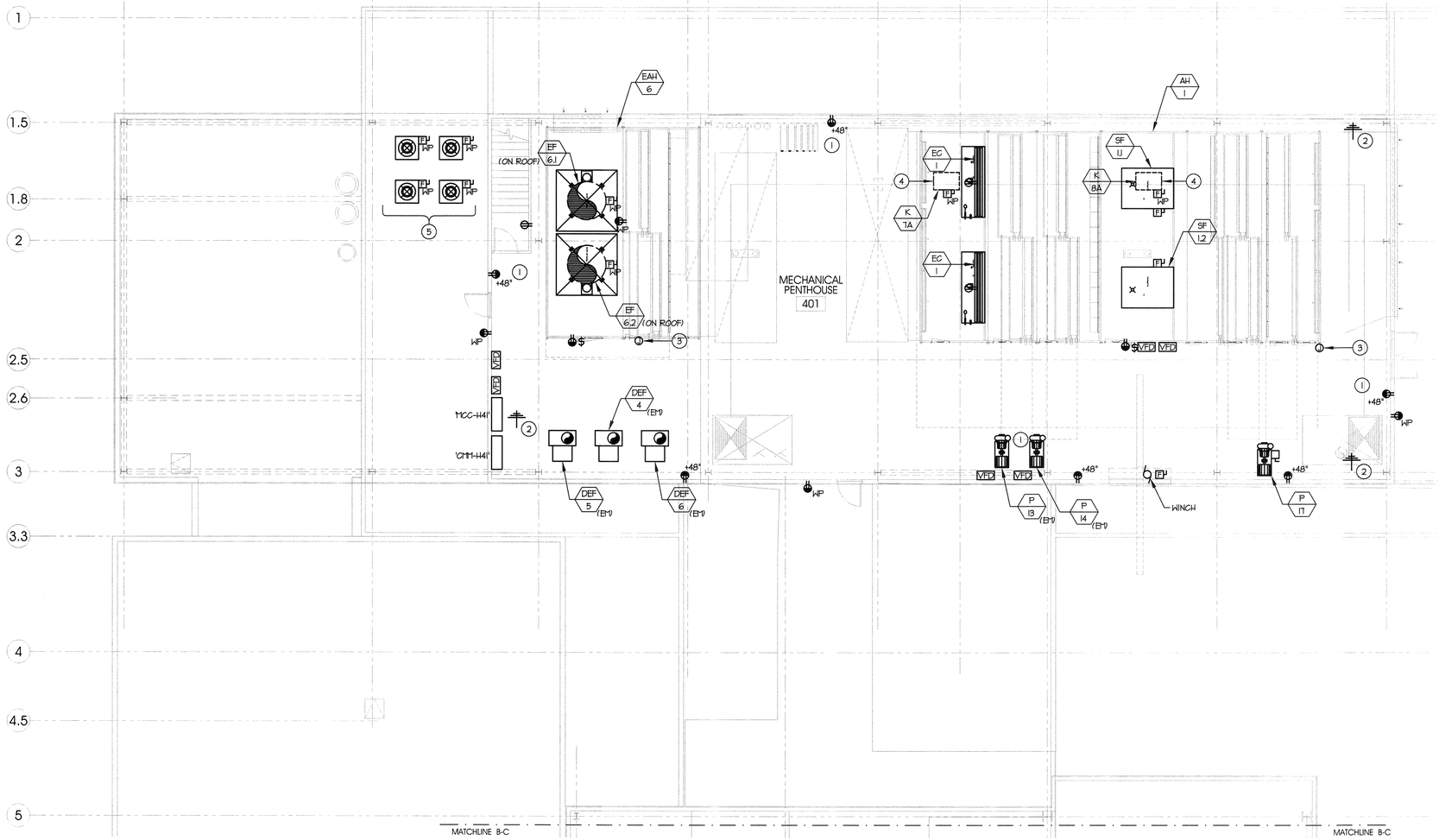
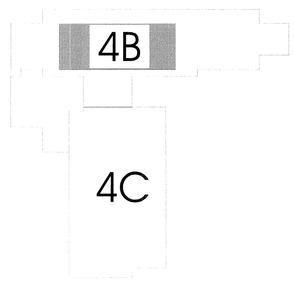


KEYED NOTES:

1. COORDINATE LOCATION OF OUTLET WITH ALL MECHANICAL DUCTS, PIPING, ETC. LOCATION SHOWN IS SCHEMATIC IS NATURE.

KEY PLAN



PLAN

scale = 1/8" = 1'-0"

LEVEL 4 PENTHOUSE POWER PLAN (A4 / EP104B)

ARCHITECT

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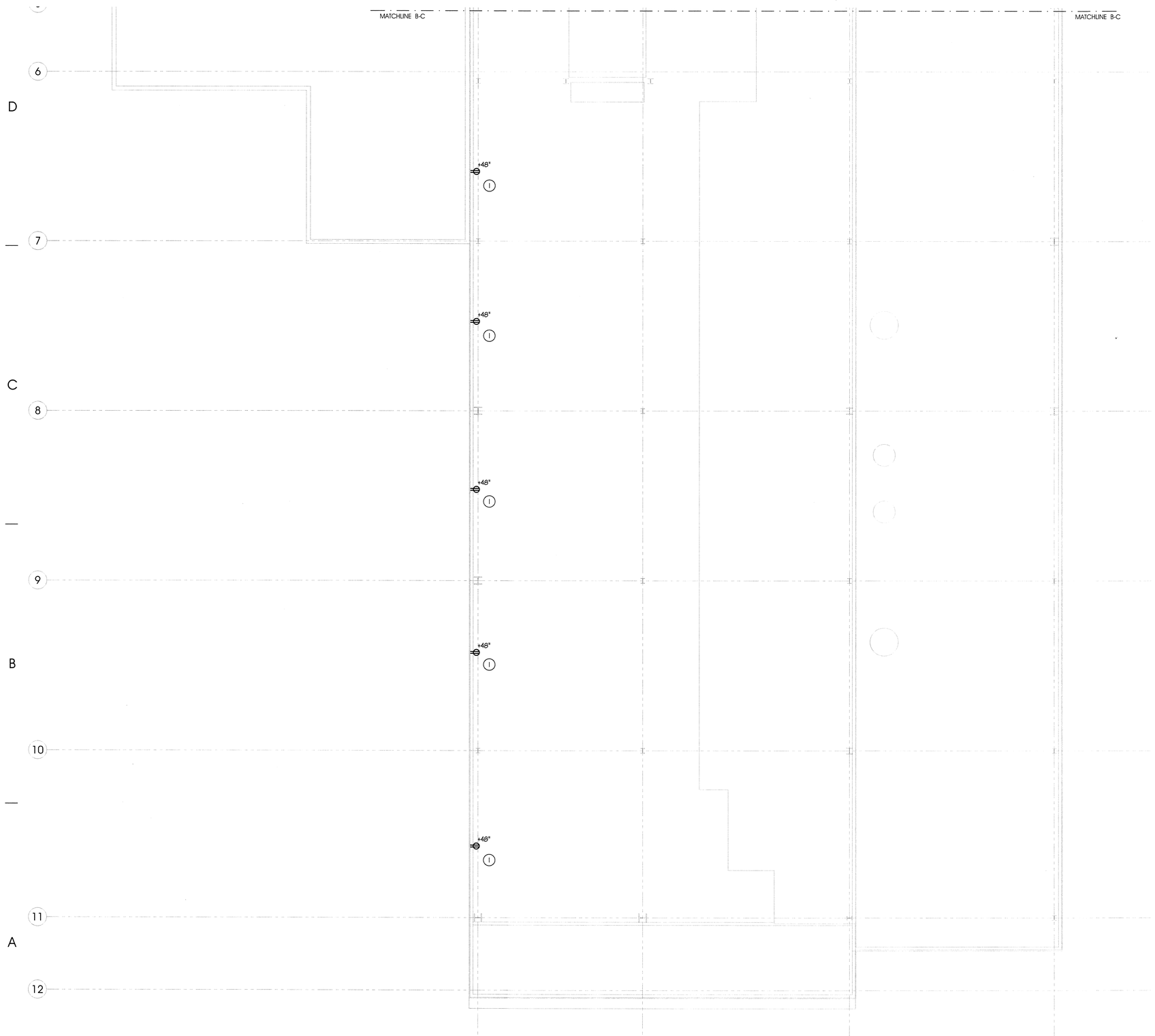
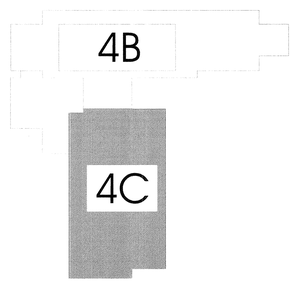


KEYED NOTES:

1. COORDINATE LOCATION OF OUTLET WITH ALL MECHANICAL DUCTS, PIPING, ETC. LOCATION SHOWN IS SCHEMATIC IS NATURE.

KEY PLAN



PLAN

8' 0' 8'

scale = 1/8" = 1'-0"

LEVEL 4 EQUIPMENT PLATFORM POWER PLAN

A4
EP104C

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LEVEL 4 EQUIPMENT PLATFORM POWER PLAN

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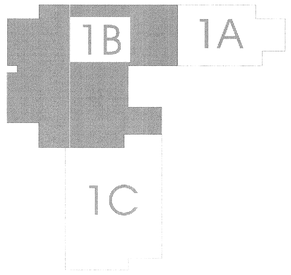
Envision Engineering, PC

KEYED NOTES:

1. PROVIDE 120V CONNECTION TO FUME HOOD.
2. PROVIDE 120V POWER TO BEDDING PALLET.

KEY PLAN



PLAN n

scale = 1/8" = 1'-0"

LEVEL 1 LAB EQUIPMENT POWER PLAN - 1B (A4 / EP106B)

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LOGAN, UTAH

SHEET NAME:

LEVEL 1 LABORATORY EQUIPMENT POWER PLAN - 1A

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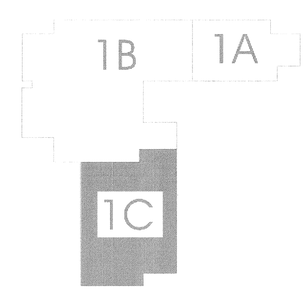
Envision Engineering, PC

KEYED NOTES:

1. PROVIDE POWER CONNECTION TO EXAM LIGHT.
2. PROVIDE 120V POWER CONNECTION TO FUME HOOD OR BIO-SAFETY CABINET.
3. ROUGH-IN CONDUIT FOR FUTURE LAB EQUIPMENT.

KEY PLAN



PLAN N

8' 0' 8'

scale = 1/8" = 1'-0"

LEVEL 1 LAB EQUIPMENT POWER PLAN - 1C

A4 EP106C

ARCHITECT

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UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

LEVEL 1 LABORATORY EQUIPMENT POWER PLAN - 1C

REVISIONS

MARK	DATE	DESCRIPTION

ISSUE DATA

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ISSUE TYPE:	DESDEV
DRAWN BY:	J. HARWARD
CHECKED BY:	D. WHITTON

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EP106C

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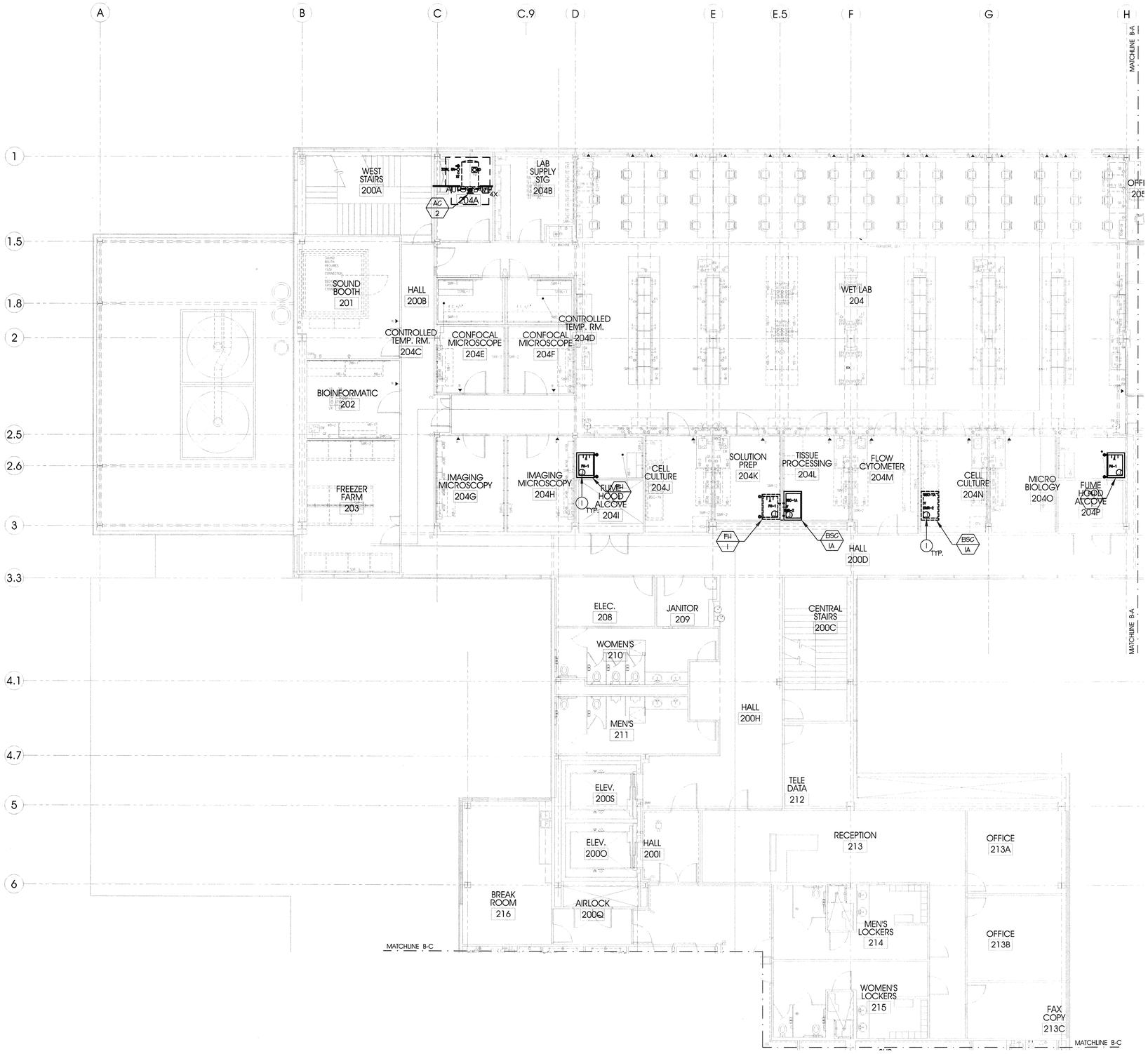


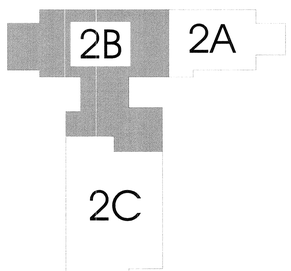
LEVEL 2 LAB EQUIPMENT POWER PLAN - 2A

A4 / EP107B

KEYED NOTES:

1. PROVIDE 120V CONNECTION TO FUME HOOD AND BIO-SAFETY CABINET.

KEY PLAN



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PROJECT DESCRIPTION

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UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

LEVEL 2 LABORATORY EQUIPMENT POWER PLAN - 2A

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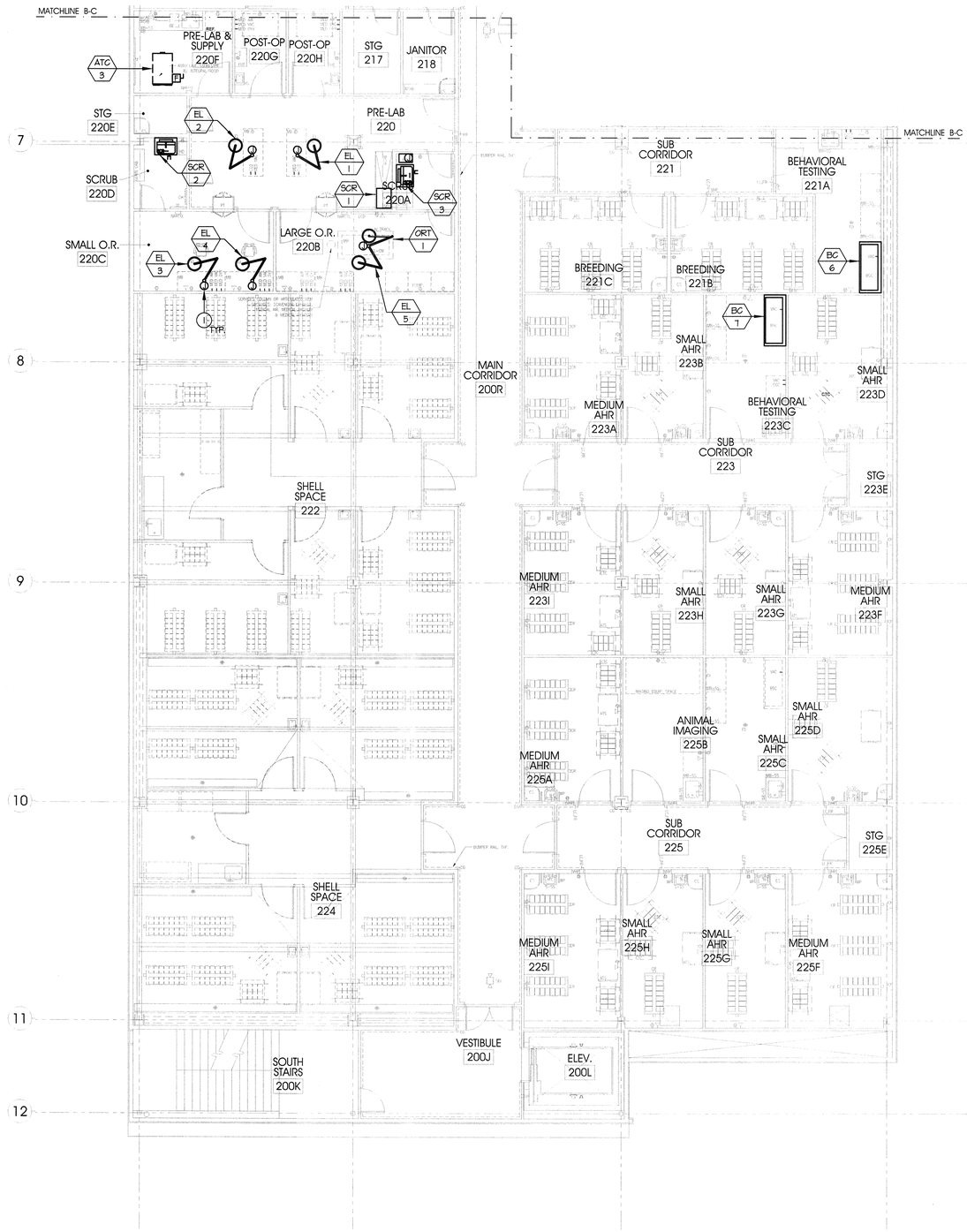


KEYED NOTES:

1. PROVIDE POWER CONNECTION TO EXAM LIGHT.

PLAN

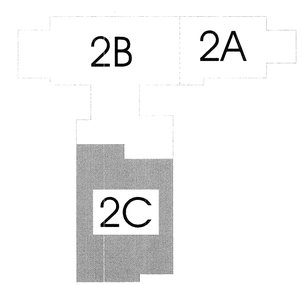
8' 0' 8'

scale = 1/8" = 1'-0"

LEVEL 2 LAB EQUIPMENT POWER PLAN - 2C

A4 EP107C

KEY PLAN



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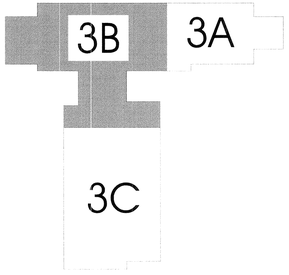
KEYED NOTES:

1. PROVIDE 120V POWER FOR FUME HOOD.
2. PROVIDE JUNCTION BOX FOR FUTURE FUME HOOD.

KEY PLAN



PLAN n

scale = 1/8" = 1'-0"

LEVEL 3 LAB EQUIPMENT POWER PLAN - 3A

A4 EP108B

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LEVEL 3 LABORATORY EQUIPMENT POWER PLAN - 3A

REVISIONS

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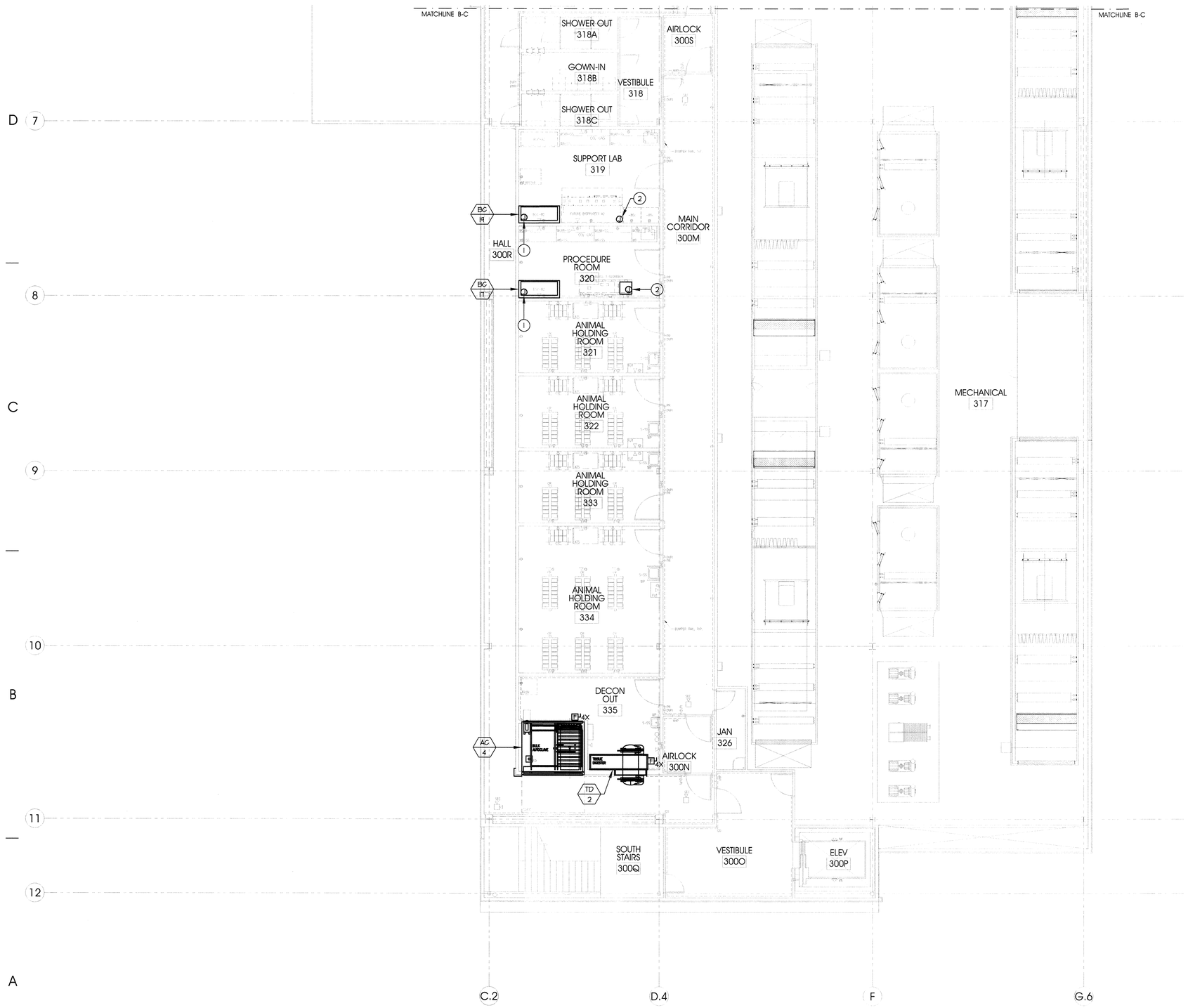
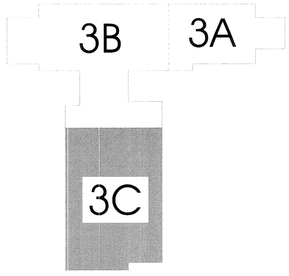


KEYED NOTES:

1. PROVIDE POWER CONNECTION TO BIO-SAFETY CABINET.
2. PROVIDE JUNCTION BOX FOR FUTURE CONNECTION TO BIO-CABINET.

KEY PLAN



PLAN

8' 0' 8'

scale = 1/8" = 1'-0"

LEVEL 3 LAB EQUIPMENT POWER PLAN - 3C

A4 EP108C

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LEVEL 3 LABORATORY EQUIPMENT POWER PLAN - 3C

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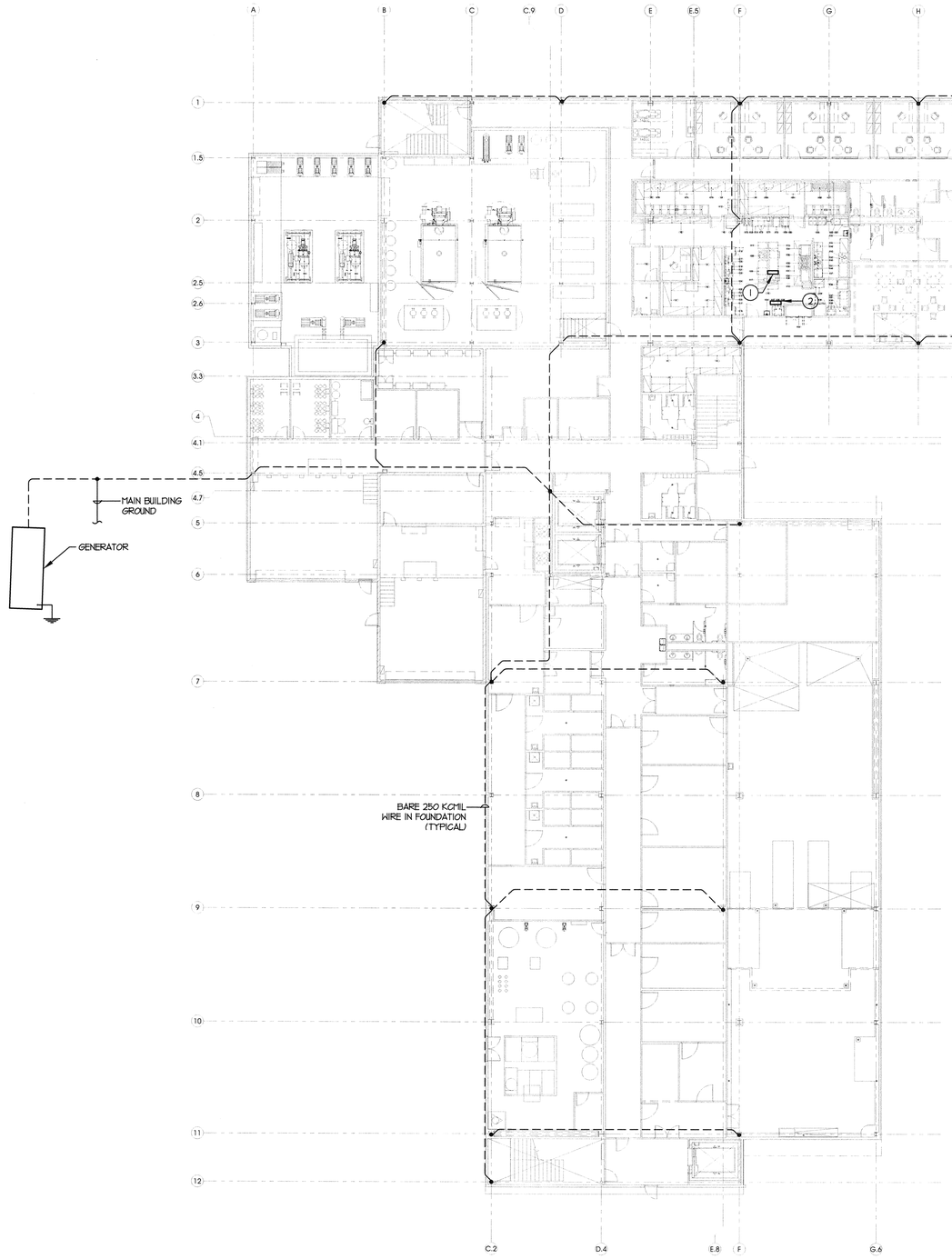

KEYED NOTES:

1. MOUNT 1/4"X4"X12" GROUNDING BAR ON COLUMN ON LEVEL 2 AND CONNECT TO LEVEL 1 GROUNDING SYSTEM.
2. MOUNT 1/4"X4"X12" GROUNDING BAR ON COLUMN ON LEVEL 3 AND CONNECT TO LEVEL 1 GROUNDING SYSTEM.

