Information Technology Design Standard
Telecommunications
Technology Infrastructure
Audio Visual
Classroom

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TELECOMMUNICATIONS/AUDIO VISUAL/CLASSROOM/TECHNOLOGY INFRASTRUCTURE
Design Standard

PART 1 GENERAL

1.1　PURPOSE

This purpose of this document is to describe minimum requirements and establish design guidelines for telecommunications, /network infrastructure, instructional and audio-video technology that will support information systems and other data-based systems. This document describes requirements and criteria to guide the Design Team (telecommunications, security, audiovisual, architectural, electrical, mechanical, and other disciplines) and the Contractor to provide the minimum infrastructure and support for information systems.

This document is not intended for use as project specifications. Each project shall have technical specifications produced specifically to said project.

1.2　SCOPE

The scope of this document includes the following:

A. Architectural, Structural, Electrical, Mechanical, Plumbing, and Security requirements for Telecom rooms build-out/fit-up

B. Outside Plant Underground Pathways

C. Telecom rooms build-out/fit-up, including equipment and termination apparatus racking and cable support

D. Building Pathways

E. Structured Cabling

F. Wireless LAN Deployment

G. Instructional Technologies

H. Audio Visual

I. Special Systems

1.3　APPLICATION

Information technologies are a critical element in the design of virtually all new and renovation building projects. Whether voice, data, video, security, fire alarm systems, audio/visual systems, or other technology, it is important that a team of experienced professionals is involved in the design of these complex systems.

The requirements and criteria herein apply to the District Office and each campus within the District – Cañada College, College of San Mateo, and Skyline College.

A Structured Cabling Plant is a key concept in enabling Information Technology for each of the three College communities in the District. To maximize network functionality, minimize labor and material costs, and improve maintenance of information technologies infrastructure, ITS has developed standards and practices that projects shall comply to. These standards are managed and administered by the District's ITS Department.

1.4　ARRANGEMENT OF INFORMATION

This document is arranged by design discipline. Best practice has the Designer reading the entire document and related documents; however, the Designer may study the specific sections related to their discipline, and review the other sections.

1.5　SYSTEMS SUPPORTED

The Telecom infrastructure shall support data network communications from the equipment in the Telecommunications Room (e.g., switch) to the work area equipment

(e.g., desktop computer) and between equipment in Telecom rooms (e.g., core router switch in MPOE to access switch in TDs).

The data network supports multiple functions, including data, voice (VOIP), security camera, access-control, building management, wireless, emergency public address system. Also, support non-VOIP data communication for campus phones and elevator control panels (elevator car emergency phone).

1.6   PROCEDURES

A.   ITS Contacts

Name	Title	Phone	Email
Daman Grewal	Chief Technology Officer	(650) 358-6722	grewald@smccd.edu
Yoseph Demissie	Director of IT Services	(650) 358-6754	demissiey@smccd.edu
Darrell Lee	Network Analyst	(650) 358-6708	leed@smccd.edu
Aaron Soo	Network Engineer	(650) 358-6704	sooa@smccd.edu
Michael Healy	Network Technician	(650) 358-6707	healym@smccd.edu
Alexis Arreola	AV Engineer and Construction Specialist	(650) 358-6717	arreolaa@smccd.edu
Stephen Richert	IT Construction Specialist	(650) 574-6395	richerts@smccd.edu

B.   Deviation from Design Standards

Any deviation from the Design standard or Specification must be approved by the Executive Director of Construction Planning or the Vice Chancellor of Facilities in writing before implementation in the Contract Documents.

C.   Project Design

All projects shall have the telecommunications infrastructure designed by a Professional Telecommunications Engineer (as part of the Design Team or independent consultant) and approved by ITS. The Professional Telecommunications Engineer shall have the following minimum requirements:

1.   Registered Professional Engineer on Staff

2.   BICSI RCDD on Staff

3.   CSI CDT on Staff

4.   Revit (or equivalent) trained personnel on Staff

5.   BIM Modeling / Clash Detection trained personnel on Staff

This infrastructure shall include all pathways, cabling, terminations, testing, and telecom room construction related to the telecommunications systems. The Designer shall provide services in accordance with these standards, and as directed by ITS.

The Design Team shall verify that all applicable portions of these standards are incorporated into the project's design, drawings, specifications and final construction. Requests for variances from these standards shall be submitted in writing to the Project Manager.

D.   BIM Modeling / Clash Detection

The Design Team shall provide BIM modeling and clash detection design services and coordination including the following:

1. Development of the project design in Revit

2. BIM modeling and clash detection of the following systems:

    a. Primary pathways

        1) Cable trays

        2) Conduits 4" diameter or larger

    b. Telecom Rooms and Components

        1) HVAC/Temperature Sensor(s)

        2) Electrical

        3) Equipment Racks

        4) Wall Mounted Equipment

        5) Vertical Pathways

        6) Overhead Pathways

        7) Plywood

        8) Grounding

3. Review and coordination of other design team and contractor trade's BIM model to verify that only approved systems are allowed in the Telecom Rooms.

E. Project Installation

The telecommunications installation contractor shall have the following minimum requirements:

1. Contractor shall be certified by the manufacturer to provide the cabling system (proposed, submitted, and approved) and to provide an extended warranty. Submit satisfactory evidence of certification in the form of a current letter or certificate from the manufacturer as part of the bid.

2. A current, active, and valid and C7 or C10 California State Contractors License

3. Five, minimum, continuous years of experience

4. Five, minimum, completed projects similar to scope and cost

5. Evidence of technicians qualified for the work

F. Scheduling

Prior to work commencing, the contractor shall meet ITS to discuss the project scope.

Contractors shall develop a construction schedule that allows adequate time for ITS to inspect the installation and perform equipment provisioning, as stated following, prior to the Owner's occupancy of each part of a project.*

Contractors shall be required to cooperate with ITS personnel and allow them equal access to the job site to complete their work, concurrent with other work underway by the Contractor.

Room Readiness Criteria:*

1. The following shall be met at a minimum of 30 days prior to substantial completion

    a. Permanent Power

    b. Permanent Cooling

c.   Secured / Controlled Space

d.   Dust Free Environment

*If the above permanent conditions are not available then temporary facilities with the same criteria shall be provided to support the ITS systems to support ITS installation requirements.

G.   Demolition of Existing Cabling

If existing cabling must be demolished, coordinate with ITS the extent of the demolition work. ITS may choose to have some equipment recovered (such as cables, jacks, faceplates, racks, or other components). The demolition plans must be produced with this information expressly stating the components to be recovered and turned over to ITS.

1.7   OWNER-PROVIDED EQUIPMENT

ITS will furnish and install the networking equipment, telephone endpoint, and AV equipment. ITS shall perform the final patching between the networking equipment and horizontal field and the final cross-connect wiring between the backbone field and horizontal field.

Wireless Access Points (WAP), surveillance cameras, and courtesy phones will be owner provided, the contractor installed unless otherwise arranged.

Refer to Provision Matrix for further details

Refer to the Wireless LAN Service section for installation requirements specific to that system.

PART 2 ARCHITECTURAL

2.1   TELECOMMUNICATION ROOMS – NEW CONSTRUCTION

These standards are intended for an MDF/IDF excluding the Campus Main Point of Entry (MPOE)

Refer to section 8.2 for descriptions of the different types and functions of the Telecom rooms. "Telecommunications Room" covers service entrance room, main distribution   room, and intermediate distribution room.

A.   Size / Critical Dimensions (MDF/IDF)

Use the following dimensions as guidelines for the minimum size of a Telecommunications Room. The actual dimensions will vary depending upon Telecom and Data or AV patch cables in the room and accommodating building elements.

These are the minimum critical dimensions for equipment and clearances for rooms to house floor-standing equipment racks (MDF/IDF):

1.   Width: 10'-6" at its narrowest point

2.   Depth: 12'-0" for the first rack and UPS, 30" for each additional rack (recommend three racks for typical floor plate of approximately 50,000 square-feet) See diagram below for an example.

3.   Height: 9'-6" from the finished floor to the lowest clearance (such as fireproofing on steel beam).

If area is encroached by building elements such as columns, critical dimensions must still be adhered to and the room dimensions appropriately adjusted.
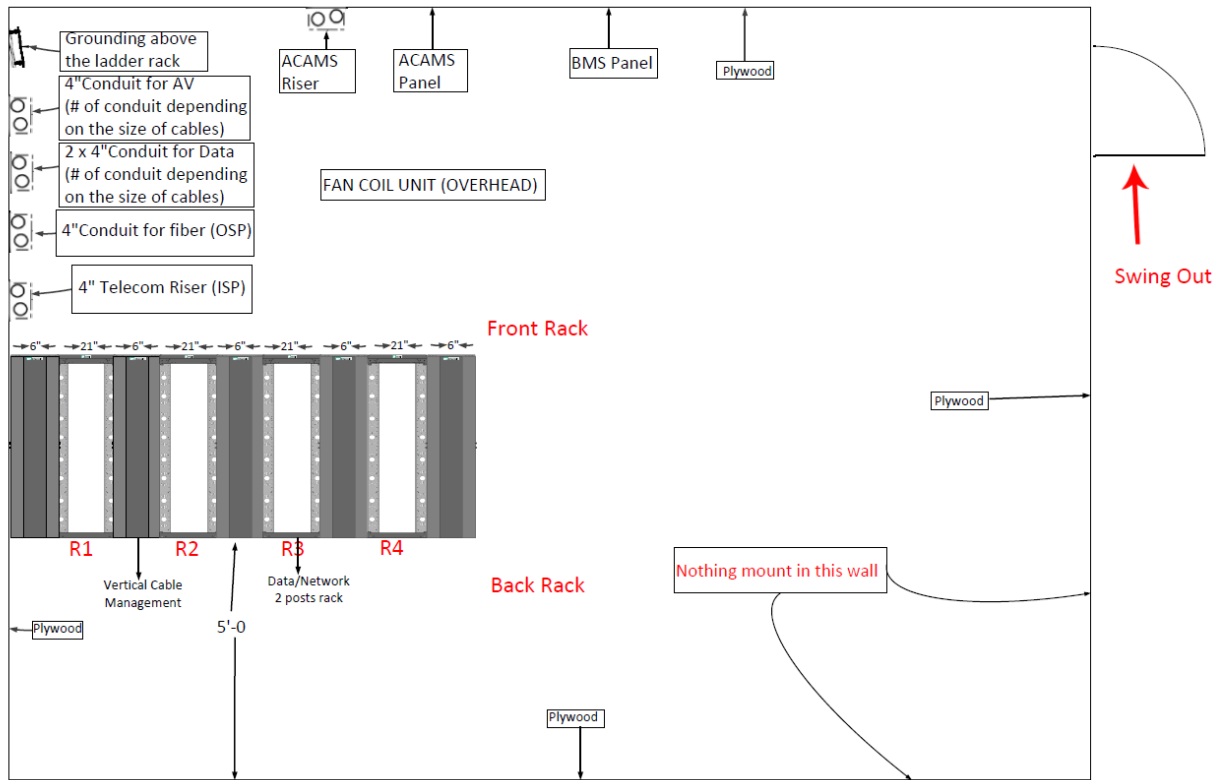
MDF Room Plan Example
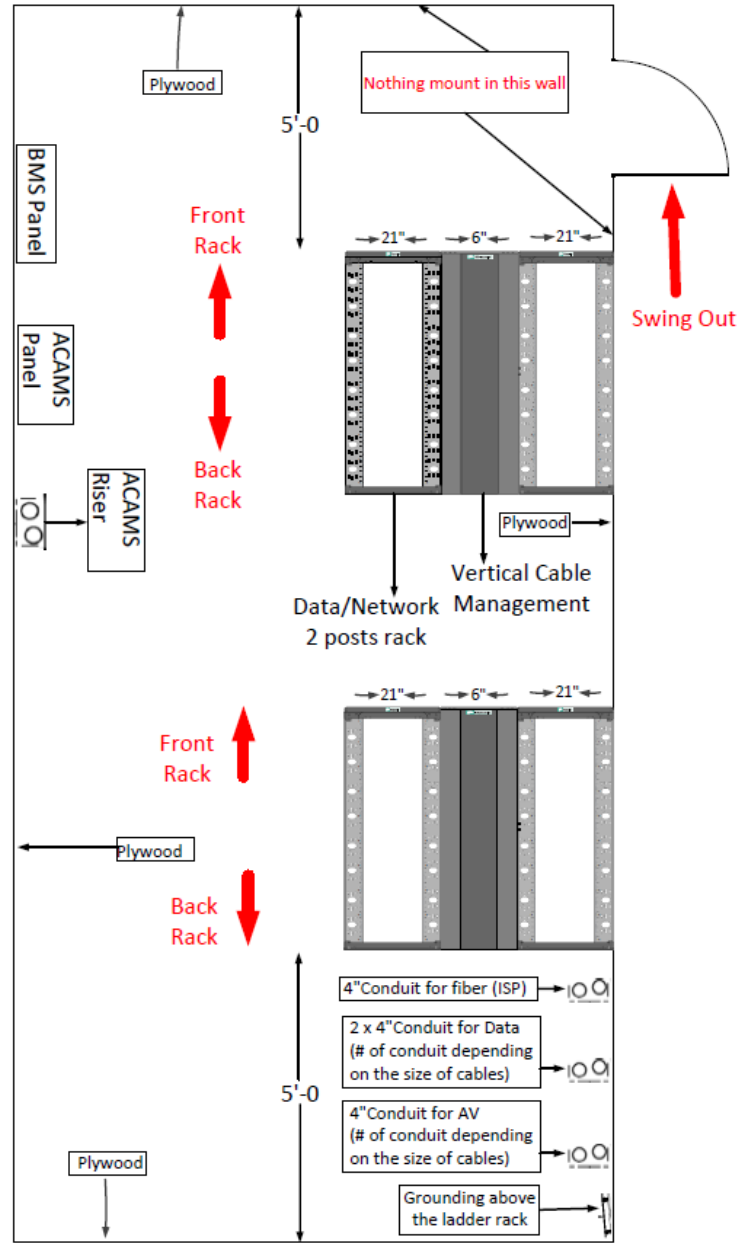
Telecom Room Plan Dimension Example

B. Data and AV Cable Run

1. Data cabling and AV shielded cabling that are home to the MDF/IDF shall be in separate bundles and shall not be combined for the duration of the run.

