



**HMSLH PET INSTALLATION AND
RENOVATION TO LEVEL 1
Schematic Design Phase**

**MECHANICAL, ELECTRICAL, PLUMBING
NARRATIVE**

Sugar Land, Texas

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SUMMARY

The project is the renovation of approximately 3,400 SF for a Radiology Reception desk and PET CT suite on the first level of the existing Sweetwater Hospital. Converting existing offices/work areas and ultra sound rooms to a PET CT suite and renovating the existing reception area to meet current needs. The PET CT suite will contain a Probe Room, Soiled Utility, PET, Hot Lab, Two PET uptakes, PET control room, a holding bay, patient toilet and housekeeping closet. The existing cashier's desk, Tech work area, ECHO and IV Stick, in the current reception area, will be renovated into a Stress room, Prep/Stick Room, Work Area and reception desk. Additionally, medical gas zone valve box will need to be relocated in order to accommodate the new PET suite.

PLUMBING

- A. Regulations and Codes:
1. *2006 NFPA 50 – Bulk Oxygen Systems at Consumer Sites*
 2. *2015 International Plumbing Code*
 3. *2015 International Fire Code*
 4. *2005 NFPA 99: Standard For Health Care Facilities*
 5. *2007 NFPA 13: Installation of Sprinkler Systems*

DEMOLITION

All existing plumbing fixtures shall be removed with all associated piping, components and trim. For all fixtures to be demolished, remove existing water piping back to shut-off valves and existing vent lines back to the existing mains located in ceiling space. Cap water and vent piping for future connections. Remove waste piping to below finished floor and repair.

PLUMBING FIXTURES

- A. Fixtures and Trim: Standard institutional type. Handicapped accessible and trimmed where required.
1. Mop sinks: Floor mounted pre-cast terrazzo.
 2. Water closets: Wall hung, vitreous china type with flush valve and floor mounted carrier.
 3. Lavatories: Wall hung or countertop, vitreous china. Wall hung fixtures provided with floor mounted carrier and ADA insulation kit.
 4. Countertop sinks: Either 18-gauge stainless steel self-rimming drop-in type or laboratory epoxy resin, depending on the use and location.
 5. Faucets and supplies: Commercial grade heavy-duty chrome plated brass fittings and trim including wrist blade or lever, gooseneck faucets with replaceable cartridges, 17 ga. P-traps and loose key supply stops.
 6. Floor drains: Nickel bronze strainer, self-priming type. Location: Toilet rooms and required utility areas.

DOMESTIC WATER DISTRIBUTION

- A. Domestic Cold Water System: The existing plumbing system will be reconfigured per the architectural design and piped to all plumbing fixtures as required.
1. Cold water piping above grade inside building: Type L copper with press-type copper fittings.

- B. Domestic Hot Water System: The existing plumbing system will be reconfigured per the architectural design and piped to all plumbing fixtures as required.
 - 1. Hot water piping: Type L copper with press-type copper fittings. Isolation valves on branch lines serving two or more fixtures.
- C. Pipe Specialties: Water hammer suppressor and vacuum breakers at high points in supply lines and at plumbing fixtures.
- D. Pipe Insulation: Cold water piping in exterior walls and areas subject to freezing, hot water piping.

SANITARY WASTE

- A. Existing Sanitary Soil, Waste and Vent System to existing sinks will be reconfigured to support the new architectural layout.
- B. A sanitary waste and vent system for plumbing fixtures, floor drains and mechanical equipment designed for gravity flow from the building to existing sanitary main. Clean-outs provided every 75 feet of run and at each change of direction.
- C. Saw cut excavate and backfill piping once installed.
 - 1. Sanitary waste and vent:
 - a. Below ground: PVC Schedule 40 piping hub and socket.
 - b. Above ground: Cast iron with either compression gaskets or no-hub with mechanical joints. Wide body No-Hub couplings utilized on all vertical stacks and stack offsets.