PLAN

8' 0' 8'

scale = 1/16" = 1'-0"

LEVEL 1 GROUNDING PLAN A4 / EP110

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SHEET NAME:

LEVEL 1 GROUNDING PLAN

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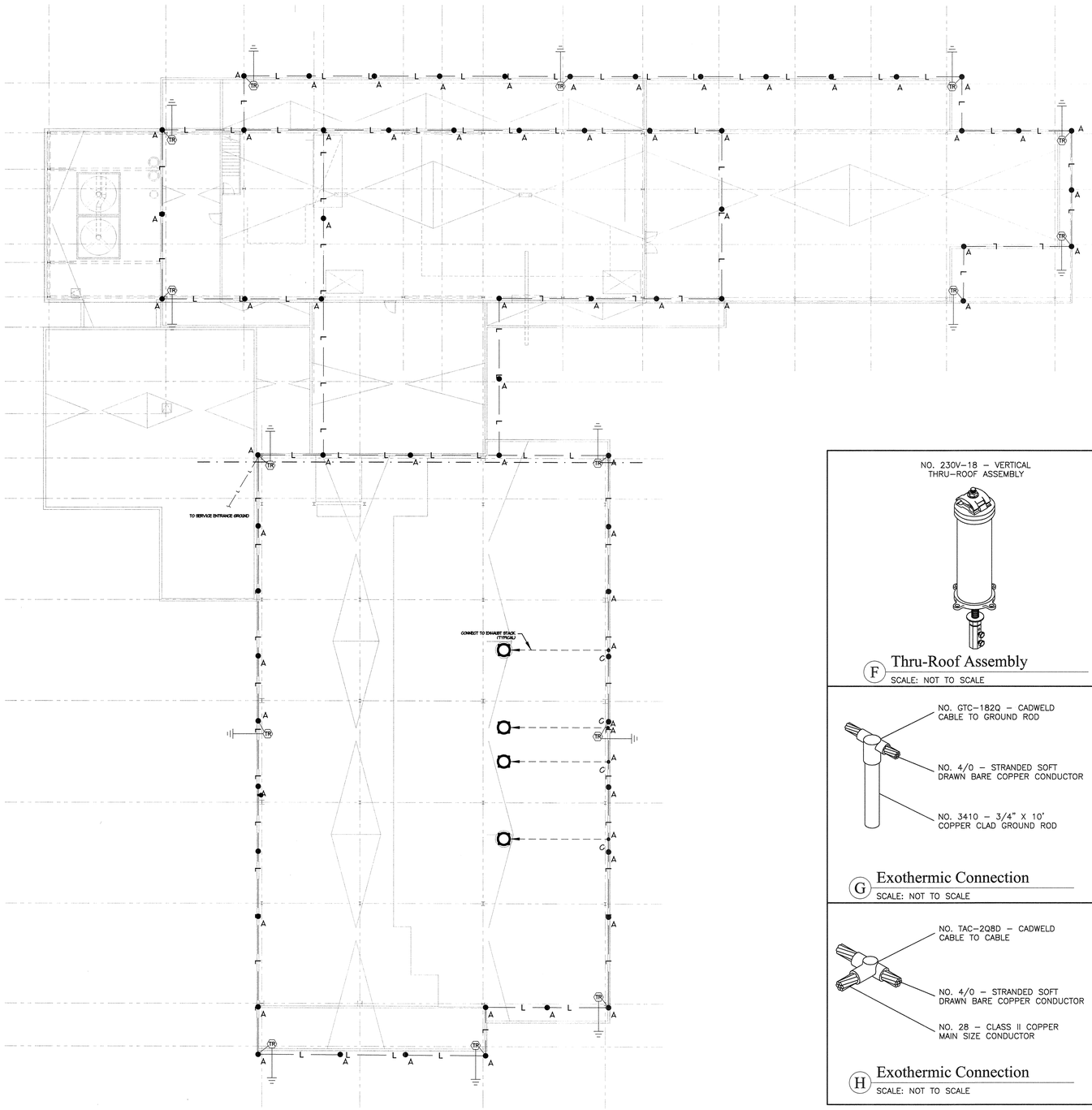
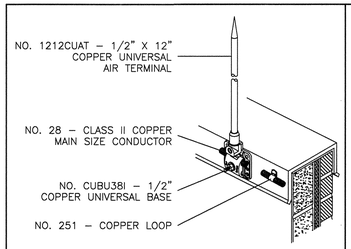
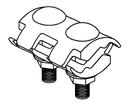




A Air Terminal @ Parapet
SCALE: NOT TO SCALE

NO. 204 – TWO BOLT PARALLEL SPLICER



USE TO SPLICE MAIN SIZE CONDUCTOR WITH MAIN SIZE CONDUCTOR

B Cable to Cable Splice
SCALE: NOT TO SCALE

NO. 208 – ONE BOLT PARALLEL SPLICER

USE TO SPLICE MAIN SIZE CONDUCTOR WITH BONDING CONDUCTOR

C Cable to Cable Splice
SCALE: NOT TO SCALE

NO. 213 – CABLE TO FLAT METAL CLAMP

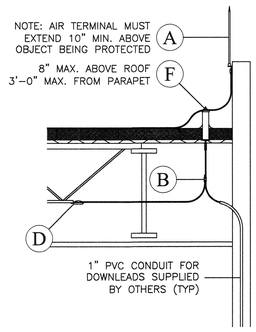
D Cable to Metal Clamp
SCALE: NOT TO SCALE

NO. 230V–18 – VERTICAL THRU–ROOF ASSEMBLY

F Thru-Roof Assembly
SCALE: NOT TO SCALE

G Exothermic Connection
SCALE: NOT TO SCALE

H Exothermic Connection
SCALE: NOT TO SCALE



E Typical Thru-Roof Detail
SCALE: NOT TO SCALE

LEGEND

NO. 1212CUAT – 1/2" X 12" COPPER UNIVERSAL AIR TERMINAL. REFER TO DETAIL "A".

MECHANICAL TYPE CABLE TO CABLE CONNECTION. REFER TO DETAILS "B" AND "C".

EXOTHERMIC TYPE CABLE TO CABLE CONNECTION. REFER TO DETAIL "H".

EXOTHERMIC TYPE CABLE TO GROUND ROD CONNECTION. REFER TO DETAIL "G".

BOND TO TYPICAL BODY OF INDUCTANCE. REFER TO "GENERAL BONDING NOTES" AND "MISCELLANEOUS BONDS & CLAMPS" DETAIL.

TR THRU–ROOF PENETRATION. REFER TO DETAIL "E".

NO. 28 – CLASS II COPPER MAIN SIZE LIGHTNING PROTECTION CONDUCTOR

NO. 4/0 – STRANDED SOFT DRAWN BARE COPPER COUNTERPOISE CONDUCTOR

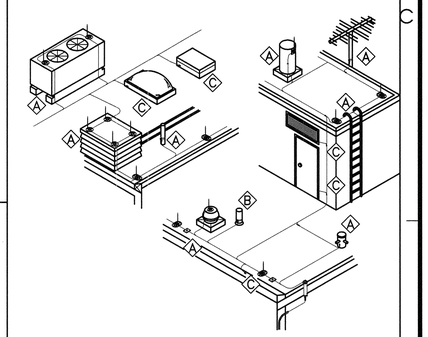
GENERAL BONDING NOTES

A TYPICAL BODIES OF CONDUCTANCE AS NOTED BELOW. USE FULL SIZE CONDUCTOR AND APPROPRIATE FITTING SHOWN FOR CONNECTION.

B (PLUMBING STACK) REQUIRES BONDING WITH MAIN SIZE CABLE ONLY IF WITHIN 6'–0" (1,828mm) OF LIGHTNING PROTECTION SYSTEM.

C TYPICAL BODIES OF INDUCTANCE AS NOTED BELOW. USE SECONDARY SIZE (SMALLER) CONDUCTOR AND APPROPRIATE FITTING SHOWN FOR CONNECTION.

D BONDING CONNECTIONS AND FITTINGS SHOWN ARE TYPICAL EXAMPLES. MAKE ALL CONNECTIONS REQUIRED TO MEED CODES AS NOTED BELOW. ADJUST FITTING TYPE AS REQUIRED TO SUIT FIELD CONDITIONS.



GENERAL INSTALLATION NOTES

1. LOCATE AIR TERMINALS AS SHOWN. TAKE CARE TO INSURE THAT ALL POINTS ARE WITHIN 2'–0" (609mm) OF OUTSIDE BUILDING EDGE, OUTSIDE CORNERS, RIDGE ENDS, AND THAT MAX SPACING DOES NOT EXCEED 20'–0" (6,096mm), AND THAT MIN PROJECTION ABOVE OBJECT PROTECTED IS 10" (254mm); POINTS PROJECTING 24" (609mm) MAY BE SPACED @ 25'–0" (7,520mm) MAX.
2. MAINTAIN HORIZONTAL OR DOWNWARD COURSING OF MAIN CONDUCTOR. INSURE THAT ALL BENDS HAVE AT LEAST AN 8" (203mm) RADIUS AND DO NOT EXCEED 90 DEGREES.
3. ATTACH ALL EXPOSED ROOF, DOWN LEAD AND BONDING CABLES AT 3'–0" (914mm) ON CENTER MAX. VERIFY COMPATIBILITY OF ADHESIVE ON MEMBRANE ROOF APPLICATION PRIOR TO INSTALLATION.
4. GROUND ELECTRODES SHALL BE INSTALLED AS SHOWN, BUT IN NO INSTANCE SHALL THEY BE LESS THAN 1'–0" (304mm) BELOW GRADE AND 2'–0" (609mm) FROM FOUNDATION WALL. DRIVEN RODS SHALL PENETRATE THE EARTH AT LEAST 10'–0" (3,048mm).
5. BOND TO WATER SERVICE AND OTHER PIPING SYSTEMS AS SHOWN AND AS REQUIRED BY CODE.
6. INTERCONNECT LIGHTNING PROTECTION GROUND TO ELECTRIC, TELEPHONE, AND OTHER BUILDING GROUND SYSTEMS AS SHOWN OR AS REQUIRED BY CODE.
7. SYSTEM SHALL BE INSTALLED AS SHOWN TO INSURE PROPER CODE COMPLIANCE AND SYSTEM CERTIFICATION. ANY MAJOR VARIANCE SHALL BE RESUBMITTED FOR APPROVAL.
8. "AS–BUILT" DRAWINGS SHALL BE SUBMITTED IN ACCORDANCE WITH CERTIFICATION PROCEDURES.
9. ALL MATERIALS TO BE UNDERWRITER'S LABORATORIES APPROVED WITH "A" LABELS ON CONDUCTORS @ 10'–0" (3,048mm) INTERVALS AND "B" LABELS ON ALL AIR TERMINALS.
10. COMPLETED INSTALLATION AS SHOWN SHALL BEAR U.L. MASTER LABEL "C" TO BE SECURED BY SYSTEM INSTALLER PER UL96A.
11. ALL MATERIALS SHOWN AND INTENDED FOR USE ARE TO BE SUPPLIED BY:
    VFC, INCORPORATED
    90 NORTH CUTLER DRIVE * NORTH SALT LAKE, UT 84054
    PHONE: (801) 292–2956 * FAX: (801) 292–4164
    EMAIL: vfc@vfcinc.com * INTERNET: http://www.vfcinc.com
12. INSTALLATION SHALL COMPLY IN ALL RESPECTS TO L.P.I. CODE 175. INSTALLATION SHALL BE MADE UNDER THE SUPERVISION OF AN L.P.I. CERTIFIED MASTER INSTALLER.

GENERAL CONSTRUCTION NOTES

1. THIS DRAWING IS INTENDED FOR USE AS A CONSTRUCTION DOCUMENT. ALL DIMENSIONS, AIR TERMINALS, CONDUCTOR RUNS, THRU–ROOFS/WALLS, AND GROUNDING LOCATIONS SHOWN ARE BASED ON THE MOST CURRENT PROVIDED INFORMATION. FIELD VERIFY ACTUAL CONDITIONS PRIOR TO CONSTRUCTION. CONTACT VFC, INCORPORATED TO CLARIFY ANY DISCREPANCIES.

PLAN
n
8' 0' 8'
scale = 1/16" = 1'-0"

LEVEL 4 LIGHTNING PROTECTON PLAN A4 / EP109

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USTAR BUILDING #2
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SHEET NAME:
LEVEL 4 LIGHTNING PROTECTION PLAN

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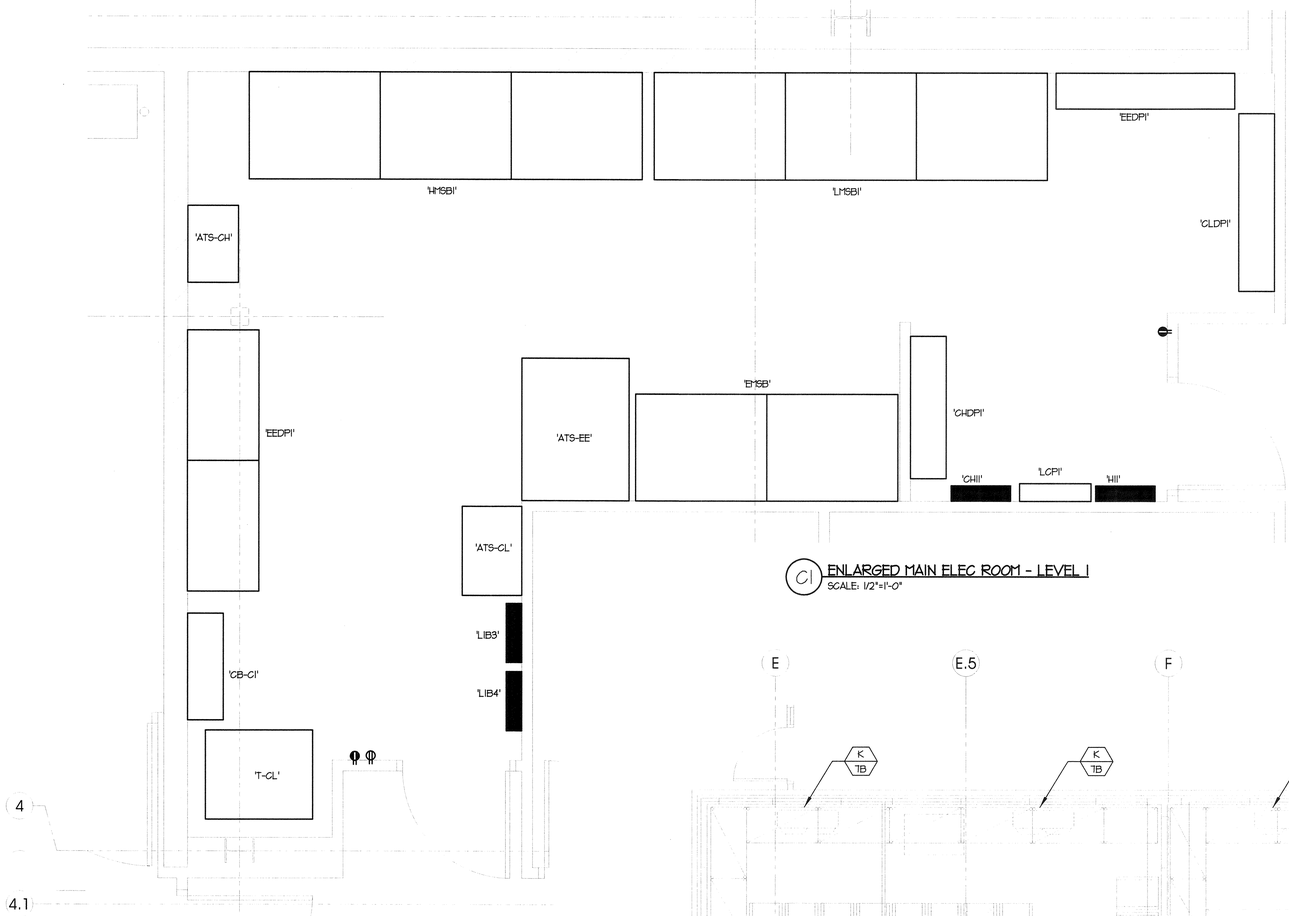
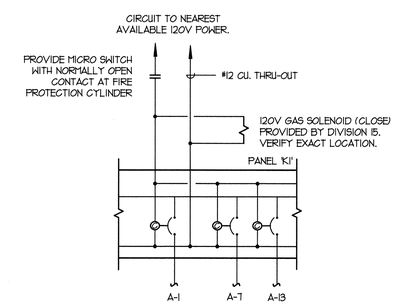


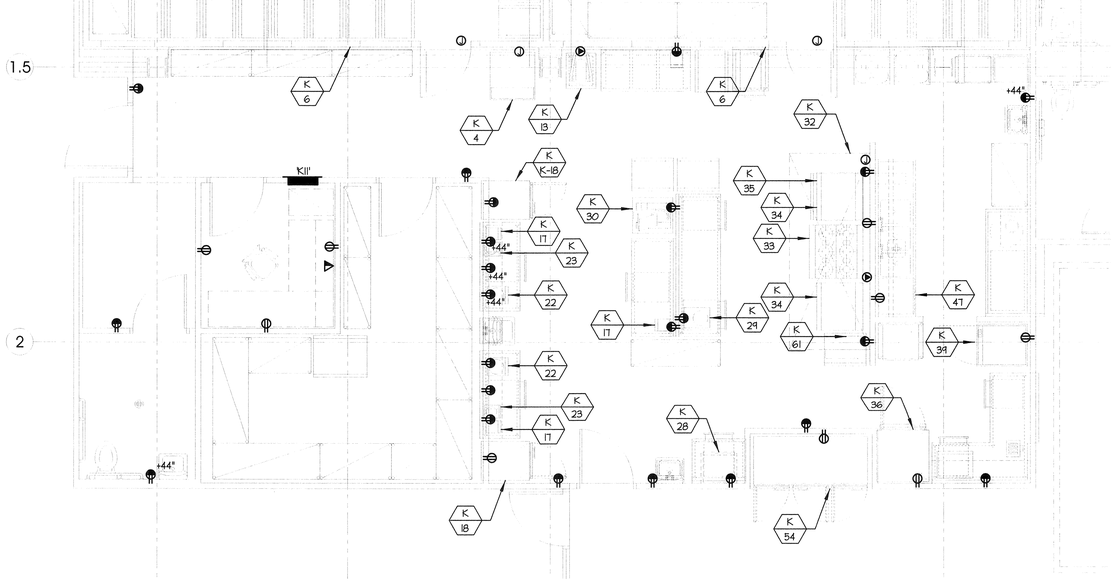
C1 ENLARGED MAIN ELEC ROOM - LEVEL 1
SCALE: 1/2"=1'-0"



A4 ELECTRICAL SHUT-OFF DETAIL
SCALE: NONE

NOTE:

PROVIDE SHUNT TRIP PER LOCAL AUTHORITIES REQUIREMENTS.



A3 ENLARGED KITCHEN - LEVEL 1
SCALE: 1/4"=1'-0"

KEYED NOTES:

1.

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USTAR BUILDING #2
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SHEET NAME:

LEVEL 1
ENLARGED POWER
PLANS

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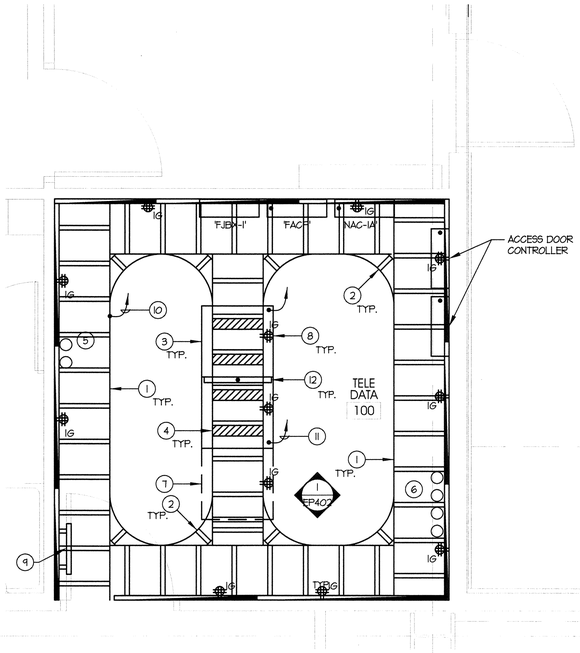
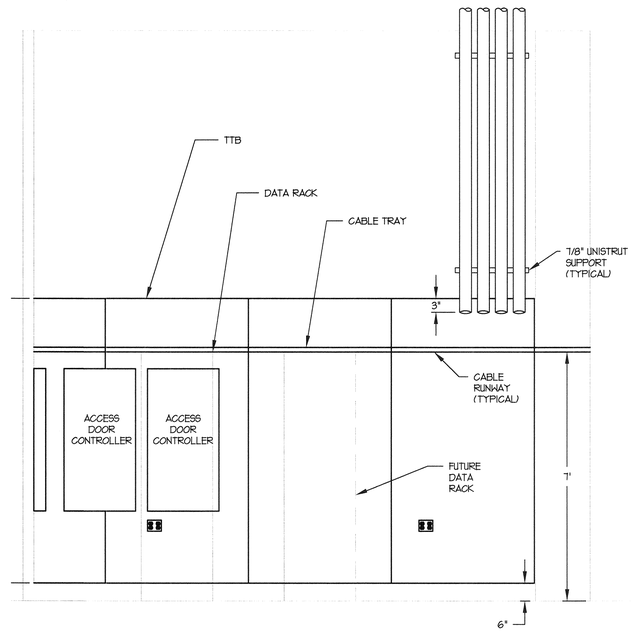


C1 ENLARGED TELE/DATA ROOM - LEVEL 1
SCALE: 1/2"=1'-0"



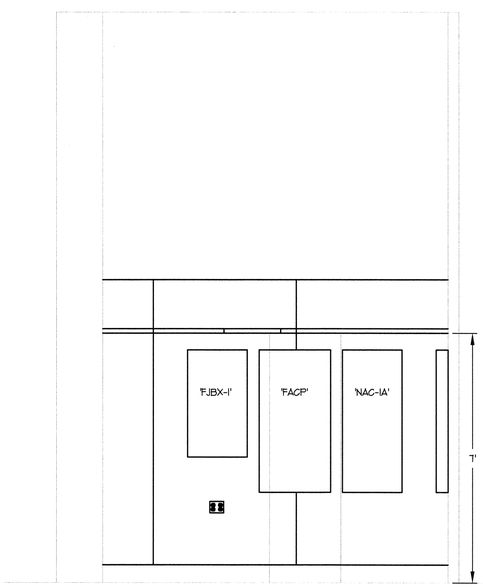
C3 EAST ELEVATION TELE/DATA ROOM - LEVEL 1
SCALE: 1/2"=1'-0"

GENERAL NOTES:

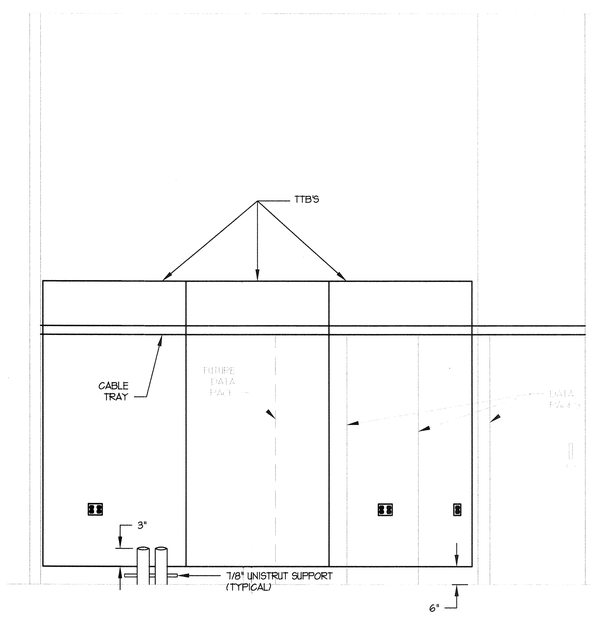
1. PROVIDE 3/4" FIRE RETARDANT, AC GRADE PLYWOOD ON ALL WALLS OF THE TELEPHONE ROOM. FILL IN ALL HOLES AND VOIDS WITH FILLER AND PAINT THE PLYWOOD AN OFF-WHITE COLOR.
2. ALL OUTLETS LOCATED ON THE WALLS OF THIS ROOM SHALL BE FLUSH WITH THE FACE OF THE PLYWOOD. SURFACE MOUNTED BOXES AND CONDUITS IS NOT ALLOWED.
3. PROVIDE SUPPORT FOR THE CABLE TRAY EVERY 5'-0" OR AS RECOMMENDED BY THE MANUFACTURER.
4. GROUND DOWN (FILE) ALL SHARP CORNERS AND EDGES OF THE CABLE TRAY AND PAINT WITH MANUFACTURER APPROVED PAINT.
5. THE CONTRACTOR SHALL PROVIDE ALL PARTS AND ACCESSORIES AS REQUIRED FOR A COMPLETE CABLE TRAY SYSTEM.
6. THE CONTRACTOR SHALL INSTALL THE CABLE TRAY SYSTEM PER ALL MANUFACTURER'S STANDARD INSTALLATION PROCESDURES AND METHODS.
7. COORDINATE INSTALLATION OF CABLE RUNWAY WITH USU'S IT DEPARTMENT.
8. ALL EQUIPMENT IN THIS ROOM SHALL BE PROPERLY GROUNDED PER EIA/TIA AND OTHER APPLICABLE STANDARDS.

KEYED NOTES:

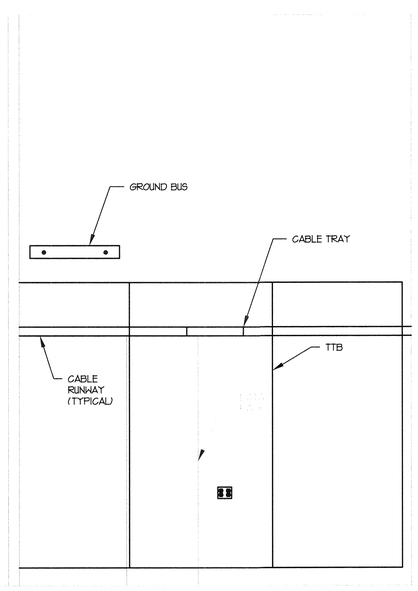
1. PROVIDE CHATSWORTH UNIVERSAL CABLE RUNWAY P/N 10250-718 (OR APPROVED EQUIVALENT).
2. PROVIDE CHATSWORTH CABLE RUNWAY CORNER BRACKET P/N 11154-715 (OR APPROVED EQUIVALENT).
3. PROVIDE 19" X 6'-0" DATA RACK. REFER TO THE SPECIFICATIONS FOR ACCEPTABLE MANUFACTURER'S. THE CABLE RUNWAY SHALL BE SECURELY FASTENED TO THE DATA RACK USING COMPONENTS MANUFACTURED BY THE CABLE RUNWAY MANUFACTURER.
4. PROVIDE TWO (2) CHATSWORTH RUNWAY RADIUS DROPS FOR EACH COMMUNICATION/DATA RACK P/N 12100-718.
5. PROVIDE TWO (2) 4" CONDUITS STUBBED INTO THE BUILDING FOR COMMUNICATION/DATA REQUIREMENTS. REFER TO THE SITE PLAN SHEET ES101 AND THE COMMUNICATION/DATAT RISER DIAGRAM ON SHEET EYXXX FOR ADDITIONAL INFORMATION. THE CONDUITS SHALL EXTEND 3" ABOVE THE EDGE OF THE PLYWOOD.
6. PROVIDE FOUR (4) 4" CONDUITS STUBBED UP INTO THE 2ND FLOOR TELEPHONE ROOM FOR COMMUNICATION/DATA CONVEYANCE. REFER TO THE TELEPHONE/DATA RISER DIAGRAM ON SHEET EYXXX FOR ADDITIONAL INFORMATION. THE CONDUITS SHALL EXTEND DOWN 3" BELOW THE EDGE OF THE PLYWOOD.
7. FUTURE COMMUNICATION/DATA RACK.
8. PROVIDE A 4-PLEX RECEPTACLE MOUNTED ON THE CABLE RUNWAY (TYPICAL OF 3) ABOVE THE COMMUNICAITON/DATA RACK. UTILIZE PARTS AND PIECES FROM THE CABLE RUNWAY MANUFACTURER TO MOUNT THE JUNCTION BOX TO THE TRAY.
9. PROVIDE A 1/4" THICK X 4" TALL X 24" LONG COPPER GROUND BUS WITH ISOLATION STANDOFF BRACKETS. THIS GROUND BUS WILL BE USED TO GROUND ALL EQUIPMENT IN THIS ROOM.
10. EXTEND A #6 AWG. COPPER WIRE GREEN INSULATION FROM THE CABLE TRAY TO THE GROUND BUS.
11. EXTEND A #6 AWG. COPPER WIRE WITH GREEN INSULATION, THAN TO THE GROUND BUS.
12. PROVIDE CHATSWORTH CABLE RUNWAY CENTER SUPPORT KIT PIN 12362-718 (OR APPROVED EQUIVALENT).



