

ELECTRONIC SAFETY AND SECURITY DESIGN GUIDE ELECTRONIC ACCESS CONTROL AND INTRUSION DETECTION

BACKGROUND AND PURPOSE

The University of Houston Electronic Safety and Security Systems consists of Electronic Access Control (EAC), Video Surveillance, Intrusion Detection and Emergency Call Stations. This guideline will provide a basis of design for of Electronic Access Control (EAC), and Intrusion Detection with a list of minimum requirements for each design deliverable.

The Security Design professional is expected to apply these guidelines together with the University of Houston Master Specifications as appropriate for each Project. <https://uh.edu/facilities-planning-construction/vendor-resources/owners-design-criteria/master-specs/>

BASIS OF DESIGN

SECURITY SPACE REQUIREMENTS

Provide at least one dedicated security closet on each floor for the installation of EAC-related equipment. Locate the rooms in such a way that cabling distances to the furthest point on the floor do not exceed 500ft. If the distance exceeds 500ft, an additional Security Closet will be required.

Ensure that the security closets are within 250ft of an IT Building (BD) or Floor Distributor (FD) Room.

Closet Requirements:

- Minimum Size: 4'0" Deep x 6'0" Wide with walls to deck.
- Sealed Concrete Floors, No Ceiling and Access Controlled Pair of Doors
- Wall-mounted task light above doors.
- Fire-retardant treated plywood "backboard" with minimum dimensions of 6' 0" wide x 8' 0" high.
- Minimum of one 120V, 20A 4-plex electrical outlet on a dedicated circuit plus one dedicated 120V, 20A hardwired circuit per closet. If building has generator support, EAC Closet is required to be supported.
- Backup battery with up to 4 hours capacity
- Minimum of two Ethernet connection ports per EAC and one port per Intrusion Control Panel
- Secondary Buss Bar tied into the Telecommunications Bonding Backbone
- Video surveillance of hallway outside of Security Closet, including recognition level view of Security Closet Door and Reader
- Ensure that Closets in multi-story buildings are stacked and connected with fire-stopped riser pathway.

PATHWAY REQUIREMENTS

Provide conduit for all hardwired EAC Doors, routing from the door component (Reader, Door Contact, Power Transfer, Local Alarm, etc.) to an 8"x8"x4" pull box above the accessible ceiling.

Install composite Door cabling in conduit through open or inaccessible ceiling areas and in cable-hooks in accessible (drop) ceiling areas.

Composite Door cabling may be installed in cable hooks above accessible ceilings, but must be installed in conduit through open or inaccessible ceiling areas.

Conduit Type:

- Interior Pathways– EMT
- Underground Pathways – Schedule 40 PVC with PVC-coated metallic stub-ups
- Exterior Exposed Pathways – Galvanized IMC or RMC

Route Access Control Cabling within the Security Room through surface-mounted raceway when not in conduit.

Whenever possible, route pathways overhead, providing access to pull points at junction boxes above each door and after every two 90-degree bends.

If overhead routing is not possible, clearly document under-slab conduit pathway routing and coordinate it with other design team members to ensure constructability.

Ensure access to pull boxes is available and coordinated during design. Coordinate required locations with Architect and show on the Security Reflected Ceiling plan for reference.

Reference Master Specification *28 0528 Pathways for Electronic Safety and Security* for additional information.

Pathway for PoE or other network enabled devices fall under Division 27 requirements. Reference UH Network Infrastructure Design Standards

<https://www.uh.edu/infotech/services/computing/networks/network-infra-standards/>

ELECTRONIC ACCESS CONTROL (EAC) REQUIREMENTS:

Integrate all new construction and renovation projects into the existing access control system.