2. When entering MDF/IDF, the Data and AV bundles shall enter via separate conduit sleeves.

3. Once in the MDF/IDF, the Data and AV cables shall be routed separately on the ladder rack (reference image below).
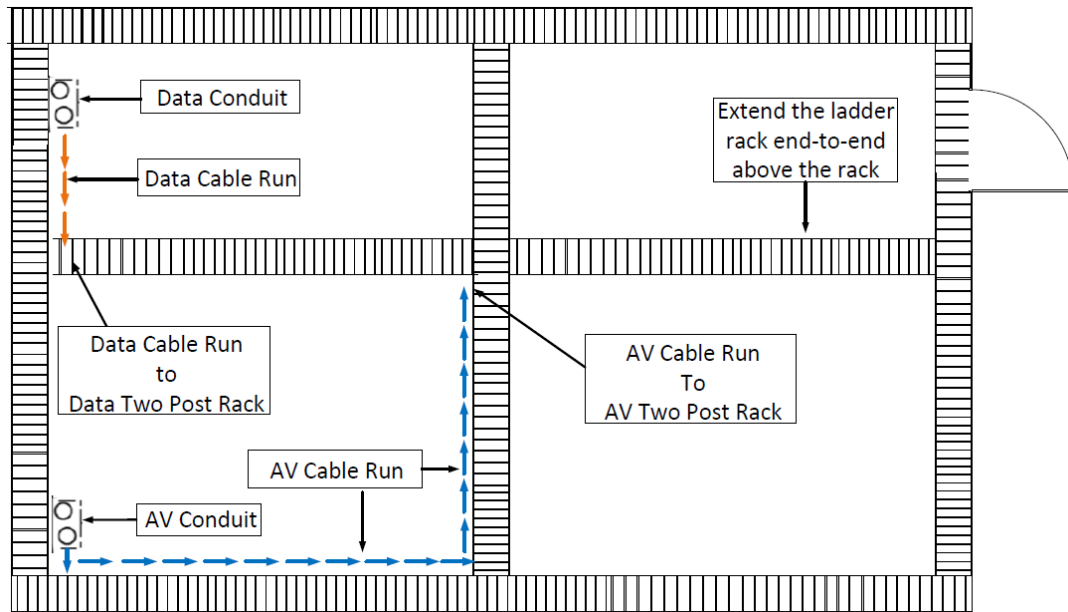
Telecom Room Ladder Rack Example

4. Horizontal ladder racks shall be installed 6" above the rack bay. The 2-post racks should be anchored to the floor and installed in parallel with the horizontal ladder racks to stabilize all 2-post racks in the room. AV and data cables will be "waterfalled" into their respective 2-post racks via cable runway radius drops. Use cable runway elevation kits as necessary. Refer to 27 11 00 Communication Equipment Rooms (reference image below). Provide a drip loop in the vertical management, 2 feet down and 2 feet up as to provide cable slack.

5. If the MDF and IDF are vertically stacked above each other, at least three (3) x 4" vertical conduit sleeves must be installed between floors. Quantity will be determined by cable count and number of services.

6. If the MDF and IDF are not stacked, at least three (3) x 4" vertical conduit sleeves must be installed to connect the rooms. Quantity will be determined by cable count and number of services

7. A vertical ladder rack in all MDF/IDF rooms shall be installed to support the riser cables (both fiber, copper, EAS etc…) that lead to the sleeves/conduits. The vertical ladder rack should be installed directly above/beneath the penetrating sleeves/conduits. Please reference the image below. Refer to 27 11 00 Communication Equipment Rooms

C. Location and Adjacencies

Telecom rooms should be centrally located on the building floor plate within the parameters listed below.

Telecom Rooms must be located where no station cable will exceed 300 feet from termination to termination.

In multi-story Buildings, Telecom Rooms shall be vertically adjacent / stacked floor- to-floor. This will improve long-term management and will result in lower construction costs for backbone pathways and backbone cabling.

D. Construction

Walls shall be typical metal-stud framed walls. Wall construction may vary depending on Building design.

Walls shall be full height construction to the structure above. Fire rated walls are not required unless mandated by applicable code.

E. Door

Swing: The door shall swing outward to maximize the usable area within the room unless restricted by egress path code.

MDF: A double door for the MDF is required, and adhere to 7.1 Access Control guidelines

IDF: The door shall be minimum 40" wide by 84" tall, and adhere to 7.1 Access Control guidelines. A double door shall be considered when applicable.

F. Finishes

1. Floors

Floors shall be either sealed concrete or anti-static VCT grounded to the telecommunications grounding system.

2. Plywood/Walls

Concrete and/or CMU walls shall be sealed prior to plywood backboard installation.

Every wall shall receive one layer ¾-inch plywood as backboard. The plywood shall be fire treated, in accordance with ASTM E 84.

The plywood shall be installed starting at 6-inches above the floor up to 8'-6", minimum.

The fasteners shall be designed per instance and will depend on the substrate (wall type) and project requirements. Installation requirements will be coordinated with the architect and structural engineer for approved methodology.

The plywood shall be painted a bright color (such as white, to improve lighting/illumination) with a minimum of two coats of semi-gloss paint. Mask fire rating stamp prior to painting. Remove masking after painting so the rated stamp is visible.

The door shall be minimum 40" wide by 84" tall, and adhere to 7.1 Access Control guidelines. A double door shall be considered when applicable.

3. Ceilings

The ceilings shall be left open to the deck above. No ceiling or grid is required.

G. Accessibility / ADA Compliance

1. Unless otherwise required by code or jurisdiction, ADA Compliance and Accessibility is not required for telecommunication spaces.

Wall Phone / Courtesy Phone
Installation of hallway wall/courtesy phones shall adhere to current ADA requirements. Wall jack shall be installed at 44" Above Finish Floor (AFF) so that the top most buttons will not exceed 48" AFF.

2.2   TELECOM ROOMS – RENOVATION

To the extent possible, renovation projects shall meet the criteria detailed in the New Construction requirements above.

Any deviations from these standards will require the ITS representative review and concurrence.

PART 3 STRUCTURAL

3.1   NEW CONSTRUCTION

    A. Floor loading, at Telecom rooms

    Floor loading at Telecom rooms shall be 50 pounds per square-foot, minimum.

    B. Seismic Bracing of Equipment Racks, in Telecom rooms:

    Floor mounted equipment racks require anchoring to the floor and shall be coordinated with the structural engineer of record for development of anchoring details and requirements specific to each project.

EQUIPMENT RACK NUT
LOCK WASHER AND FLAT
WASHER (TYP FOR 4)

RACK SEISMIC
GUSSET KIT
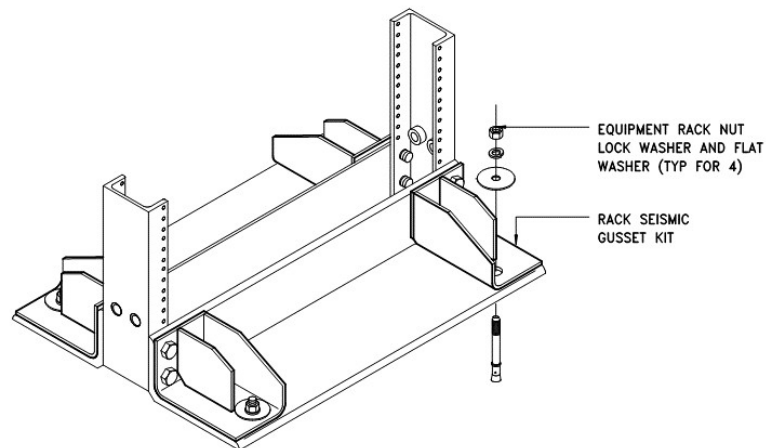
NOTE: REFER TO ROOM PLANS FOR EQUIPMENT RACK TYPE, SIZE, AND
          LOCATION(S).

3 2-POST GUSSET MOUNTING KIT
SCALE: 12" = 1'-0"

Rack Base Anchor Example

The detail above is an example only of floor mounted equipment rack anchoring requirements.

3.2   RENOVATION CONSTRUCTION

To the extent possible, renovation projects shall meet the criteria detailed in the New Construction requirements above.

Any deviations from these standards will require the ITS CTO or designated representative review and concurrence.

PART 4 PLUMBING

4.1   PIPING COORDINATION THROUGH TELECOM ROOMS

Piping and plumbing shall not be routed through Telecom rooms or on the floor directly above the Telecom rooms (with exception to chilled water or refrigerant lines supporting the HVAC within the Telecom room).

Chilled water or refrigerant lines supporting the HVAC for the Telecom room shall not route over equipment racks, electrical panels, or active equipment. Condensate pans and drain lines shall be provided as required to prevent water leakage in the room or on equipment.

Any deviations from this requirement will require the ITS CTO or designated representative review and concurrence.

PART 5 MECHANICAL

5.1   TELECOM ROOMS

H.   General

Each Telecom room requires 24/7/365 environmentally controlled cooling.

I.   Preferred Cooling Solutions:

The most cost effective and efficient method for cooling is to utilize the building or campus chilled water system. However, the chilled water system must provide cooling capacity 24/7/365.

If a chilled water loop meeting the criteria above is not available, then the preferred solution is a dedicated split system.

J.   Environmental Control Requirements

Mechanical equipment within Telecom rooms shall be controlled and monitored by SMCCCD's Building Management System. Refer to Section 25 55 00 Building Management System design standard.

The temperature in Telecom rooms shall not exceed 78 degrees Fahrenheit. Average operating temperature is between 67-72 degrees Fahrenheit. Temperature readings that exceed 78 degrees Fahrenheit shall initiate a BMS system alarm that will trigger a SNMP alarm to alert ITS of an over-temperature status.

K.   Power/Cooling Loads

The typical recommended power/cooling load requirements for a Telecom room is 50 watts per square foot. The designer shall validate the final load requirements for each telecom room in coordination with ITS and the MEP design team.

L.   Air Changes

Telecom rooms require one air change per hour, minimum.

M.   Spatial Coordination

The Telecom room equipment layout will be based on a standardized design approach. The mechanical design and mechanical equipment layout shall follow the telecom/network equipment layout. In general, locate the cooling unit in front of the rack bay to provide cool air to the front side of the equipment.

Coordinate final placement of the equipment with the Mechanical Engineer.

N.   Installation

The cooling unit shall be wall mounted or suspended from the ceiling above.

Chilled water or refrigerant lines supporting the HVAC for the Telecom room shall not route inside the MDF/IDF rooms to prevent water leakage in room or on equipment.

HVAC ducting unrelated to the Telecom Room shall not be routed through the Telecom room.

PART 6 ELECTRICAL

6.1   GROUNDING FOR TELECOMMUNICATIONS/DATACOM

A.   Telecommunications Grounding Backbone

A grounding backbone is required for each building with a ground terminal presented in each Telecommunications Room.

The Telecommunications Grounding Backbone shall be designed in compliance with ANSI-J-STD-607-A.

1. Bonding Conductor for Telecommunications (BCT)

    A BCT is required from the TMGB to the main building ground reference. The conductor shall be insulated, green. Size the conductor as 1,000 circular-mils per foot up to 3/0 AWG.

2. Telecommunications Main Grounding Busbar (TMGB)

    A TMGB is required in the Service Entrance and Termination Room / MDF. Refer to ANSI-J-STD-607-A for busbar size and requirements.

3. Telecommunications Bonding Backbone (TBB) Conductor

    A TBB is required from the TMGB to each TGB. The conductor shall be insulated, green. Size the conductor as 1,000 circular-mils per foot up to 3/0 AWG.

4. Telecommunications Grounding Busbar (TGB)

    A TGB is required in the Equipment Room / MDF or IDF, and in each per-floor Telecommunications Room / IDF. Refer to ANSI-J-STD-607-A for busbar size and requirements.

5. Grounding Busbar location

    Each two-post rack has its own grounding wire to the ground busbar. The ground busbar is to be located on the wall, but set *above* the ladder rack.
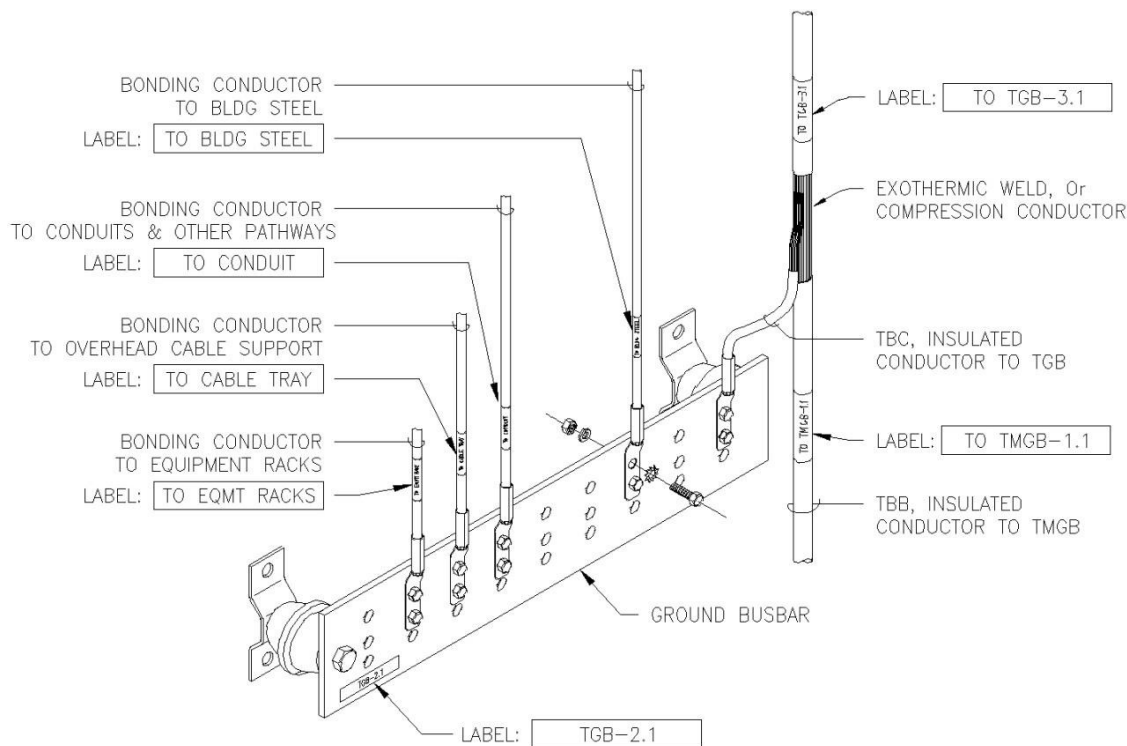
Grounding Busbar Example

B. Telecommunications Bonding to Grounding Backbone

Metallic components, such as pathways (conduit), overhead cable support, rack bays, etc., within a Telecom room shall be bonded to the respective TGB.

6.2   ELECTRICAL SERVICE IN TELECOMMUNICATION ROOMS (MDF/IDF)

A.   Convenience Outlets

Convenience outlets shall be 120V. Convenience outlets shall be circuited from a shared dedicated power panel.

On walls adjacent to the rack bay (where the rack bay butts up against the wall), provide one quadplex outlet approximately 12 inches in front of the rack bay and one quadplex outlet approximately 30 inches behind the rack bay.

On the other walls, provide two quadplex outlets per wall up to 15 feet. On walls longer than 15 feet, provide three quadplex outlets.