A2 SOUTH ELEVATION TELE/DATA ROOM - LEVEL 1
SCALE: 1/2"=1'-0"



A3 WEST ELEVATION TELE/DATA ROOM - LEVEL 1
SCALE: 1/2"=1'-0"



C2 NORTH ELEVATION TELE/DATA ROOM - LEVEL 1
SCALE: 1/2"=1'-0"

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Internet: http://www.dfcm.utah.gov

PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

LEVEL 1
ENLARGED TELE/
DATA PLANS

REVISIONS

MARK	DATE	DESCRIPTION

ISSUE DATA

ISSUE DATE:	DEC. 9, 2008
ISSUE TYPE:	DESDEV
DRAWN BY:	J. HARWARD
CHECKED BY:	D. WHITTON

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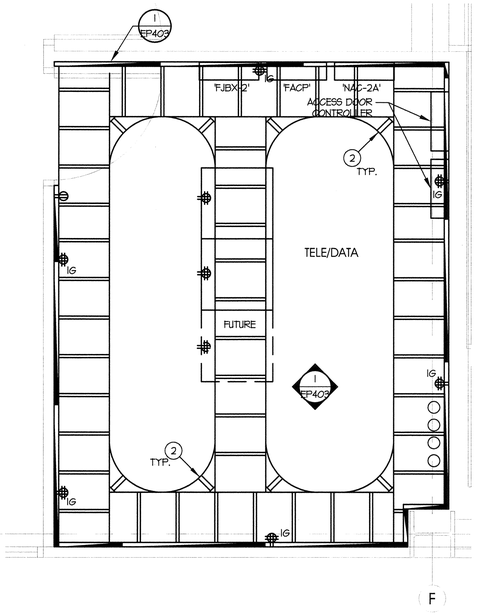
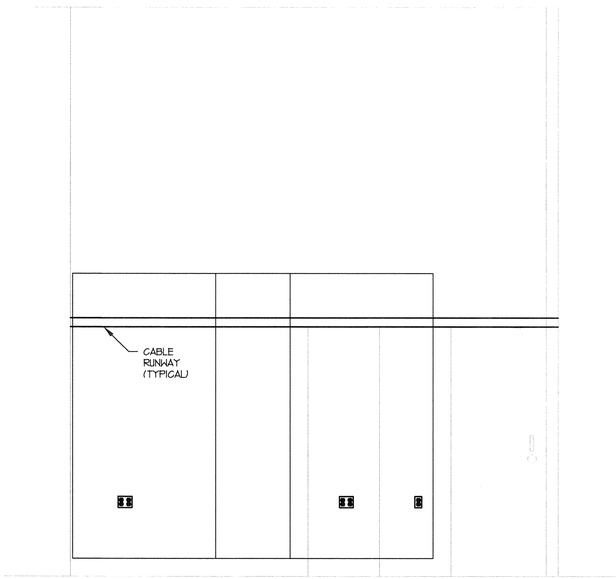
SHEET NUMBER:

EP402

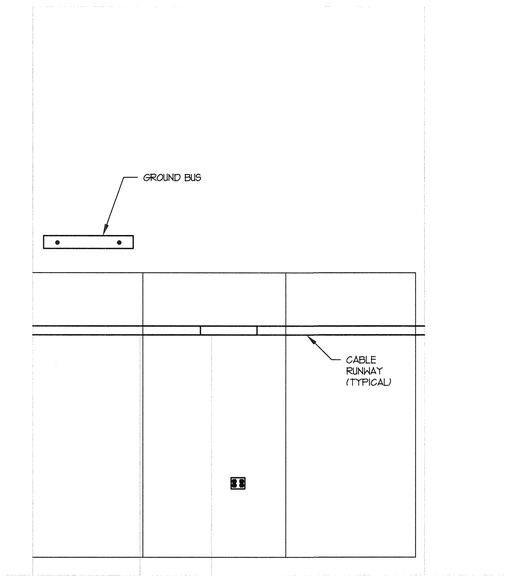
W:\2008-064.00 - USU USTAR Life Science Research Center\Elec\EP402.dwg, 12/6/2008 2:55:58 PM, dave,
Envision Engineering, P.C.



C1 ENLARGED TELE/DATA ROOM - 2ND LEVEL
SCALE: 1/2"=1'-0"



C2 WEST ELEVATION TELE/DATA ROOM - 2ND LEVEL
SCALE: 1/2"=1'-0"



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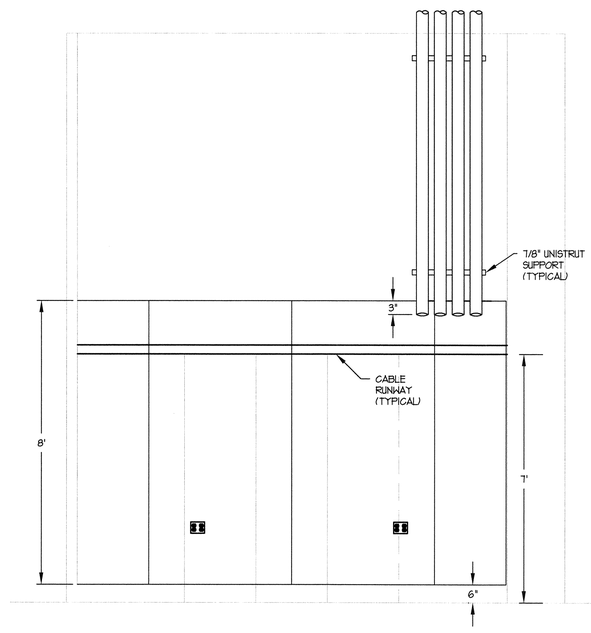
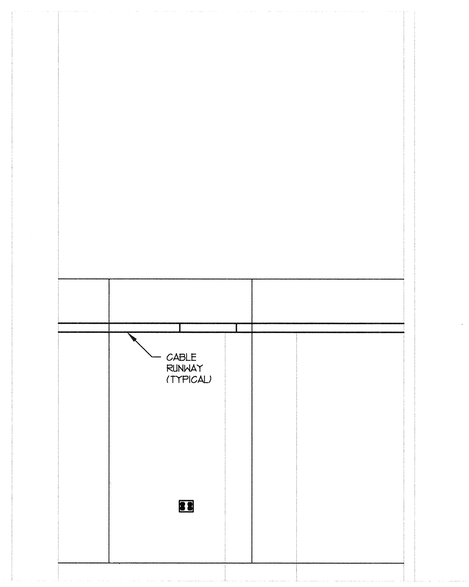
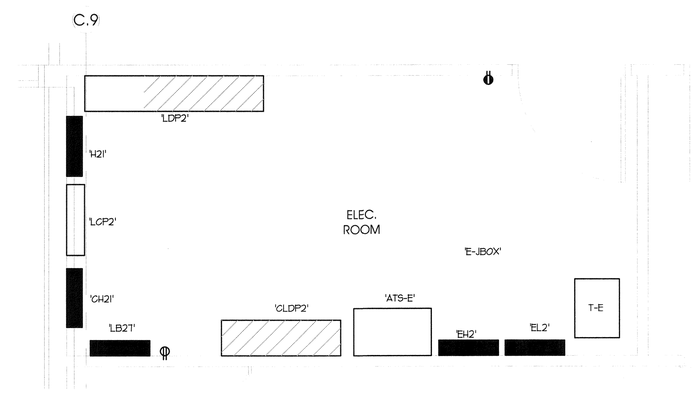
SCALE: 1/2"=1'-0"



A1 EAST ELEVATION TELE/DATA ROOM - 2ND LEVEL
SCALE: 1/2"=1'-0"



A3 SOUTH ELEVATION TELE/DATA ROOM - 2ND LEVEL
SCALE: 1/2"=1'-0"



A4 ENLARGED ELECTRICAL ROOM - 2ND LEVEL
SCALE: 1/2"=1'-0"

KEYED NOTES:

1. PROVIDE CHATSWORTH UNIVERSAL CABLE RUNWAY P/N 10250-718 (OR APPROVED EQUIVALENT).
2. PROVIDE CHATSWORTH CABLE RUNWAY CORNER BRACKET P/N 11959-715 (OR APPROVED EQUIVALENT).
3. PROVIDE 19" X 6'-0" DATA RACK. REFER TO THE SPECIFICATIONS FOR ACCEPTABLE MANUFACTURER'S. THE CABLE RUNWAY SHALL BE SECURELY FASTENED TO THE DATA RACK USING COMPONENTS MANUFACTURED BY THE CABLE RUNWAY MANUFACTURER.
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7. FUTURE COMMUNICATION/DATA RACK.
8. PROVIDE A 4-PLEX RECEPTACLE MOUNTED ON THE CABLE RUNWAY (TYPICAL OF 3) ABOVE THE COMMUNICAITON/DATA RACK. UTILIZE PARTS AND PIECES FROM THE CABLE RUNWAY MANUFACTURER TO MOUNT THE JUNCTION BOX TO THE TRAY.
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11. EXTEND A #6 AWG. COPPER WIRE WITH GREEN INSULATION, THHN TO THE GROUND BUS.
12. PROVIDE CHATSWORTH CABLE RUNWAY CENTER SUPPORT KIT PIN 12362-718 (OR APPROVED EQUIVALENT).

GENERAL NOTES:

1. PROVIDE 3/4" FIRE RETARDANT, AC GRADE PLYWOOD ON ALL WALLS OF THE TELEPHONE ROOM. FILL IN ALL HOLES AND VOIDS WITH FILLER AND PAINT THE PLYWOOD AN OFF-WHITE COLOR.
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PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

LEVEL 2 ENLARGED TELE/ DATA PLANS

REVISIONS

MARK	DATE	DESCRIPTION

ISSUE DATA

ISSUE DATE:	DEC. 9, 2008
ISSUE TYPE:	DESDEV
DRAWN BY:	J. HARWARD
CHECKED BY:	D. WHITTON

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EP403

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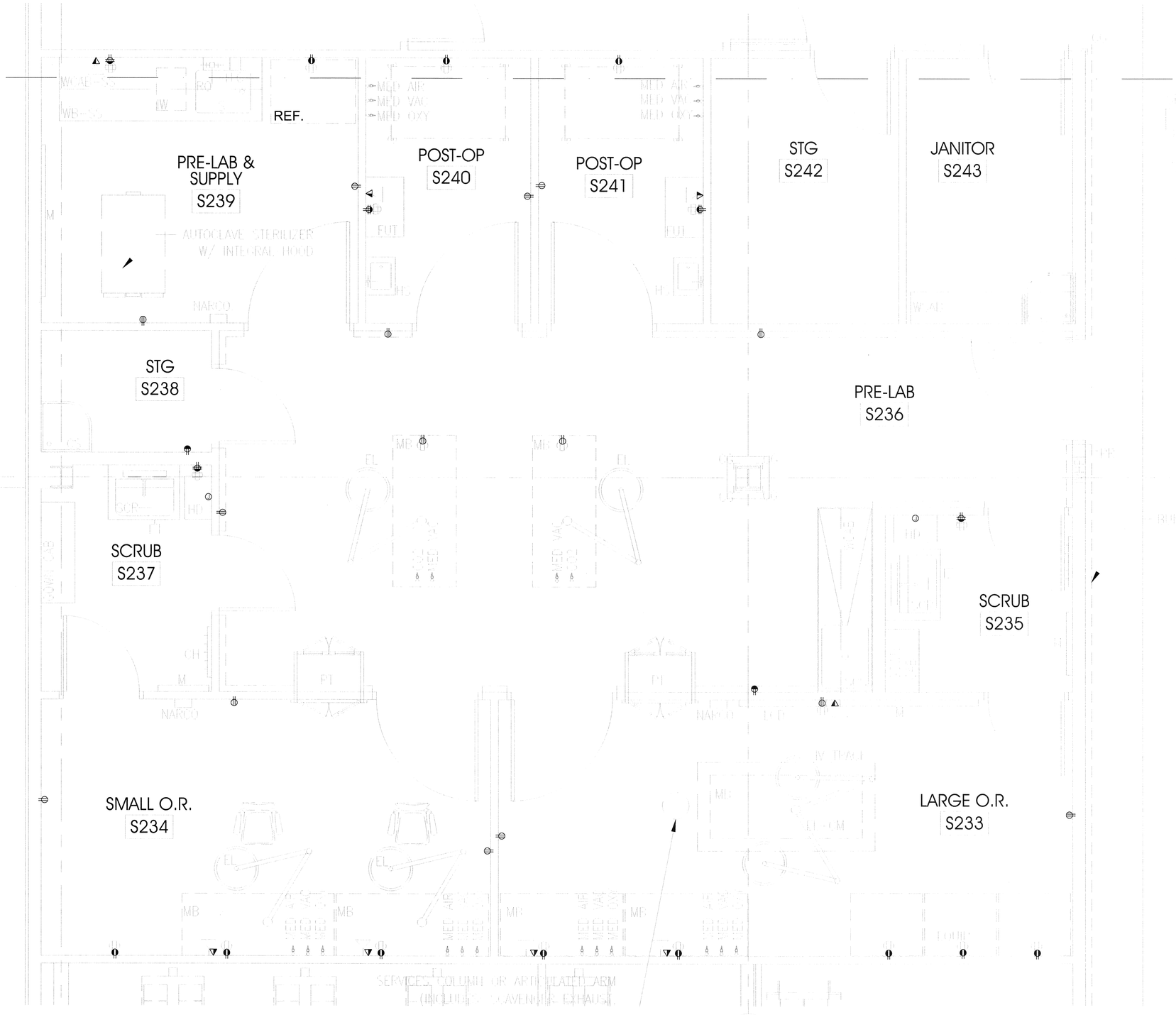
Envision Engineering, P.C.

KEYED NOTES:

1.



PLAN n

scale = 1/4" = 1'-0"

ENLARGED SURGERY - LEVEL 2 (A4 / EP404)

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UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

LEVEL 2 ENLARGED POWER PLAN

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CHECKED BY:	D. WHITTON

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EP404

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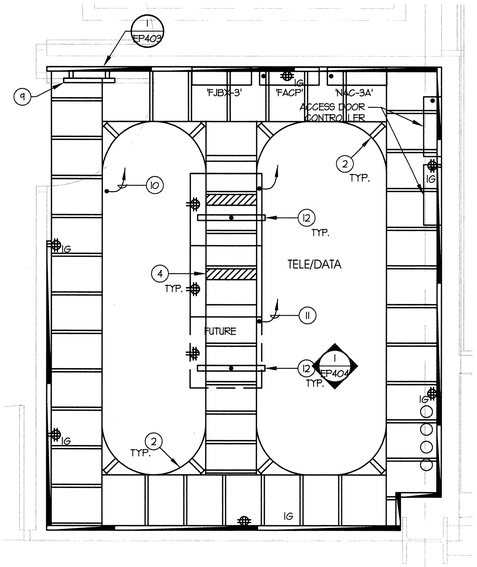
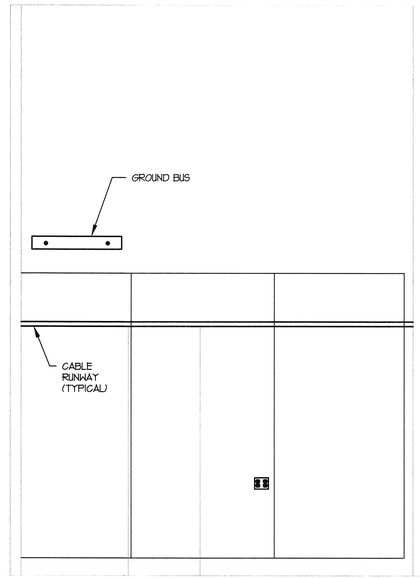
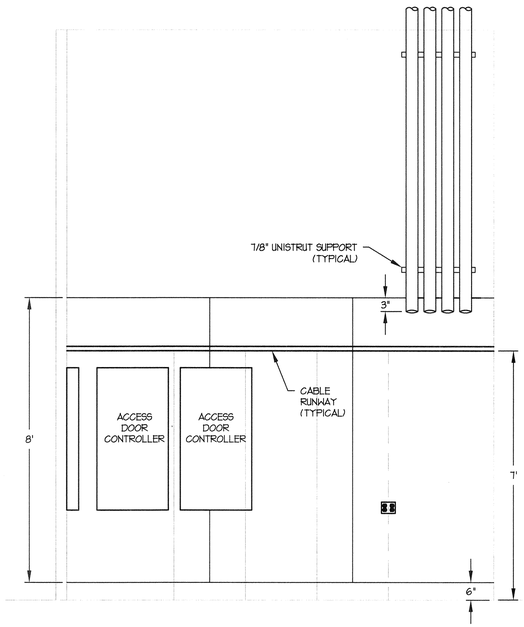


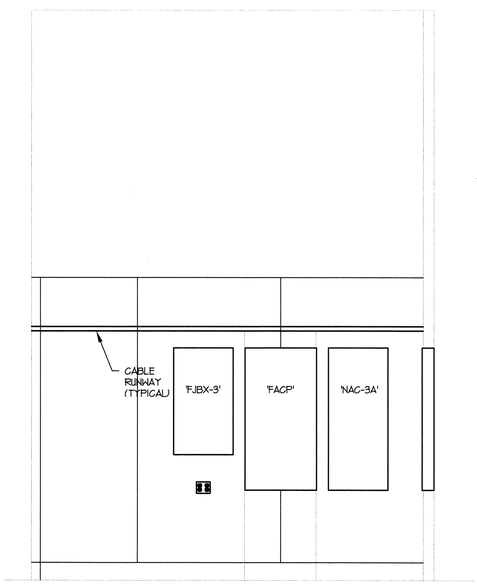
C1 ENLARGED TELE/DATA ROOM - LEVEL 3
SCALE: 1/2"=1'-0"



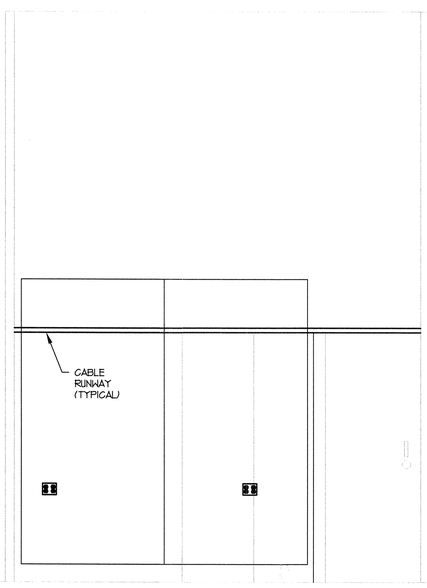
C2 NORTH ELEVATION TELE/DATA ROOM - LEVEL 3
SCALE: 1/2"=1'-0"



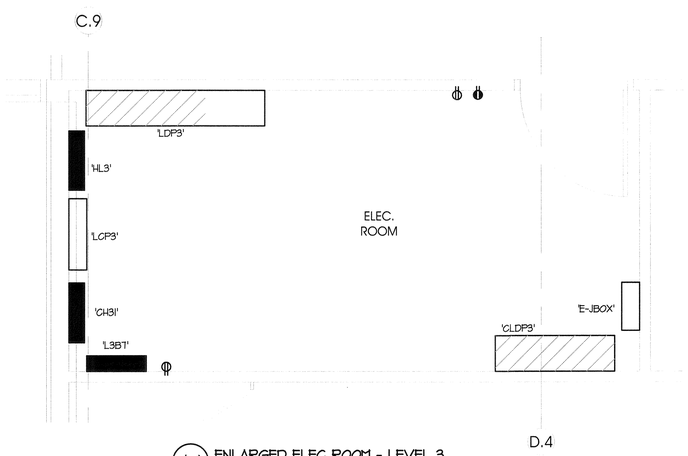
C3 EAST ELEVATION TELE/DATA ROOM - LEVEL 3
SCALE: 1/2"=1'-0"



A1 SOUTH ELEVATION TELE/DATA ROOM - LEVEL 3
SCALE: 1/2"=1'-0"



A3 WEST ELEVATION TELE/DATA ROOM - LEVEL 3
SCALE: 1/2"=1'-0"



A4 ENLARGED ELEC ROOM - LEVEL 3
SCALE: 1/2"=1'-0"

KEYED NOTES:

1. PROVIDE CHATSWORTH UNIVERSAL CABLE RUNWAY P/N 10250-718 (OR APPROVED EQUIVALENT).
2. PROVIDE CHATSWORTH CABLE RUNWAY CORNER BRACKET P/N 11954-715 (OR APPROVED EQUIVALENT).
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4. PROVIDE TWO (2) CHATSWORTH RUNWAY RADIUS DROPS FOR EACH COMUNICATION/DATA RACK P/N 12100-718.
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9. PROVIDE A 1/4" THICK X 4" TALL X 24" LONG COPPER GROUND BUS WITH ISOLATION STANDOFF BRACKETS. THIS GROUND BUS WILL BE USED TO GROUND ALL EQUIPMENT IN THIS ROOM.
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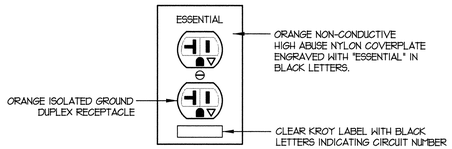
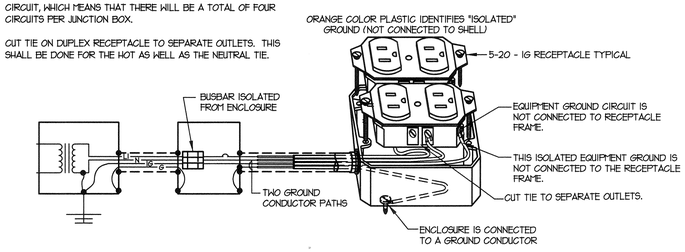


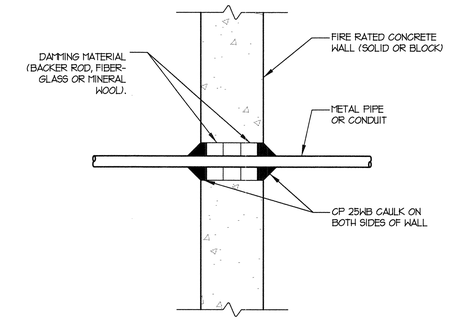
B1 ISOLATED GROUND DUPLEX RECEPTACLE OUTLET DETAIL
SCALE: NONE

NOTES:

1. EACH SINGLE RECEPTACLE WILL BE CONNECTED TO A BRANCH CIRCUIT, WHICH MEANS THAT THERE WILL BE A TOTAL OF FOUR CIRCUITS PER JUNCTION BOX.
2. CUT TIE ON DUPLEX RECEPTACLE TO SEPARATE OUTLETS. THIS SHALL BE DONE FOR THE HOT AS WELL AS THE NEUTRAL TIE.



C3 ISOLATED GROUND DUPLEX RECEPTACLE CONNECTION DETAIL
SCALE: NONE



C5 TYPICAL WALL PENETRATION DETAIL
SCALE: NONE

C — PROVIDE A 4-11/16"x4-11/16"x2-1/8" DEEP JUNCTION BOX WITH DOUBLE GANG PLASTER RING FOR SYSTEMS FURNITURE COMMUNICATION/DATA REQUIREMENTS. EXTEND (2) 1-1/4" CONDUITS WITH NYLON PULL ROPES TO THE CABLE TRAYLOCATED ABOVE THE ACCESSIBLE CEILING. TERMINATE CONDUITS WITH NYLON BUSHINGS. COMMUNICATION/DATA CABLES WILL BE PROVIDED BY USU'S IT DIVISION.
(3,3) — NUMBER OF TELEPHONE LINES (FIRST), NUMBER OF DATA LINES (SECOND).

P — PROVIDE 4"x4"x2-1/8" DEEP JUNCTION BOX WITH SINGLE GANG PLASTER RING FOR SYSTEMS FURNITURE POWER. EXTEND A 3/4" CONDUIT WITH ASSOCIATED BRANCH CIRCUITS TO REQUIRED ELECTRICAL PANEL.

▽ — PROVIDE 4"x4"x2-1/8" DEEP JUNCTION BOX WITH SINGLE GANG PLASTER RING AND EXTEND 3/4" CONDUIT WITH NYLON PULL ROPE TO ACCESSIBLE CEILING. TERMINATE CONDUIT IN CEILING SPACE WITH A NYLON BUSHING. CABLE TO BE PROVIDED BY OWNER.
(3) — NUMBER OF TELEPHONE LINES

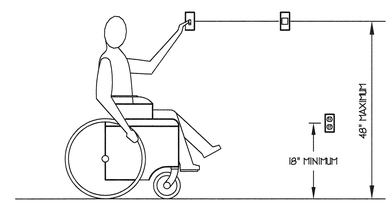
▼ — PROVIDE 4"x4"x2-1/8" DEEP JUNCTION BOX WITH SINGLE GANG PLASTER RING AND EXTEND 3/4" CONDUIT WITH NYLON PULL ROPE TO ACCESSIBLE CEILING. TERMINATE CONDUIT IN CEILING SPACE WITH A NYLON BUSHING. CABLE TO BE PROVIDED BY OWNER.
(3) — NUMBER OF DATA LINES

▽ — PROVIDE 4"x4"x2-1/8" DEEP JUNCTION BOX WITH SINGLE GANG PLASTER RING AND EXTEND 3/4" CONDUIT WITH NYLON PULL ROPE TO ACCESSIBLE CEILING. TERMINATE CONDUIT IN CEILING SPACE WITH A NYLON BUSHING. CABLE TO BE PROVIDED BY OWNER.
(3,3) — NUMBER OF TELEPHONE LINES (FIRST), NUMBER OF DATA LINES (SECOND).

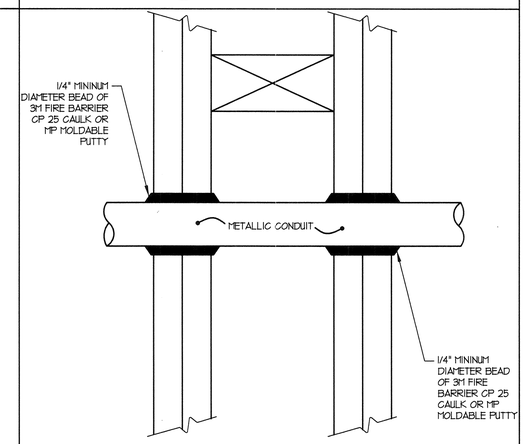
A1-40 — DESIGNATION OF CIRCUIT. WIRE COMPLETE.

A1-40/IG — ISOLATED GROUND CIRCUIT.

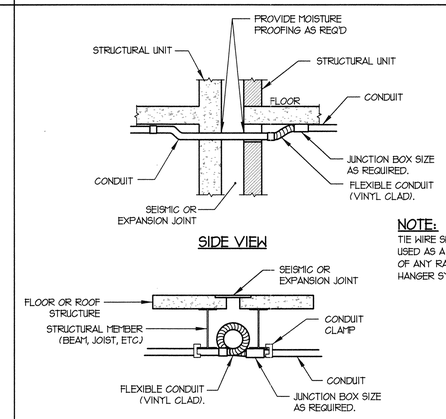
B2 TYPICAL OUTLET CONVENTION
SCALE: NONE



A2 ADA ELEVATION DETAIL
SCALE: NONE



B5 FIRESTOP THRU GYPBOARD WALL
SCALE: NONE



NOTE:
TIE WIRE SHALL NOT BE USED AS A COMPONENT OF ANY RACEWAY HANGER SYSTEM.