EAC systems Procurement and Installation responsibilities are as follows:

- EAC Servers and Workstations: OFOI (Project Funded)
- EAC Software Licenses: OFOI (Project Funded)
- EAC Door Hardware: CFCI
- EAC Pathway and Wiring: CFCI
- EAC Panels, Power Supplies, Gateways, enclosures, etc.: CFCI
- POE Switches supporting EAC Components: OFCI (Project Funded)

EAC Doors

There are three EAC Door technologies used on Campus:

1. Hardwired – Panel-powered: Composite Cabling from EAC Panel to Door
2. PoE – Network Switch-powered: Network Cabling from FD Room to Door
3. Wireless – Battery-powered, Integrated Door Hardware. (Pre-approval required)

Hardwired Doors

Install EAC on exterior and specialty doors based on the access control function required, coordinating with Division 08, Door Hardware.

The major access control functions and the devices required for each function are as follows:

CARD READER DOOR: Allows entry using access card, scheduled locking and unlocking, and door status monitoring. Devices required include:

- Credential card reader.
- Door contact switch.
- Integrated Request to Exit Device
- Sounder (if applicable)
- Electric lock or electric exit device.
- Power transfer hinge

AUTO-LOCK DOOR: Allows scheduled locking/unlocking, door status monitoring and audible alarm with door is forced or held open. Devices required include:

- Door contact switch.
- Integrated Request to Exit Device
- Sounder.
- Electric lock or electric exit device.
- Power transfer hinge or Wired Loop

EXIT-ONLY DOOR: Allows door status monitoring and audible alarm when forced or held open. Devices required include:

- Door contact switch.
- Passive Infrared Request to Exit Device
- Sounder.

EMERGENCY EXIT-ONLY DOOR: Allows door status monitoring, provides audible alarm when door is used. Devices required include:

- Door contact switch.
- Sounder or horn.

These door functions may be applied to single doors and pairs of doors, with or without center dividing mullions.

Hardwired Specialty Doors

ROLL-UP DOOR: Allows door status monitoring when door is used. Devices required include:

- Surface-mounted position switch.

PEDESTRIAN GATE: Provides Card Reader Door functionality using exterior hardware.

VEHICLE GATE CONTROL: Allows entry/exit using access card, I/O to initiate gate operation. Devices required include:

- Credential card reader.
- I/O interface.

ELEVATOR CONTROL:

Where controlled floor access is needed, provide readers in elevator lobbies and/or elevator cabs as appropriate. Coordinate with elevator specifier to ensure elevator equipment can interface with the EAC system.

Hardwired Door Panel / Controller Equipment

Each EAC backboard typically includes the following items:

- Intelligent Controller.
- Card Reader Interface Modules.

- Input Modules.
- Output Modules.
- Power Supplies and related accessories.
- Power Supply Network Interface
- Equipment Enclosures.

Coordinate with Division 08 and Door Hardware Consultant to determine the specific quantity and types of EAC doors per EAC Closet. Design EAC Backboards and equipment at 75% capacity to allow for future increases in EAC devices.

Door Hardware Coordination:

Coordinate EAC Door requirements with the Architect and Door Hardware Consultant to ensure alignment between Division 08 and Division 28. Electrified Lock preferences are below:

Approved Electrified Lock Types include:

- Electrified Mortise
- Electrified Exit Device
- Electric Latch Retraction

Lock Types requiring UH Security written approval prior to specification:

- Electrified Cylinder
- Electric Strike
- Bloomcraft Strike
- Electromagnetic Lock
- Delay Egress Locks
- Wireless Locks

Pay special attention to access control and door operator interfaces at ADA and automatic door locations.

Reference Master Specifications *08 7100 Door Hardware* and *28 1300 Access Control* for additional information

POE Powered Doors

Only permitted in buildings with generator-backed IT Facilities, Install PoE powered on interior Suite Entry/Exits, Instructional and laboratory spaces and rooms housing 4 or more people. Where generator-backed IT Facilities are NOT available, Hardwired Doors are required.