Electrical/Fire panels cannot be installed in the ITS MDF/IDF

B.   Rack Bay Service

Each rack/cabinet shall have one 20A dedicated circuit (1 quadplex outlet)

The dedicated quadplex outlets will be installed at the top of the ladder rack, above the 2-post rack, facing the rear.

If only 1 rack is installed, a 2nd 20A dedicated circuit shall be added as a spare and shall be individually circuited from a dedicated power panel.

Telecom Room Power Plan Example
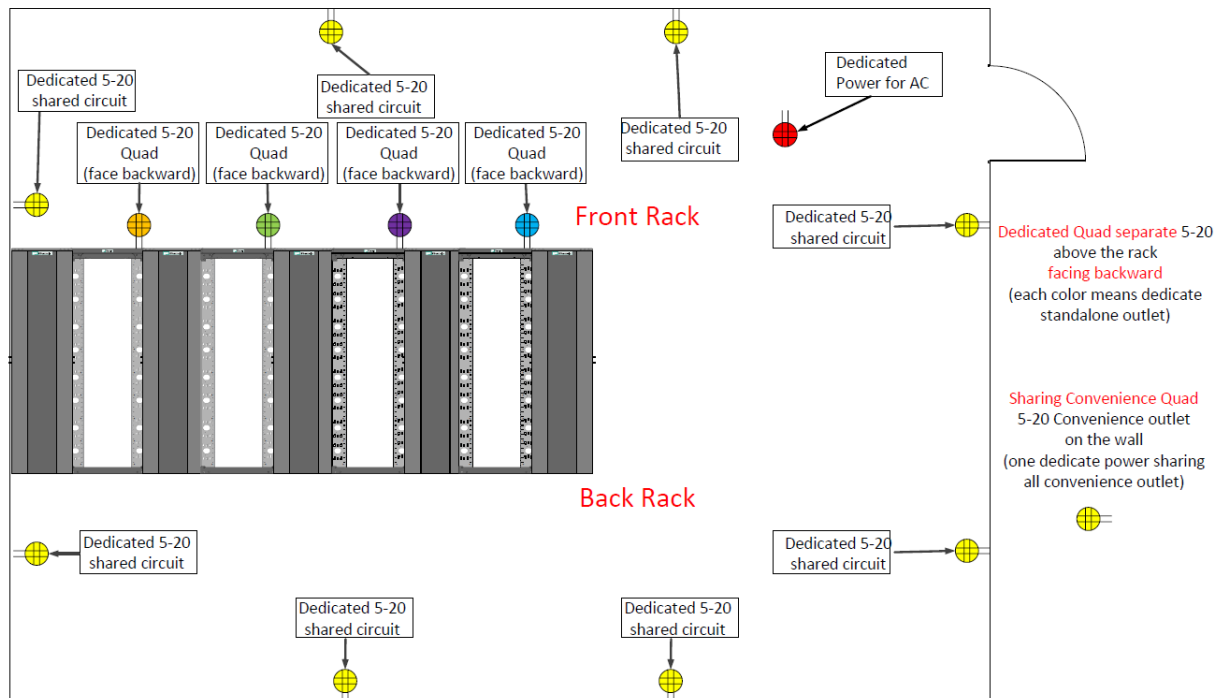
The rack bay will receive power from a UPS system and Power Distribution Unit (PDU) (*see next item*).

C. UPS Service

At least two dedicated electrical circuits shall be provided for the UPS system. Additional circuits may be required depending on circumstances. The service shall consist of one 120V 20A breaker to a 5-20R receptacle (i.e. non-twist) above the rack bay in close proximity to the intended location of the UPS system. The Telecom Designer and   Electrical Designer shall coordinate the electrical service with the network equipment rack layout.

The UPS system with the PDU for rack service will be provided by ITS.

D. Access Control and Alarm Monitoring System (ACAMS) Service

Coordinate the service requirements with the Security Designer, as the security/ACAMS system will require a dedicated 120V 20A circuit with special termination requirements.

E. HVAC

MDF/IDF rooms shall be cooled by dedicated HVAC system and shall be on their own zone.

If building HVAC is not available in MDF/IDF, a standalone AC unit shall be installed and powered by one 20A dedicated circuit. It shall be installed facing the front of the rack bay.

F. Temperature Sensor
MDF/IDF rooms shall be monitored by a temperature sensor (Schneider Electric). Location of the sensor shall be coordinated with District ITS.

G. Lighting

Lighting shall be overhead both in front of and behind the rack bay. Lighting should be dual-lamp fluorescent type, lens not required.

Luminance shall be 50 foot-candles measured horizontally at 3 feet above finished floor, minimum.

MDF/IDF room shall have a manual light switch.

6.3   PATHWAYS COORDINATION

Pathways shall be shown on the telecom drawings. For joint systems (i.e. surface raceway, floor boxes), the Electrical Engineer and Telecom Engineer shall carefully   coordinate the pathway requirements to avoid missed and/or duplicated requirements,   and to ensure component compatibility.

Electrical conduits unrelated to the Telecom Room shall not be routed through the Telecom room.

PART 7 SECURITY

Refer to SMCCCD Physical Access Controls and Security Management Design Standard for additional information.

7.1   ACCESS CONTROL FOR TELECOMMUNICATION ROOMS

A. All Telecom rooms require access control. MPOE, MDF and IDF rooms shall have electric locks with card reader interface and connection to the access control system.

7.2   SECURITY EQUIPMENT WITHIN TELECOM ROOMS

A. The Telecom Designer and the Security Designer shall coordinate the equipment layout / wall elevation within the Telecom Room with ITS and the Electrical Engineer.

B. Refer to section 2.1 for a room layout example indicating security equipment coordination within Telecom Room.

7.3   SURVEILLANCE CAMERAS WITHIN TELECOMMUNICATION ROOMS

A. All Telecom rooms require surveillance cameras. MPOE, MDF and IDF rooms shall have dedicated network jack (2 minimum) per camera location.

PART 8 TELECOMMUNICATIONS

8.1   OUTSIDE PLANT UNDERGROUND PATHWAYS

A.   Conduit Types

The following conduit types will be accepted for different circumstances:

Circumstance	Acceptable Conduit Types
Straight Sections, no vehicular or automobile traffic	Non-Metallic Schedule 40 PVC Minimum 24" cover/backfill (applies to all sections) Underground warning tape installed minimum 6" above conduits (applies to all sections)
Straight Sections, under heavy vehicular traffic (e.g. loading docks)	Non-Metallic Schedule 40 PVC, with concrete slurry
Sweeping Bends	Non-Metallic Schedule 80 PVC
Factory Sweeps	Non-Metallic Schedule 80 PVC
Building Entrance	PVC Coated Galvanized Rigid Steel

B.   Maintenance Hole Types

The maintenance holes shall have the following features:

1.   Vault-type maintenance holes/pull boxes:

a.   Minimum size (interior clearances) shall be 48-inches wide by 84-inches deep by 60-inches long

b.   Equipped with pipe connection to a storm drain that is gravity drained and has a back-flow valve

c.   Equipped with a sump pump, corrosion-resistance pulling irons, corrosion- resistance cable racks, and grounding.

2.   Split cover-type maintenance holes/pull boxes:

a.   Minimum size shall be 36-inches wide by 48-inches deep by 60-inches long.

b.   Equipped with pipe connection to a storm drain that is gravity drained and has a back-flow valve

c.   Equipped with a sump, corrosion-resistance pulling irons, corrosion-resistance cable racks, and grounding.

3.   Hand hole-type pull boxes:

a.   Minimum size should be 17-inches wide by 12-inches deep by 30-inches long, installed with a 12-inch deep (minimum) gravel base for drainage.
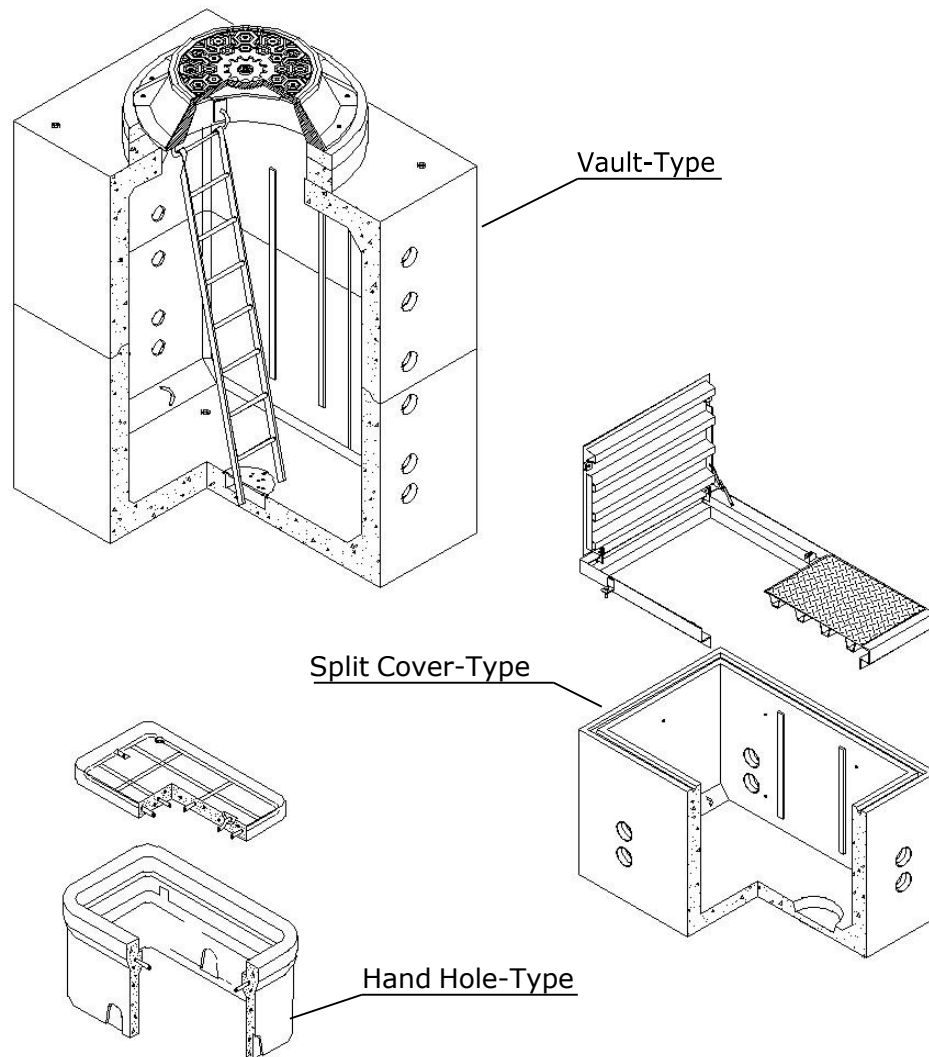
Maintenance Manholes Examples

C. Pathway Service per Building

Each building shall receive two 4-inch trade size conduits, minimum, from the campus' telecommunications underground pathways infrastructure.

Within 15 feet of the point where the conduit enters the building, the conduit type shall be GRS. Non-metallic / PVC conduit will not be accepted.

D. Installation

The minimum burial depth for conduits shall be 36 inches.

Duct banks shall not contain more than two 90-degree bends between pull points, and should exceed 300 feet between pull points.

At buildings, install the conduit sloping toward away from the building with no less than 0.125 inches per linear foot of slope

Between maintenance holes, install the conduit sloping towards maintenance holes with no less than 0.125 inches per linear foot of slope.

Datacom conduits shall be separated from other underground structures as follows:

Structure	Separation
Power, concrete-encased	3 inches
Power, buried	12 inches
Power, on poles	Separate poles if possible; if not possible, 90 degrees, minimum

Conduits shall be bonded to the grounding backbone within the Telecom rooms.

E. Subduct (and Innerduct)

At least one of the service conduits shall contain fabric subduct (Maxcell).

Alternatively, four 1-inch trade size innerducts. Each innerduct shall be uniquely colored.

8.2   TELECOMMUNICATION ROOMS

A. Telecom Room Types

The following descriptions summarize the typical telecom room types along with the   room's associated functions.

1. Service Entrance and Termination Room (Main Distribution Frame - MDF)

The Service Entrance and Termination Room (MDF) is the main telecommunications building service entrance for a building. It is the location where the demarcation between the interbuilding and intrabuilding cabling systems is established. The MDF is typically found on the first floor.

This room may serve as the Telecom Room for the area of the building in lieu of providing two separate spaces.

This room is dedicated to this purpose with no other building services sharing the space.

2. Telecom Room (Intermediate Distribution Frame - IDF)

This room provides for demarcation between the horizontal station cabling, building network and the building data backbone cabling. This room contains the electronic equipment that transitions between the building backbone and the end   user endpoints.

This room is dedicated to this purpose with no other building services sharing the space.

3. Door Signage
Room Signage shall follow the building's signage format.
The MDF should be labeled with the building number followed by the room number. It shall have the letters "TDA" below the building/room number.
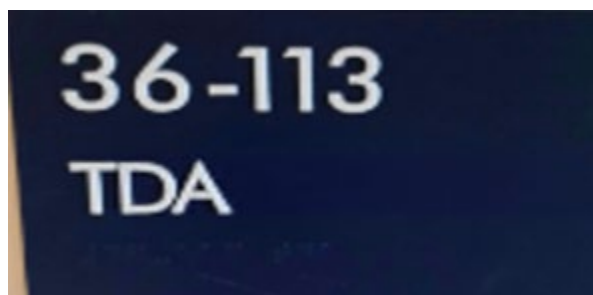
The IDFs shall follow the same format, and will have the letters TDB, TDC and so on.

8.3 INTERIOR BUILDING PATHWAYS

A. Backbone Pathway

Backbone pathway is the cable pathway from the MDF to each IDF. Each project is unique and the pathway may consist of conduit, riser path and/or cable tray. The minimum requirements are two 4-inch conduits from the MDF to each first level IDF room. Each conduit should leave 40% space of capacity

Conduits shall have continuous pull strings installed end-to-end.

The backbone pathway may also be shared with the Horizontal Primary Pathway (e.g. cable tray/basket tray) throughout the building.

In no instance shall cables lay directly on suspended ceilings or attached to suspended ceiling support wires.

B. Horizontal Pathways

Horizontal pathways are the pathway components that support horizontal station cabling. Horizontal pathways include the pathway from the Telecom room to the individual outlet. Pathway should not exceed 300 feet between respective network closet and endpoint.

In no instance shall cables lay directly on suspended ceilings or attached to suspended ceiling support wires.

1. Primary Pathways: The primary horizontal pathways shall be defined as those directly from a Telecom room serving a section (a wing or side) of the building or an entire floor. The primary pathway component used shall be a cable tray system. Primary pathways should be located in easily-accessible non-user spaces, such as over corridor ceilings. This will minimize disruption to user spaces during future cable adds/changes.