A5 TYPICAL EXPANSION JOINT DETAIL
SCALE: NONE

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PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

POWER DETAILS

REVISIONS

MARK	DATE	DESCRIPTION

ISSUE DATA

ISSUE DATE:	DEC. 9, 2008
ISSUE TYPE:	DESDEV
DRAWN BY:	J. HARWARD
CHECKED BY:	D. WHITTON

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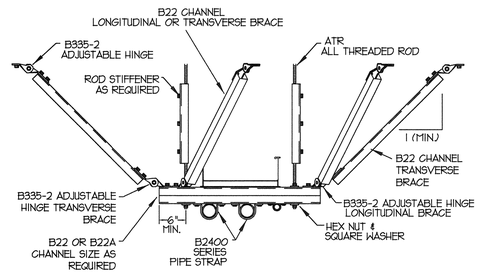
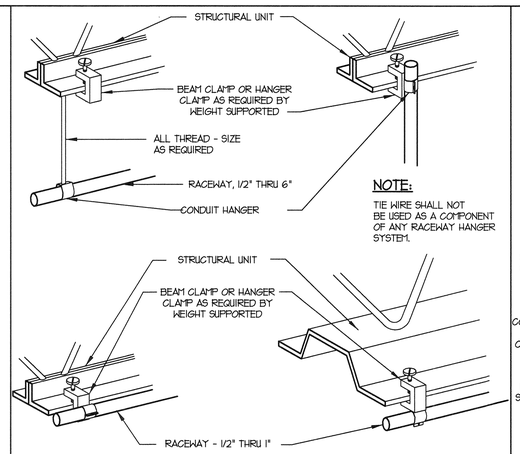
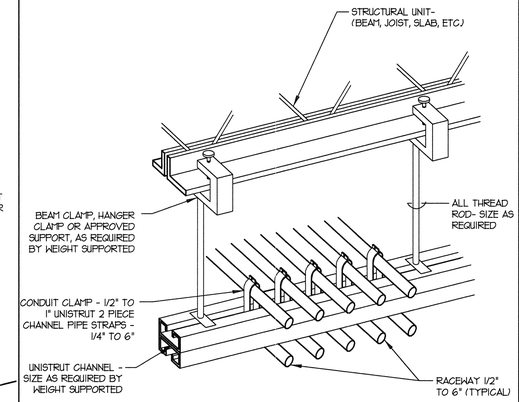


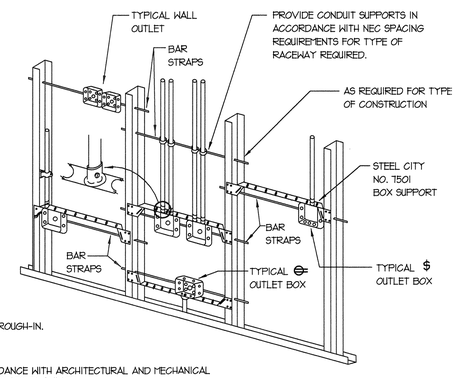
C2 TRAPEZE TRANSVERSE BRACING AND LONGITUDINAL BRACING
SCALE: NONE



C3 TYPICAL RACEWAY DETAILS
SCALE: NONE



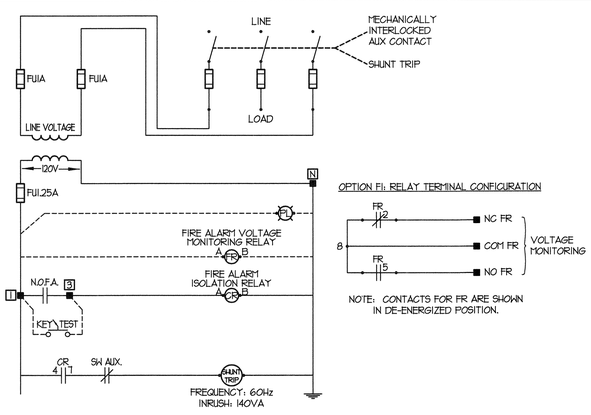
C5 MULTIPLE RACEWAY SUPPORT DETAIL
SCALE: NONE



NOTES:

1. TYPICAL FOR WOOD AND METAL STUD ROUGH-IN.
2. PLASTER RINGS NOT SHOWN.
3. LOCATE ALL OUTLET BOXES IN ACCORDANCE WITH ARCHITECTURAL AND MECHANICAL DRAWINGS, AND WITH ALL APPLICABLE SHOP DRAWINGS.
4. IN ACCORDANCE WITH UBC 4303 OUTLETS ON OPPOSITE SIDES OF WALLS OR PARTITIONS IN THE SAME STUD SPACE MUST BE SEPARATED BY A MINIMUM OF 24" HORIZONTAL DISTANCE.

C5 TYPICAL ROUGH-IN REQUIREMENTS
SCALE: NONE



LEGEND:

N.O.F.A. - NORMALLY OPEN FIRE ALARM CONTACTS SUPPLIED FROM THE FIRE ALARM SYSTEM TO INITIATE THE SHUNT TRIP.
SHUNT TRIP - SOLENOID FOR REMOTE TRIP OF SWITCH, WHICH IS ACTIVATED BY THE CLOSING OF THE FIRE ALARM CONTACTS OR KEY TEST SWITCH.
OPTION R1 - FIRE SAFETY INTERFACE RELAY THAT IS OPERATED AT 120VAC FROM SECONDARY OF TRANSFORMER. NO ADDITIONAL POWER NEEDED.
CR - CONTROL RELAY USED TO ISOLATE THE N.O.F.A. CONTACTS FROM THE DUTY OF THE SHUNT TRIP.
FR - FIRE ALARM VOLTAGE MONITORING RELAY USED TO MONITOR PRESENCE OF VOLTAGE IN SWITCH FROM A REMOTE LOCATION (I.E. FIRE ALARM CONTROL PANEL).
PL - PILOT LIGHT TO VISUALLY INDICATE PRESENCE OF VOLTAGE ON OUTSIDE OF SWITCH ENCLOSURE.
CPT - CONTROL POWER TRANSFORMER USED TO STEP DOWN LINE VOLTAGE TO 120VAC TO POWER SHUNT TRIP COIL.
SW AUX. - NORMALLY CLOSED CONTACT WHEN SWITCH IS CLOSED. OPENS AS POWER SWITCH OPENS.
KEY TEST - KEY-TO-TEST SWITCH USED TO OPERATE SHUNT TRIP FROM THE OUTSIDE OF SWITCH ENCLOSURE. CAN BE USED FOR TROUBLE-SHOOTING AND INSPECTION.
MECHANICALLY INTERLOCKED AUXILIARY CONTACT - CONTACT USED TO DISCONNECT SECONDARY SOURCE OF POWER.
■ - TERMINAL BLOCK CONNECTION POINT.
● - PRE-WIRED CONNECTION POINTS.

A4 POWER MODULE SWITCH WIRING DIAGRAM
SCALE: NONE

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CHECKED BY:	D. WHITTON

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EP502

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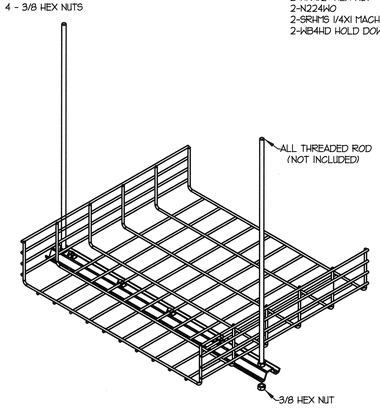
WB53XX

-KIT SUPPORTS WIRE BASKET AS A TRAPEZE HANGER.
-FINISH: PRE-GALVANIZED ZINC
-INCLUDES:
1 - BRACKET
4 - 3/8 HEX NUTS

ASSEMBLY INCLUDES:
1-4ZN-5212H0
1-B202 SQUARE WASHER
2-HN 1/2" HEX NUT
2-N224H0
2-SRHPS 1/4X1 MACHINE SCREW
2-WB4HD HOLD DOWN PLATES



PART NUMBER	SYSTEM WIDTH	BRACKET LENGTH
WB53I8	18	21.7
WB53I24	24	25.6

TRAPEZE KIT

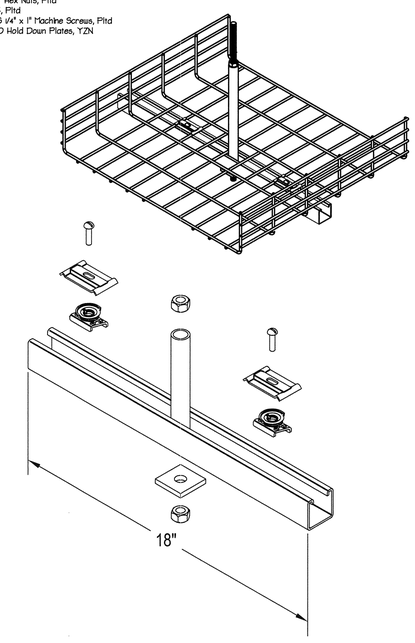
DR

SK-0274
12/10/02

A3 TRAPEZE KIT
SCALE: NONE

Designed for 1/2" ATR. Channel length of 18" supports 12, 18 and 24 Inch Wire Basket Systems. Welded steel tubing extends 6" above strut. 1/2" ATR attachment hardware provided. Wire Basket mounting attachment hardware provided.

Finish: Electro-Galvanized Zinc
Heavy Duty Center Hung Support assembly
Includes:
1 - 4ZN-5212H0
1 - B202 Square Washer, Pltd
2 - HN 1/2" Hex Nuts, Pltd
2 - FN224, Pltd
2 - SRHPS 1/4" x 1" Machine Screws, Pltd
2 - WB4HD Hold Down Plates, YZN



HEAVY DUTY CENTER
HUNG SUPPORT

DR

S4736 WB
02/20/03

A5 HEABY DUTY CENTER HUNG SUPPORT
SCALE: NONE

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USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

POWER DETAILS

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ISSUE TYPE:	DESDEV
DRAWN BY:	J. HARWARD
CHECKED BY:	D. WHITTON

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EP503

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EQUIPMENT SCHEDULE

UNIT NAME	DESCRIPTION	LOAD	TYPE	VOLTAGE	PHASE	AMPERAGE	CONDUIT SIZE	WIRES		STARTER / DISCONNECT/ CONNECTION AT UNIT						POWER FACTOR CORRECTION CAPACITOR (KVAR)	REMARKS
												OCP		DISCONNECT			
								NO.	SIZE	NOTE	STARTER SIZE	SIZE	POLES	SIZE	POLES		
AC-1,2, &3	AIR COMPRESSOR	(3) 20	HP	480	3	81	1-1/4"	3	2	12A	-	-	-	-	-		TRI-PLEX SYSTEM WITH STARTERS & DISC.
AH-1	AIR HANDLER SYSTEM (EMERGENCY POWER)																
(S-1.1)	SUPPLY FAN S-1.1	125	HP	480	3	156	2"	3	4/0	5A/10A	-	500	3	600	3		LATE MAKE/ EARLY BREAK CONTACT
(S-1.2)	SUPPLY FAN S-1.2	125	HP	480	3	156	2"	3	4/0	5A/10A	-	500	3	600	3		LATE MAKE/ EARLY BREAK CONTACT
(EC-1)	EVAPORATIVE COOLER EC-1	1/2	HP	120	1	9.8	3/4"	2	12	13A	-	-	-	-	-		
AH-2	AIR HANDLER SYSTEM (EMERGENCY POWER)																
(S-2.1)	SUPPLY FAN S-2.1	25	HP	480	3	34	1"	3	6	5A/10A	-	50	3	60	3		LATE MAKE/ EARLY BREAK CONTACT
(S-2.2)	SUPPLY FAN S-2.2	25	HP	480	3	34	1"	3	6	5A/10A	-	50	3	60	3		LATE MAKE/ EARLY BREAK CONTACT
(EC-2)	EVAPORATIVE COOLER EC-2	1/2	HP	120	1	9.8	3/4"	2	12	13A	-	-	-	-	-		
AH-3	AIR HANDLER SYSTEM (EMERGENCY POWER)																
(S-3.1)	SUPPLY FAN S-3.1	25	HP	480	3	34	1"	3	6	5A/10A	-	50	3	60	3		LATE MAKE/ EARLY BREAK CONTACT
(S-3.2)	SUPPLY FAN S-3.2	25	HP	480	3	34	1"	3	6	5A/10A	-	50	3	60	3		LATE MAKE/ EARLY BREAK CONTACT
(EC-3)	EVAPORATIVE COOLER EC-3	1/2	HP	120	1	9.8	3/4"	2	12	13A	-	-	-	-	-		
AH-4	AIR HANDLER SYSTEM (EMERGENCY POWER)																
(S-4.1)	SUPPLY FAN S-4.1	50	HP	480	3	65	1-1/4"	3	2	5A/10A	-	100	3	200	3		LATE MAKE/ EARLY BREAK CONTACT
(S-4.2)	SUPPLY FAN S-4.2	50	HP	480	3	65	1-1/4"	3	2	5A/10A	-	100	3	200	3		LATE MAKE/ EARLY BREAK CONTACT
(EC-4)	EVAPORATIVE COOLER EC-4	1/2	HP	120	1	9.8	3/4"	2	12	13A	-	-	-	-	-		
AH-5	AIR HANDLER SYSTEM (EMERGENCY POWER)																
(S-5.1)	SUPPLY FAN S-5.1	50	HP	480	3	65	1-1/4"	3	2	5A/10A	-	100	3	200	3		LATE MAKE/ EARLY BREAK CONTACT
(S-5.2)	SUPPLY FAN S-5.2	50	HP	480	3	65	1-1/4"	3	2	5A/10A	-	100	3	200	3		LATE MAKE/ EARLY BREAK CONTACT
(EC-5)	EVAPORATIVE COOLER EC-5	1/2	HP	120	1	9.8	3/4"	2	12	13A	-	-	-	-	-		
AH-6	AIR HANDLER SYSTEM (EMERGENCY POWER)																
(EF-6.1)	EXHAUST FAN EF-6.1	10	HP	480	3	85	1-1/2"	3	1	5A/10A	-	125	3	200	3		LATE MAKE/ EARLY BREAK CONTACT
(EF-6.2)	EXHAUST FAN EF-6.2	10	HP	480	3	85	1-1/2"	3	1	5A/10A	-	125	3	200	3		LATE MAKE/ EARLY BREAK CONTACT
AH-7	AIR HANDLER SYSTEM (EMERGENCY POWER)																
(EF-7)	EXHAUST FAN EF-7	25	HP	480	3	34	1"	3	6	5A/10A	-	50	3	60	3		
AH-8	AIR HANDLER SYSTEM (EMERGENCY POWER)																
(EF-8)	EXHAUST FAN EF-8	25	HP	480	3	34	1"	3	6	5A/10A	-	50	3	60	3		
AH-9	AIR HANDLER SYSTEM (EMERGENCY POWER)																
(EF-9)	EXHAUST FAN EF-9	50	HP	480	3	65	1-1/4"	3	2	5A/10A	-	100	3	200	3		
AH-10	AIR HANDLER SYSTEM (EMERGENCY POWER)																
(EF-10)	EXHAUST FAN EF-10	50	HP	480	3	65	1-1/4"	3	2	5A/10A	-	100	3	200	3		
B-1	BOILER (EMERGENCY POWER)	1	HP	480	3	2.1	3/4"	3	12	4A	NEMA SIZE 0	3	3	-	-		PROVIDE 120V CIRCUIT FOR CONTROLS
B-2	BOILER (EMERGENCY POWER)	1	HP	480	3	2.1	3/4"	3	12	4A	NEMA SIZE 0	3	3	-	-		PROVIDE 120V CIRCUIT FOR CONTROLS
B-3	BOILER (EMERGENCY POWER)	1	HP	480	3	2.1	3/4"	3	12	4A	NEMA SIZE 0	3	3	-	-		PROVIDE 120V CIRCUIT FOR CONTROLS
B-4	BOILER (EMERGENCY POWER)	1	HP	480	3	2.1	3/4"	3	12	4A	NEMA SIZE 0	3	3	-	-		PROVIDE 120V CIRCUIT FOR CONTROLS
B-5	BOILER (EMERGENCY POWER)	1	HP	480	3	2.1	3/4"	3	12	4A	NEMA SIZE 0	3	3	-	-		PROVIDE 120V CIRCUIT FOR CONTROLS
B-6	BOILER (EMERGENCY POWER)	1	HP	480	3	2.1	3/4"	3	12	4A	NEMA SIZE 0	3	3	-	-		PROVIDE 120V CIRCUIT FOR CONTROLS
B-7	STEAM BOILER FAN (EMERGENCY POWER)	7.5	HP	480	3	11.0	3/4"	3	12	4A	NEMA SIZE 1	15	3	-	-	2.5	PROVIDE 120V CIRCUIT FOR CONTROLS
	OIL PUMP (EMERGENCY POWER)	1.5	HP	480	3	3.0	3/4"	2	12	4A	NEMA SIZE 0	7	3	-	-		
B-8	STEAM BOILER FAN (EMERGENCY POWER)	7.5	HP	480	3	11.0	3/4"	3	12	4A	NEMA SIZE 1	15	3	-	-	2.5	PROVIDE 120V CIRCUIT FOR CONTROLS
	OIL PUMP (EMERGENCY POWER)	1.5	HP	480	3	3.0	3/4"	2	12	4A	NEMA SIZE 0	7	3	-	-		
BP-01	PUMP-BOILER ROOM (EMERGENCY POWER)	2	HP	480	3	3.4	3/4"	3	12	4A	NEMA SIZE 0	7	3	-	-		
BP-02	PUMP-BOILER ROOM (EMERGENCY POWER)	2	HP	480	3	3.4	3/4"	3	12	4A	NEMA SIZE 0	7	3	-	-		
BP-03	PUMP-BOILER ROOM (EMERGENCY POWER)	2	HP	480	3	3.4	3/4"	3	12	4A	NEMA SIZE 0	7	3	-	-		
BP-04	PUMP-BOILER ROOM (EMERGENCY POWER)	2	HP	480	3	3.4	3/4"	3	12	4A	NEMA SIZE 0	7	3	-	-		
BP-05	PUMP-BOILER ROOM (EMERGENCY POWER)	2	HP	480	3	3.4	3/4"	3	12	4A	NEMA SIZE 0	7	3	-	-		
BP-06	PUMP-BOILER ROOM (EMERGENCY POWER)	2	HP	480	3	3.4	3/4"	3	12	4A	NEMA SIZE 0	7	3	-	-		
BP-07	PUMP-BOILER ROOM (EMERGENCY POWER)	3	HP	480	3	4.8	3/4"	3	12	4A	NEMA SIZE 0	7	3	-	-	1.5	
CFS-1	CHEMICAL FEEDER	1/2	HP	120	1	9.8	3/4"	2	12	2A	-	-	-	1 HP	1		
CFS-2	GLYCOL FEEDER	1/2	HP	120	1	9.8	3/4"	2	12	2A	-	-	-	1 HP	1		
CFS-3	GLYCOL FEEDER	1/2	HP	120	1	9.8	3/4"	2	12	2A	-	-	-	1 HP	1		
CFS-4	GLYCOL FEEDER	1/2	HP	120	1	9.8	3/4"	2	12	2A	-	-	-	1 HP	1		
CFS-5	GLYCOL FEEDER	1/2	HP	120	1	9.8	3/4"	2	12	2A	-	-	-	1 HP	1		
CFS-6	GLYCOL FEEDER	1/2	HP	120	1	9.8	3/4"	2	12	2A	-	-	-	1 HP	1		
CFS-7	GLYCOL FEEDER	1/2	HP	120	1	9.8	3/4"	2	12	2A	-	-	-	1 HP	1		
CFS-8	GLYCOL FEEDER	1/2	HP	120	1	9.8	3/4"	2	12	2A	-	-	-	1 HP	1		
CFS-9	GLYCOL FEEDER	1/2	HP	120	1	9.8	3/4"	2	12	2A	-	-	-	1 HP	1		
CHEM	BYPASS FEEDER	1/2	HP	120	1	9.8	3/4"	2	12	2A	-	-	-	1 HP	1		
CHEM	BYPASS FEEDER	1/2	HP	120	1	9.8	3/4"	2	12	2A	-	-	-	1 HP	1		
CH-1	CHILLER - MOTOR (EMERGENCY POWER)	393	MCA	480	3	311	2"	3	4/0	6B/10A	-	700	3	800	3		PROVIDE 120V CIRCUIT FOR CONTROLS
CH-2	CHILLER - MOTOR	393	MCA	480	3	311	2"	3	4/0	6B/10A	-	700	3	800	3		
CP-1	CIRCULATION PUMP	10	HP	480	3	14	3/4"	3	12	4A	NEMA SIZE 2	30	3	-	-	3.0	
CP-2	CIRCULATION PUMP	10	HP	480	3	14	3/4"	3	12	4A	NEMA SIZE 2	30	3	-	-	3.0	
CRU-1	COMPUTER ROOM UNIT	0.5	HP	277	1	4	3/4"	2	12	1A	-	-	-	1 HP	1		
CT-1	COOLING TOWER (EMERGENCY POWER)	40	HP	480	3	52	1"	3	4	5A/10A	-	80	3	100	3		LATE MAKE/ EARLY BREAK CONTACT, PROVIDE120V CKT FOR CONTROLS
CT-2	COOLING TOWER	40	HP	480	3	52	1"	3	4	5A/10A	-	80	3	100	3		LATE MAKE/ EARLY BREAK CONTACT, PROVIDE120V CKT FOR CONTROLS
CT-3	COOLING TOWER		HP	480	3		1"	3			-						LATE MAKE/ EARLY BREAK CONTACT, PROVIDE120V CKT FOR CONTROLS
CU-1	CONDENSER UNIT FOR DUCT FREE FAN	8.3	MCA	480	3	6.6	3/4"	3	12	10A	-	15	3	30	3		
CU-2	CONDENSER UNIT FOR DUCT FREE FAN	8.3	MCA	480	3	6.6	3/4"	3	12	10A	-	15	3	30	3		
DEA-1	DEAERATOR	N/A	N/A	120	1	N/A	N/A	2	12	16A	-	-	-	-	-		PROVIDE 120V CIRCUIT FOR CONTROLS
DEF-1	FAN	1	HP	480	3	2.1	3/4"	3	12	4A	NEMA SIZE 0	3	3	-	-		
DEF-2	FAN	3/4	HP	480	3	1.6	3/4"	3	12	4A	NEMA SIZE 0	3	3	-	-		
DEF-3	FAN	2	HP	480	3	3.4	3/4"	3	12	4A	NEMA SIZE 0	7	3	-	-		
DEF-4	FAN (EMERGENCY POWER)	7.5	HP	480	3	11	3/4"	3	12	4A	NEMA SIZE 1	15	3	-	-	2.5	
DEF-5	FAN (EMERGENCY POWER)	2	HP	480	3	3.4	3/4"	3	12	4A	NEMA SIZE 0	7	3	-	-		
DEF-6	FAN (EMERGENCY POWER)	1/3	HP	120	1	7.2	3/4"	3	12	2A	-	-	-	1 HP	1		
DEF-7	FAN (EMERGENCY POWER)	10	HP	480	3	14	3/4"	3	12	4A/10A	NEMA SIZE 2	30	3	-	-	3.0	
DEF-8	FAN (EMERGENCY POWER)	10	HP	480	3	14	3/4"	3	12	4A/10A	NEMA SIZE 2	30	3	-	-	3.0	
DEF-9	FAN	2	HP	480	3	3.4	3/4"	3	12	4A	NEMA SIZE 0	7	3	-	-		
DEF-10	FAN	3/4	HP	480	3	1.6	3/4"	3	12	4A	NEMA SIZE 0	3	3	-	-		
DF-1	DUCT FREE FAN W/ CONDENSATE PUMP	0.55	MCA	480	3	0.44	3/4"	3	12	4A	NEMA SIZE 0	3	3	-	-		PROVIDE 120V POWER FOR CONDENSATE PUMP
DF-2	DUCT FREE FAN W/ CONDENSATE PUMP	0.55	MCA	480	3	0.44	3/4"	3	12	4A	NEMA SIZE 0	3	3	-	-		PROVIDE 120V POWER FOR CONDENSATE PUMP
ECP-DEA-1.1	DEAERATOR PUMP	15	HP	480	3	21	3/4"	3	10	4A	NEMA SIZE 2	30	3	-	-	4.0	
ECP-DEA-1.1	DEAERATOR PUMP	15	HP	480	3	21	3/4"	3	10	4A	NEMA SIZE 2	30	3	-	-	4.0	
ECP-SURGE-1.1	SURGE TANK PUMP	15	HP	480	3	21	3/4"	3	10	4A	NEMA SIZE 2	30	3	-	-	4.0	
ECP-SURGE-1.2	SURGE TANK PUMP	15	HP	480	3	21	3/4"	3	10	4A	NEMA SIZE 2	30	3	-	-	4.0	
FCU-1	FAN COIL	2	HP	480	3	3.4	3/4"	3	12	4A	NEMA SIZE 0	7	3	-	-		
FCU-2	FAN COIL	2	HP	480	3	3.4	3/4"	3	12	4A	NEMA SIZE 0	7	3	-	-		
FCU-3	FAN COIL	2	HP	480	3	3.4	3/4"	3	12	4A	NEMA SIZE 0	7	3	-	-		
FCU-4	FAN COIL	2	HP	480	3	3.4	3/4"	3	12	4A	NEMA SIZE 0	7	3	-	-		
FCU-5	FAN COIL	0.24	HP	277	1	13.4	3/4"	2	12	1A	-	-	-	1 HP	1		

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Internet: http://www.dfcm.utah.gov

PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

MECHANICAL EQUIPMENT SCHEDULE

REVISIONS

MARK	DATE	DESCRIPTION

ISSUE DATA

ISSUE DATE: DEC. 9, 2008
ISSUE TYPE: DESDEV
DRAWN BY: J. HARWARD
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SHEET NUMBER:

EP601

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EQUIPMENT SCHEDULE

UNIT NAME	DESCRIPTION	LOAD	TYPE	VOLTAGE	PHASE	AMPERAGE	CONDUIT SIZE	WIRES NO.	WIRES SIZE	STARTER / DISCONNECT/ CONNECTION AT UNIT NOTE	STARTER SIZE	OCP SIZE	OCP POLES	DISCONNECT SIZE	DISCONNECT POLES	POWER FACTOR CORRECTION CAPACITOR (KVAR)	REMARKS
P-1	PUMP (EMERGENCY POWER)	30	HP	480	3	40	1"	3	6	4A	NEMA SIZE 4	100	3	-	-	7.0	
P-2	PUMP	30	HP	480	3	40	1"	3	6	4A	NEMA SIZE 4	100	3	-	-	7.0	
P-3	PUMP (EMERGENCY POWER)	25	HP	480	3	34.0	1"	3	6	4A	NEMA SIZE 3	50	3	-	-	6.0	
P-4	PUMP	25	HP	480	3	34.0	1"	3	6	4A	NEMA SIZE 3	50	3	-	-	6.0	
P-5	PUMP (EMERGENCY POWER)	20	HP	480	3	27	3/4"	3	8	4A	NEMA SIZE 3	50	3	-	-	5.0	
P-6	PUMP	20	HP	480	3	27	3/4"	3	8	4A	NEMA SIZE 3	50	3	-	-	5.0	
P-7	PUMP	15	HP	480	3	21	3/4"	3	10	4A	NEMA SIZE 2	30	3	-	-	4.0	
P-8	PUMP	15	HP	480	3	21	3/4"	3	10	4A	NEMA SIZE 2	30	3	-	-	4.0	
P-9	PUMP	30	HP	480	3	40	1"	3	6	5A/10A	-	60	3	100	3		LATE MAKE/ EARLY BREAK CONTACT
P-10	PUMP	30	HP	480	3	40	1"	3	6	5A/10A	-	60	3	100	3		LATE MAKE/ EARLY BREAK CONTACT
P-11	PUMP (EMERGENCY POWER)	75	HP	480	3	96	1-1/2"	3	1	5A/10A	-	150	3	200	3		LATE MAKE/ EARLY BREAK CONTACT
P-12	PUMP	75	HP	480	3	96	1-1/2"	3	1	5A/10A	-	150	3	200	3		LATE MAKE/ EARLY BREAK CONTACT
P-13	PUMP (EMERGENCY POWER)	15	HP	480	3	21	3/4"	3	10	5A/10A	-	30	3	30	3		
P-14	PUMP (EMERGENCY POWER)	15	HP	480	3	21	3/4"	3	10	5A/10A	-	30	3	30	3		
P-15	PUMP (EMERGENCY POWER)	15	HP	480	3	21	3/4"	3	10	5A/10A	-	30	3	30	3		
P-16	PUMP (EMERGENCY POWER)	15	HP	480	3	21	3/4"	3	10	5A/10A	-	30	3	30	3		
P-17	PUMP	15	HP	480	3	21	3/4"	3	10	4A	NEMA SIZE 2	30	3	-	-	4.0	
P-18	PUMP	7.5	HP	480	3	11	3/4"	3	12	4A	NEMA SIZE 1	15	3	-	-	2.5	
P-19	PUMP	7.5	HP	480	3	11	3/4"	3	12	4A	NEMA SIZE 1	15	3	-	-	2.5	
P-20	PUMP	7.5	HP	480	3	11	3/4"	3	12	4A	NEMA SIZE 1	15	3	-	-	2.5	
P-21	PUMP	7.5	HP	480	3	11	3/4"	3	12	4A	NEMA SIZE 1	15	3	-	-	2.5	
P-22	PUMP																
P-23	PUMP																
P-24	PUMP																
P-25	PUMP																
RO-1	RO UNIT (PURE WATER SYSTEM)	1	HP	230	1	8	3/4"	2	12	4A	NEMA SIZE 0	15	2	-	-		
	ULTRA VIOLET STERILIZER	0.38	WATTS	120	1	3.2	3/4"	2	12	13A							
RO-2	RO UNIT (PURE WATER SYSTEM)	1	HP	230	1	8	3/4"	2	12	4A	NEMA SIZE 0	15	2	-	-		
	ULTRA VIOLET STERILIZER	0.38	WATTS	120	1	3.2	3/4"	2	12	13A							
SURGE-1	SURGE TANK	N/A	N/A	120	1	N/A	3/4"	2	12	16A	-	-	-	-	-		PROVIDE 120V POWER FOR CONTROLS
UH-1	UNIT HEATER	1/12	HP	120	1	2.2	3/4"	2	12	2A	-	-	-	1 HP	1		
UV-1	ULTRA VIOLET STERILIZER	3.2	FLA	120	1	3.2	3/4"	2	12	13A	-	-	-	-	-		
VP-1,2,&3	VACUME PUMP	(3) 25	HP	480	3	102	1-1/4"	3	2	12A	-	-	-	-	-		TRI-PLEX SYSTEM WITH STARTERS & DISC.
WH-1	WATER HEATER	N/A	N/A	120	1	N/A	3/4"	2	12	16A	-	-	-	-	-		PROVIDE 120V POWER FOR CONTROLS
WH-2	WATER HEATER	N/A	N/A	120	1	N/A	3/4"	2	12	16A	-	-	-	-	-		PROVIDE 120V POWER FOR CONTROLS
WH-3	WATER HEATER	N/A	N/A	120	1	N/A	3/4"	2	12	16A	-	-	-	-	-		PROVIDE 120V POWER FOR CONTROLS
WH-4	WATER HEATER	N/A	N/A	120	1	N/A	3/4"	2	12	16A	-	-	-	-	-		PROVIDE 120V POWER FOR CONTROLS

