

## Corporate Office Building Radiant HVAC – Integrated Project Delivery

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**WATER &  
ENERGY**

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EVAPCO's Sage® Control System \*

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### DESIGN ENGINEER'S PUNCHLIST

**Project Delivery Method:**

- Design-Build (D-B)
- Integrated Project Delivery (IPD)
- Construction Management @ Risk (CM) with Guaranteed Maximum Price (GMP)
- Design-Bid-Build (D-B-B)

**Owner Team:**

ES

Building Owner  
Owner Representative (consultant)  
Project Manager of Capital Projects  
Facility Manager (out-source staff)

**Project Delivery Team:**

D-B Project Manager  
IPD Project Manager  
CM Project Manager  
Job Superintendent  
Mechanical-Electrical Coordinator  
Architect, HVAC, Plumbing, Electrical, Structural, Fire Protection, and Security Consultants

**HVAC Project Team:**

HVAC Contractor Project Manager  
Automatic Temperature Control (ATC) Technician (in-house staff)  
O&M Technician (out-source staff)  
Third-Party Commissioning Consultant (CxC)  
Testing, Adjusting, and Balancing (TAB) Technician

**Application 2019 ASHRAE Handbook**

Retail Facilities, Chapter 2  
Commercial and Public Buildings, Chapter 3  
Tall Buildings, Chapter 4  
Places of Assembly, Chapter 5

**Systems & Equipment 2020 ASHRAE Handbook**

Air-Handling and Distribution, Chapter 4  
In-Room Terminal Systems, Chapter 5  
Radiant Heating and Cooling, Chapter 6  
Combined Heat and Power Systems, Chapter 7

**Project Type:**

New Construction  
Addition  
Renovation  
Tenant Fit-Out

**References:**

2017 ASHRAE Handbook – Fundamentals  
2018 ASHRAE Handbook – Refrigeration  
Refer to the Codes and Standards Section in the Back of Each ASHRAE Handbook for Additional Reference

**Other References:**

ASHRAE GreenGuide: Design, Construction, & Operation of Sustainable Buildings  
ASHRAE Indoor-Air Quality Guide: Best Practice for Design, Construction, & Commissioning  
ASHRAE Design Guide for Dedicated Outdoor Air Systems  
ASHRAE Standard 202 (Commissioning Process for Buildings & Systems)

## DESIGN INTENT DOCUMENT (DID)

- The HVAC system selection and design intent is based on the processed outlined in ASHRAE Handbook 2020, Chapter 1, HVAC System Analysis and Selection, and includes the following:
  - Owner's Building Program Goals and Additional Goals
  - Specialized Systems Shall Include Toilet Exhaust and Kitchen Exhaust
- Program & Project Goals:
  - Functional Goals: (Refer to Chapter 1, 2020 Handbook)
  - Management Goals: Property Management and Out-Source Mechanical and Electrical Services
- Available Utilities:
  - Gas (propane), Electrical Power, Emergency Power, Low Pressure Steam, and BAS system
- Existing Conditions:
  - Central Air Systems: Supply Air and/or Return Air CFM, General Exhaust, and Toilet Exhaust
  - Heating System: Hot Water Heating
  - Terminal Units: Variable Refrigerant Flow (VRF) Fan Coil Units
  - Sheet Metal: Low Velocity and Medium Galvanized Sheet with Volume Dampers and Fire Dampers
  - Pumps: Existing End Suction Primary-Secondary Pumping with a Variable Frequency Drive (VFD)

## DESIGN CRITERIA DOCUMENT

- The HVAC Design Criteria Shall Be in Sync with the Project Delivery Method and Owner's Project Requirements
- The Design Criteria Shall Be Based on ASHRAE 90.1 and State Energy Code Compliance for Outdoor Air Temperature Compliance
- Reuse Existing Utilities and Central Heating and Chilled Water Systems
- The New Automatic Controls Shall Be Interfaced with the Existing BAS
- The New Central Plant Hot Water System Shall Be Primary Pumps per Boiler and Secondary Pumps with VFDs. The Pipe Distribution Shall Be Installed Overhead and Connect to Existing Tertiary Pumps with VFDs Within Each Building.
- The Existing Central Plants Shall Provide Heating in the Winter to Maintain 68°F and 76°F in the Air Conditioning Season Via a Single Duct, Single Zone, Providing Ventilation Air and Maintaining a Positive Building Pressure of 0.05 Inch Gage
- Existing VAV and Fan-Powered Air Terminals Shall Be Replaced with Passive Chilled Beams and Radiant Heat Ceiling Panels
- Conceptual/Schematic Phase General Notes:
  - The HVAC Design Engineer Shall Provide System Flow Diagrams with These Three Documents (OPR, DID, and BOD) Along with ATC Sequences of Operation
  - HVAC Design Engineer Shall Include Electrical Data Sheet to Coordinate with the Design-Build Firm