Cable Tray

Image of Typical Primary Pathway

Note: "Secondary pathways" may be used as primary pathways when the total cable counts are low enough to allow a lower capacity system. Lower cable counts are

approximately 50-100 cables, maximum, throughout an IDF's service area.

2. Secondary Pathways: The secondary horizontal pathways shall be defined as those from the primary pathways serving an area of a section or to specific devices. The secondary pathway components can be cable hangers.

Cable Hanger
Image of Typical Secondary Pathway

C. Device Pathways

The device pathways shall be defined as the pathway supporting a single complement of cabling to a single device within a User Space.

For all installation configurations requiring a conduit stub, the conduit shall be 2-inch trade size, minimum. Stubs shall be continued to the first accessible location.

For all installation configurations requiring a device box, the box shall be 4-11/16" square and shall be deep (2-1/8" min).

The following descriptions shall be used to plan the configuration of telecom devices throughout the building. These descriptions are for planning purposes and the exact configuration shall be finalized per instance.

1. Framed Wall, for both New Construction and Renovation:

The device pathway at framed walls shall be conduit stub from an accessible space (such as acoustical tile ceiling) to a device box within the wall interstitial.

The device box should be installed at +18 inches for typical outlets or as coordinated by the architect.

2. Concrete Wall, for New Construction:

The device pathway at concrete walls should be buried (cast within the forms) into the wall.

3. Concrete Wall, for Renovation:

The device pathway at concrete walls shall be either conduit surface-mounted to a device box surface-mounted, or surface raceway to a device box surface- mounted.

4. CMU Wall, for both New Construction and Renovation:

The device pathway at CMU walls shall be either conduit surface-mounted to a device box surface-mounted, or shall be surface raceway to a device box surface-mounted.

5. Floor Devices, for both New Construction and Renovation:

The device pathway for in-floor type instances shall be buried (cast within the forms) into the floor.

For poke-thru type instances, no special device pathway is required as the cables will be routed within standard building pathways on the floor below to the poke-thru device.

6. In-Ceiling Devices, for both New Construction and Renovation:

The device pathway for in-ceiling devices shall be a device box installed either on the structure above or onto a channel at an accessible height above an accessible ceiling.

The cables will be routed within standard building pathways to the device box.

7. Pathways within Classroom for AV

Refer to Instructional Technologies section for requirements on pathways.

8. Pathways to the roof area

3" conduit sub to the roof from any top floor IDF in a building. There should also be additional 3" conduit stubs to the roof from other top floor locations in the building.

8.4   Backbone Fiber Optic Cabling

A. Cabling Deployment

Buildings shall receive interbuilding backbone fiber optic cabling and interbuilding backbone twisted pair copper cabling from the campus MPOE.

Fiber cable color designations will be as follows:

1. Single Mode Fiber: Yellow

2. Multimode Fiber (10G): Aqua

B. Outdoor Backbone Fiber Optic Cable Type

Backbone fiber optic cables installed outdoors shall be loose tube buffered type cable.

Outdoor backbone fiber optic cable shall be a dielectric cable installed in innerduct from the nearest manhole to the cable entrance of the building.

C. Indoor Backbone Fiber Optic Cable Types

Backbone fiber optic cables installed indoors shall meet the following:

1. Cable rating required by the authority having jurisdiction.

2. Tight buffered.

3. A sheath consisting of an integral strength element with a thermoplastic outer jacket over the inner cable components (buffered fibers, strength element, and other components).

D. Fiber Type

Singlemode fibers shall be 8.3/125 m, with a maximum dispersion of 3.5 ps/nm·km at 1285-1330 nm, and a cutoff wavelength of 1260 nm.

Multimode fibers shall be OM4.

E. Cable Capacity / Conductor Count

1. Campus Backbone Fiber Optic Cabling

a. Minimum of 36 strands of singlemode fiber.

2. Intrabuilding Backbone Fiber Optic Cabling

a. Minimum of 24 strands of multimode fiber.

F. Splicing

Splicing of fiber optic cable is prohibited.

G. Termination

1. Connectors

Singlemode fibers shall be terminated via single-mode LC connectors. LC connectors shall meet all requirements of TIA/EIA-604-10A.

If existing singlemode/multimode fiber requires re-termination these fibers shall be terminated via LC connectors.

2. Patch Panel

Patch panels shall be 1RU rack-mount type and shall be installed in the 2nd rack position at the top of the rack (leaving 1RU open for growth).

Provide separate fiber panels for singlemode and multimode terminations. Refer to diagram on section 8.5 for rack-mount fiber optic termination example.

A strain relief bar must be used behind each patch panel (see appendix for part number)

3. Adapters

Adapters within the patch panels shall meet all requirements of TIA/EIA-568-B.3, section 5.0 including references.

Multimode 50/125 adapter housing shall be aqua in color and shall be duplex.
Singlemode adapter housing shall be blue in color and shall be duplex.

H. Backbone Fiber Optic Cabling Testing

Each fiber strand requires testing. The testing shall be bi-directional characterization testing via Fluke OTDR (within the calibration expiration date) and passive link insertion loss test (via light source and power meter). Test results must be in Fluke Linkware (.flw) which reviewed and approved by ITS prior to network equipment installation.

Please note: results should all pass. ITS will **not** accept the following results:
- Failed
- Pass with Warning

8.5   BACKBONE TWISTED PAIR CABLING

A. OSP Backbone Twisted Pair Cable Type

Buildings shall receive interbuilding backbone twisted pair copper cabling from the campus MPOE. Backbone twisted pair cables installed outdoors shall be outdoor rated gel-filled and should be ANMW type, with an ASP sheath.

B. OSP Backbone Twisted Pair Cable Capacity / Conductor Count

OSP backbone twisted pair cabling links should contain either 50 pairs or 100 pairs. Confirm conductor count with ITS per Project

For a 50 pair installation, pairs 1 through 48 will be terminated and installed into two (2) 24-port patch panels. Pairs 49 and 50 shall be terminated but can be coiled on the back side of the rack.

For a 100 pair installation, pairs 1 through 96 will be terminated and installed into four (4) 24-port patch panels. Pairs 97 through 100 shall be terminated but can be coiled on the back side of the rack.

C. OSP Backbone Twisted Pair Cabling Entrance Termination

Backbone twisted pair cabling links entering from underground from the Campus shall be spliced to building entrance protection terminals, wall-mounted. BEP shall include fuses.

See following diagram.
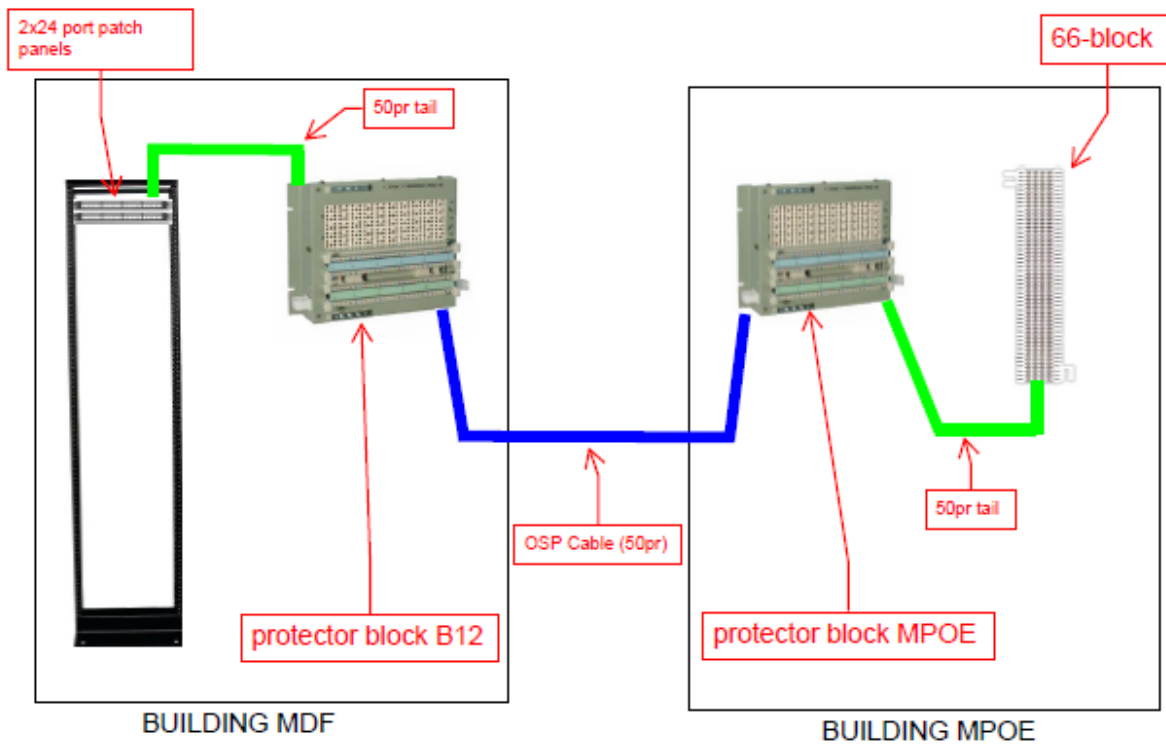
Backbone OSP Twisted Pair Cable Termination Example

D. Indoor Backbone Twisted Pair Cable Types

Backbone twisted pair cables installed indoors shall meet the rating required by the authority having jurisdiction.

Backbone twisted pair cables installed indoors should ARMM type.

E. Indoor Backbone Twisted Pair Cable Capacity / Conductor Count

Indoor backbone twisted pair cabling links should contain either 25 pairs or 50 pairs to each IDF. Confirm conductor count with ITS per Project

F. Backbone Twisted Pair Cabling Termination

Backbone twisted pair cabling links, including output stubs from BEP terminals (see prior paragraph), shall be terminated to modular patch panels on an equipment rack. Refer to Horizontal Cabling for modular patch panel specifications. The following diagram depicts the intent for the backbone twisted pair cable termination.

45U Chatsworth 2 Post Rack
(Black - 48353-703)

Leave 1 usable 1U space (Top)

1U Corning Fiber Panel – LC Connector
Single mode (2 x 1u: 36 strands.
Multi-mode (1 x 1u: 24 strands)

1U Corning Fiber Panel – LC Connector

Leave 1 usable 1U space (below Fiber
Enclosure for the door to open)

1U x Chatsworth Cable Management (30139-719)

1U x Panduit 24 port patch panel
(CPPL24M6BLY) – *For 50 or 100 pairs analog*

1U x Panduit 24 port patch panel
(CPPL24M6BLY) – *For 50 or 100 pairs analog*

1U x Chatsworth Cable Management (35441-701)

1U x Panduit 24 port patch panel
(CPPL24M6BLY) – *For Data*

1U x 48 port Cisco 3650-48 POE Switch

1U x Panduit 24 port patch panel
(CPPL24M6BLY) – *For Data*

1U x Panduit 24 port patch panel
(CPPL24M6BLY) – *For Data*

1U x 48 port Cisco 3650-48 POE Switch

1U x Panduit 24 port patch panel
(CPPL24M6BLY) – *For Data*

1U x Chatsworth Cable Management (35441-701)

Eaton PDU (EMIT08-10)

APC UPS Main Unit

APC UPS Battery

APC UPS Battery

APC UPS Battery

Backbone Twisted Pair and Fiber Optic Cable Rack-Mount Termination Example

G. Backbone Twisted Pair Cabling Testing

Backbone twisted pair cabling links shall have 100% of the pairs tested for wire map and one pair from each 25-pair binder group tested for length. The testing shall be testing via Fluke Cable Analyzer DSX8000 (within the calibration expiration date). Test results must be in Fluke Linkware format which can be reviewed and approved by ITS prior to network equipment installation.
The 25th /50th etc. pairs of the copper backbone will terminate in a white RJ45 jack and should be coiled behind the patch panel

8.6   HORIZONTAL CABLING

A. Horizontal Cable Type

Horizontal cables shall meet the rating required by the authority having jurisdiction. Assume that all cables shall be CMP (plenum) rated unless otherwise approved by the AHJ.

Horizontal cable shall be unshielded twisted pair type, with four twisted pairs, and should have a CMP rated sheath.

B. Cable Type

Cable type shall be Category 6A for data. Category 6A <u>shielded</u> for AV. Refer to 27 15 13 – Horizontal Cabling in Appendix belowHorizontal Cable Management Type

Data and AV using different type of horizontal Cable Management on the rack bay. Refer to 27 11 00 Communication Equipment Rooms

C. Telecom Room Termination

In the Telecom rooms, cables shall be terminated via modular jacks in a rack- mounted modular patch panel.

Modular patch panels shall be discrete port type (snap-in modular connectors).

<u>Coordinate layout of patch panels and equipment in rack with ITS</u>.

D. Workstation Termination

At the workstations, cables shall be terminated via modular jacks.

E. Modular Jacks

Modular jacks shall be 8-position 8-conductor type connectors, compliant with T568B wiring.

F. Type of Screw

Screws used in the rack shall be silver in color. Refer to Section 27 11 00 Communication Equipment Rooms. DO NOT USE BLACK SCREW COLOR.

G. Service, Per Work Area

A link shall consist of a single cable terminated in the IDF room and at the work area. Termination in the IDF shall consist of one port on a patch panel. Termination at the work area shall consist of one modular jack (one per cable) into a wall faceplate within appropriate device pathways.

1. **Standard Device**: shall consist of three (3) links, minimum.

2. **Printer Device**: shall consists of two (2) links, minimum.

3. **Wireless Access Point (WAP)**: shall consist of two (2) links, minimum.

4. **Standard Monitor Display**: shall consist of four (4) links, minimum.

5. **Lectern Device**: shall consist of eight (8) links.

6. **Projector Device**: shall consist of four (4) links.

7. **Classroom Device**: front and back walls shall consist of two (2) links.

8. **Wallphone/Courtesy/AOR Phone**: shall consist of two (2) links minimum.

9. **Elevator**: shall consist of two (2) links, minimum.

10. **Hallway Monitor Display:** shall consist of two (2) links, minimum.**Access Control Alarm Monitoring System (ACAMS)**: shall consist of two (2) links, minimum.

11. **Surveillance Cameras:** shall consist of two (2) links, minimum.

12. **Building Management Systems (BMS) device**: shall consist of two (2) links, minimum.

H. Fixed Office: Fixed offices shall receive at least two standard devices, generally on opposing walls. If the fixed office is large enough and intended to support multiple workstations, add one standard device per additional workstation.

1. Open Office: Generally, open offices shall receive one standard device per workstation.

2. Standard Conference Room (with fixed conference table):

   a. 2 standard devices in the table furniture.

   b. 1 standard monitor display at the wall mounted display unit (i.e. monitor).

   c. 1 WAP device in the ceiling.

3. Flexible Conference Room

   a. 2 standard devices at the front of the room.

   b. 1 standard devices at the wall mounted display unit (i.e. monitor).

   c. 1 standard device on the opposite wall.

   d. 1 WAP device in the ceiling.