SIZE ALL FUSES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

STARTER / DISCONNECT NOTES:

1. MANUAL STARTER WITH THERMAL OVERLOAD
2. MANUAL STARTER WITH THERMAL OVERLOAD PROTECTION & LOW VOLTAGE RELAY / CONTACTOR FOR ATC CONTROL
3. COMBINATION MAGNETIC STARTER / FUSED DISCONNECT
4. COMBINATION MAGNETIC STARTER / MOTOR CIRCUIT PROTECTOR (MCP)
5. COMBINATION VARIABLE FREQUENCY DRIVE / MOTOR CIRCUIT PROTECTOR (MCP)
6. REDUCED VOLTAGE STARTER
7. COMBINATION TWO-SPEED STARTER / FUSED DISCONNECT
8. COMBINATION TWO-SPEED STARTER / MOTOR CIRCUIT PROTECTOR (MCP)
9. NON-FUSED DISCONNECT SWITCH
10. FUSED DISCONNECT SWITCH
11. BREAKER AND ENCLOSURE
12. DIRECT CONNECTION
13. DUPLEX RECEPTACLE OUTLET
14. SPECIAL PURPOSE OUTLET
15. SHUNT-TRIP BREAKER AND ENCLOSURE
16. TOGGLE SWITCH

INSTALLATION NOTES:

A. FURNISHED, INSTALLED, & CONNECTED UNDER DIVISION 16.
B. FURNISHED & INSTALLED UNDER ANOTHER DIVISION REQUIRING CONNECTIONS UNDER DIVISION 16.
C. FURNISHED UNDER ANOTHER DIVISION BUT INSTALLED AND CONNECTED UNDER DIVISION 16.
D. FURNISHED, INSTALLED, & CONNECTED UNDER ANOTHER DIVISION
E. FURNISHED BY OWNER, INSTALLED & CONNECTED BY DIVISION 16

KITCHEN EQUIPMENT SCHEDULE

UNIT NAME	DESCRIPTION	LOCATION	LOAD	TYPE	VOLTAGE	PHASE	AMPERAGE	CONDUIT SIZE	WIRES NO.	WIRES SIZE	STARTER / DISCONNECT/ CONNECTION AT UNIT NOTE	STARTER SIZE	OCP SIZE	OCP POLES	DISCONNECT SIZE	DISCONNECT POLES	REMARKS
K-4	ICE MAKER & BIN	KITCHEN N109			208	1											
K-6	WALK-IN COOLER/FREEZER BOX	KITCHEN N109			208	1											
K-7A	FREEZER REFRIGERATION: REMOTE CONDENSER	ROOF			208	3											
K-7B	FREEZER REFRIGERATION: BLOWER COILS	KITCHEN N109			208	1											
K-8A	FREEZER REFRIGERATION: REMOTE CONDENSER	ROOF			208	3											
K-8B	FREEZER REFRIGERATION: BLOWER COILS	KITCHEN N109			208	1											
K-13	20 QUART MIXER	KITCHEN N109			208	3											
K-17	SCALE	KITCHEN N109			120	1											
K-18	REACH-IN REFRIGERATOR	KITCHEN N109			120	1											
K-22	INDUCTION COOK TOP	KITCHEN N109			120	1											
K-23	BLENDER	KITCHEN N109			120	1											
K-28	MICROWAVE	KITCHEN N109			120	1											
K-29	FOOD PROCESSOR	KITCHEN N109			120	1											
K-30	SLICER	KITCHEN N109			120	1											
K-31	STAINLESS STEEL EXHAUST HOOD	KITCHEN N109			120	1											
K-32	FIRE PROTECTION SYSTEM	KITCHEN N109			120	1											
K-33	SIX BURNER RANGE	KITCHEN N109			120	1											
K-34	COMBINATION OVEN:HALF PAN	KITCHEN N109			208	1											
K-35	BLAST CHILLER	KITCHEN N109			120	1											
K-36	REACH-IN REFRIGERATOR: ONE SECTION	KITCHEN N109			120	1											
K-39	HOT FOOD WARMER	KITCHEN N109			120	1											
K-47	UNDER COUNTER DISHWASHER	KITCHEN N109			120	1											
K-54	REACH-IN REFRIGERATOR: THREE SECTION	KITCHEN N109			120	1											
K-61	TOASTER	KITCHEN N109			120	1											

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PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

MECHANICAL AND KITCHEN EQUIPMENT SCHEDULES

REVISIONS

MARK DATE DESCRIPTION

ISSUE DATA

ISSUE DATE: DEC. 9, 2008
ISSUE TYPE: DESDEV
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CHECKED BY: D. WHITTON

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SHEET NUMBER:

EP602

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LABORATORY EQUIPMENT SCHEDULE

UNIT NAME	DESCRIPTION	LOCATION	LOAD	TYPE	VOLTAGE	PHASE	AMPERAGE	CONDUIT SIZE	WIRES NO.	WIRES SIZE	STARTER / DISCONNECT/ CONNECTION AT UNIT NOTE	STARTER SIZE	OCP SIZE	OCP POLES	DISCONNECT SIZE	DISCONNECT POLES	REMARKS
LEVEL 1																	
TW-1	TUNNEL WASHER	CAGE WASH - DIRTY			480	3											
TW-2	TUNNEL WASHER (FUTURE)	CAGE WASH - DIRTY			480	3											
CRW-1	RACK WASHER	CAGE WASH - DIRTY			480	3											
CRW-2	RACK WASHER (FUTURE)	CAGE WASH - DIRTY			480	3											ROUGH-IN CONDUIT ONLY
BDS-1	BEDDING DUMP STATION	CAGE WASH - DIRTY			230/480	3											
BDS-2	BEDDING DUMP STATION	CAGE WASH - DIRTY			230/480	3											
BFS-1	BEDDING FILL STATION	CAGE WASH - CLEAN			480/120	3/1											
BFS-2	BEDDING FILL STATION	CAGE WASH - CLEAN			480/120	3/1											
BT-1	BOTTLE FILL STATION	CAGE WASH - CLEAN			120	3											
AC-1	AUTOCLAVE - BULK	CAGE WASH - CLEAN			480	3											
NT-1	NECROPSY TABLE	NECROPSY			120	1											
TD-1	TISSUE DIGESTOR	CARCASES DISPOSAL			480	3											
MT-1	MISTING TABLE	ANIMAL RECEIVING			120	1											
LEVEL 2																	
GW-1	UNDERCOUNTER GLASSWARE WASHER	WET LABORATORY			230	1											
GW-2	UNDERCOUNTER GLASSWARE WASHER	WET LABORATORY			230	1											
GW-3	UNDERCOUNTER GLASSWARE WASHER	WET LABORATORY			230	1											
GW-4	UNDERCOUNTER GLASSWARE WASHER	WET LABORATORY			230	1											
FH-1	FUME HOOD 4' BENCH TYPE	FUME HOOD ALCOVE 1			230/120	1/1											
FH-2	FUME HOOD 4' BENCH TYPE	FUME HOOD ALCOVE 2			230/120	1/1											
BSC-1	BIO-SAFETY CABINET 4' TYPE B2	TISSUE PROCESSING			120	1											
BSC-2	BIO-SAFETY CABINET 4' TYPE B2	TISSUE (CELL) CULTURE			120	1											
BSC-3	BIO-SAFETY CABINET 4' TYPE B2	TISSUE (CELL) CULTURE			120	1											
BSC-4	BIO-SAFETY CABINET 6' TYPE B2	TISSUE (CELL) CULTURE			120	1											
BSC-5	BIO-SAFETY CABINET 6' TYPE B2	TISSUE (CELL) CULTURE			120	1											
AC-2	AUTOCLAVE - MEDIUM CHAMBER	AUTOCLAVE ROOM			480	3											
EL-1	EXAM LIGHT - SINGLE HEAD	OR PREP			120	1											
EL-2	EXAM LIGHT - SINGLE HEAD	OR PREP			120	1											
SCR-1	SCRUB SINK - DOUBLE	OR PREP			120	1											
SCR-2	SCRUB SINK - SINGLE	SCRUB			120	1											
SCR-3	SCRUB SINK - SINGLE	SCRUB			120	1											
EL-3	O.R. LIGHT - WALL MNT. W/ DOUBLE ARM	SMALL OR			120	1											
EL-4	O.R. LIGHT - WALL MNT. W/ DOUBLE ARM	SMALL OR			120	1											
ORT-1	O.R. TABLE	LARGE OR			120	1											
EL-5	O.R. LIGHT - DOUBLE HEAD	LARGE OR															
AC-3	AUTOCLAVE - SMALL CHAMBER	PREP LAB & SUPPLY			480	3											
BSC-6	BIO-SAFETY CABINET 6' TYPE B2	BEHAVIORAL TESTING 1			120	1											
BSC-7	BIO-SAFETY CABINET 6' TYPE B2	BEHAVIORAL TESTING 2			120	1											
LEVEL 3																	
GW-5	UNDERCOUNTER GLASSWARE WASHER	WET LABORATORY			230	1											
GW-6	UNDERCOUNTER GLASSWARE WASHER	WET LABORATORY			230	1											
GW-7	UNDERCOUNTER GLASSWARE WASHER	WET LABORATORY			230	1											
GW-8	UNDERCOUNTER GLASSWARE WASHER	WET LABORATORY			230	1											
FH-3	FUME HOOD 4' BENCH TYPE	RADIOISOTOPE ROOM			230/120	1/1											
BSC-10	BIO-SAFETY CABINET 6' TYPE B2	RADIOISOTOPE ROOM			120	1											
FH-4	FUME HOOD 4' BENCH TYPE	FUME HOOD ALCOVE			230/120	1/1											
FH-5	FUME HOOD 4' BENCH TYPE	FUME HOOD ALCOVE			230/120	1/1											
BSC-11	BIO-SAFETY CABINET 4' TYPE B2	TISSUE (CELL) CULTURE 1			120	1											
BSC-12	BIO-SAFETY CABINET 4' TYPE B2	TISSUE (CELL) CULTURE 1			120	1											
BSC-13	BIO-SAFETY CABINET 6' TYPE B2	TISSUE (CELL) CULTURE 1			120	1											
BSC-14	BIO-SAFETY CABINET 4' TYPE B2	TISSUE (CELL) CULTURE 2			120	1											
BSC-15	BIO-SAFETY CABINET 4' TYPE B2	TISSUE (CELL) CULTURE 2			120	1											
BSC-16	BIO-SAFETY CABINET 6' TYPE B2	TISSUE (CELL) CULTURE 2			120	1											
FP-1	AUTOMATIC FILM PROCESSOR	DARK ROOM			208	3					10A						
AC-4	AUTOCLAVE - BULK	DECON ROOM 1			480	3											
TD-2	TISSUE DIGESTOR	DECON ROOM 1			480	3											
AC-5	AUTOCLAVE - BULK	DECON ROOM 2			480	3											
TD-3	TISSUE DIGESTOR	DECON ROOM 2			480	3											
BSC-17	BIO-SAFETY CABINET 6' TYPE B2	PROCEDURE ROOM 1			120	1											
BSC-18	BIO-SAFETY CABINET 6' TYPE B2	PROCEDURE ROOM 2			120	1											
BSC-19	BIO-SAFETY CABINET 6' TYPE B2	SUPPORT LAB 1			120	1											
BSC-20	BIO-SAFETY CABINET 6' TYPE B2	SUPPORT LAB 1			120	1											
BSC-21	BIO-SAFETY CABINET 6' TYPE B2	SUPPORT LAB 2			120	1											
BSC-22	BIO-SAFETY CABINET 6' TYPE B2	SUPPORT LAB 2			120	1											

SIZE ALL FUSES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

STARTER / DISCONNECT NOTES:

1. MANUAL STARTER WITH THERMAL OVERLOAD
2. MANUAL STARTER WITH THERMAL OVERLOAD PROTECTION & LOW VOLTAGE RELAY / CONTACTOR FOR ATC CONTROL
3. COMBINATION MAGNETIC STARTER / FUSED DISCONNECT
4. COMBINATION MAGNETIC STARTER / MOTOR CIRCUIT PROTECTOR (MCP)
5. COMBINATION VARIABLE FREQUENCY DRIVE / MOTOR CIRCUIT PROTECTOR (MCP)
6. REDUCED VOLTAGE STARTER
7. COMBINATION TWO-SPEED STARTER / FUSED DISCONNECT
8. COMBINATION TWO-SPEED STARTER / MOTOR CIRCUIT PROTECTOR (MCP)
9. NON-FUSED DISCONNECT SWITCH
10. FUSED DISCONNECT SWITCH
11. BREAKER AND ENCLOSURE
12. DIRECT CONNECTION
13. DUPLEX RECEPTACLE OUTLET
14. SPECIAL PURPOSE OUTLET
15. SHUNT-TRIP BREAKER AND ENCLOSURE
16. TOGGLE SWITCH

INSTALLATION NOTES:

A. FURNISHED, INSTALLED, & CONNECTED UNDER DIVISION 16.
B. FURNISHED & INSTALLED UNDER ANOTHER DIVISION REQUIRING CONNECTIONS UNDER DIVISION 16.
C. FURNISHED UNDER ANOTHER DIVISION BUT INSTALLED AND CONNECTED UNDER DIVISION 16.
D. FURNISHED, INSTALLED, & CONNECTED UNDER ANOTHER DIVISION
E. FURNISHED BY OWNER, INSTALLED & CONNECTED BY DIVISION 16

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PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

LABORATORY EQUIPMENT SCHEDULE

REVISIONS

MARK	DATE	DESCRIPTION

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EP603

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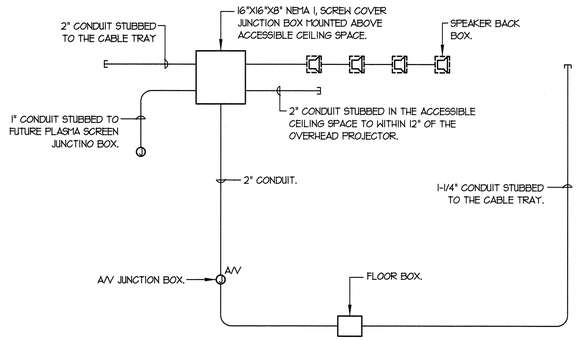
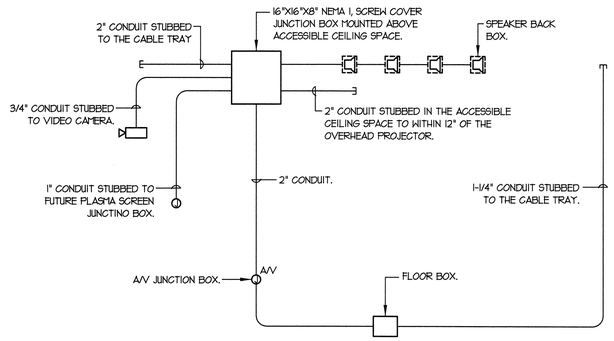
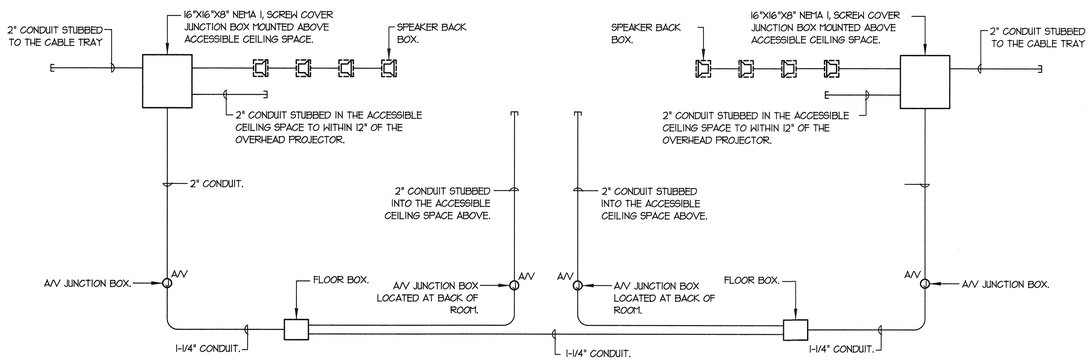


C1 CONFERENCE ROOM COMMUNICATION CONDUIT RISER
SCALE: NONE
CONFERENCE ROOM 151, N244, 305B, 305E



B1 CONFERENCE ROOM COMMUNICATION CONDUIT RISER
SCALE: NONE
CONFERENCE ROOM N202



C3 CONFERENCE ROOM COMMUNICATION CONDUIT RISER
SCALE: NONE
CONFERENCE ROOM 158, 158A

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USTAR BUILDING #2
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RISER DIAGRAMS

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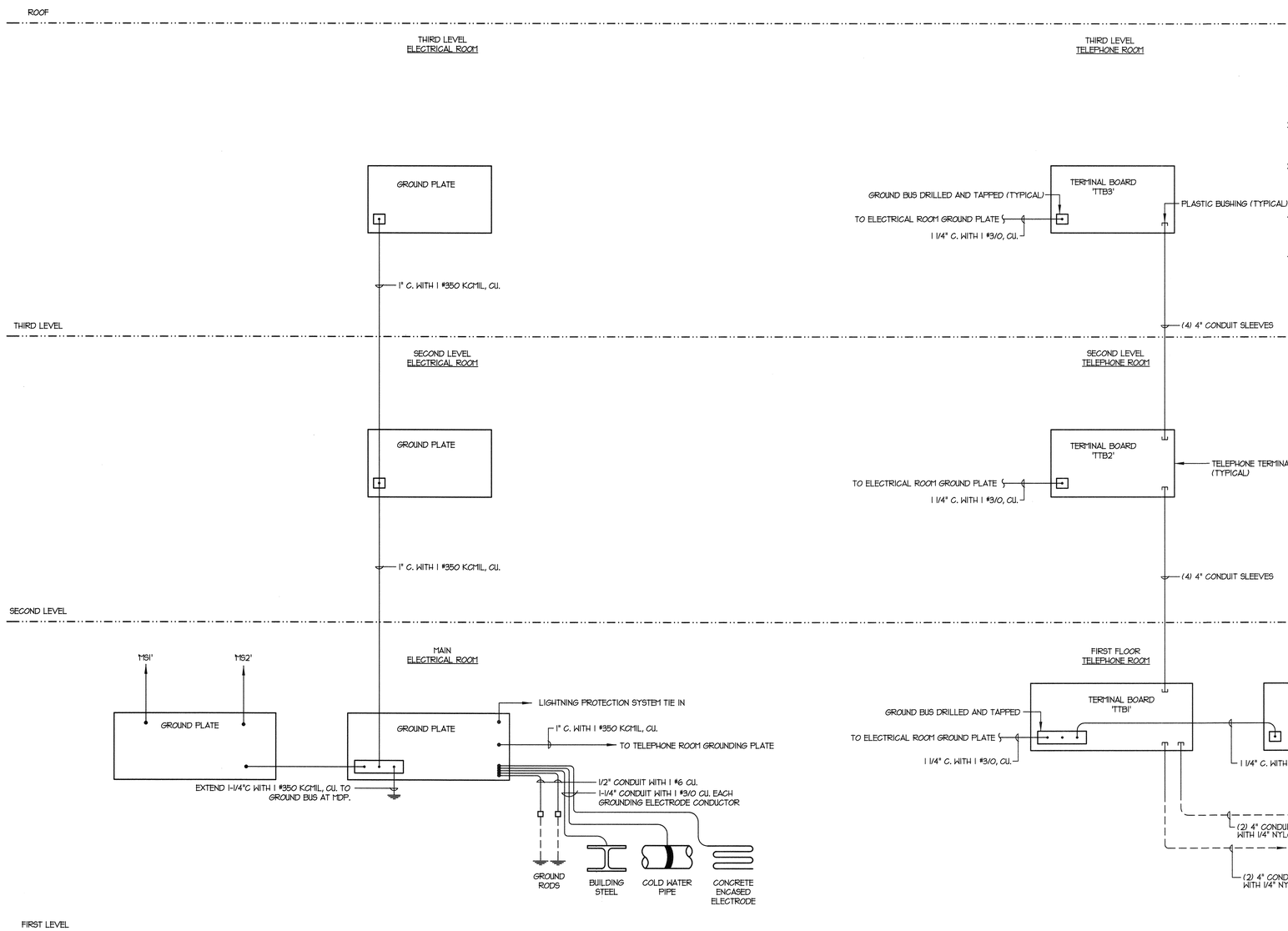

A2 / EY104 BUILDING GROUNDING RISER DIAGRAM
SCALE: NONE

A4 / EY103 TELEPHONE RACEWAY RISER DIAGRAM
SCALE: NONE

COMMUNICATION/DATA SYSTEM NOTES:

1. THE CONTRACTOR WILL PROVIDE A RACEWAY SYSTEM CONSISTING OF CABLE TRAY, CONDUIT, AND JUNCTION BOXES FOR THE VERTICAL FIBER OPTIC BACKBONE.
2. ALL DATA RACKS ASSICATED WITH THE FIBER OPTIC BACKBONE SHALL BE PROVIDED BY UTAH STATE UNIVERSITY AND THEIR IT DEPARTMENT.
3. THE FIBER OPTIC CABLE, CONNECTORS, AND TESTING ASSOCIATED WITH THE FIBER OPTIC BACKBONE WILL BE PROVIDED BY UTAH STATE UNIVERSITY AND THEIR IT DEPARTMENT.
4. FIBER OPTIC CABLE FROM THE TELEPHONE ROOM OUT TO THE CCTV AND CASS SYSTEM DEVICES SHALL BE PROVIDED BY THE CONTRACTOR.
4. MINIMUM CODUIT THAT SHALL BE USED IS 3/4".

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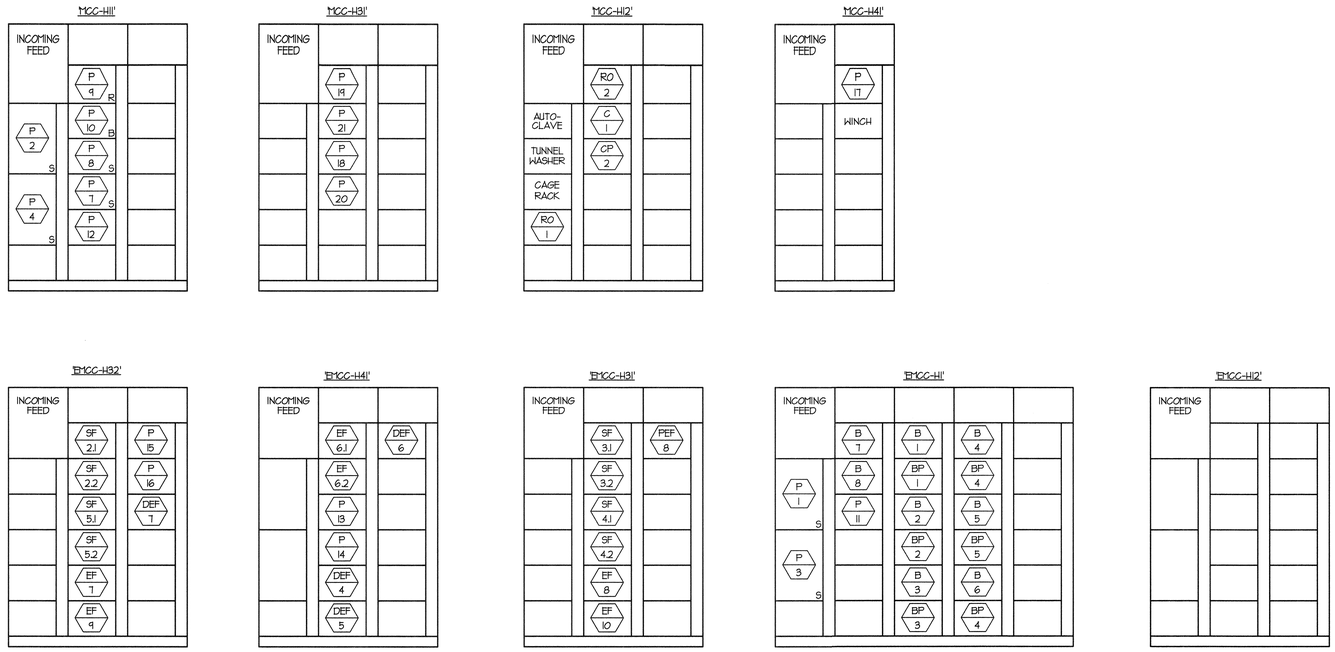

B3 MOTOR CONTROL CENTER ELEVATIONS
SCALE: NONE

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EP606

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ONE-LINE DIAGRAM GENERAL NOTES:

1. ALL SWITCHBOARDS AND PANELBOARDS SHALL BE FULLY RATED. SERIES RATED SYSTEM ARE NOT ACCEPTABLE.
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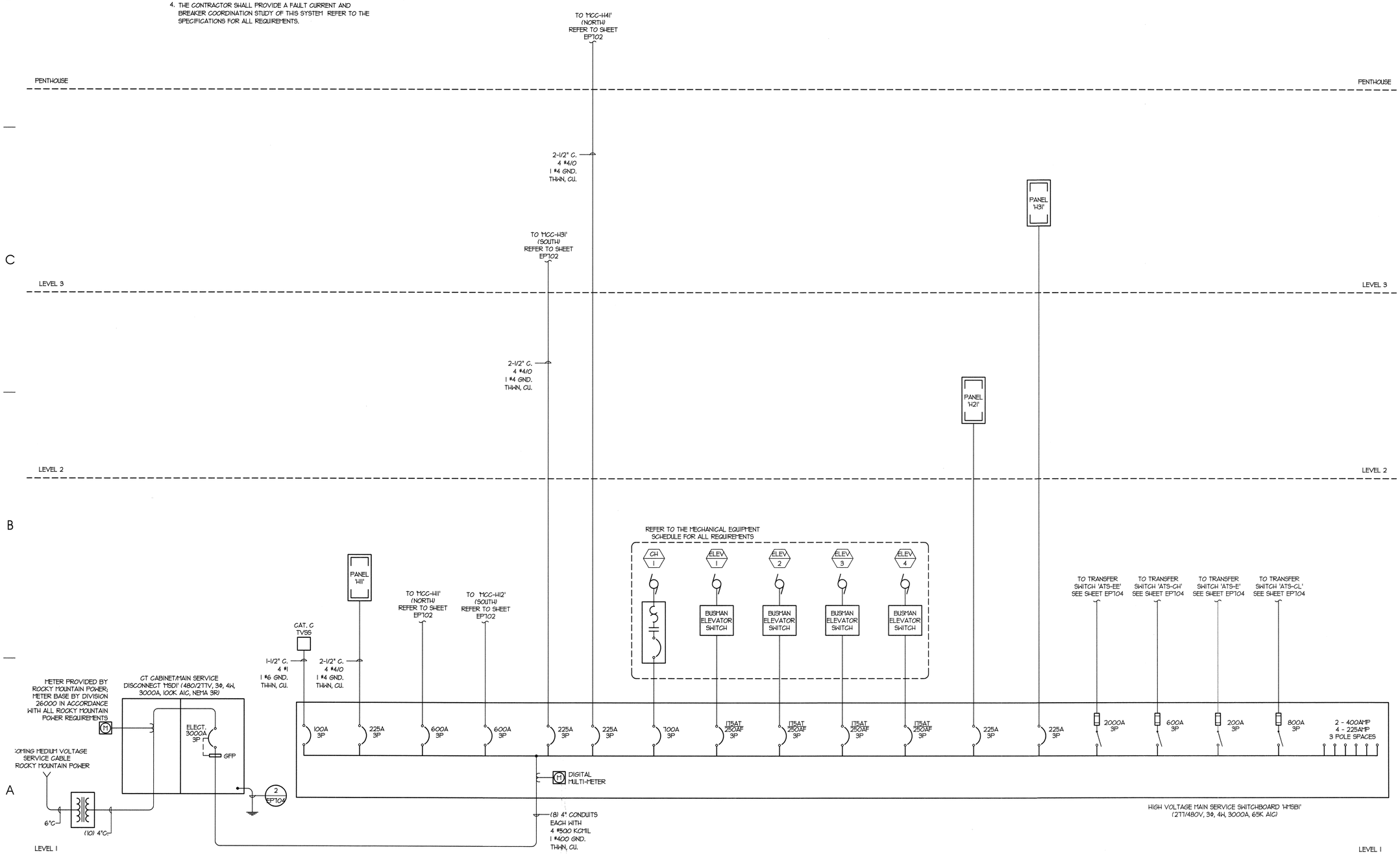
4. THE CONTRACTOR SHALL PROVIDE A FAULT CURRENT AND BREAKER COORDINATION STUDY OF THIS SYSTEM. REFER TO THE SPECIFICATIONS FOR ALL REQUIREMENTS.



