PART 1: GENERAL

1.01 General Requirements

A. This standard is intended to provide useful information to the Professional Service Provider (PSP) to establish a basis of design. The responsibility of the engineer is to apply the principles of this section and the ones that follow so that the Sam Houston State University may achieve a level of quality and consistency in the mechanical design of their facilities. Deviations from these guidelines must be justified through LCC analysis and submitted to the University for approval.

B. Use SHSU specifica
c 0.0(h)25.7SHSU nomenclature for naming and numbering. See attached for details.

C. Use SHSU sta E. Use gravity drain of liquids at all possible places. Recover all fin water sou
economic feasibility.

F. SHSU preference for mounting of air handler temperature control valves is for s
without the use of ladder; maximum height 5'0" AFF. Where service valves are
the floor provide service platform, catwalk, or Roto-hammer chain wheels and s
Do not block equipment access when locating temperature control valves.

G. Indicate required service clearances on drawings with dashed lines. Design shall
and maintenance access to all equipment. Service area shall comply with codes
recommendations and shall be reasonably planned for human access. Project sha
access to all levels including basement and attic mechanical spaces. Elevators sh
designed for equipment removal.

H. Design shall include plan for removal of all equipment. Plan shall indicate sizes
equipment and clearly marked paths of removal and egress for this equipment fr
equipment-to-equipment loading area exterior to building. Entire egress path sha
removal of equipment. Preference is to remove all equipment through elevators
paths of equipment through removable louvers or roof cupolas are acceptable pr
cupolas locations are crane accessible. Coordinate with structural to add lifting b
move or replace heavy equipment.

I. Include a 0-100 psig pressure gauge on the domestic water header. Also include a
sensor on the header, suitable for connection to University BAS system. Provide
incoming water line upstream of the water meter and backflow prevention.

J. Provide N+1 redundancy for equipment providing building utility service such as
pumps, heating hot water converters, and heating hot water pumps. N+1 redunda
provided for equipment serving critical applications such as laboratory exhaust f

K. Avoid 3½" and 5" diameter pipe.

L. Mechanical systems shall be designed in accordance with the latest version of ASRHAE 90.1 adopted by the State Energy Conservation Office.

M. A detailed HVAC control sequence of operations, controls system schematic diagrams, and BAS point list shall be included in the plans and specifications.

N. Piping: All Piping & Fittings to be seamless or SMAW. NO ERW PIPING ALLOWED.

O. PSP Deliverables – Plans, Profiles, Elevations, Control sequencing details, P&ID, PFD, Riser Diagrams, Instrumentation Index, Equipment Schedules, Construction Details & Specifications.

P. Construction Filters must be used to protect intakes to HVAC Units prior to beginning of construction.

Q. All instrumentation that can be damaged from construction dust or smoke must be protected prior to beginning of construction. This includes all Fire & Smoke devices that are a part of the Fire Alarm System.

1.02 Codes:

Not Used

1.03 Mechanical Systems Selection:

A. Airside – HVAC

1. Provide air handling units configured to serve campus buildings in accordance with these standards as minimum level and consistent with good engineering practice, zoned in a practical manner to facilitate convenient building operation, thermal performance and shutdown. Design HVAC systems with a practical number of air handling units preferably located to a common mechanical room to increase functional space within the building. The exact quantity, location, and configuration of the air handling units shall be verified through LCC analysis. The baseline system required by these standards shall be as follows:

a. LABS: 100% outside air, dual duct, variable air volume, central air-handling units with single duct VAV boxes with reheat coils.

i. Lab Exhaust – Header system connecting all chemical fume hoods, ducted bio-safety cabinets, and general lab exhaust to common lab exhaust fan system located on roof. Lab exhaust shall terminate with stack to exhaust contaminants to provide acceptable dilution and prevent recirculation of containments into building ventilation.

ii. Exhaust Energy Recovery – Laboratory facilities with total exhaust, excluding fume hood exhaust, greater than 15,000 CFM shall include heat energy recovery systems to precondition outside air.

iii Energy recovery systems will be designed for zero cross-contamination with fume hood exhaust systems.

b. CLASSROOM/OFFICE: Single duct, variable air volume, central air-handling units with VAV boxes with hot water reheat coils with approval as needed. Building

ventilation shall be provided by dedicated outside air pre-treatment unit(s) unless otherwise approved by SHSU

i. Exhaust Energy Recovery – Not recommended, due to reduced hours of operation for Classroom and Office Facilities, except where required by ASHRAE 90.1 or requested by the University.

c. DORMITORY: Single duct, variable air volume, central air-handling units with VAV boxes with hot water reheat coils with approval as needed, zoned for individual living suite control. Building ventilation shall be provided by dedicated outside air pre-treatment unit(s).

i. Exhaust Energy Recovery –ASHRAE 90.1 establishes minimum requirement; however, individual pre-treat units over 8,000 CFM shall be evaluated for the use of exhaust energy recovery.

ii. Common building areas will be served by single duct, variable air volume, central air-handling units with VAV boxes using hot water re-heat coils with approval as needed.

iii. A system consisting of individual four-pipe fan coil units for each dorm room or suite may be selected as the preferred mechanical system. This selection will be made at the discretion of the University, based on specific building program and marketability. Building ventilation shall be provided by dedicated outside air pre-treatment unit(s) ducted directly to the room fan coils

2. Utilize dedicated 100 percent outside air handling units to pre-treat ventilation air prior to delivery to main central air handling unit(s), unless otherwise approved by SHSU. Provide outside air handling units dedicated to a single or group of central air handlers consistent with prudent engineering practice and to facilitate convenient building operation and shutdown.

3. Not Used

4. Locate building air intakes as high as possible to ensure the cleanest possible air. Devote special attention to noxious fume exhaust systems to make certain that the exhaust contents escape boundary layer entrainment and subsequent contamination of the building or its neighbors.

5. Use variable frequency drives (VFDs) for fan static pressure control.

6. Control air handling system outside air ventilation rates using a carbon dioxide based demand ventilation control strategy to reduce the total supply or outside air during periods of reduced occupancy. Monitor the carbon dioxide levels in the zones and vary ventilation rates to track a carbon dioxide offset consistent with ASHRAE 62 recommendations.

7. Provide an engineered smoke control system where required by NFPA 101 and per the requirements of NFPA 96A.

8. Use plenum-like low friction ductwork sizing with long radius fittings (R/D = 1.5) preferred. Target values for air duct design velocities are 1,500 feet per minute on trunks and 800 feet per minute on run-outs and drops.

9. Construct supply duct risers to withstand minimum 4" pressure class, construct horizontal ductwork to withstand minimum 2" w.c. of air pressure. Seal ductwork to SMACNA seal Class A.

10. Provide balancing dampers at supply, return, and general exhaust branches as required to appropriately balance the system.