# Mechanical Narrative – Tyndall Honor Guard Facility

September 14, 2022

## PROJECT DESCRIPTION

This project includes the design and construction of the Tyndall Honor Guard Facility located at Tyndall AFB, Florida. The project scope includes a new one-story facility of approximately 4200 square feet. The facility includes locker rooms, restrooms, a janitor closet, chief offices, workstations, a training room, a mechanical room, an electrical room, and a comm room.

The mechanical design effort for the proposed facility shall concentrate on the following key elements: fulfillment of the mechanical and solicitation requirements, proper design of high-security measures, functional controls integration, and sustainability.

This narrative is to be used in conjunction with the pricing drawings, RFP (SOW) and all relevant Unified Facility Criteria (UFCs). The contractor(s) shall read all requirements in the RFP, especially Volume I containing program requirements in Part 3 sections D30 (HVAC) and room data sheets and Part 4 Performance technical specifications.

A preliminary whole-building load has been prepared for the development of this narrative in Trane TRACE 3D+ utilizing all relevant requirements and heat gain information in the RFP and preliminary drawings. The results of this analysis were utilized for initial unit selection and pricing efforts. Final confirmation of loads will be developed during the design phase. Load analysis will comply with all requirements of Section 18: Sustainable Design and Energy Use Reduction. The system design will make use of the latest technology to provide equipment with the highest efficiency possible to achieve compliance with EPACT 2005 and comply with ASHRAE Standard 90.1.

The DDC system shall be extended to provide control to all HVAC systems included in this project. System components must be compatible and completely integrated into the existing Tyndall Siemens BACnet Desigo CC framework including host graphics, programming, and end-to-end commissioning of each field point to the home screen. Minimum control points shall be developed based on requirements from the RFP as well as those required in UFC 3-410-01 Appendix D. The UMCS shall also have interconnectivity with all metering requirements per Section 18.

## GENERAL HVAC DESIGN PARAMETERS

The following are the general psychrometric design parameters by which the HVAC systems shall be designed:

1. Outdoor Conditions:
    a. Summer: 93°F db/81°F wb (1% Cooling)
       84.9°F db/80.0°F wb (1% HR)
    b. Winter: 24°F db (99% Heating)
2. General Spaces (Occupied/Unoccupied):
    a. Summer: 78°F db, 50% RH
    b. Winter: 68°F db
3. Telecommunication:
    a. Summer: 70°F db, 50% RH
    b. Winter: 70°F db
4. Air Filtration:
    a. MERV 13 Final Filters per ASHRAE 52-2 and MERV 8 pre-filters.
    b. Construction filters shall be provided per HPSB requirements.
5. Exhaust Rates:
    a. Restrooms: Min. 70 cfm per fixture
    b. Janitor Closets: Min. 1 cfm/SF
    c. Locker Room: Min. 0.5 cfm/SF
    d. Shower Room: Min. 50 cfm per shower

e. Pressurization: 10-15% Positive

Space heat loads in the initial design load were based on specified heat gain values as outlined in the RFP Actual occupancy and heat loads will be verified prior to commencing work on the design phase of the project. It is assumed at this time that occupancy is during regular duty hours of 0600 to 1800 hours, Monday thru Friday, but may operate during after-duty hours and weekends.

## ADDITIONAL HVAC DESIGN PARAMETERS

Ventilation (outdoor air) criteria will be developed per ASHRAE Standard 62.1. Where specific occupancy numbers are not provided by the architectural programming, ASHRAE 62.1 standard occupancy densities will be utilized.

All air handling units including VAV Air Handler shall be provided with MERV 13 filters per ASHRAE Standard 52.2, as well as MERV 8 prefilters upstream of the coils for each unit. Additional filters will be provided by the contractor to be utilized during construction. All supply fans will be ARI certified; all drain pans will be stainless steel.

Equipment subject to harsh coastal outside conditions shall meet ASTM B117 Salt Spray Test requirements. This includes but is not limited to Air Cooled Chillers, Outdoor Condensing units, and energy recovery devices (internals).

All materials and equipment shall meet the Buy American Act.

## APPLICABLE CODES

Mechanical systems design shall adhere to design requirements as listed in the RFP section 01 10 10 and latest editions of all applicable UFC, ASHRAE, ASME, and industry standards.

## MECHANICAL SYSTEMS

**Mechanical Systems – Tyndall Honor Guard Facility**

The air distribution portion of the mechanical system shall consist of variable air volume boxes. The return air system shall be a sheet metal return duct system back to the individual air handling unit (No plenum return allowed). The air handling unit shall be equipped with a return air inlet, filter section, dx coil, access section and supply fan section. The AHUs shall be setup in a draw thru arrangement. The filtration section shall consist of a MERV 13 primary filtration with MERV 8 pre-filter section with all sections equipped with differential pressure gauges. Each air handling unit shall also have the standard cooling coil, plenum fan with VFD, discharge and appropriate access sections.

The air handler shall service an area of the building consisting of both interior and exterior zones. The insulated medium pressure ductwork, equipped with double thickness turning vanes, and shall be constructed to the latest SMACNA standards and Class A construction. The medium pressure loop shall supply shut-off style variable air volume boxes equipped with electric heating coils. The low-pressure ductwork system shall be routed in a manner to reduce crossover of other ductwork, pipe and equipment. Outside air shall be ducted to the spaces directly.

An energy recovery wheel shall be installed inside the air handling unit. Exhaust will be collected from restrooms, janitors' closets, breakrooms and positively pressurized spaces and routed back to the air handling unit to achieve the energy recovery requirements.

Air distribution shall consist of four-way louvered 2x2 lay-in style supply diffusers with opposed blade dampers. The return system shall primarily consist of return air through 2x2 egg-crate style return grilles shall be utilized. Generally, exhaust grilles shall be 2x2 egg-crate grilles.

The Comm room (IDF) shall be fully conditioned with ductless mini-split heat pump units and positively pressurized from the air handling unit. The outdoor condensing units are to be located outside next to the air handling unit.

**DDC Systems General**

Building level supervisory controls shall be based on Tyndall Siemens BACnet Desigo CC framework.

**Testing and Balancing**

Provide a complete tested and balanced system according to part 1.29, section 01 00 00 of the RFP, applicable UFCs, and UFGS Specification section 23 05 93.

**Commissioning**

Provide a complete commissioned system according to chapter 11.4, section 01 10 10-1 of the RFP, applicable UFCs, and UFGS Specification section 23 05 93.

**Specifications**

Relevant UFGS specification sections:

23 05 93
23 07 00
23 09 00
23 09 13
23 09 23.02
23 21 23
23 30 00
23 64 10
23 64 26
23 81 00

[END MECHANICAL]