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ONE-LINE DIAGRAM GENERAL NOTES:

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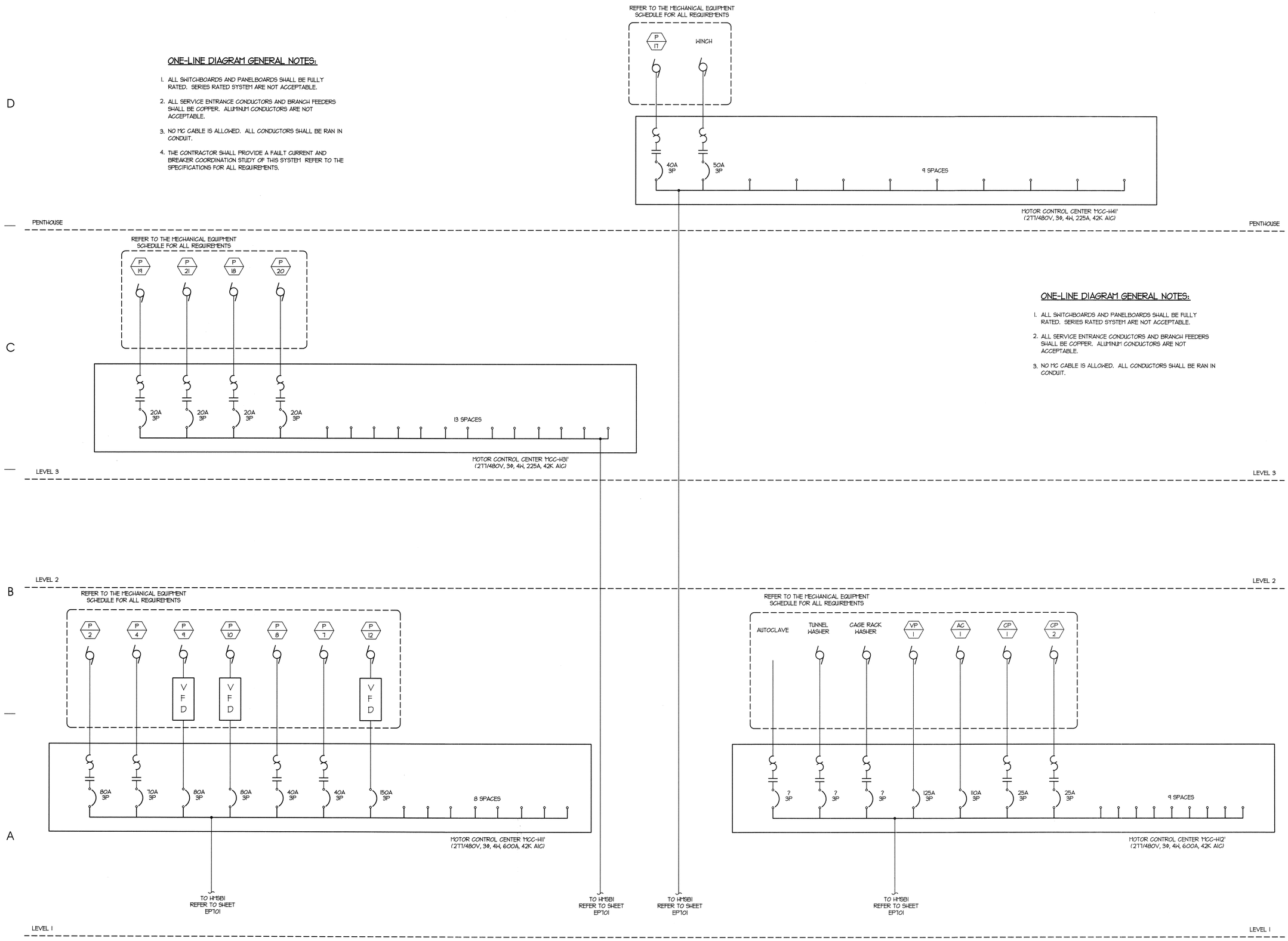

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EP702

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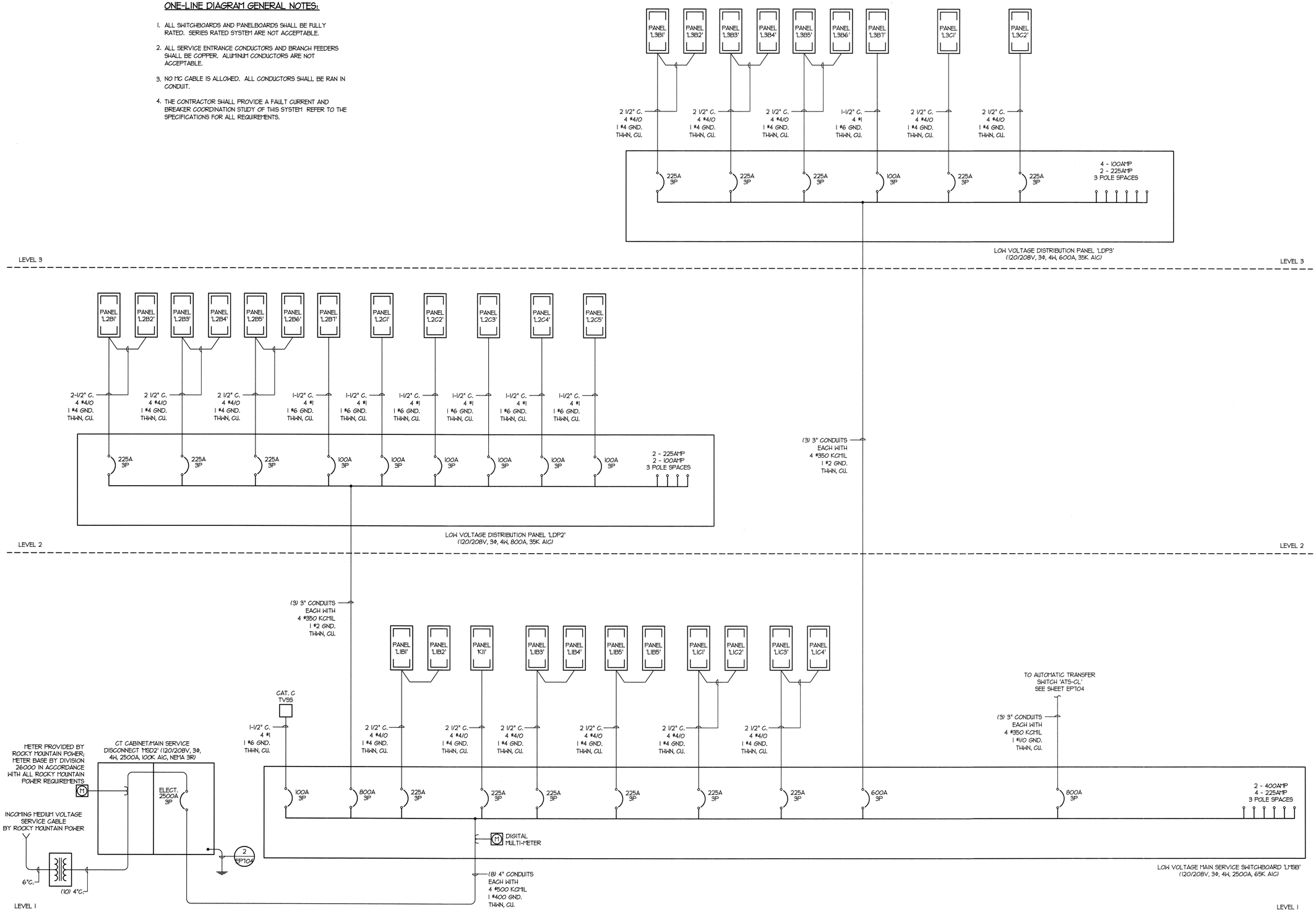

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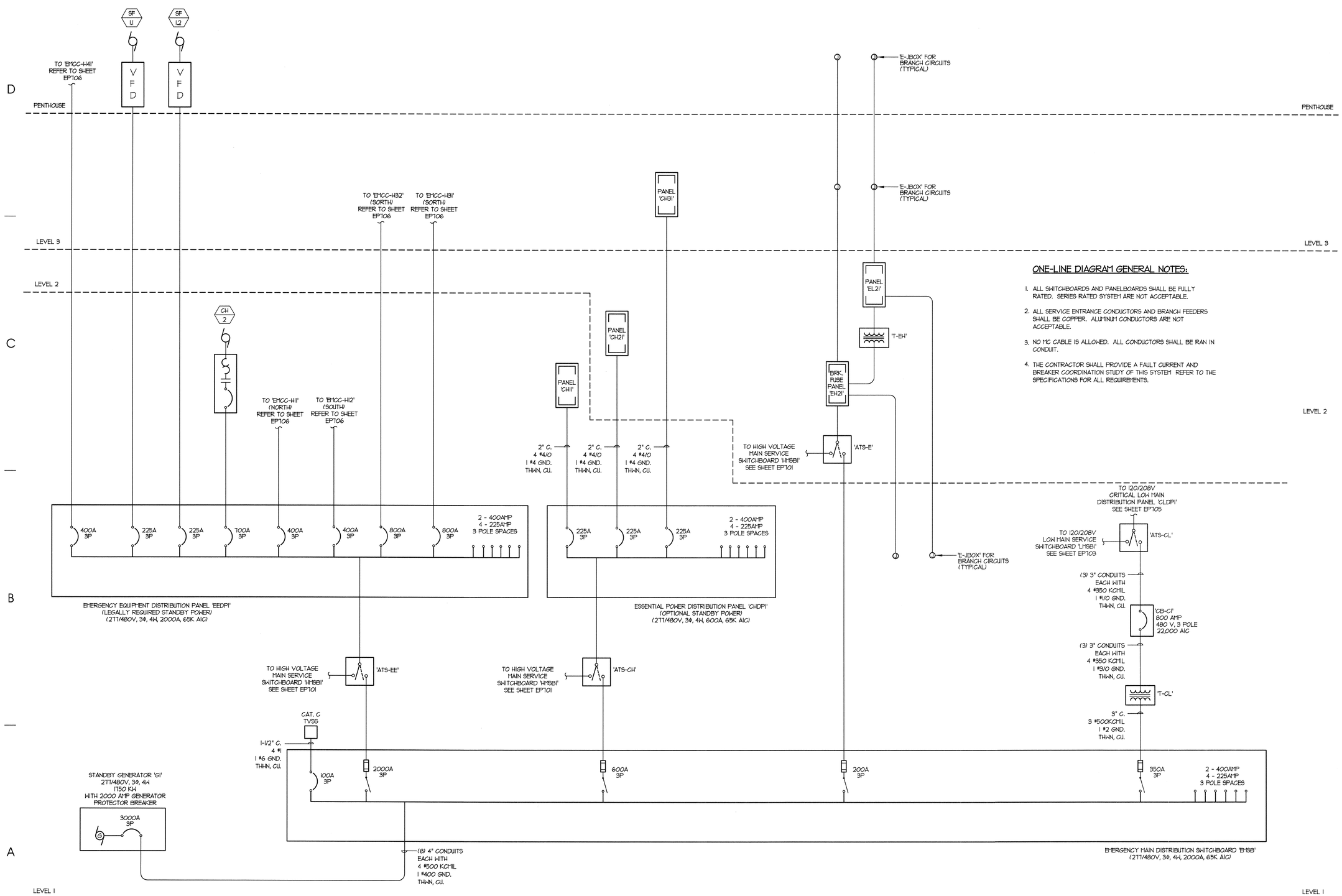

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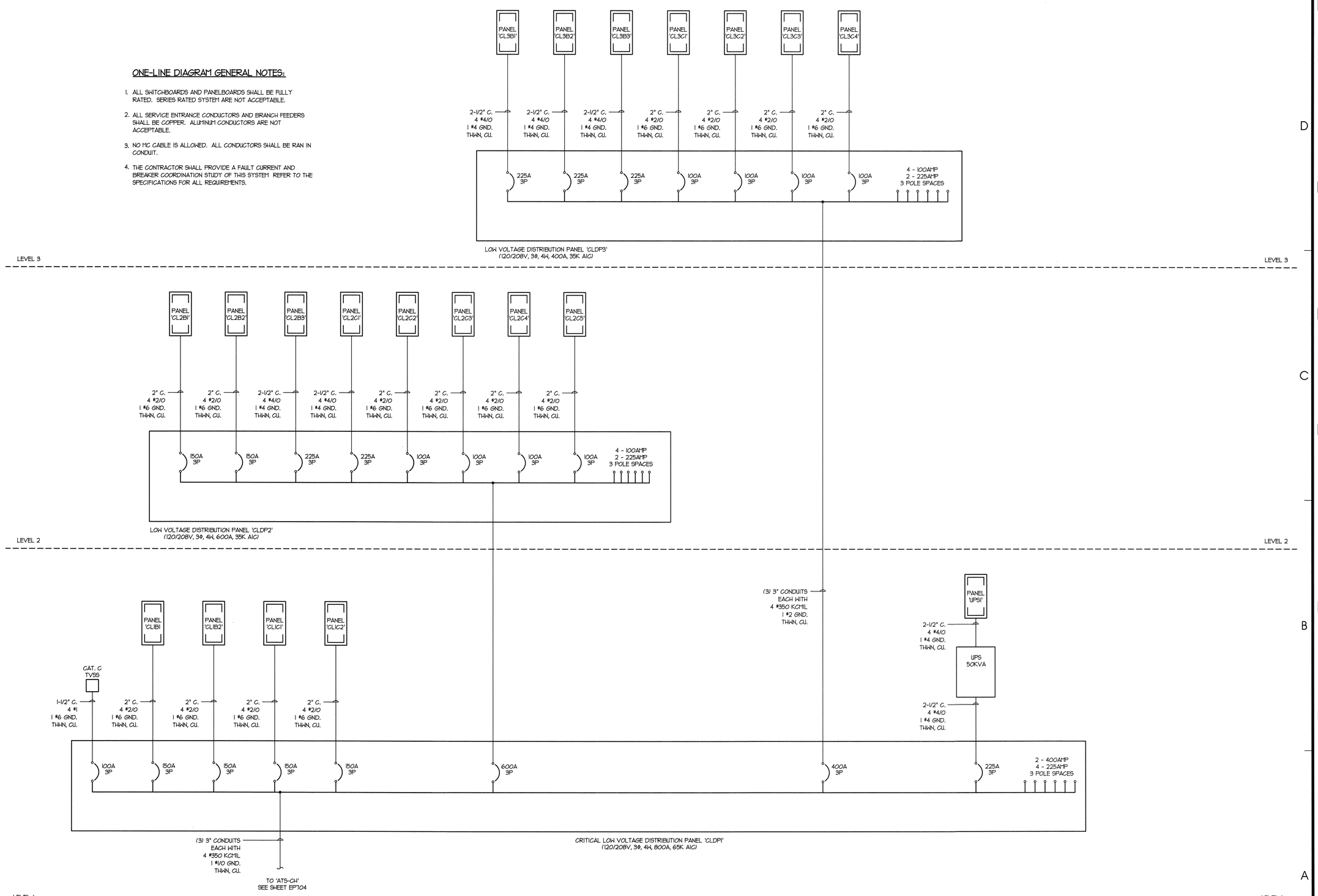

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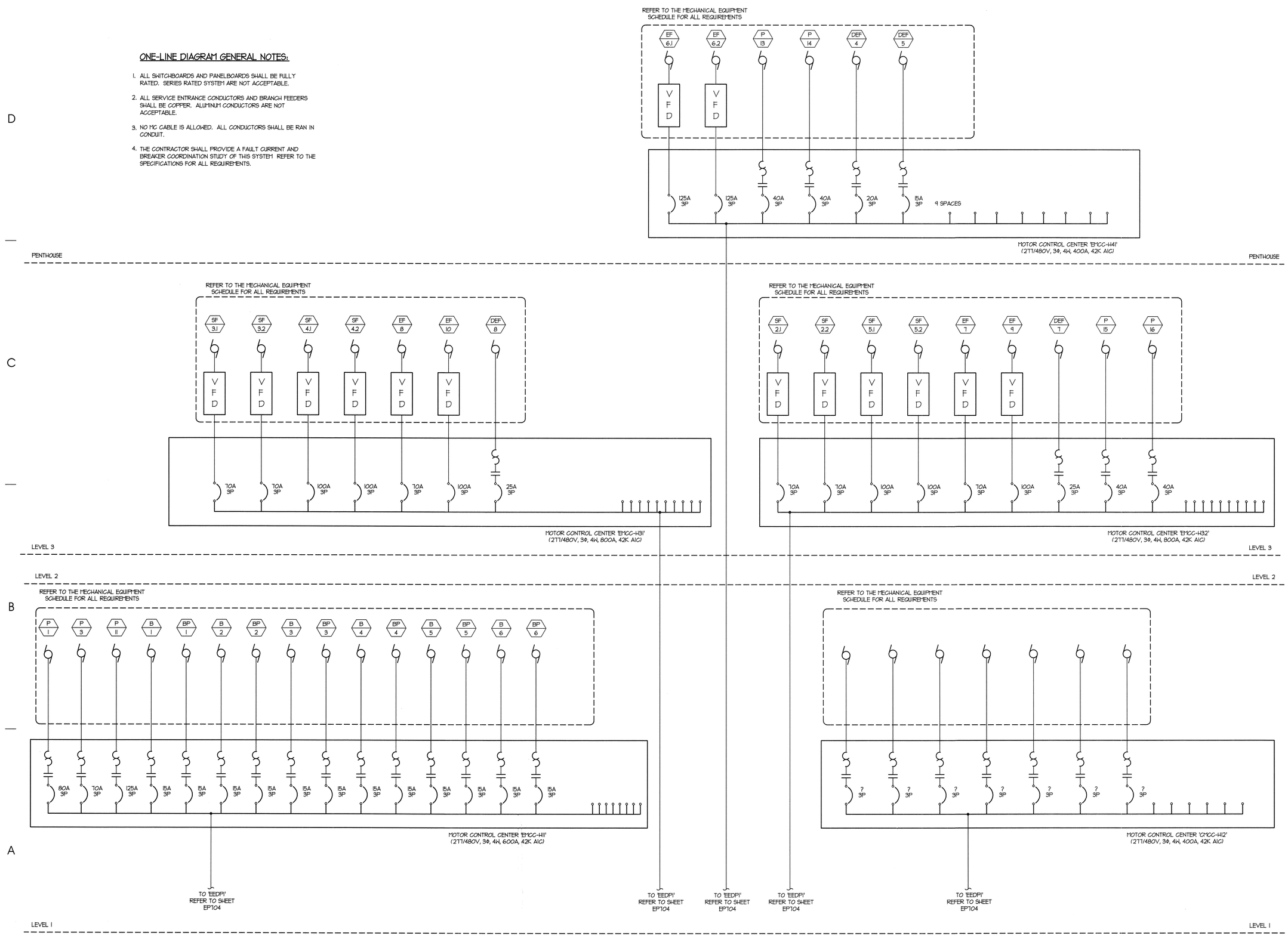

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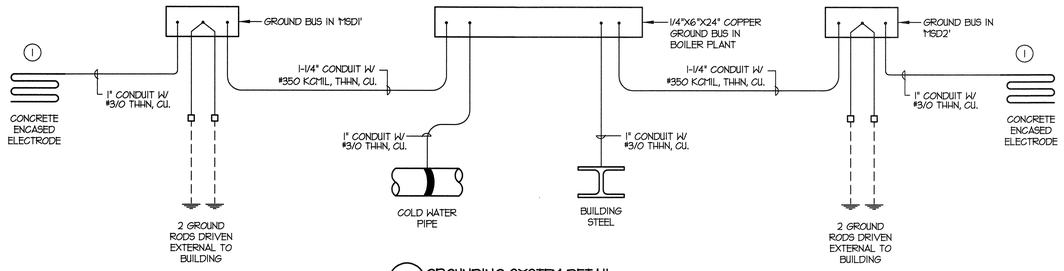

3 GROUNDING SYSTEM DETAIL
SCALE: NONE

ONE-LINE DIAGRAM GENERAL NOTES:

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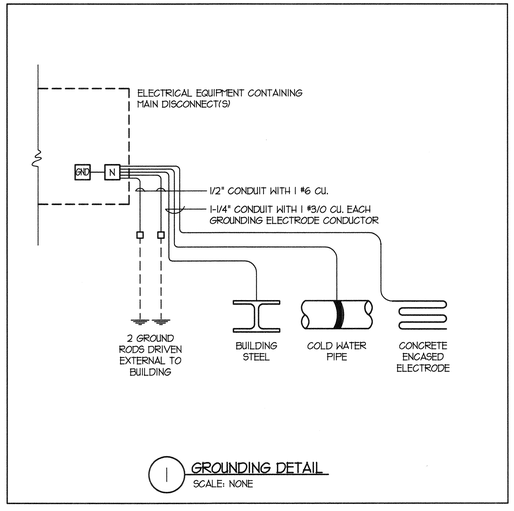
TRANSFER SWITCH SCHEDULE

NAME	TYPE	VOLTAGE	POLES	WIRES	AMPERAGE	SHORT CIRCUIT CURRENT RATING WITH BREAKER	SHORT CIRCUIT CURRENT RATING WITH FUSE	NEMA RATING
ATS-E	AUTOMATIC	277/480	4	4	200	65,000	N/A	1
ATS-EE	AUTOMATIC	277/480	4	4	2000	65,000	N/A	1
ATS-GH	AUTOMATIC	277/480	4	4	600	65,000	N/A	1
ATS-GL	AUTOMATIC	120/208	4	4	800	65,000	N/A	1

TRANSFORMER SCHEDULE

NAME	STATUS	TYPE	KVA	PRIMARY VOLTAGE	PRIMARY CONNECTION	SECONDARY VOLTAGE	SECONDARY CONNECTION	GROUNDING ELECTRODE CONDUCTOR SIZE	GROUNDING ELECTRODE CONDUCTOR TYPE	K FACTOR	ELECTRO-STATIC SHIELD	MOUNTING	REMARKS
T-GL	NEW	DRY	225	480	DELTA	120/208	WYE	#1/0, 1-1/4" C.	THHN, CU. / EMT	1	NO	FLOOR	LEVEL 1 ELEC. RM.
T-EH	NEW	DRY	30	480	DELTA	120/208	WYE	#6, 3/4" C.	THHN, CU. / EMT	1	NO	WALL	LEVEL 1 ELEC. RM.



1 GROUNDING DETAIL
SCALE: NONE

ONE-LINE SYMBOLS

SYMBOL	DESCRIPTION
PANEL 'A'	LIGHTING AND APPLIANCE PANEL BOARD
PANEL 'A'	LOAD CENTER
	CIRCUIT BREAKER
	CIRCUIT BREAKER & ENCLOSURE
	FUSED SWITCH
	MOTOR
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
	DISCONNECT SWITCH
	FUSED DISCONNECT SWITCH
M	METER
	CT TRANSFORMER
	GROUNDING ELECTRODE & CONDUCTOR
	AUTOMATIC TRANSFER SWITCH
G	GENERATOR
	GUTTER
	TRANSFORMER
	POWER FACTOR CORRECTION CAPACITOR & ENCLOSURE
	CT CABINET PER UTILITIES REQUIREMENTS
	PULLING SECTION PER UTILITIES REQUIREMENTS

SYMBOL	DESCRIPTION
	FUSE CUT OUT
	DRAWOUT CIRCUIT BREAKER
	MEDIUM VOLTAGE DRAWOUT CIRCUIT BREAKER
	THERMAL OVERLOAD
C	RELAY/COIL
	NORMALLY CLOSED CONTACT
	NORMALLY OPEN CONTACT
K	KEY INTERLOCK
	COMBINATION FUSIBLE STARTER WITH THERMAL OVERLOAD
	COMBINATION MCP STARTER WITH THERMAL OVERLOAD
	ELECTRONIC CIRCUIT BREAKER
GFP	ELECTRONIC CIRCUIT BREAKER WITH GROUND FAULT PROTECTION
C	SHUNT TRIP CIRCUIT BREAKER
PF	PHASE FAILURE RELAY
	MUSHROOM PUSH BUTTON
	ISOLATION BYPASS AUTOMATIC TRANSFER SWITCH

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UTAH STATE UNIVERSITY

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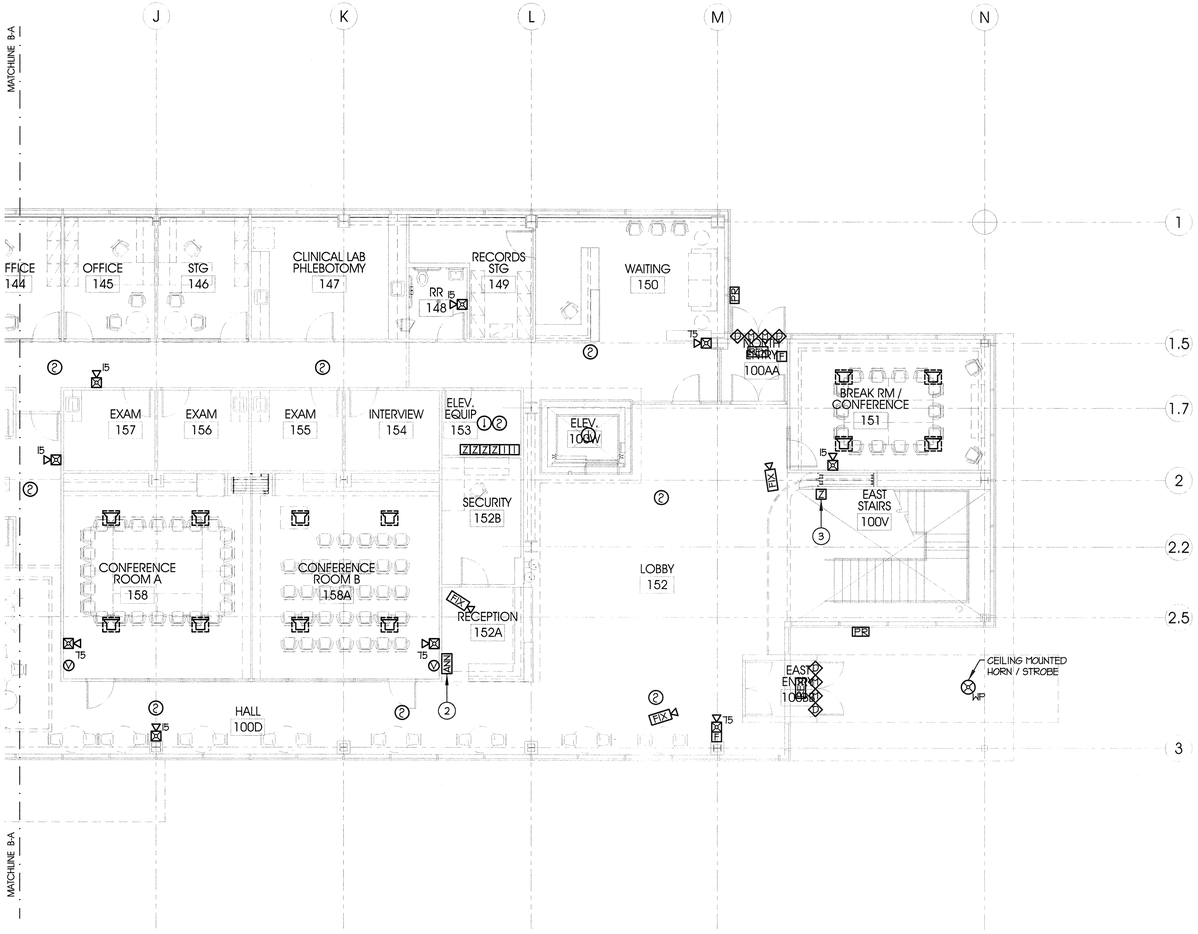
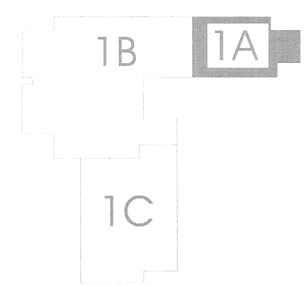


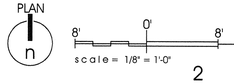
KEYED NOTES:

1. PROVIDE A FIRE ALARM MONITOR MODULE TO MONITOR THE KITCHEN FIRE ALARM PROTECTION SYSTEM (ANSUL).
2. LOCATION OF THE FIRE ALARM SYSTEM REMOTE ANNUNCIATION PANEL.
3. PROVIDE FIRE ALARM CONTROL MODULE FOR FIRE DOOR.