4. Classroom: Generally, classrooms shall receive the following device

   a. Lectern device

   b. 2 WAP devices in the ceiling

   c. Projector device

   d. Computer Lab Workstation: 1 classroom device

   Additional data drops will increase/vary for larger size classrooms

5. Computer Lab: Generally, computer labs shall receive the following devices

   a. Lectern Device

   b. 2 WAP devices in the ceiling

   c. Projector Device

   d. Computer Lab workstation: 1 classroom device

   Additional data drops will increase/vary for larger size classrooms

6. Wireless Access Point: The deployment shall be determined per project as the coverage area is building-specific (*refer to 9.1 Wireless LAN Service*). Also, the installation shall vary per instance (wall mount, ceiling mount etc.)

7. Elevator: Each Elevator shall receive two (2) links to the elevator control mechanical room.

8. Fire Alarm panel/Lighting Controller/BMS: shall consist of two (2) links, minimum, to a single device. **Total number of locations needs to be discussed with the college's respective facilities department to determine the exact number low voltage needs.**

9. Multifunctional Printer (MFP): MFPs shall receive one **standard** device. This should apply to common share spaces such as pods or faculty or staff break areas.

10. Facility's Building Management System (BMS) shall receive two (2) links, located within the management system panel. **Total number of locations needs to be discussed with**

the college's respective facilities department to determine the exact number low voltage needs.

11. ACAMS Panel: ACAMS (access control and monitoring system) control panels shall receive two (2) links located within the panel.

12. IP Camera: IP cameras shall receive two (2) links, usually located within the camera housing but as approved by ITS.

13. IP Security Locks: IP Security locks shall receive two (2) links, in the ceiling above door frame.

8.7   ADMINISTRATION / LABELING

A. General

Labels, tags, and straps shall be high quality that will endure over the life of the cable plant. Hand written labels are not acceptable.

Cable labels shall be self-laminating. Cable labels shall be provided at both ends of the cable and installed on the cable jacket ten inches of the termination ends

B. RJ45 Modular Jack Color

RJ45 modular jacks shall be color coded for specified services. They should match in color on either side of the category-6A network cable (i.e. in the patch panel and in the faceplate/room).

1. Data/Desktop Phone/– Orange (CJ6X88TGOR)

2. Wall Phone/Courtesy Phone/AOR Phone – White (CJ6X88TGWH)

3. Audio/Visual Media/Video Wall – Black (shielded Cat6A) (CJS6X88TGY)

4. Security-Camera/Access Control– Green (CJ6X88TGGR)

5. Access Point – Yellow (CJ6X88TGYL)

6. Building Management System/Lighting (Lutron) District Facilities Rooms (Mechanical/Chemical/Electrical) – Purple (CJ6X88TGVL)

7. EAS System - Blue (CJ6X88TGBU)

C. RJ45 Keystone Jack (Special Cases)

The following keystone jacks require ITS approval prior to completion of design.

1. Indoor/Outdoor CAT6A Jack – NK6X88MGR (Green)

2. Indoor/Outdoor CAT6A Jack – NK6X88MYL (Yellow)

D. Network Patch cable color

Network patch cables shall be color coded for specified services.

1. Data/Desktop Phone– Black

2. Wall Phone/Courtesy Phone/AOR Phone – White

3. Audio/Visual Media/Video Wall – Black (shielded Cat6A)

4. Security Camera/ACAM/Card Reader – Green

5. Access Point – Yellow

6. BMS/Fire Alarm System Data Cable - Purple

7. EAS System - Blue

8. Analog (only for the analog patch panel) - White

E. Face Plate Endpoint

Data RJ45 jack labeling shall adhere to the following format

1. <telecom room – Cable Group# - cable identifier>

2. TDA 1001-A, B, C ("1"001 indicate 1st floor), TDA 1002-A, B, C (2nd Data)

3. TDB 2001-A, B, C ("2"001 indicate 2nd floor), TDB 2002-A, B, C (2nd Data)

4. TDC 3001-A, B, C ("3"001 indicate 3rd floor), TDC 3002-A, B, C (2nd Data)

v

First Floor

Second Floor
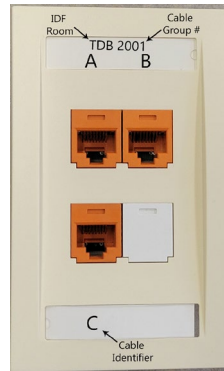
E. **WAP** RJ45 jack labeling shall adhere to the following format
1. <telecom room –Sequence WAP# - cable identifier>
2. TDA WAP101-A, B, C ("1"01 indicate 1st floor), TDA WAP102-A, B, C (2nd WAP)
3. TDB WAP201-A, B,C ("2"01 indicate 2nd floor), TDB WAP202-A, B, C (2nd WAP)
4. TDC WAP301-A, B,C ("3"01 indicate 3rd floor), TDC WAP302-A, B, C (2nd WAP)

First Floor

Second Floor

Above Ceiling
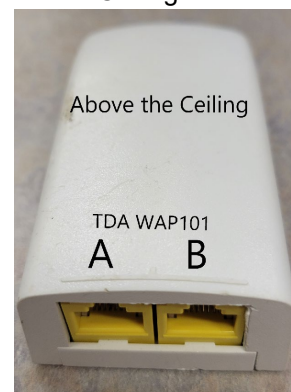
F. **Security Camera/Access Control** RJ45 jack labeling shall adhere to the following format
1.   <telecom room –Sequence CAM or ACAM# - cable identifier>
2.   TDA CAM101-A, B (101 indicate 1st floor), TDA CAM102-A, B (2nd CAM)
3.   TDB CAM201-A, B (201 indicate 2nd floor), TDB CAM202-A, B (2nd CAM)
4.   TDC CAM301-A, B (301 indicate 3rd floor), TDC CAM302-A, B (2nd CAM)
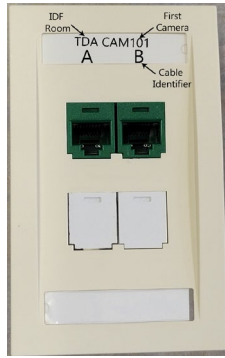
First Floor   Second Floor   Above Ceiling
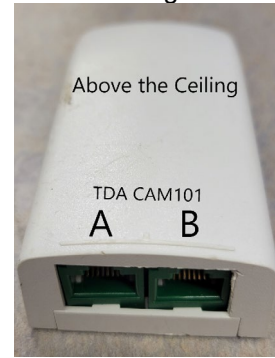
G. **ACAM** RJ45 jack labeling shall adhere to the following format
1.   <telecom room –Sequence ACAM# - cable identifier>
2.   TDA ACAM101-A, B (101 indicate 1st floor), TDA ACAM102-A, B (2nd ACAM)
3.   TDB ACAM201-A, B (201 indicate 2nd floor), TDB ACAM202-A, B (2nd ACAM)
4.   TDC ACAM301-A, B (301 indicate 3rd floor), TDC ACAM302-A, B (2nd ACAM)
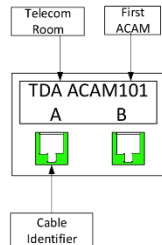
First Floor   *Second Floor*
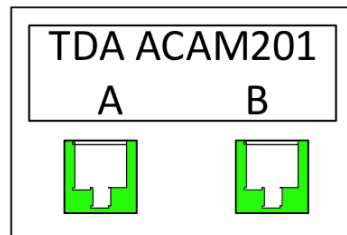
H.   **AV** RJ45 jack labeling shall adhere to the following format
   1.   \<telecom room –Sequence AV# - cable identifier\>
   2.   TDA AV101-A, B (101 indicate 1st floor), TDA AV102-A, B (2nd AV)
   3.   TDB AV201-A, B (201 indicate 2nd floor), TDB AV202-A, B (2nd AV)
   4.   TDC AV301-A, B (301 indicate 3rd floor), TDC AV302-A, B (2nd AV)

First Floor   Second Floor
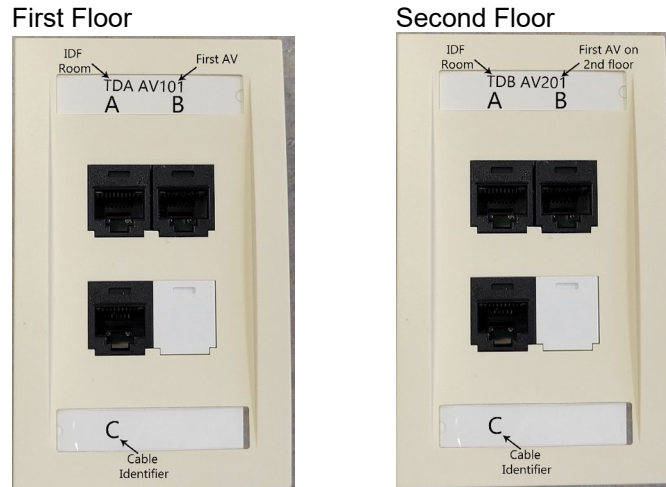
I.   **Wall Phone** RJ45 jack labeling shall adhere to the following format
   1.   \<telecom room –Sequence CP# - cable identifier\>
   2.   TDA CP101-A, B (101 indicate 1st floor), TDA CP102-A, B (2nd CP)
   3.   TDB CP201-A, B (201 indicate 2nd floor), TDB CP202-A, B (2nd CP)
   4.   TDC CP301-A, B (301 indicate 3rd floor), TDC CP302-A, B (2nd CP)
   5.   Note that Courtesy Wall Device consists of two (2) data cables. The 2nd cable shall be coiled behind the Faceplate (KWP6PY).

First Floor   Second Floor
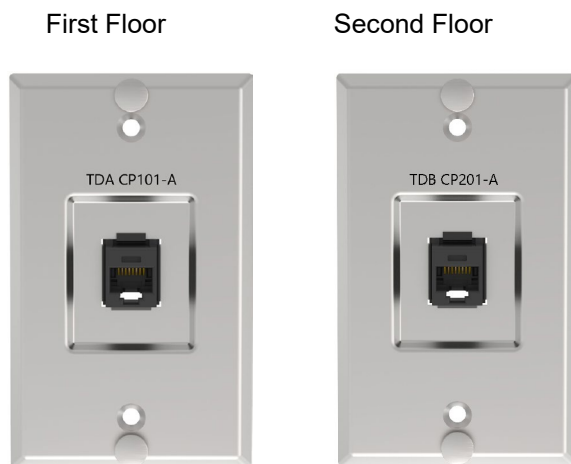
J.   **Courtesy/AOR**** Phone RJ45 jack labeling shall adhere to the following format
   1.   <telecom room –Sequence AOR# - cable identifier>
   2.   TDA AOR101-A, B (101 indicate 1st floor), TDA AOR102-A, B (2nd AOR)
   3.   TDB AOR201-A, B (201 indicate 2nd floor), TDB AOR202-A, B (2nd AOR)
   4.   TDC AOR301-A, B (301 indicate 3rd floor), TDC AOR302-A, B (2nd AOR)

**Due to the brand and model of our Courtesy/AOR phone, the RJ45 jacks for Courtesy/AOR phones will not be placed in a faceplate. Rather these jacks will remain either in the wall box, or within the phone's wall enclosure. Consult with ITS regarding specifics to the cable termination. Below are examples of the phone and various enclosures.

| Talk-A-Phone | Wall Enclosure | Flush Mounted Enclosure |
| VOIP-600ECK | ETP-SM-1-SS-NL | MS-600 |

K.   **Classroom** RJ45 jack labeling shall adhere to the following format
   1.   <telecom room –Sequence AV/Data# - cable identifier>
   2.   **Lectern location**:
      a.   TDA 1001 "A" to "H" CAT6A Data to TD closet (1001 indicate 1st floor, 1st port)
      b.   AV "A" to "D" Shielded CAT6A Data to Projector location within classroom (same pattern as the rest of the classrooms)

      Projector Location:
      c.   TDA 1002 "A" to "C" CAT6A Data to TD closet (1002 indicate 1st floor, 2nd port)
      d.   AV "A" to "D" Shielded CAT6A Data to Lectern location within classroom (same pattern as the rest of the classrooms)

Standard Classroom
Patch Cable Example
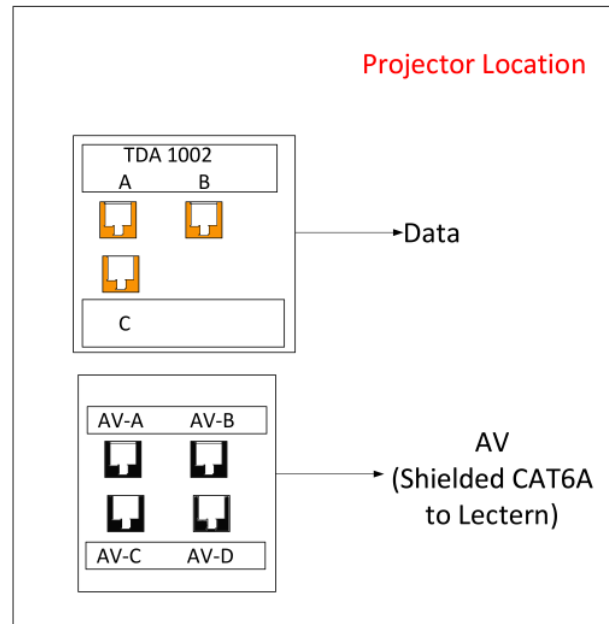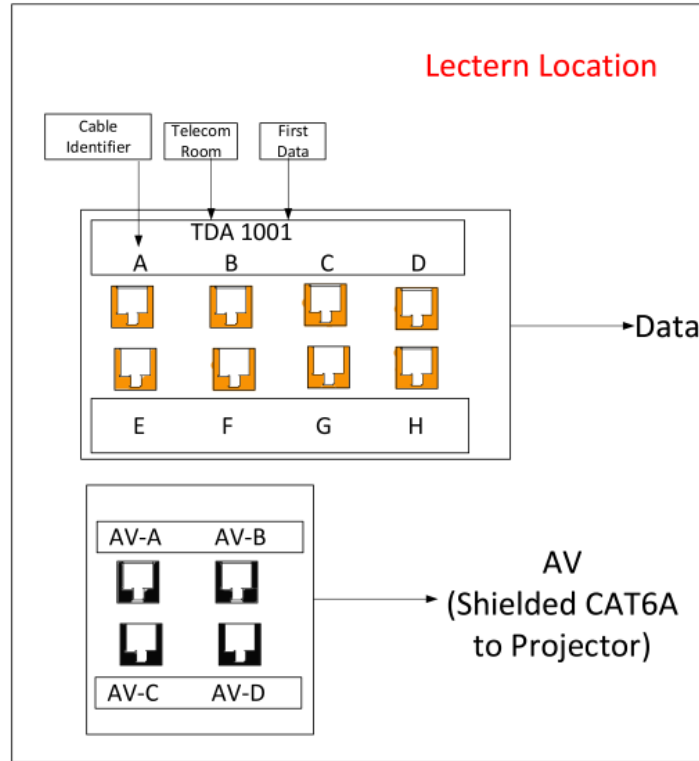
L.   **Video Wall** RJ45 jack labeling shall adhere to the following format
     1.   <telecom room –Sequence AV/Data # - cable identifier>
     2.   TDA AV101-"A" to "P"   CAT6A Shielded to TD closet (101 indicate 1st floor, 1st port)
     3.   TDA 1001-A, B CAT6A Data to TD closet (1001 indicate 1st floor, 1st port)