POE CARD READER DOOR: Allows entry using access card, scheduled locking and unlocking, and door status monitoring. Devices required include:

- Integrated Credential card reader.
- Integrated Door contact switch.
- Integrated Request to Exit Device.
- Electric lock or electric exit device.
- Power transfer hinge
- PoE Compatible harness wiring.

These door functions may be applied to single doors and pairs of doors with an inactive or auto locking leaf.

Provide server/gateway and licenses as required to support new PoE doors.

Coordinate data cabling requirements with the Technology Systems Consultant.

Reference Section 28 1300 *Access Control* for information on approved PoE Locks.

Wireless Locks

Use of Wireless Locks requires Facilities Services Approval.

Wireless locks are commonly used on offices, storage rooms, and back of house / utility spaces such as IT Facilities, Electrical Rooms, Mechanical Rooms, etc. Where a “keyless” building is desired, wireless locks are provided on rooms housing 3 or fewer people.

Provide wireless gateways and licenses as required to support new wireless doors. Perform a Wireless predictive survey to determine required antenna locations.

Reference Section 28 1300 *Access Control* for information on approved Wireless Locks.

INTRUSION DETECTION SYSTEM

Provide concealed Duress Buttons to the following locations:

- Building Lobby Reception / Security Desk
- Office Suite Reception Desks
- Manned Cashier Locations
- Safe and high-value locations
- Large Venue Lecterns

Provide one IDS Control Panel and Wireless Transceiver per building with Zone Expanders as required on each floors EAC Closet.

Install Control Panels and Zone Expanders in secure enclosures with min. 4 hour battery back-up.

Reference Master Specification Section 28 1600 *Intrusion Detection* for information

DOCUMENTATION REQUIREMENTS

RESPONSIBILITY MATRIX

Required to help clearly outline the Project Scope, a Responsibility Matrix is required to be part of all design documents below is an example:

SECURITY RESPONSIBILITY MATRIX				
SCOPE OF WORK	GENERAL CONTRACTOR	SECURITY CONTRACTOR	DOOR HARDWARE	OWNER
CONDUIT	X			
JUNCTION BOXES	X			
120V POWER	X			
ACCESS PANELS	X			
CABLE HOOKS / SECURITY ROOM RACEWAY		X		
SECURITY ROOM PLYWOOD	X			
SECURITY ROOM BUSSBAR AND TBB	X			
FIRE ALARM CONNECTIONS / RELAYS	X			
PANEL AND DEVICE BONDING		X		
SECURITY PANELS AND ACCESSORIES		X		
SECURITY POWER SUPPLIES AND BATTERIES		X		
SECURITY CABLING (NON IP)		X		
ELECTRIFIED DOOR HARNESSSES, HINGES AND LOCKSETS			X	
DOOR CONTACTS		X		
REQUEST TO EXIT (PIR)		X		
REQUEST TO EXIT (INTEGRATED)			X	
LOCAL AUDIBLE DOOR ALARMS		X		
POE DOOR HARNESSSES, HINGES AND LOCKSETS		X		
WIRELESS LOCKSETS		X		
ACCESS CONTROL SYSTEM LICENSES		X		
INTRUSION SYSTEM / DURESS BUTTONS		X		
NETWORK VIDEO RECORDERS				X
CAMERAS		INSTALL		FURNISH
CAMERA MOUNTS AND ACCESSORIES		INSTALL		FURNISH
VIDEO MANAGEMENT SYSTEM LICENSES		X		
NETWORK CABLING TO SECURITY ROOM	X			
NETWORK CABLING TO CAMERAS	X			
NETWORK CABLING TO POE LOCKS	X			
NETWORK CABLING TO CALL STANCHIONS	X			
CALL STANCHIONS AND BOXES		X		
POE INTERCOMS AND ACCESSORIES		X		
NETWORK SWITCHES				X
WORKSTATION COMPUTERS				X

DEVICE MODELING

Model each device using BIM software to Level of Development (LOD) 300 to simplify the review, coordination, and schedule development process. Avoid using annotative symbols not tied to a modeled family.