OTHER PLUMBING SYSTEMS

- A. Demolition of Medical Gas Piping: Existing medical gas headwall/wall outlets and associated piping, in the affected area, shall be removed. Medical gas piping shall be removed back to the supply main and capped for future connection. Existing zone valve box to be relocated per architectural plan, continuity of service will be maintained.
- B. Medical Gas Location: Medical gas branch piping will be rerouted per architectural medical gas outlet locations
- C. Medical Gas Pipe Line System: Alarms will be of the digital type. Outlet and zone valves as required. Medical air and vacuum piping type K hard seamless copper tubing. DISS quick connect pin type wall outlets. Vacuum slides adjacent to each vacuum outlet. Outlet Locations: Typically, one vacuum, oxygen and medical air PET, one vacuum, oxygen and slide outlet for New Stress/PET Uptake, one vacuum, oxygen and slide per patient holding.
- D. Testing: All systems tested and balanced.

HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)

- A. Regulations and Codes:
 - 1. *2004 NFPA 45 – Fire Protection for Laboratories Using Chemicals*
 - 2. *2002 NFPA 90A – Installation of Air Conditioning and Ventilating Systems*
 - 3. *2006 NFPA 90B – Installation of Warm Air Heating and Air Conditioning Systems*
 - 4. *2015 IMC – International Mechanical Code*

DEMOLITION

Existing diffusers, registers, grilles, ductwork, hangers, insulation, controls, dampers, piping, valves, and thermostats in the area to be renovated will be removed. Existing HVAC system will remain in use where applicable. Existing HVAC system continuity to other areas served by removed ductwork shall be maintained and air handling units will be rebalanced based on renovation.

HEAT GENERATION SYSTEMS

- A. Heating System: The existing hot water reheat supply and return piping will be reconfigured to support reheat requirements for new air terminal units.

HEAT HVAC DISTRIBUTION SYSTEMS

- A. Existing branch ductwork will be demolished back to the main duct runs and reconfigured to support the new architectural layout. Space shall be conditioned with ducted supply and plenum return system using single ducted air terminal units with hot water heating coils provided on the distribution side of the variable air volume (VAV) system. Which will function to regulate airflow to the area, in response to temperature requirements.
- B. Ductwork:
1. Material:
 - a. Typical: Ductwork externally insulated with 2-inch fiberglass. Galvanized steel sheet ductwork fabricated in accordance with ASHRAE Guide and SMACNA Manual.
 - b. Outside air ductwork: Ductwork externally insulated with 2-inch rigid fiberglass. Galvanized steel sheet ductwork fabricated in accordance with ASHRAE Guide and SMACNA Manual.
 2. Type:
 - a. High velocity: Round or oval type for air distribution from the air terminals to the space.
 - b. Low velocity: Round and rectangular ductwork for return air, relief air, and outside air.
 - c. Flexible aluminum foil covered vinyl lined fiberglass ductwork; UL listed Class I, with spin-in fittings; limited to 6-foot length or less.
 3. All exhaust and return air will be ducted.
- C. Piping:
1. Chilled and hot water: Schedule 40, black steel pipe.
 - a. 2 inches and smaller -150 lb. malleable screwed fittings.
 - b. 2 1/2 inches and larger - Welded steel fittings.
 2. Condenser water piping: Schedule 40, black steel pipe with Victaulic fittings.
 3. Accessories: Piping system adequately valved for reliable service and proper maintenance.
 - a. Strainers, air vents, expansion tanks and other auxiliary items installed for proper maintenance and operation.

- D. Insulation:
1. Chilled water: Up to 1-1/2 inch pipe the insulation shall be 1 inch thick glass fiber with vapor barrier jacket. Pipes greater than 1-1/2 inch thick shall have 1-1/2 inch thick glass fiber insulation with aluminum jacket when exposed to exterior.
 2. Hot water: Up to 1-1/2 inch pipe size the insulation shall be 1 inch thick glass fiber with universal jacket. All pipes larger than 1-1/2 inch shall have 2 inch thick with aluminum jacket when exposed to exterior.
 3. Condensate: 1-inch calcium silicate with canvas jacket.