Following is the example of 16 videos on wall and each video needs one shielded CAT6A to the AV patch panel and each Video Wall location needs two regular data drops

Video Wall
Patch Cable Example
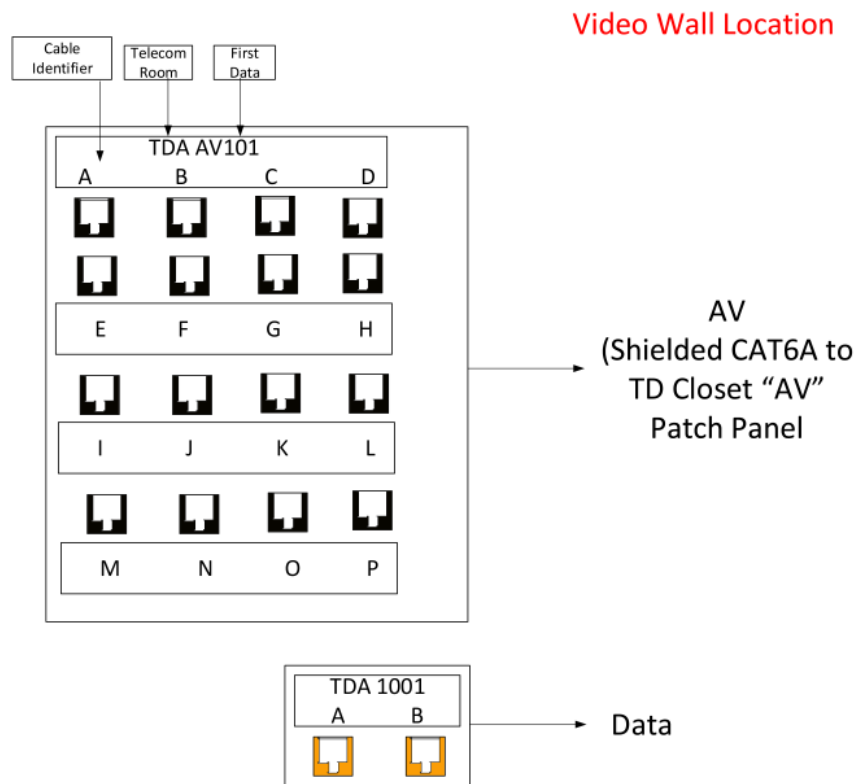
Furnish and install 1U 24 port patch panel.
Illustration below: Panduit 4 channel minicom patch panel

Data/Voice:

First Floor:
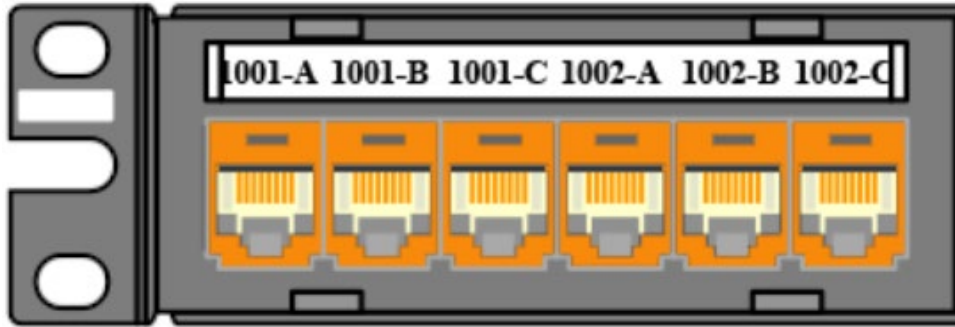
Second Floor:
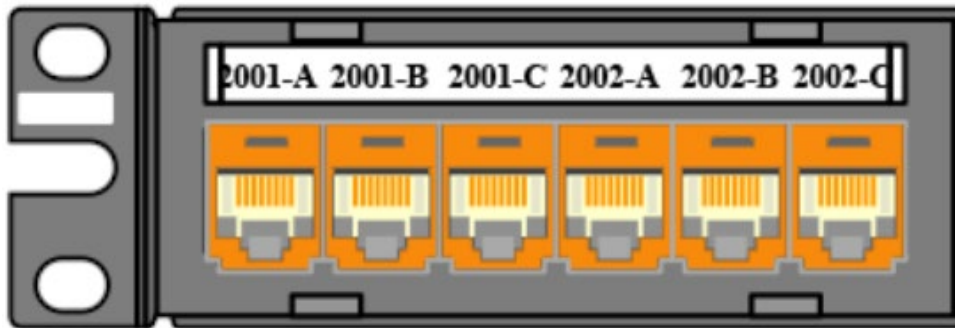
Wireless Access Point:

First Floor:
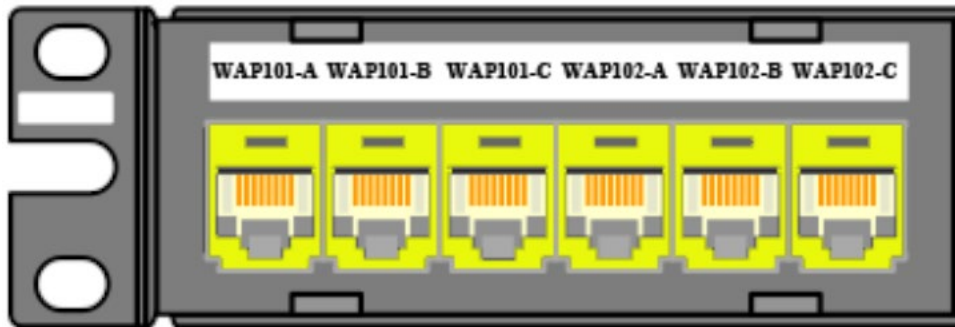
Second Floor:
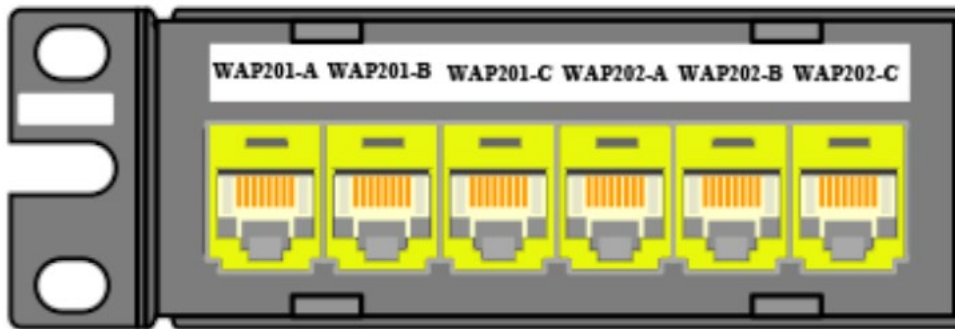
Security Camera:

First Floor:
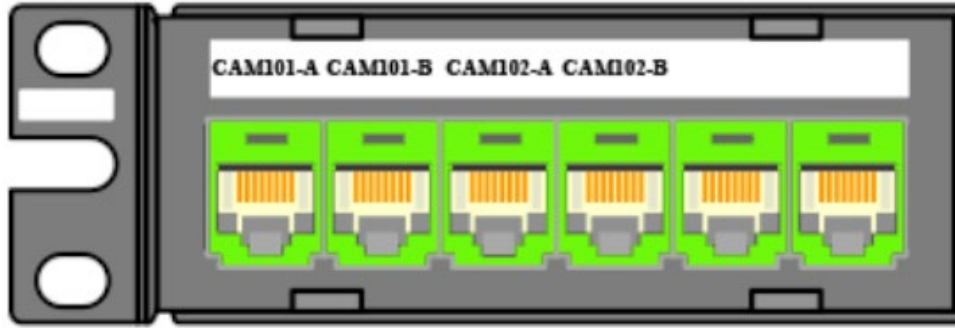
Second Floor:
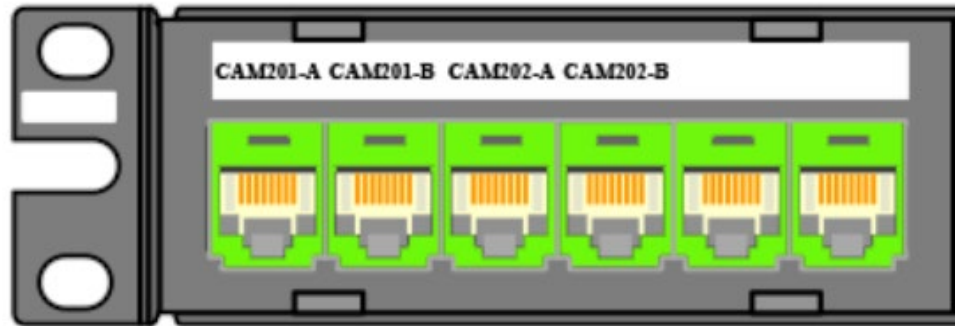
ACAM:

First Floor:

Second Floor:

AV:

First Floor:
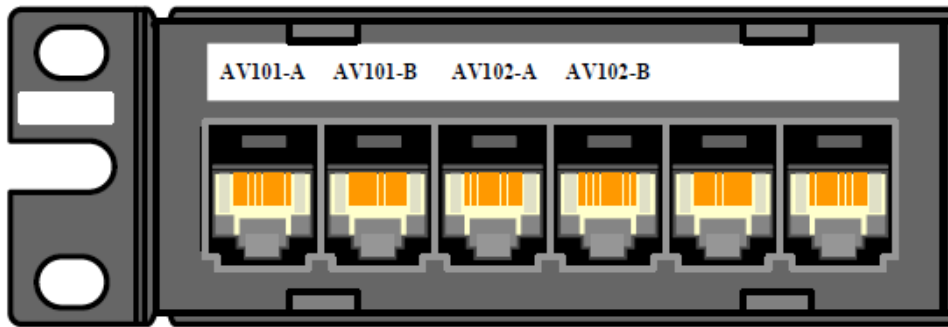
Second Floor:
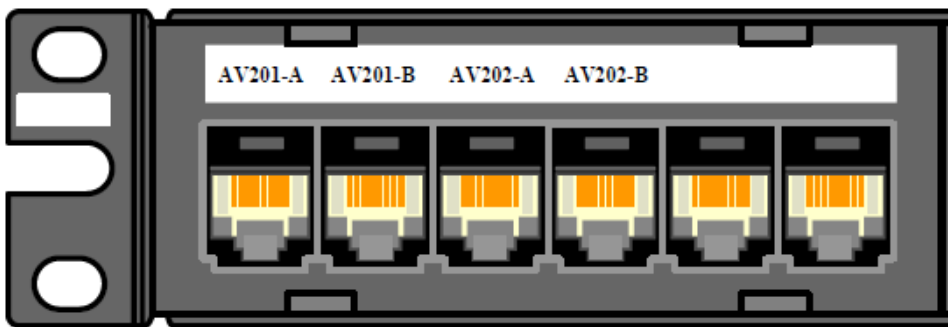
Courtesy Phone:

First Floor:
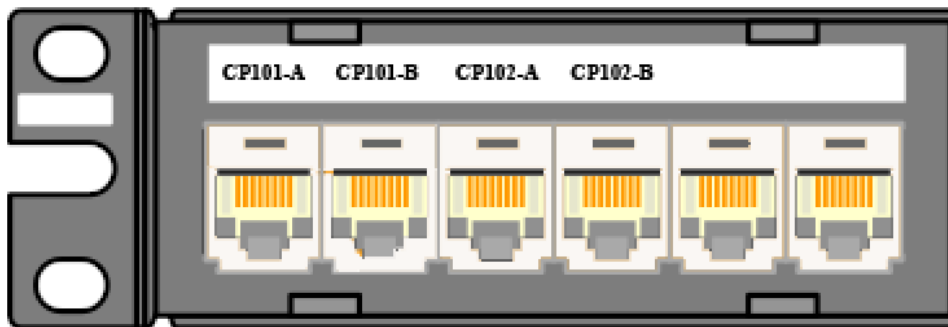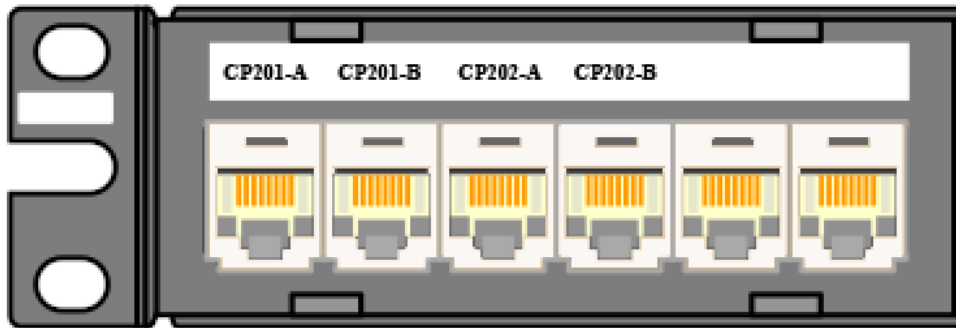
Second Floor:

AOR Phone:

First Floor:
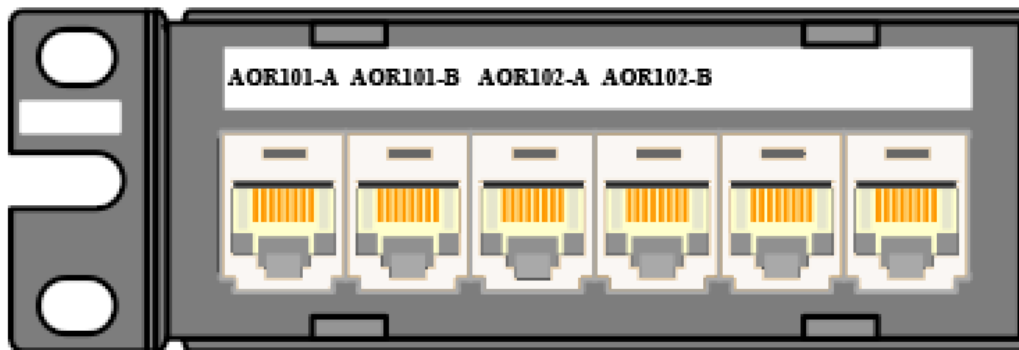
Second Floor:

Classroom:

First Floor:

Lectern Location - Data:

1001-A 1001-B 1001-C 1001-D 1001-E 1001-F   1001-G 1001-H

Projector Location - Data:

1002-A 1002-B 1002-C
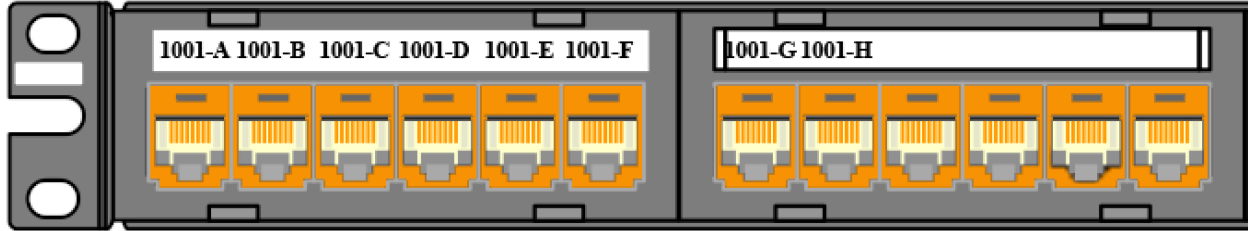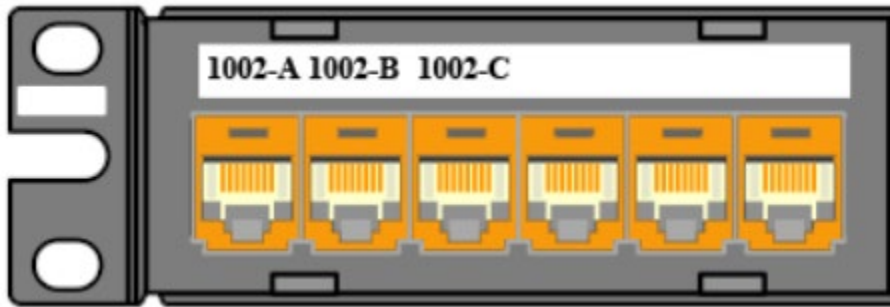
Second Floor:

Lectern Location - Data:

2001-A 2001-B 2001-C 2001-D 2001-E 2001-F   2001-G 2001-H
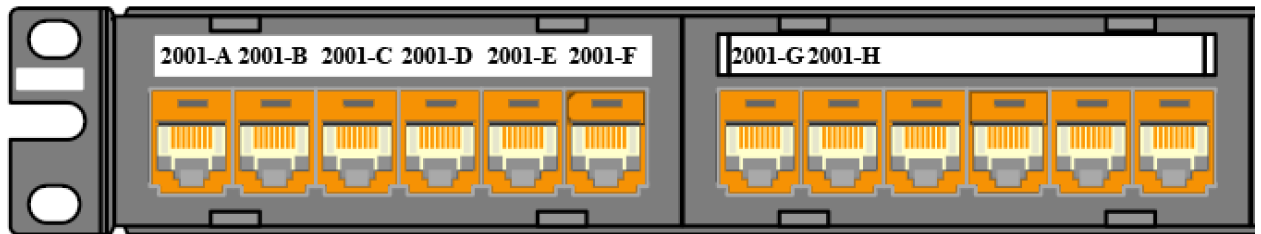
Projector Location - Data:
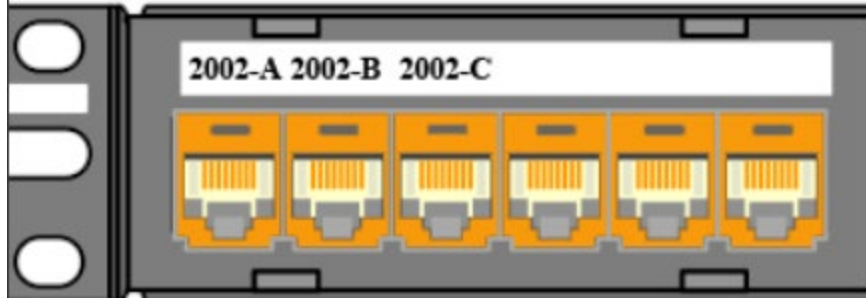
Video Wall:

First Floor:

Video Wall Location: (DO NOT MIX with Data Patch Panel)
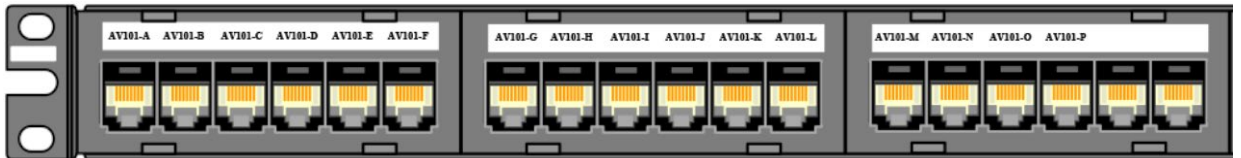
Video Wall Location (for Data)
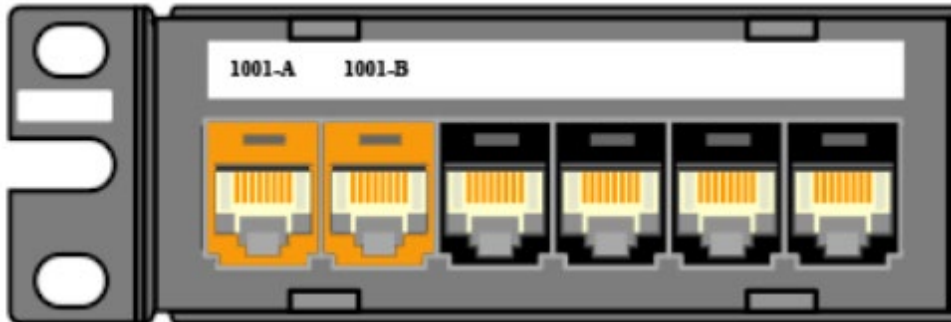
Second Floor:

Video Wall Location: (DO NOT MIX with Data Patch Panel)
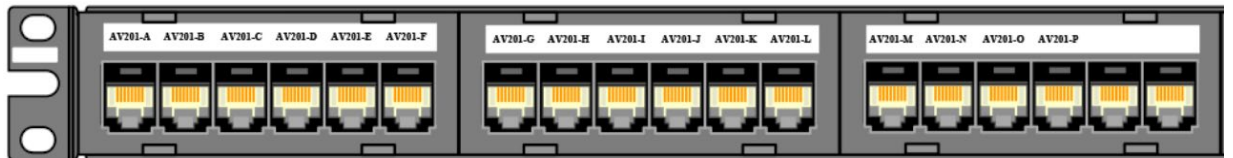
Video Wall Location (for Data)
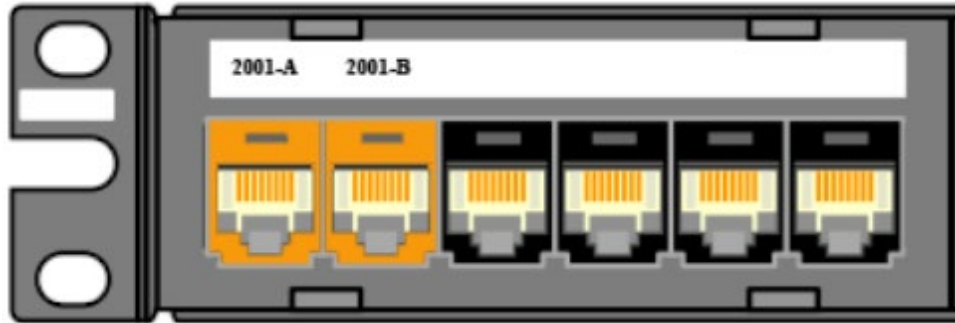
Furnish and install 1U 24 port patch panel on two post rack Example:
First Rack: OSP/ISP/Copper/Data Patch Panel
Second Rack: WAP Patch Panel
Third Rack: Security/ACAM Patch Panel

	Rack 1 Against the wall	Vertical CM	Rack 2	Vertical CM	Rack 3	Vertical CM
45U	SPACE		SPACE		SPACE	
44U	36 SM Strand Fiber Patch Panel to MPOE		CPI Cable Management		CPI Cable Management	
43U	36 SM Strand Fiber Patch Panel to MPOE		Patch Panel (WAP)		Patch Panel (CAM/ACAM)	
42U	24 MM Strand Fiber Patch Panel to 2nd fl IDF		Cisco Switch		Cisco Switch	
41U	24 MM Strand Fiber Patch Panel to 3rd fl IDF		Patch Panel (WAP)		Patch Panel (CAM/ACAM)	
40U	CPI Cable Management		Patch Panel (WAP)		Patch Panel (CAM/ACAM)	
39U	50 PAIR Copper from MPOE (analog)		Cisco Switch		Cisco Switch	
38U	50 PAIR Copper from MPOE (analog)		Patch Panel (WAP)		CPI Cable Management	
37U	CPI Cable Management		CPI Cable Management		blank	
36U	25 PAIR Copper to 2nd fl IDF (analog)		blank		blank	
35U	25 PAIR Copper to 3rd fl IDF (analog)		blank		blank	
34U	CPI Cable Management		blank		blank	
33U	Patch Panel (Data)		blank		blank	
32U	Cisco Switch		blank		blank	
31U	Patch Panel (Data)		blank		blank	
30U	Patch Panel (Data)		blank		blank	
29U	Cisco Switch		blank		blank	
28U	Patch Panel (Data)		blank		blank	
27U	Patch Panel (Data)		blank		blank	
26U	Cisco Switch		blank		blank	
25U	Patch Panel (Data)		blank		blank	
24U	CPI Cable Management		blank		blank	
23U	blank		blank		blank	
22U	blank		blank		blank	
21U	blank		blank		blank	
20U	blank		blank		blank	
19U	blank		blank		blank	
18U	CPI Cable Management		CPI Cable Management		CPI Cable Management	
17U	Eaton Power Strip		Eaton Power Strip		Eaton Power Strip	
16U						
15U	APC UPS		APC UPS		APC UPS	
14U						
13U						
12u						
11U	APC UPS Battery Pack		APC UPS Battery Pack		APC UPS Battery Pack	
10U						
9U						
8U						
7U	APC UPS Battery Pack		APC UPS Battery Pack		APC UPS Battery Pack	
6U						
5U						
4U						
3U	APC UPS Battery Pack		APC UPS Battery Pack		APC UPS Battery Pack	
2U						
1U						

PART 9 WIRELESS LAN SERVICE

9.1   GENERAL INFORMATION

ITS has established Cisco Meraki wireless access points as the exclusive standard for wireless networks throughout the District.

As a rule, each wireless access point will support 100 users. Each wireless access point will effectively serve a 1500 foot radius. General classrooms will have one (1) access point.

High density environments, such as lecture halls, labs, learning center, dining services, theaters, etc. will use the above said metric to calculate the necessary wireless access points. ITS shall be consulted before making any final decision on the quantity of wireless access points.

9.2   ACCESS POINTS

A. Internal Placement Guidelines

All plans for placement of wireless access point devices **MUST** be approved by ITS before the plans are submitted for bid.

B. External Placement Guidelines

Placement and coverage for exterior Wireless coverage will be determined on a project by project basis.

Coordinate device type and placement with ITS if exterior coverage is a program requirement.

Placement of exterior Wireless devices and cabling requires detailed coordination with ITS, the Architect and Landscaping designer.

Exterior Wireless devices and cabling include but are not limited to roof, light poles, and walls. Roof pathway should be addressed per Part 8.3.C.8

9.3   INSTALLATION COORDINATION

A. Please refer to "Owner Furnished/Contractor Installed" details

B. Cabling Service

In the IDF/MDF, the cables shall be terminated in the patch panel on the rack. At the WAP device, the cables shall be terminated in an RJ45 female outlet installed above suspended ceilings located as close as possible to the device.

The Telecom contractor shall install the patch cable from the outlet into the WAP (patch cable provided by the contractor).

C. Enclosure Installation

Cisco Exterior Meraki Wireless Access Points do not require weather protection.

Indoor and Outdoor Meraki WAPs come with its own bracket for either ceiling or wall mount installations.

If installing to a pole, many SMCCD light poles have 50"+ diameters, so a longer set of steel straps will be required.

WAP on a pole can be installed at 13 feet high. If combined with a camera, WAPs should be installed above the camera to avoid obstruction.

D. Access Point Labeling

ITS shall provide a label indicating Hostname. If access point is in a room, hostname should be labeled "Network ID-Campus-Building number-Room number-Model number". For example, "72-CSM10-110-MR53", which means it is located in CSM building 10, room 110.

Example of installing WAP on ceiling tile

1. Make a small 1"x1" penetration in the ceiling tile close to the T-bar.

2. Use the Meraki provided t-bar mounting clips and clip to the T-bar. Use the bracket to align the clips, and screw the mount to the clips (see Step 5 for mounting direction)
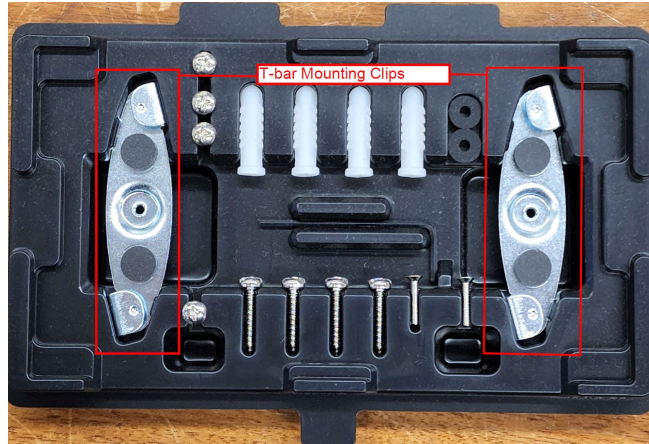
3. Pass the network patch cable through the tile **and** the Meraki bracket via the bracket opening.
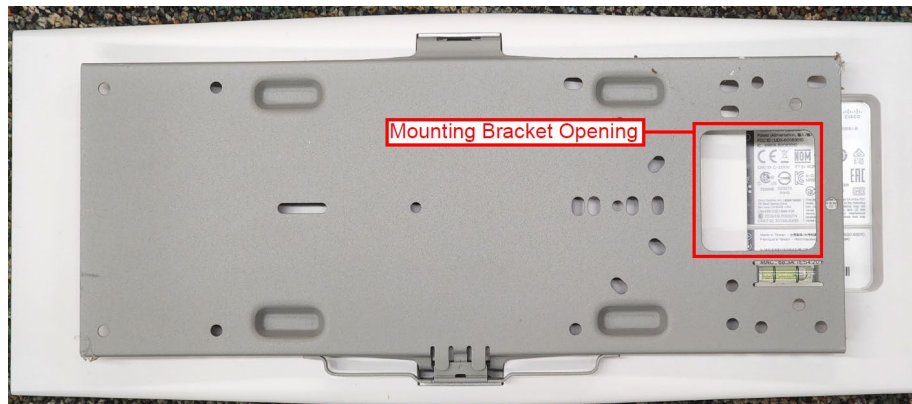
4. Connect the patch cord to the Wireless Access Point's network port and snap the WAP to the mount.
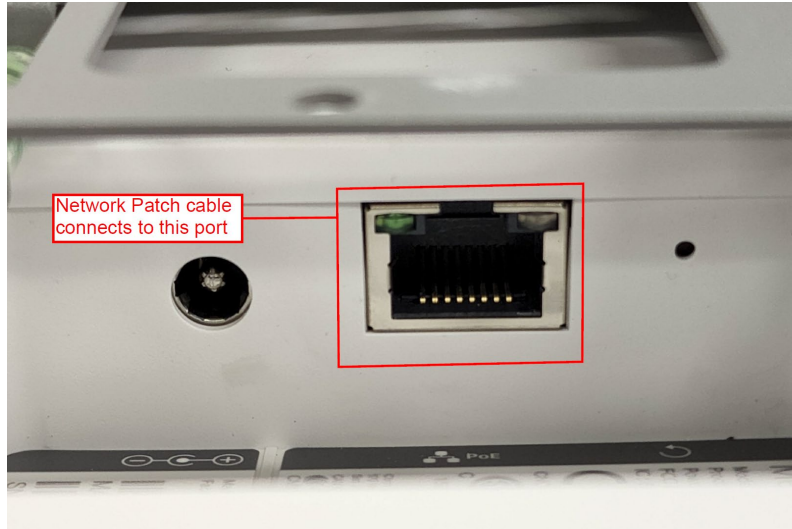
5. If this is a classroom/conference/office install, face the Power/Connectivity LED towards the door.
    If this is a hallway or open area install, face the Power/Connectivity LED where it is most visible.