Model device families to scale, ensuring they are hosted to the appropriate surface, at the correct location and height.

Include mounting accessories, if applicable, in the modeled device families.

Customize the modeled device families to include parameters associated with information required in the appropriate Schedules Section.

Tie the modeled device families to annotative symbols similar to those shown below:

DEVICE SYMBOLOGY

Device symbology is permitted to vary from designer to designer, but should be clear enough to capture scope without flipping to between sheets (other than the index sheet).

Access Control:

	<p>CARD READER: LOCATIONS INCLUDE READER, DOOR POSITION SWITCH, REX AND POWER FOR ELECTRIFIED LOCKSET.</p>
	<p>DOOR POSITION SWITCH ONLY LOCATIONS REFERENCE SCHEDULES FOR REX REQUIREMENTS</p>
	<p>ELECTRIFIED LOCK: LOCATIONS INCLUDE DOOR POSITION SWITCH REX AND POWER FOR ELECTRIFIED LOCKSET.</p>
	<p>AUDIBLE ALARM: LOCATIONS INCLUDE DOOR POSITION SWITCH EXIT DOOR (INCLUDES REX) - ACTIVATES ON FORCED DOOR OR HELD OPEN EMERGENCY EXIT ONLY - ACTIVATES WHEN DOOR OPENS</p>
	<p>PUSH PLATE OR WAVE PLATE: ACTIVATES ADA DOOR OPENER</p>

DEVICE NUMBERING

All Symbols must include a unique, intuitive, Identifier to help streamline review and coordination. Where text is used minimum text height is 3/32”.

Identifiers vary from project to project, but usually follow a DT-LA## pattern:

Device Type (DT) – Level (L), Area (A), Device Number (XX).

Examples:

CR-1B001: Is a Card Reader Door on Level 1 Area B of the Drawings set,

C-501: Is Camera on Level 5 of small building with no Area Plan,

C-S025: Is a Camera on the Site Plan,

DB-3C002: Duress Button on Level 3 Area C,

DP-RA002: Door Position on the Roof Area A,

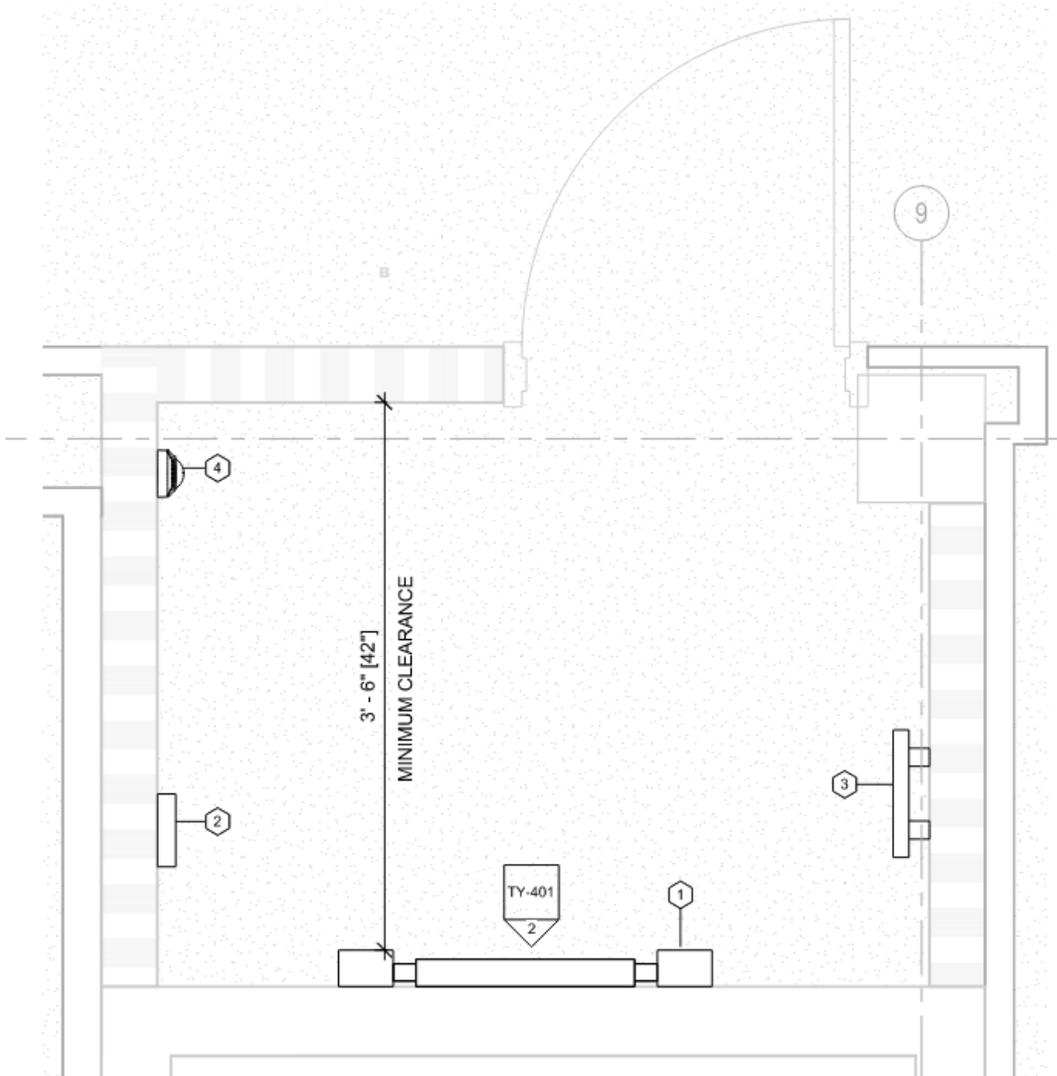
CT-001: Is a Call Tower (As they are only found outdoors, there is no need for an "S").

Note that design numbering will be replaced by the Owner Label per Section 28 XXXX during construction.