KEY PLAN



PLAN



LEVEL 1 AUXILIARY PLAN - 1A (A4 / EY101A)

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LOGAN, UTAH

SHEET NAME:

LEVEL 1
AUXILIARY PLAN - 1A

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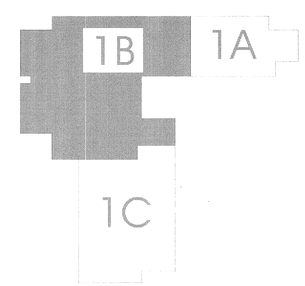
LEVEL 1 AUXILIARY PLAN - 1B

A4 / EY101B

KEYED NOTES:

1. FIRE ALARM REMOTE INDICATOR AND TEST STATION FOR DUCT SMOKE DETECTOR LOCATED IN SUPPLY AND EXHAUST DUCTS.

KEY PLAN



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LEVEL 1
AUXILIARY PLAN - 1B

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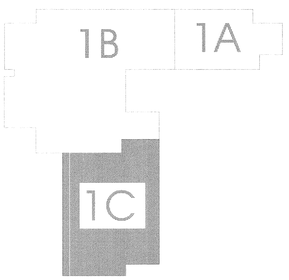
Envision Engineering, PC

KEYED NOTES:

1. FIRE ALARM REMOTE INDICATOR AND TEST STATION FOR DUCT SMOKE DETECTOR LOCATED IN SUPPLY AND EXHAUST DUCTS.

KEY PLAN



PLAN

8' 0' 8'

scale = 1/8" = 1'-0"

LEVEL 1 AUXILIARY PLAN - 1C

A4 / EY101C

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LEVEL 1
AUXILIARY PLAN - 1C

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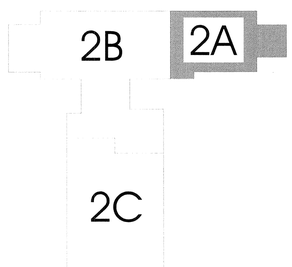
KEYED NOTES:

1. PROVIDE FIRE ALARM CONTROL MODULE FOR FIRE DOOR.

KEY PLAN



PLAN

8' 0' 8'

scale = 1/8" = 1'-0"

LEVEL 2 AUXILIARY PLAN - 2A (A4 / EY102A)

ARCHITECT

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LEVEL 2
AUXILIARY PLAN - 2A

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EY102A

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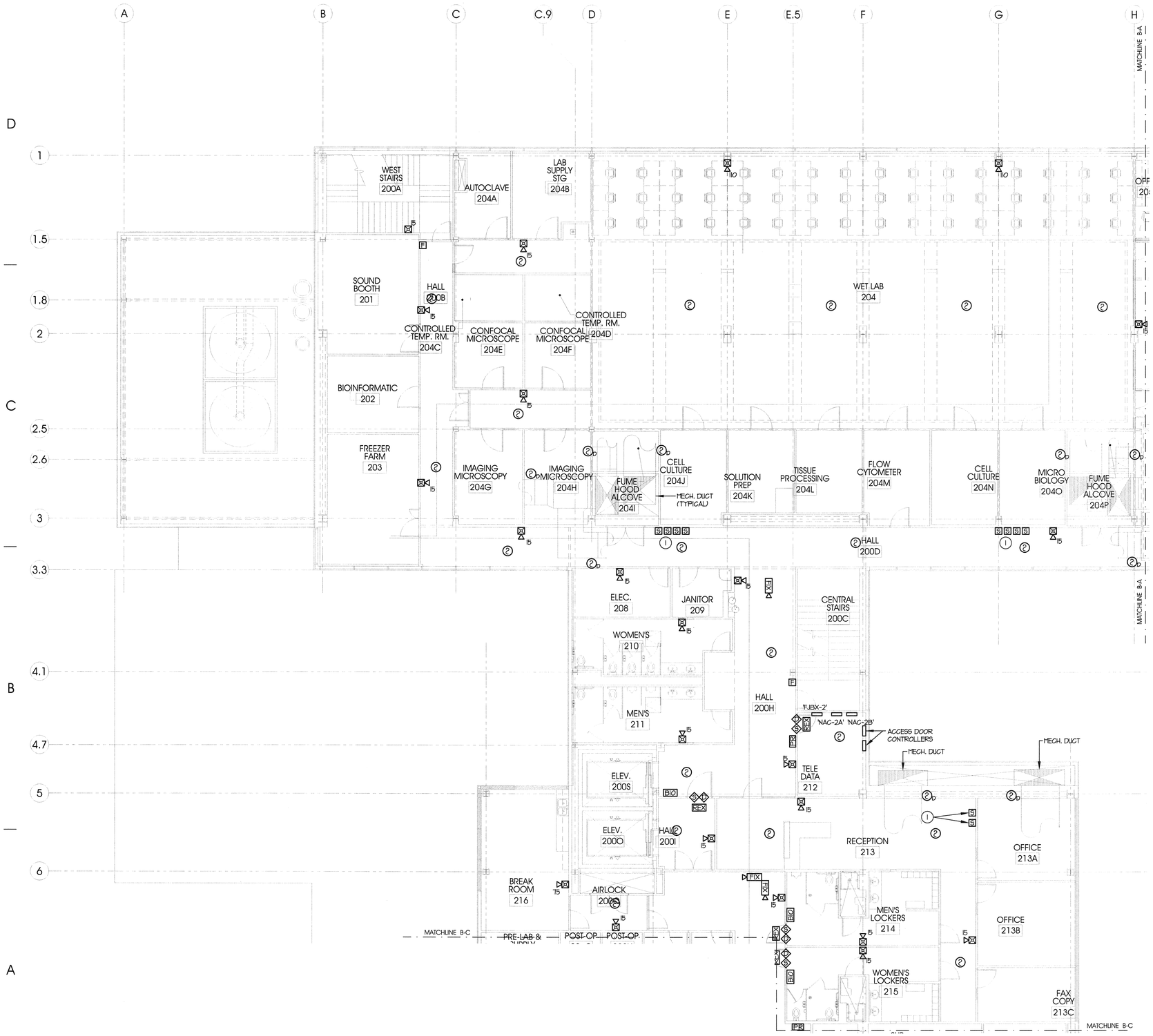


PLAN

scale = 1/8" = 1'-0"

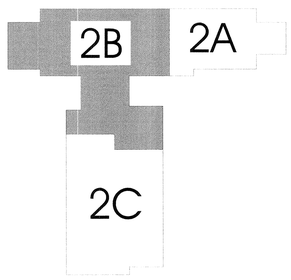
LEVEL 2 AUXILIARY PLAN - 2B

A4 / EY102B

KEYED NOTES:

1. FIRE ALARM REMOTE INDICATOR AND TEST STATION FOR DUCT SMOKE DETECTOR LOCATED IN SUPPLY AND EXHAUST DUCTS.

KEY PLAN



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LEVEL 2
AUXILIARY PLAN - 2B

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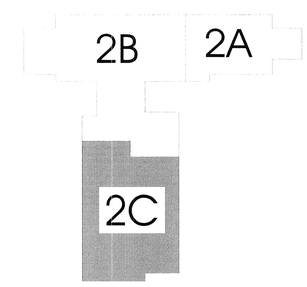
KEYED NOTES:

1. FIRE ALARM REMOTE INDICATOR AND TEST STATION FOR DUCT SMOKE DETECTION LOCATED IN SUPPLY AND EXHAUST DUCTS.
2. PUSH BUTTON TO RELEASE DOOR.

GENERAL NOTES:

1. ALL DOOR ACCESS DEVICES IN THE ANIMAL SUITES SHALL BE PART OF THE WATCHDOG SYSTEM.
2. ALL WIRING DEVICES WITHIN THE ANIMAL SUITES SHALL BE INSTALLED USING WATERPROOF, SPRAYDOWN METHODS.

KEY PLAN



PLAN

8' 0' 8'

scale = 1/8" = 1'-0"

LEVEL 2 AUXILIARY PLAN - 2C

A4 / EY102C

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LEVEL 2
AUXILIARY PLAN - 2C

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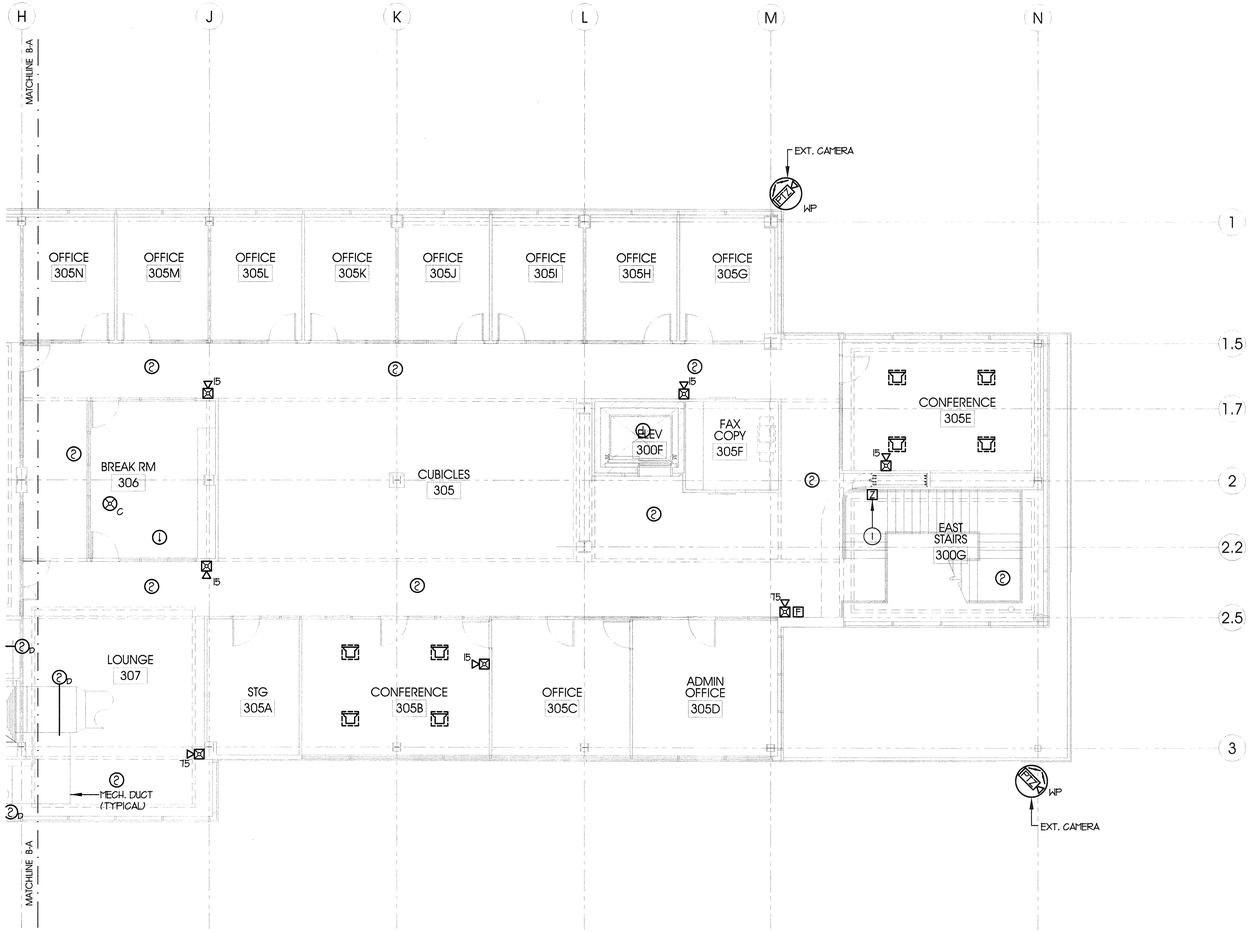
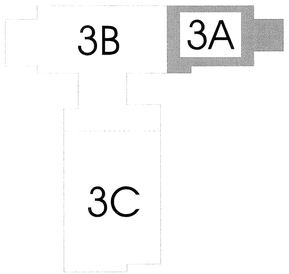


KEYED NOTES:

1. PROVIDE FIRE ALARM CONTROL MODULE FOR FIRE DOOR.

KEY PLAN



PLAN

8' 0' 8'

scale = 1/8" = 1'-0"

LEVEL 3 AUXILIARY PLAN - 3A (A4 / EY103A)

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AUXILIARY PLAN - 3A

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EY103A

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KEYED NOTES:

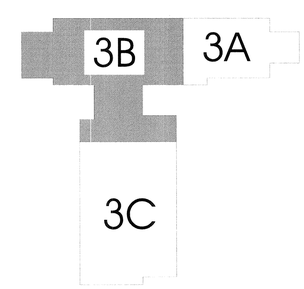
1. PROVIDE FIRE ALARM CONTROL MODULE FOR SMOKE DAMPERS. THIS CONTROL MODULE SHALL CONTROL ALL FIRE / SMOKE DAMPERS ON THIS AREA OF THE BUILDING INCLUDING THE LEVELS BELOW.
2. FIRE ALARM REMOTE INDICATOR AND TEST STATION FOR SMOKE DUCT DETECTOR LOCATED IN SUPPLY AND EXHAUST DUCTS.

PLAN

scale = 1/8" = 1'-0"

LEVEL 3 AUXILIARY PLAN - 3B (A4 / EY103B)

KEY PLAN



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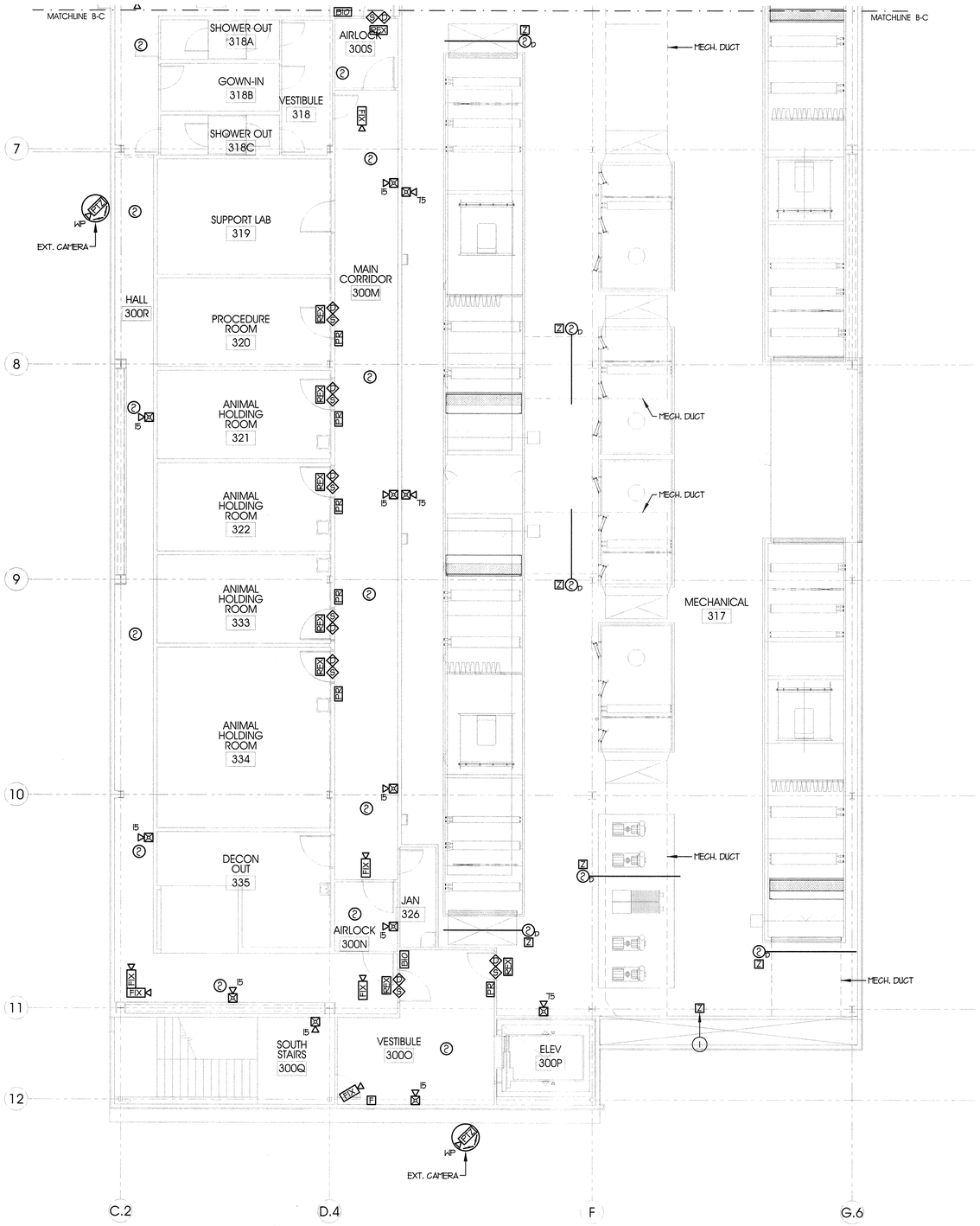


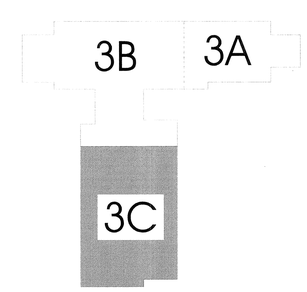
KEYED NOTES:

1. PROVIDE FIRE ALARM CONTROL MODULE FOR FIRE SMOKE DAMPERS. THIS CONTROL MODULE SHALL CONTROL ALL FIRE/SMOKE DAMPERS IN THIS AREA OF THE BUILDING INCLUDING THE LEVELS BELOW.

GENERAL NOTES:

1. ALL DOOR ACCESS DEVICES IN THE BIO-CONTAINMENT SUITE SHALL BE PART OF THE WATCHDOG SYSTEM.
2. ALL WIRING DEVICES WITHIN THE BIO-CONTAINMENT SUITE SHALL BE INSTALLED SO THAT THE INSTALLATION IS GAS TIGHT. ALL CONDUIT SHALL BE GALVANIZED RIGID CONDUIT AND ALL BOXES SHALL BE CAST IRON TYPE WITH THREADED HUBS.
3. ALL CONDUIT AND BOXES ASSOCIATED WITH THE BIO-CONTAINMENT SUITE SHALL BE SEALED USING METHODS SHOWN ON SHEET GL901 OF THE DESIGN DOCUMENTS.

KEY PLAN



PLAN n

8' 0' 8'

scale = 1/8" = 1'-0"

LEVEL 3 AUXILIARY PLAN - 3C (A4 / EY103C)

ARCHITECT

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LEVEL 3
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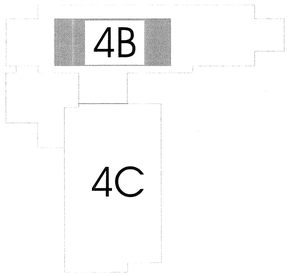
PLAN
n
8' 0' 8'
scale = 1/8" = 1'-0"

LEVEL 4C PENTHOUSE AUXILIARY PLAN A4 EY104B

KEY PLAN



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PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

LEVEL 4B PENTHOUSE AUXILIARY PLAN

REVISIONS

MARK	DATE	DESCRIPTION

ISSUE DATA

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ISSUE TYPE:	DESDEV
DRAWN BY:	J. HARWARD
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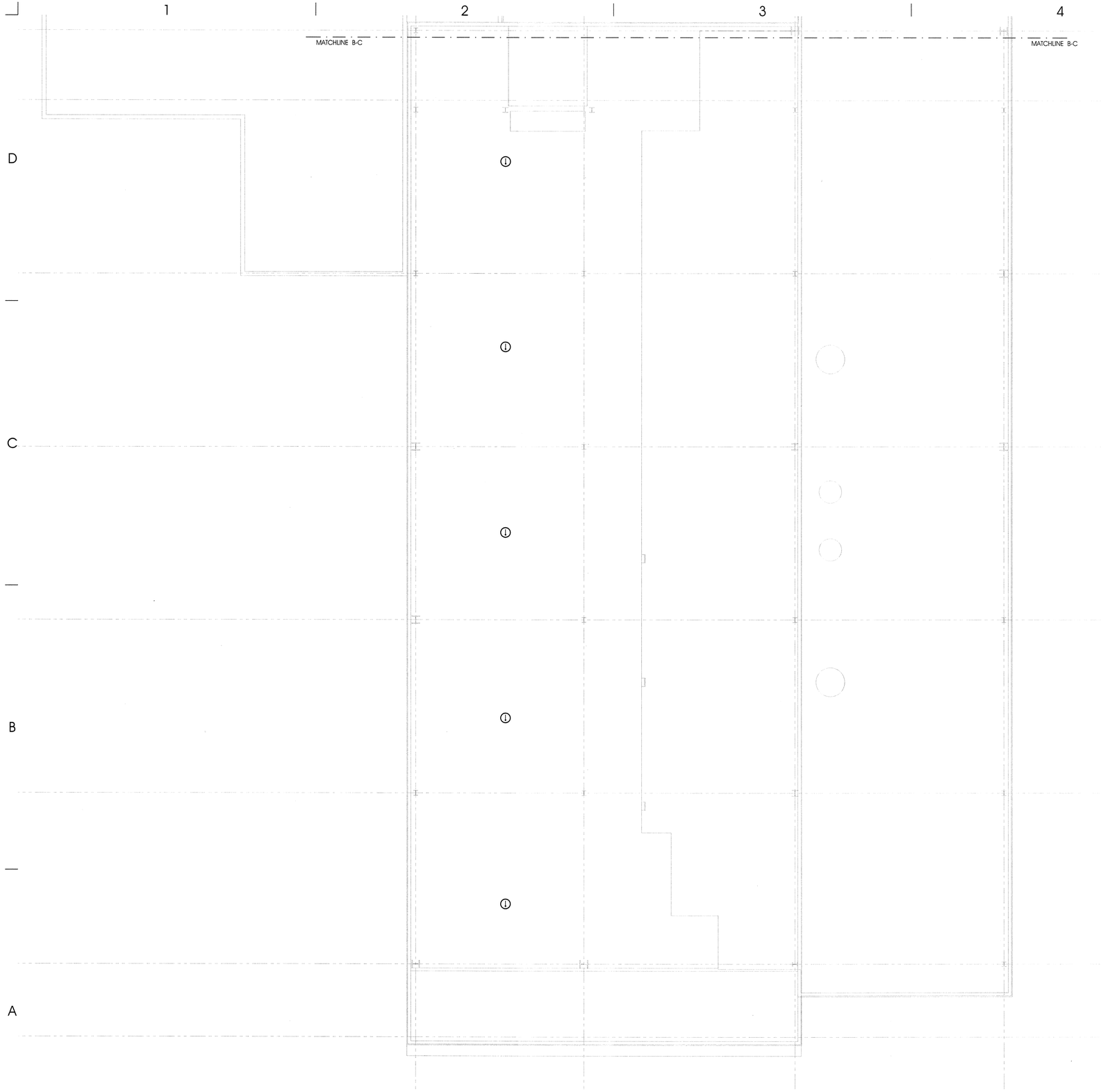
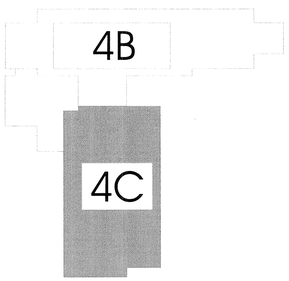


PLAN
n
8' 0' 8'
scale = 1/8" = 1'-0"

LEVEL 4C PLATFORM EQUIPMENT AUXILIARY PLAN

A4
EY104C

KEY PLAN



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LOGAN, UTAH

SHEET NAME:

LEVEL 4C
EQUIPMENT
PLATFORM
AUXILIARY PLAN

REVISIONS

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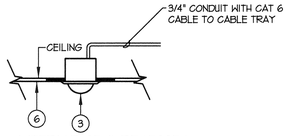
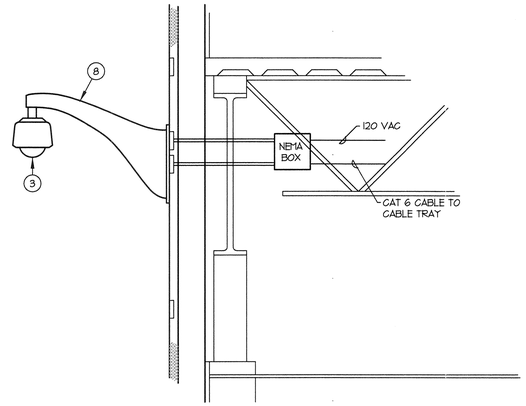
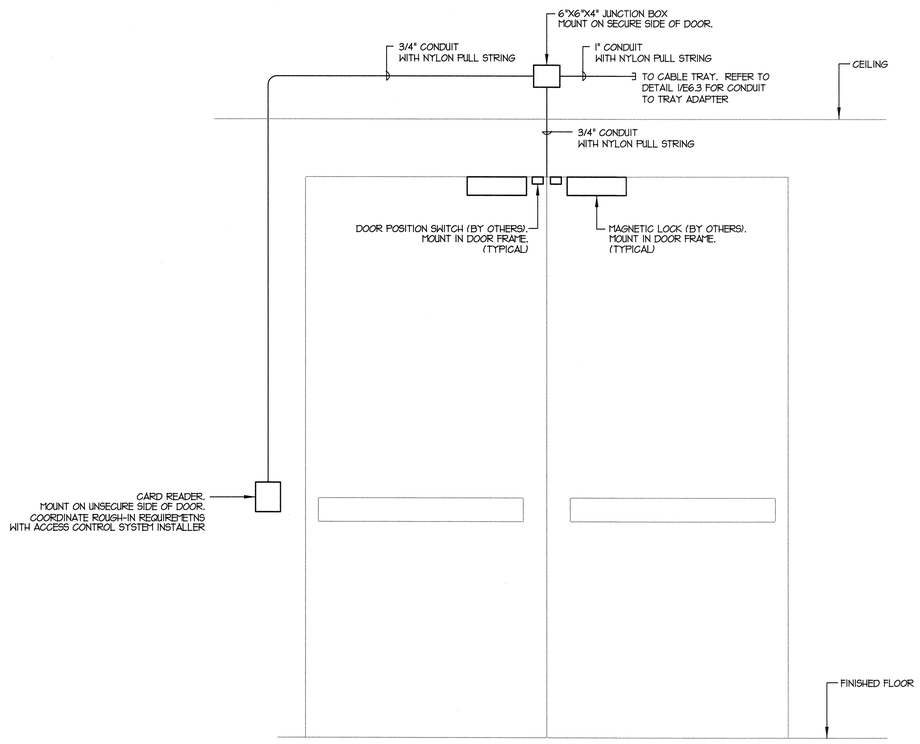


INTERIOR SEMI-RECESSED FIXED CAMERA DOME DETAIL
SCALE: N.T.S.