AIR TERMINAL UNITS AND CHILLED WATER AIR HANDLING UNITS

- A. Air Handling Units: The existing air handling unit will be used to provide cooling for the PET CT suite renovation and the reception renovation. A predesign test of the HVAC system serving the PET system will be done to ensure the unit has capacity to support the new CT.
- B. Air Terminal Units:
1. Pressure independent Variable air volume terminals will be located in the ceiling cavity for each zone. Terminal units - single duct variable air volume type, with motorized damper, hot water coil, airflow measuring device and volume regulator.
- C. Pressurization:
1. PET Suite - Negative pressure relative to adjacent area.
 2. Toilets, janitor closets, Hot Lab, PET Uptake - Negative pressure with respect to adjacent areas.
- D. Air Devices:
1. Supply and return: panel aluminum face 2x2 foot ceiling diffusers, grilles with trim for type of ceiling. Titus model: OMNI. Low returns grilles will be provided for PET and uptake.
 2. Smoke and fire dampers: UL listed fire dampers where supply, return or exhaust ducts penetrate fire rated walls or floors.
- E. Exhaust:
1. Toilets, soiled: Ducted through existing common exhaust shaft riser to centrifugal, belt driven, vent sets or inline exhaust type fans with factory built curbs. Exhaust port provided on riser of each floor for future use.
 2. PET Suite: Exhausted directly outside. New ductwork and fan (Approximately 5,000 CFM) will be provided to route the exhaust to the old central plant roof. Provide new vent set fan with exhaust stack on roof. Exact location will be coordinated with existing field conditions. Exhaust discharge shall be a minimum of 25' - 0" from any intakes or building openings.

HVAC INSTRUMENTATION AND CONTROLS

Controls: All controls data will be integrated into the existing building system and be viewable and controllable by the existing front end control station PC. The HVAC control system will be automatically controlled by a direct digital control system capable of handling all sensing, logic and control functions. Control functions at the reheat terminal boxes for space temperature and humidity control will include modulating variable volume dampers in the boxes and heating hot water control

valves in order to maintain temperature and humidity control in the areas served by the boxes. Each thermostat will be capable of being set by adjustment or selection of sensors.

HVAC SYSTEMS TESTING, ADJUSTING, AND BALANCING

Testing and balancing: Systems properly tested and balanced for pressure and airflow.

FIRE PROTECTION SYSTEMS

- A. Regulations and Codes:
 - 1. *2007 NFPA 13 – Installation of Sprinkler Systems*
 - 2. *2007 NFPA 14 – Installation of Standpipe and Hose Systems*

FIRE PROTECTION SPRINKLERS SYSTEMS

- A. Sprinkler System:
 - 1. Wet pipe: Building has existing fire sprinkler protection throughout. Existing fire sprinkler system will be reconfigured per architectural design. Standard coverage and standard response sprinklers provided unless noted otherwise.
 - 2. Head types:
 - a. Public spaces: Concealed type heads with white cover plates centered in ceiling tiles.
 - b. Finished ceilings, typical: Semi-recessed chrome plated heads with white escutcheon.
- B. Piping Materials:
 - 1. 2 inch and smaller: Schedule 40 black steel pipe with class 125 cast iron threaded fittings.
 - 2. 2½ inch and larger: Schedule 10 black steel piping with roll grooves and Victaulic couplings and fittings.

FIRE PROTECTION SPECIALTIES

- A. Fire Protection Cabinets and Accessories:
 - 1. Type 1: Fully recessed fire extinguisher cabinets with 10 pound ABC dry chemical fire extinguishers. Black vinyl die-cut lettering “Fire Extinguisher”. Locate such that all occupants are within 75 feet of an extinguisher, per NFPA 10.

ELECTRICAL SYSTEMS

- A. Regulations and Codes:
 - 1. *2014 NFPA 70 – National Electrical Code*

DEMOLITION

Existing lighting, lighting controls and receptacles in the area to be renovated will be demolished. Existing circuits will remain in use where applicable. Circuit continuity to other areas served by demolished circuits shall be maintained (e.g. Panel boards KH1, KL1 and 1NLCB1 in existing Holding/Prep 1014 on demolition plan will need to be relocated but currently service existing nuclear camera and other areas).

ELECTRICAL SERVICE AND DISTRIBUTION

- A. General purpose and Critical receptacle will be provided per the architectural layout. Demolished circuits will be used to power new receptacles.