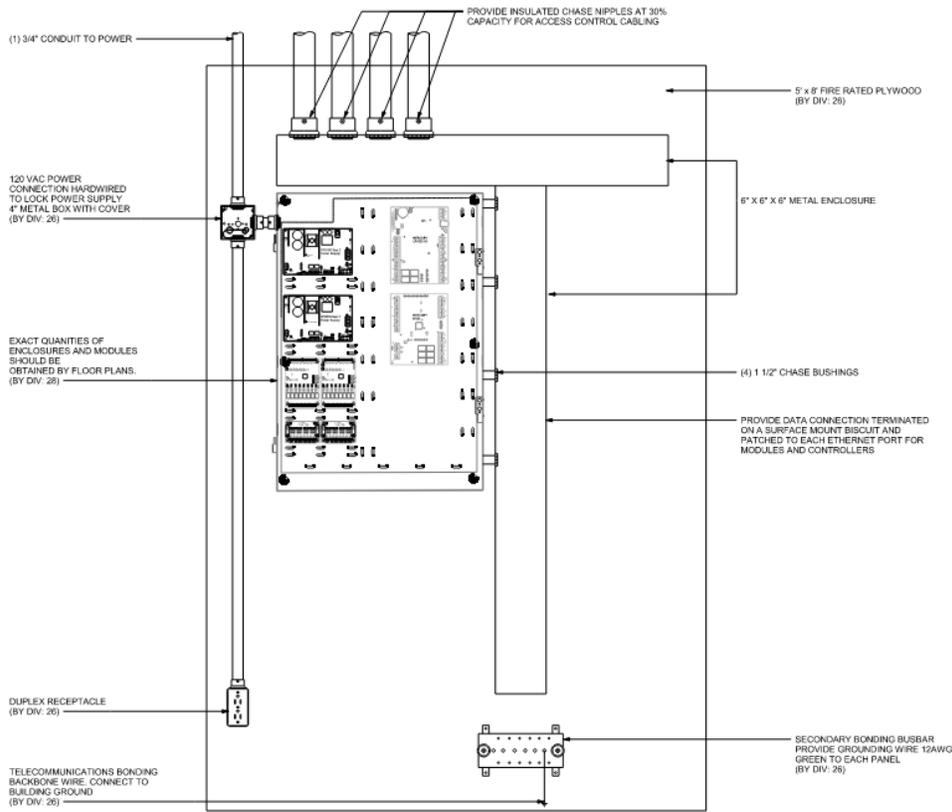
DETAILS

Include details for each unique installation type on the project in the final Construction Document review deliverable.

EAC Room Elevation Example:



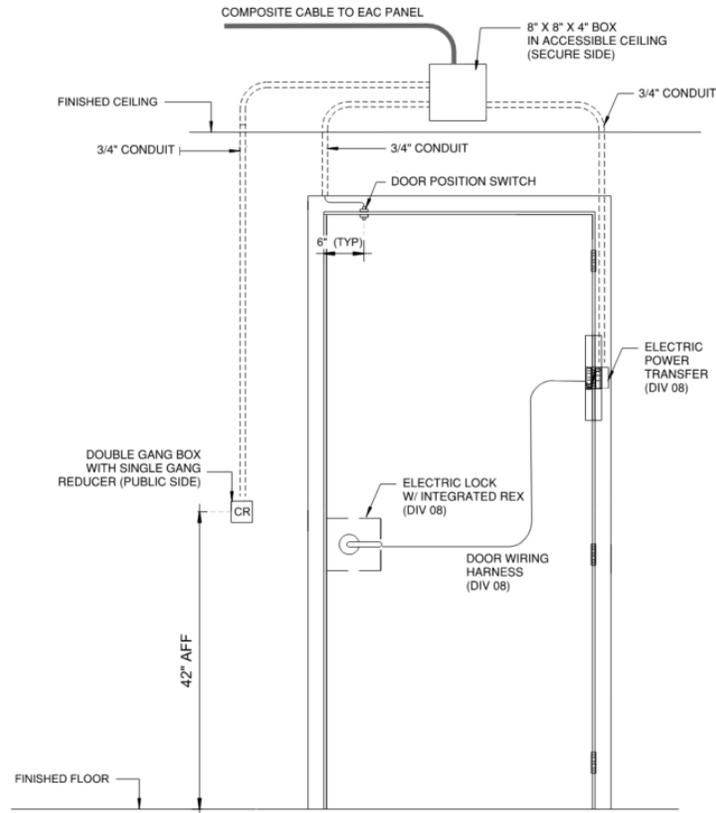
EAC Room Enclosure Elevation Example:



KEYNOTE LEGEND	
1	LIFESAFETY POWER ENCLOSURE.
2	DSC INTRUSION SECURITY CONTROL PANEL.
3	12" X 4" SECONDARY BONDING BUSBAR.
4	FIXED DOME CAMERA WITH POINT OF VIEW OF ENTRY AND PANEL.

Door Detail Example:

Include conduit and back-box rough-in requirements for each unique EAC Door type. Coordinate to ensure alignment with Project Div 08 Hardware Specification.



3 SINGLE CARD READER DOOR - ELECTRIC MORTISE WITH INTEGRATED REX
SCALE: NTS

SCHEDULES

Provide preliminary schedules at Design Development and completed schedules in Construction Document final review.