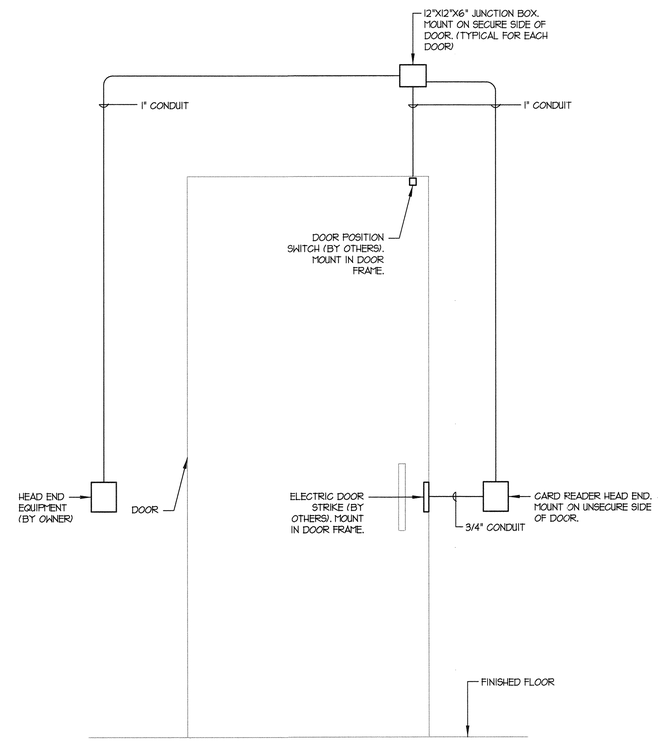
C3 CAMERA DETAIL
SCALE: NONE



C4 EXTERIOR PENDANT MOUNT HIGH SPEED DOME
SCALE: NONE



A2 ACCESS CONTROL DOOR ROUGH-IN DETAIL
SCALE: NONE



A4 CARD ACCESS SYSTEM RISER DIAGRAM
SCALE: NONE (TYPICAL FOR EACH DOOR)

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SHEET NAME:

AUXILIARY SYSTEMS DETAILS

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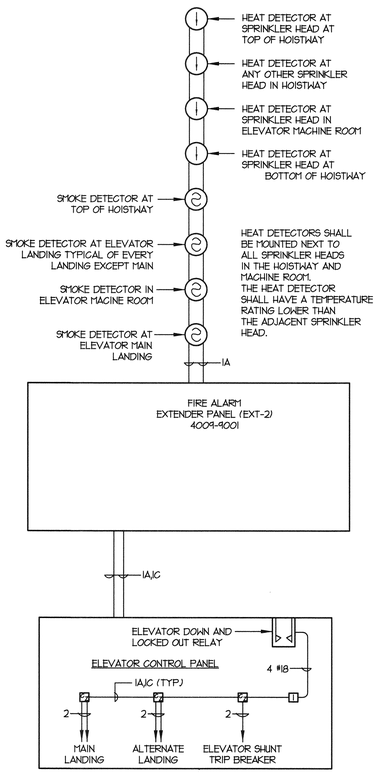
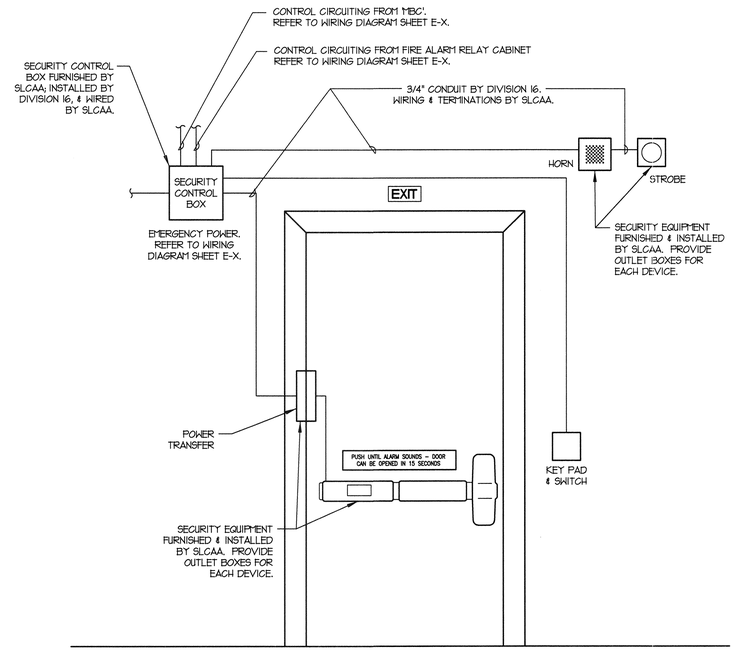


A2 FIRE ALARM AND ELEVATOR INTERFACE FOR ELEVATOR CAPTURE AND SHUT DOWN
SCALE: NONE



A4 SECURITY DOOR DETAIL
SCALE: NONE

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AUXILIARY SYSTEMS DETAILS

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EY502

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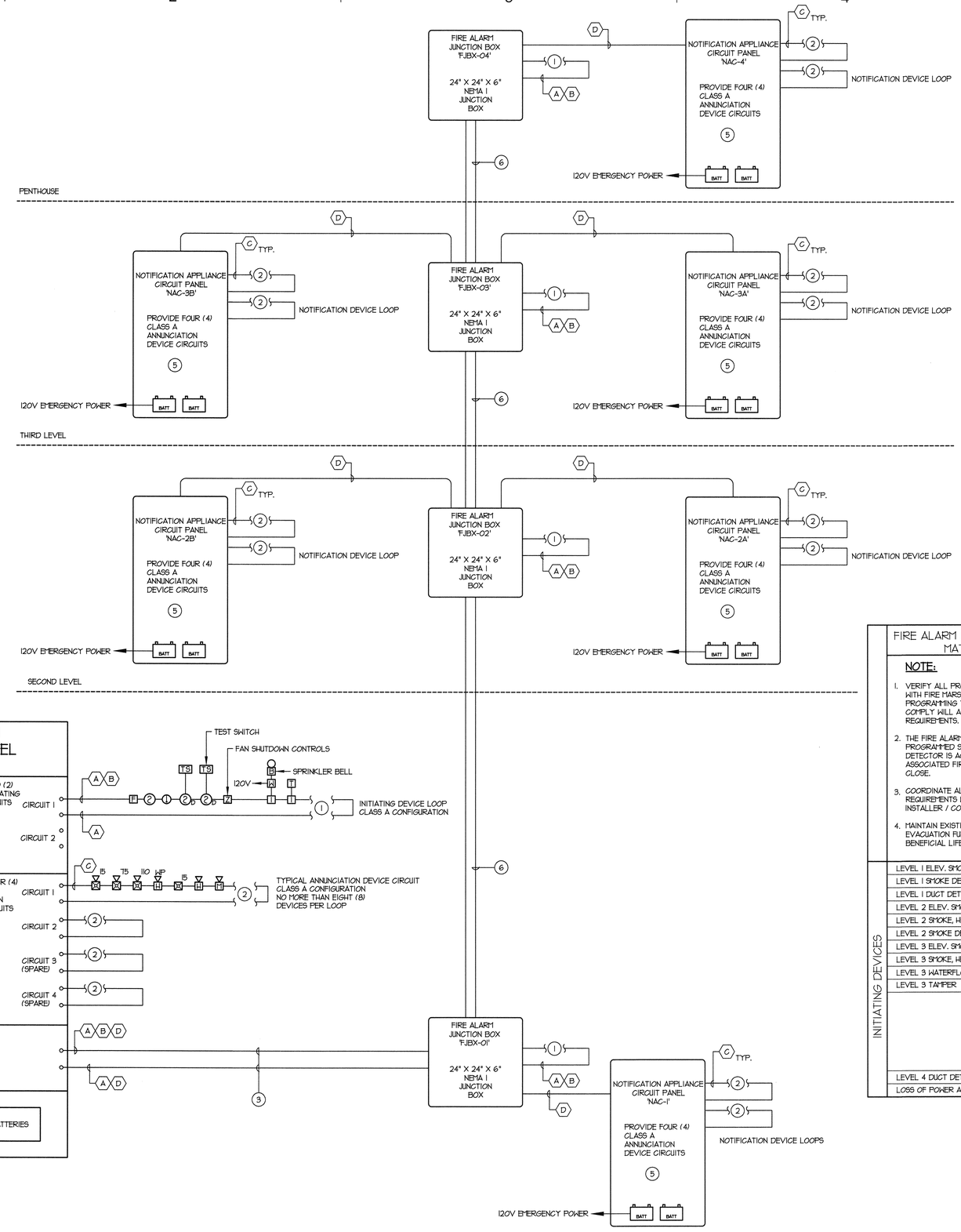
FIRE ALARM KEYED NOTES:

1. EXTEND 3/4" CONDUIT WITH INITIATION CABLES TO ADDRESSABLE FIRE ALARM DEVICES INCLUDING SMOKE DETECTORS, DUCT SMOKE DETECTORS, MONITOR MODULES, AND CONTROL MODULES. REFER TO POWER PLANS FOR QUANTITIES, DEVICE TYPES AND LOCATIONS. INCLUDE POWER WIRING AS REQUIRED FOR CONTROL MODULES AND DUCT SMOKE DETECTORS. THIS WIRING SHALL TIE BACK INTO THE MAIN FIRE ALARM PANEL.
2. EXTEND 3/4" CONDUIT WITH POWER CONDUCTORS TO FIRE ALARM HORNS, HORN/STROBES, AND STROBES. REFER TO POWER PLANS FOR QUANTITIES, DEVICE TYPES AND LOCATIONS. PROVIDE SYNC MODULES FOR STROBES AS REQUIRED TO COMPLY WITH ALL APPLICABLE CODES. WIRE ANNUNCIATION DEVICES PER ALL MANUFACTURERS RECOMMENDATIONS.
3. EXTEND A 3/4" CONDUIT (UNLESS NOTED OTHERWISE) WITH THE REQUIRED FIRE ALARM CABLES FROM THE MAIN FIRE ALARM PANEL OUT TO ALL NOTIFICATION APPLIANCE CIRCUIT PANELS AND FIRE ALARM JUNCTION BOXES. REFER TO THE RISER DIAGRAMS FOR REQUIRED CABLES.
4. EXTEND 3/4" CONDUIT WITH TWO (2) CAT. 6 CABLES TO THE TELEPHONE TERMINAL BOARD. FIRE ALARM SYSTEM WILL REQUIRE TWO (2) DEDICATED PHONE LINES FOR COMMUNICATIONS TO ALARM MONITORING COMPANY.
5. NOTIFICATION APPLIANCE CIRCUIT PANELS SHALL BE PROVIDED WITH FOUR(4) CLASS A CIRCUITS, REQUIRED POWER SUPPLIES, ETC. FOR A COMPLETE AND OPERATING SYSTEM.
6. EXTEND TWO (2) 1" CONDUITS ONE FOR COMMUNICATION CABLING AND ONE SPARE.

FIRE ALARM CABLE SCHEDULE

A	1 - 18 AWG. TSP. (ADDRESSIBLE LOOP)
B	2 - 12 AWG. (POWER)
C	2 - 14 AWG. (ANNUNCIATION)
D	4 - 14 AWG. (ANNUNCIATION CIRCUIT)
E	2 - 14 AWG. (ZONE)



A3 EY701 FIRE ALARM SYSTEM RISER DIAGRAM
SCALE: NONE

FIRE ALARM SYSTEM NOTES:

1. PROVIDE ADDRESSABLE FIRE ALARM SYSTEM.
2. CONFIRM ALL WIRING REQUIREMENTS WITH FIRE ALARM SYSTEM SUPPLIER AND PROVIDE IN ACCORDANCE THEREWITH.
3. THE SYSTEM SHALL BE PROGRAMMED SO THAT IF ANY INITIATION DEVICE IS ACTUATED, AN ALARM SIGNAL WHICH IS AUDIBLE THROUGHOUT THE BUILDING WILL BE ACTIVATED.
4. WIRING SHALL BE CONTINUOS FROM ONE DEVICE TO ANOTHER. NO SPLICING IS ALLOWED.
5. PROVIDE FIRE ALARM MAP OF THE BUILDING SHOWING ALL FIRE ALARM SYSTEM DEVICES. ALL MAPS SHALL BE 11X17 IN A 11X17 3 RING BINDER AND PROTECTIVE SLEEVES.
6. ALL FIRE ALARM CABLING SHALL BE RAN IN CONDUIT OR MC STYLE CABLE. THERE SHALL BE NO EXPOSED CONDUIT. FOR THE WEST PARKING GARAGE, THE CONDUIT SHALL BE SCHEDULE 40 PVC CONDUIT WHICH WILL BE RAN IN THE SLAB. THE MINIMUM SIZE CONDUIT SHALL BE 3/4". CONTRACTOR SHALL SPRAY PAINT ALL JUNCTION BOXES ASSOCIATED WITH THE FIRE ALARM SYSTEM "FIRE ENGINE RED".
7. THE FIRE ALARM SYSTEM SUPPLIER SHALL PROVIDE A COMPUTER DRAFTED PLAN OF THE FIRE ALARM SYSTEM USING FLOOR PLANS PROVIDED BY THE ENGINEER. COMPLETE RISER & WIRING DIAGRAMS SHALL BE INCLUDED.
8. ALL NOTIFICATION DEVICE CIRCUIT VOLTAGE DROP CALCULATIONS SHALL BE DONE IN COMPLIANCE WITH NFPA 72 2002 SECTION 4.4.4.1. THE FIRE ALARM SYSTEM SUPPLIER TO DETERMINE THE AMOUNT NOTIFICATION DEVICE CIRCUITS THAT ARE REQUIRED BASED ON THE NUMBER OF NOTIFICATION DEVICES SHOWN ON THE DRAWINGS. PROVIDE FIRE RATED CABLE TO NOTIFICATION DEVICES PER ALL NFPA REQUIREMENTS.
9. SUBMIT THE FIRE ALARM INSTALLATION DRAWINGS AND MANUFACTURERS CUTSHEETS TO THE LOCAL AUTHORITY HAVING JURISDICTION FOR REVIEW AND APPROVAL PRIOR TO THE ROUGH-IN OF THE SYSTEM.
10. VERIFY AND COMPLY WITH ALL LOCAL AND NATIONAL CODES.
11. FIRE ALARM SYSTEM SUPPLIER TO PROVIDE A COPY OF PROGRAMMING CODES AND OPERATION MANUALS IN A SLEEVED BINDER ATTACHED TO THE FIRE ALARM CONTROL PANEL.

FIRE ALARM INPUT/OUTPUT MATRIX

NOTE:

1. VERIFY ALL PROGRAMMING REQUIREMENTS WITH FIRE MARSHAL PRIOR TO PROGRAMMING THE FIRE ALARM SYSTEM. COMPLY WILL ALL FIRE MARSHAL REQUIREMENTS.
2. THE FIRE ALARM SYSTEM SHALL BE PROGRAMMED SO THAT WHEN A DUCT DETECTOR IS ACTIVE ON A FLOOR THE ASSOCIATED FIRE/SMOKE DAMPERS WILL CLOSE.
3. COORDINATE ALL ELEVATOR CONTROL REQUIREMENTS WITH THE ELEVATOR INSTALLER / CONTROL CONTRACTOR.
4. MAINTAIN EXISTING PROGRAMMING AND EVACUATION FUNCTION FOR EXISTING BENEFICIAL LIFE TOWER.

	SYSTEM OUTPUT																				
	FACP ANNUNCIATION					NOTIFICATION			FIRE SAFETY CONTROL							REPORTING			
	ALARM SIGNAL TO MONITORING COMPANY	SUPERVISORY SIGNAL TO MONITORING COMPANY	TROUBLE SIGNAL TO MONITORING COMPANY	REPORT TO PRINTER	ELEVATOR PRIMARY RECALL	ELEVATOR ALTERNATE RECALL	ELEVATOR SHUNT-TRIP	FAN SHUTDOWN	STAIR PRESSURIZATION	PARKING LEVEL 2 ELEV. LOBBY EVAC	PARKING LEVEL 1 ELEV. LOBBY EVAC	LEVEL 1 ELEV. LOBBIES EVAC	LEVEL 2 ELEV. LOBBY / TOWER LOBBY EVAC	LEVEL 3 EVAC		SOUTH STAIR EVAC	WEST STAIR EVAC	CENTER STAIR EVAC	EAST STAIR EVAC	
INITIATING DEVICES																					
LEVEL 1 ELEV. SMOKE DETECTORS	X			X	X			X	X	X	X	X					X	X	X		
LEVEL 1 SMOKE DETECTOR	X			X	X			X	X	X	X	X	X	X			X	X	X		
LEVEL 1 DUCT DETECTOR	X			X	X			X	X	X	X	X	X	X	X		X	X	X		
LEVEL 2 ELEV. SMOKE DETECTOR	X			X		X		X	X	X	X	X	X				X	X	X		
LEVEL 2 SMOKE, HEAT OR DUCT DETECTOR	X			X	X			X	X	X	X	X	X	X	X		X	X	X		
LEVEL 2 SMOKE DETECTOR	X			X	X			X	X	X	X	X	X	X			X	X	X		
LEVEL 3 ELEV. SMOKE DETECTOR	X			X	X			X	X	X	X	X	X	X	X		X	X	X		
LEVEL 3 SMOKE, HEAT OR DUCT DETECTOR	X			X	X			X	X	X	X	X	X	X	X		X	X	X		
LEVEL 3 WATERFLOW	X			X	X		X	X	X	X	X	X	X	X	X		X	X	X		
LEVEL 3 TAMPER		X		X																	
LEVEL 4 DUCT DETECTOR	X			X	X			X	X	X	X	X	X	X	X		X	X	X		
LOSS OF POWER ANY PANEL OR NAC			X	X																	

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PROJECT DESCRIPTION

LIFE SCIENCES RESEARCH CENTER
UTAH STATE UNIVERSITY

USTAR BUILDING #2
LOGAN, UTAH

SHEET NAME:

VOICE AND DATA AND FIRE ALARM RISER DIAGRAMS

REVISIONS

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EY701

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CCTV RISER DIAGRAM NOTES:

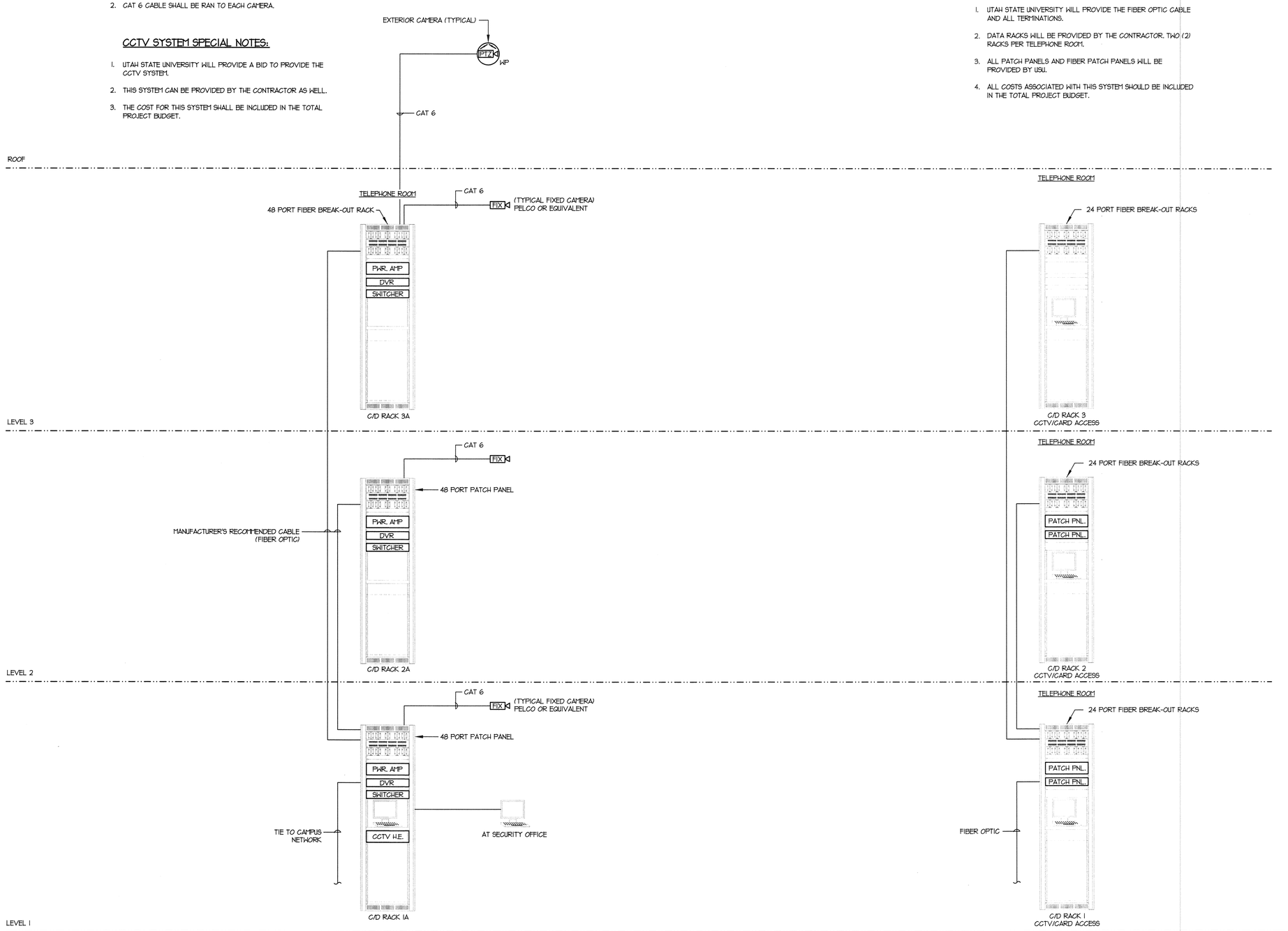
1. CAMERA SYSTEMS SHALL UTILIZE POWER OVER ETHERNET (P.O.E).
2. CAT 6 CABLE SHALL BE RAN TO EACH CAMERA.

CCTV SYSTEM SPECIAL NOTES:

1. UTAH STATE UNIVERSITY WILL PROVIDE A BID TO PROVIDE THE CCTV SYSTEM.
2. THIS SYSTEM CAN BE PROVIDED BY THE CONTRACTOR AS WELL.
3. THE COST FOR THIS SYSTEM SHALL BE INCLUDED IN THE TOTAL PROJECT BUDGET.

FIBER OPTIC DISTRIBUTION RISER NOTES:

1. UTAH STATE UNIVERSITY WILL PROVIDE THE FIBER OPTIC CABLE AND ALL TERMINATIONS.
2. DATA RACKS WILL BE PROVIDED BY THE CONTRACTOR. TWO (2) RACKS PER TELEPHONE ROOM.
3. ALL PATCH PANELS AND FIBER PATCH PANELS WILL BE PROVIDED BY USU.
4. ALL COSTS ASSOCIATED WITH THIS SYSTEM SHOULD BE INCLUDED IN THE TOTAL PROJECT BUDGET.



A2 / EY104 CCTV RISER DIAGRAM
SCALE: NONE

A4 / EY102 FIBER OPTIC DISTRIBUTION RISER DIAGRAM
SCALE: NONE

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FIBER OPTIC DISTRIBUTION AND CCTV RISER DIAGRAMS

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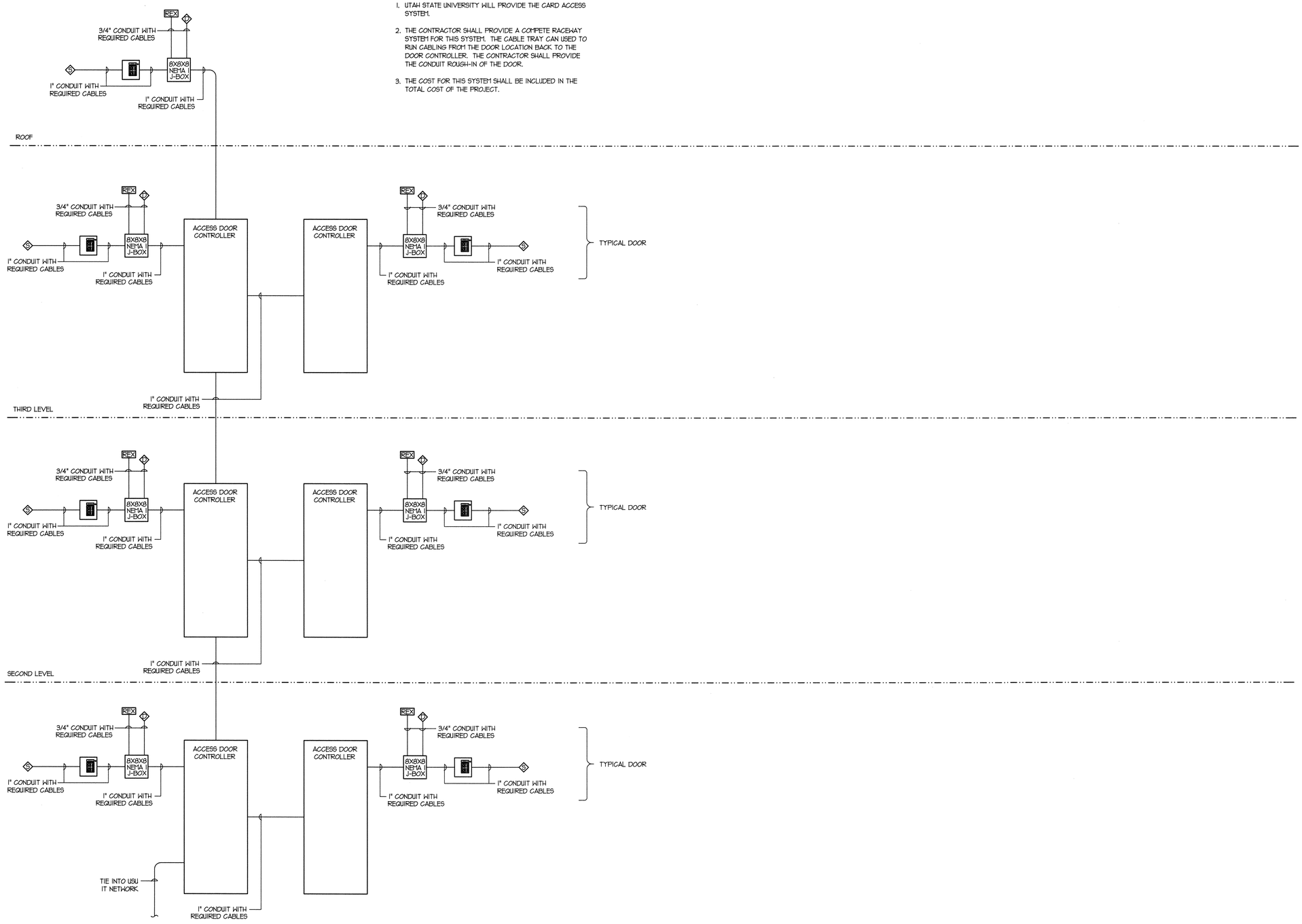
CARD ACCESS SYSTEM NOTES:

1. UTAH STATE UNIVERSITY WILL PROVIDE THE CARD ACCESS SYSTEM.
2. THE CONTRACTOR SHALL PROVIDE A COMPETE RACEWAY SYSTEM FOR THIS SYSTEM. THE CABLE TRAY CAN USED TO RUN CABLING FROM THE DOOR LOCATION BACK TO THE DOOR CONTROLLER. THE CONTRACTOR SHALL PROVIDE THE CONDUIT ROUGH-IN OF THE DOOR.
3. THE COST FOR THIS SYSTEM SHALL BE INCLUDED IN THE TOTAL COST OF THE PROJECT.



A3 EY703 CARD ACCESS SYSTEM RISER DIAGRAM
SCALE: NONE

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