- B. PET CET Power – Will be furnished per manufactures specification. Provide 80A breaker in panel KH1 or from nearest Imaging panel on generator power. Conduit will be sized per manufactures recommendation.
- C. UPS – It is assumed the PET CT manufacturer will provide the UPS.
- D. Distribution Panels: Surface mounted, dead front, sectional, circuit breaker type.
- E. Branch Circuit Panels: Surface mounted, dead front, sectional, circuit breaker type using standard frame size plug-in or bolt-in type breakers.
- F. Safety Disconnect Switches: Horsepower rated disconnect switch within sight of motors. Fused switches where branch circuit fuses are not sized for overload protection.
- G. Transformers: Dry type, 480 volt, 3Ø primary, 120/208 volt, 3Ø, 4-wire secondary. NEMA Class H insulation for transformers 45 KVA and over. Class F insulation for transformers 30 KVA and below. Vibration isolation consisting of two layers of ribbed neoprene separated by a layer of 16 ga. galvanized steel. Transformer mounted on 4-inch high concrete pad.

LIGHTING AND BRANCH WIRING

- A. Conduit: Wiring will be installed in conduit. All conduit will be concealed except in utility areas. Minimum size 3/4 inch. Support conduit at not more than 8-foot center with galvanized hangers.
 - 1. Underground: PVC conduit.
 - 2. Exposed: Rigid galvanized conduit.
 - 3. Eight feet above floor in walls and ceiling: Zinc coated electric metallic tubing (EMT) conduit.
 - 4. Connected motors, transformers and other equipment subject to vibration: Flexible metal or liquid tight flexible metal conduit.
- B. Wire: Wire and cables conductors of soft-drawn annealed copper. Minimum size No. 12 for power and lighting circuits. Color-coded throughout.
 - 1. Type THHN: No. 10 and 12 (solid conductors)
 - 2. Type THW: No. 8 and larger (stranded conductors)
 - 3. Type THHN: No. 14 (fixture wiring)
- C. Wiring:
 - 1. Branch circuits of No.12 at 120 volts, which extend over 100 feet from supply panel, will be increased in size to No. 10 AWG. For 277 volts the size will be increased at 200 feet. All exposed non-current carrying metallic parts of electrical equipment and raceway system will be grounded and bounded.
 - 2. System wiring run in air plenums or ceiling cavities will be installed in conduit or if not, shall be approved low smoke plenum rated cable.
- D. Wiring Devices: Galvanized steel outlet boxes at least 1-1/2 inch deep and of sufficient size to accommodate wiring or device for which they are provided.

1. Switches, receptacles and telephone: 4-inch square flush boxes with raised covers.
 2. Lighting fixtures: 4-inch octagonal boxes with fixture stud supports and attachments required to support fixture.
- E. Devices: Specification grade smooth faced duplex grounding type 20 amp. Receptacles, stainless steel cover plates and matching 15 amp. rocker type switches. All devices with screw terminals. GFCI protected receptacles at all toilet rooms.
1. Corridors: Duplex receptacles for general use installed not less than 50'-0" apart in all corridors and within 25'-0" of corridor ends.
 2. Receptacle colors:
 - a. Emergency power: red.
 - b. Normal power: white.
- F. Interior Lighting: LED light fixtures shall be used throughout. Lighting levels in accordance with IES recommended illumination levels for energy conservation. Local switching for general offices and corridors and multi-level illumination for special areas. Emergency lighting and exit fixtures powered by emergency power system.
1. Offices: 3-lamp direct/indirect 2x4 LED with perforated diffuser.
 2. Corridors and waiting areas: 2-lamp direct/indirect 2x4 LED with perforated diffuser.
 3. Procedure and exam rooms: 3-lamp direct/indirect 2x4 LED with perforated diffuser.
 4. Public toilets: 2 lamp LED wall brackets with up/down lighting.
 5. Utility areas: 2-lamp 4-foot surface mounted LED strip fixtures.
 6. Exit signs: Slimline, stencil face, low power consuming LED with self-contained emergency power unit.

FIRE ALARM SYSTEM

Fire alarm devices will be provided in the renovation area as required to conform with NFPA 72, NFPA 101, and local regulations. Fire alarm devices will be compatible with the existing fire alarm system. Existing devices may be reused where their condition is acceptable, and the devices conform to current codes and local requirements.

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