Include Schedules on associated site, floor or reflected ceiling plain sheets. Examples completed schedules is below:

Access Control:

ACCESS CONTROL SCHEDULE - LEVEL 1								
ACCESS CONTROL ID	LOCATION	DOOR NUMBER	READER TYPE	TERMINATION LOCATION	HARDWARE SET	ROUGH-IN DETAIL	NOTES	ASSOCIATED CAMERA ID
CR-101	ENTRY VESTIBULE 100	100A	WIRED	EAC ROOM 101	27.1	TY605/1	ADA OPERATOR / LOCK ON SCHEDULE	C-101
CR-102	SUITE 105	105A	POE	FD 102	30	TY605/2	LOCK ON SCHEDULE	C-107
CR-103	LECTURE HALL 195	195A	POE	FD 103	40	TY605/3		C-104
EL-101	ENTRY VESTIBULE 100	100B	NA	EAC ROOM 101	27.2	TY606/2	LOCK ON SCHEDULE	C-102
EL-102	LECTURE HALL 195	195B	NA	EAC ROOM 194	28.2	TY606/3		C-104
DP-101	STAR C	S1A	NA	EAC ROOM 101	28	TY606/3	EXIT WITH REX AND LOCAL ALARM	C-110
DP-102	LECTURE HALL 195	195C	NA	EAC ROOM 194	42	TY606/4	EMERGENCY EXIT ONLY WITH LOCAL ALARM	C-S07

Intrusion Detection:

INTRUSION DETECTION SCHEDULE - LEVEL 1					
DEVICE ID	LOCATION	TERMINATION LOCATION	ROUGH-IN DETAIL	NOTES	ASSOCIATED CAMERA ID
DB-101	LOBBY RECEPTION 102	EAC ROOM 101	TY606/1	UNDER RECEPTION DESK	C-104
DB-102	CASHIER 185	EAC ROOM 194	TY606/1	IN CASHIER MILLWORK	C-117
DB-103	SUPERVISOR OFFICE 199	EAC ROOM 194	TY606/2	ON WALL ADJACENT TO SAFE	C-119

CONSTRUCTION ADMINISTRATION

Provide periodic overviews of the project, including a review of the construction advancements and observations that the contractors are working within set guidelines and conforming to technical specifications. The sequence and milestones of the observations should be coordinated and aligned with the General Contractors milestones and construction schedules. At a minimum these observations should be performed before any phase of construction is completed, i.e. underground conduit pathways before cover, underground conduit pathways before structural completion, in-wall rough in before closure, above-ceiling rough in before closure, device installation, equipment room turn overs, pre-punch, punch and punch list validation. Additionally review submittals containing technical information regarding material and equipment supplied by the contractor. Ensure compliance of product data and shop drawings conform to overall project specific design and UH design and master specifications. Review, approve and recommend any changes to the project specifications. Attend and contribute to OAC meetings, sub-contractor kick-off calls, first of its kind installation and QAQC meetings.

Activities:

- Participate in project meetings as required to properly implement the work.
- Provide coordination with the Architect, Owner, Engineers, and other consultants.
- Respond to Requests for Information (RFI).
- Conduct site visits to observe the installation and quality of work and prepare Field Observation Reports. Field Observation reports include detailed information of deficiencies, exact location as referred to by drawing or specification. A photo or illustration of deficiencies and remediation needed to comply with the construction documents or owner standards. Any significant deficiencies that would affect overall project completion should be brought to the immediate attention of the general contractor, UH FPC Project Manager and UH EAC Project Manager.

- Review completed and returned Field Observation Reports to ensure remediation complies with Construction Documents and Owner Standards.
- Submit construction progress reports that address existing or potential problems. Coordinate with General Contractor for any unforeseen condition during design that needs to be addressed in construction administration phase to ensure conformance with UH Design standards and Master Specifications.
- Coordination with Architect, Owner, Engineers, and other consultants to issue ASI's, PRs, or updated construction documents as required.

Deliverables

- Consultant approved product data submittals.
- Consultant approved shop drawing submittals.
- Field Observation Reports.
- Final Punch list Observation Reports.
- Consultant approved close-out documents.
- Record Drawings based on Contractor provided as-builts.