6. Secure the WAP with the Phillips security screw.

Use Phillips Screw to secure the WAP to the bracket
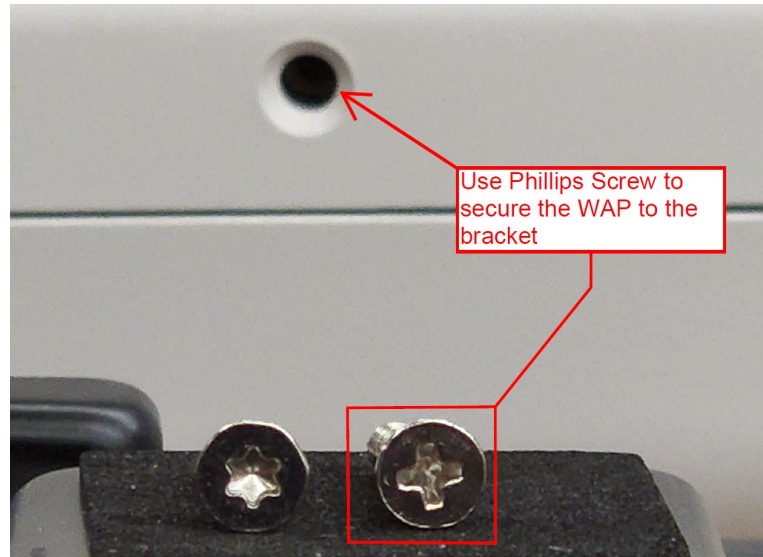
7. Return all unused Meraki Mounting Kit components to ITS

PART 10 SPECIAL SYSTEMS

10.1   TWO-WAY COMMUNICATION SYSTEM

    A. The following requirements for two-way communications shall be designed for projects that meet the applicable code criteria:

        1. CBC - Two-Way Communication; A two-way communication system shall be provided at the elevator landing on each accessible floor that is one or more stories above or below the story of exit discharge complying with.

        2. NFPA 72 - Two-way emergency communication system for accessible means of egress, including related infrastructure and functional requirements.

10.2   EMERGENCY RESPONDER RADIO COVERAGE

    A. An Emergency Responder Radio Coverage system shall be provided for all projects based on the following code criteria:

        1. California Code of Regulations (CCR), Title 24, Part 9, "California Fire Code"

        2. NFPA-72 "National Fire Alarm and Signal Code Regulations":

            a. Part 24.5.2 Two-Way Radio Communication Enhancement systems

            b. Part 14.4.12 In-Building Emergency Radio Communication systems

        3. International Fire Code (IFC), section 510

If this is not initially installed, at a minimum, contractors shall provide pathways & infrastructure for any poss. additions in the future. This includes space for equipment & distribution.

10.3   DISTRIBUTED ANTENNA SYSTEM

    A. A Distributed Antenna System shall be designed for all buildings where the current availability and strength of Cellular/PCS services is limited due to building location or building construction type.

B. The Distributed Antenna System will consist of the following system criteria:

1. The in-building distributed antenna system shall reliably distribute wireless services throughout the specified frequency ranges and throughout the specified coverage spaces. The System shall be implemented based on proven state-of-the-art technology that can seamlessly integrate with the rapid evolution of wireless technologies and business applications. The System shall be flexible and shall easily accommodate additional wireless services within the System's frequency bands without requiring significant upgrades or system modifications.

2. The DAS shall include a head end subsystem. The head end shall include a wideband transceiver and be a common interface node. The head end may be co-located with Base Station systems from multiple cellular common carriers.

3. Frequency Range: The System shall support all frequencies between 700 MHz to 2100 MHz.

4. Coverage areas shall include the following:

    a. Floor areas

    b. Classrooms

    c. Instruction Labs

    d. Basement

    e. Stairwells

    f. Elevators

    g. General Use spaces (break rooms, staff rooms)

    h. Mechanical/Electrical Rooms

    i. IT Rooms

    j. Restrooms

5. The System shall be able to simultaneously support the following wireless services, applications, and/or technologies:

6. Wireless Operators, such as Nextel/Sprint, Verizon, AT&T, T-Mobile, MetroPCS:

    a. 4G - SISO

    b. LTE (700 MHz) - Verizon (4G/5G)

    c. Cellular (850 MHz) - AT&T, Verizon (2.5G & 3G, 4G, 5G)

    d. PCS (1900MHz) - Verizon, Sprint (2.5G & 3G, 4G/5G)

    e. iDEN (800/900MHz) – Nextel/Sprint

    f. AWS (1700/2100 MHz) - AT&T, T-Mobile, MetroPCS (3G /4G & 5G LTE)

In addition to above, include any & all current & poss. future systems etc.

7. The System shall have the capability for separate control over each service (or wireless operator) to allow the ability to adjust and control power levels without disturbing other services.

8. The System shall support multiple services in a modular architecture so services can be added or removed without requiring new infrastructure, without readjustment of signal power levels, or disturbing existing services/operators.

9. The system shall support expansion to adjacent buildings and campus to provide a single

cohesive distributed antenna system for the client.

10. The System shall enable services to be added without requiring additional cabling plant or antennas.

11. The System shall not impede any management features or functionality of any attached network and/or device management system. The System shall allow for proactive management and end-to-end alarming of active electronics. The System shall be able to engage with 3rd party SNMP-based element management systems and provide fault management information.

If this is not initially installed, at a minimum, contractors shall provide pathways & infrastructure for any poss. additions in the future. This includes space for equipment & distribution.

10.4   EVENT ANNUNCIATION SYSTEM (EAS)

A. Refer to SMCCCD Section 27 51 13 Event Annunciation System Design Standard and Construction Specification for speaker and cabling work to be performed by Contractor.

The EAS is SMCCCD's voice public address system at each college & the district office to notify the college & district office community of emergencies.

The EAS system serves two functions:

1. Voice public address system

2. Hourly college chimes

The Voice side of EAS system is both an indoor and outdoor sound while chimes annunciated outdoor only. This system is a public address (PA) system with two functions and SMCCCD references to the total system as the EAS system. The EAS system is designed, maintained and installed by ITS staff, with the aid of contractors for infrastructural and low voltage run installs which are listed below. The EAS system primary user is the District & College's Public Safety Department. This standard outlines t h e   equipment and wiring needed for the system.

General Guidelines:

3. Substitution or design modification shall be approved by ITS staff

4. Install a speaker (1 each) in each classroom, computer labs, stairwells, offices, and other enclosed areas. Install several speakers in the halls as needed

5. Connect all speakers in parallel per the manufacture specks. The supply side cable shall be marked with black tape 6in from the speaker connector.

6. Use "J" hooks or existing hangers to follow existing wiring paths as much as possible above suspended ceilings

7. Install proper raceway in areas where there are no suspended ceilings

8. Follow existing wiring paths as much as poss. in wiring closets

B. Contractor Supplied & Installed via Project Funds:

Indoor EAS speaker Wiring from the IDF/MDF where EAS amp will be located:

a. Use 14/2 AWG (2-conductors) shielded cable with drain wire for speakers. Genesis Cable (Honeywell) 32231012

b. Use one line per floor as home run.

Outdoor EAS speaker Wiring from IDF/MDF where EAS amp will be located to any external

speaker(s):

      c.   Use 14/2 Aquaseal Shielded with drain wire cable. WestPenn AQC295

Underground EAS Line Level Wiring from the MPOE EAS distribution system rack location to building's EAS amp location.

Run 2ea lines from MPOE EAS distribution system rack to each build EAS amp location. One for use now & one as a spare.

Use 16/2 Aquaseal Shielded with drain wire cable. WestPenn AQC294.

Where the building will have a fire alarm voice annunciation system, the EAS MPOE wiring shall land at the building FA panel. Coordination between ITS and Siemens/McKinney required for interface system.

Splicing is permitted if needed. Matching the wire colors, twist & solder all wires including the drain wire. Water seal all wires separately. Use strain relief on the connections. Water seal the outer jacket at the splice location. Restore the shield. Enclose in a waterproof enclosure suitable for a flooded location.

      C.   Speakers for suspended ceilings (70V):

1 Bogen HFCS1 ceiling speaker is preferred for most locations. (Halls, classrooms, large meeting rooms, other larger areas)

The following three units must be installed at each location. Set tap to 4 watts. Red dot facing the door.

      a.   1ea Bogen HFCS1 Ceiling speaker

      b.   1ea Bogen TBCR Tile Bridge Support Ring

      c.   1ea Bogen CK10 Safety cable kit or other safety wire

      2.   Bogen HFCS1LP for areas that will not accommodate the Bogen HFCS1. The following three units must be installed at each location. Set tap to 4 watts. Red dot facing the door.

      a.   1ea Bogen HFCS1LP Ceiling speaker

      b.   1ea Bogen TBCR Tile Bridge Support Ring

      c.   1ea Bogen CK10 Safety cable kit or other safety wire

      3.   Small Rooms: (Offices, meeting rooms, other small areas) Set tap to 4 watts. Red dot facing the door.

      a.   Bogen #HFSF1 Small-Footprint Ceiling Speaker

      b.   Bogen #**TBSF** Tile Bridge Support Ring

      c.   Bogen CK10 Safety cable kit or other safety wire

      D. Speakers for wall mount (70V):

Wall mount speaker shall be installed where suspended ceiling speakers are not possible. Set tap to 4 watts (black & yellow wires). Mount with transformer in the up position. Red dot below the grill.

a. 1ea Bogen MB8TSLVR.

E. Speakers Horns (70V):

   a. Bogen BDT30A indoor Duel horn. Set tap to 3.7 watts.

   b. Bogen SPT30A Indoor single horn. Set tap to 3.7 watts.

   c. Bogen KFLDS30T Outdoor horn (Small coverage areas) Set tap to 30 watts.

   d. Atlas Sound CJ-46 Horn & PD60AT Driver (Large coverage areas). Set tap to 60 watts. The contractor may need to supply appropriate roof mounting. Freestanding with weights, pipe or wall brackets/braces.

F. Supplied and Installed by ITS via Project Funds:

   Important: ITS will purchase & install all amplifiers, DA's, Mixers etc. in the head-end MPOE's & network rooms and other locations for the system as needed. The list of this equipment is helped by ITS.

PART 11 INSTRUCTIONAL TECHNOLOGIES

The District is committed to providing a consistent, high-quality teaching and learning environment for its students and faculty. The use of technology to support instruction is integral to achieving this goal. Whether it be audio/visual systems, communication technologies, or network technologies, it is important that a team of experienced instructional professionals are involved in the design and specifications of instructional classrooms and laboratories.

The technology used to support instruction is to be determined based on the unique instructional needs and utilization of each room or laboratory. **No facility should be designed or specified without consultation of the instructional faculty that will use the technology and District's ITS department.** The ITS staff responsible for ongoing support of the technology shall be included in all discussions of technology and room layout during planning, design development, construction design, as well as project implementation and completion.

The goals for establishing Instructional Technology Standards and Guidelines are to:

1. Serve as a planning and design reference for architects, engineers, and furniture coordinators.

2. Assist with budget planning and cost estimation.

3. Facilitate service and maintenance by having consistent technology throughout the District.

4. Ensure that the room or building technology design addresses SMCCC District's mission in meeting currently set pedagogical core requirements. This includes but not limited to teaching position locations, ADA compliance, core installed technologies within a given classroom, cable, network and power infrastructure, room acoustics lighting, soffit, whiteboard or other surfaces, etc.

The specific requirements for each instructional facility will depend on the unique instructional use of that facility. Therefore, these standards are guidelines and are subject to change based on the introduction of new technologies or to meet unique instructional needs.

11.1   GENERAL GUIDELINES FOR INSTRUCTIONAL TECHNOLOGY

Equipment specified by make and model shall not be substituted without the written approval of SMCCD ITS.

New instructional technology installations must reflect current technology at the time of opening

and be designed to be easily upgraded as technology and pedagogy change over time.

New or remodeled classroom shall be a Smart Classroom.

Where appropriate, new or remodeled instructional laboratories shall be a Smart Classroom.

Instructional facilities shall have wireless access so that students and faculty may connect to the Internet.

11.2   SMART CLASSROOMS INFRASTRUCTURE

A. Construction Standards

The minimum standard for all new or modernized classrooms is to include a projector mount, projector power, projector data connections, projector AV connections, teaching position data connections, teaching stations AV connections, teaching position power, pathway for cables from the projector to the teaching position, a projection screen, a mounted controller for the projector, speakers, controlled room lighting at the wall, and a teaching station or a lectern equipped with secure media cabinet.

1. Ceiling Mount for Projector Pole

   Mount shall be centered relative to projection screen 15'+/-6" distance from the front of the screen.

   For flat ceilings, use Chief CMA-110 8" x 8" - 1 ½" NPT fitting

   For angled ceilings, use Chief CMA-395 Angled Ceiling Adapter 4 1/4" H x 3" W x 7 1/2" L

   Locate projector mount centered with the projection screen 15' +/-6" from the front of the screen.

   The contractor shall install the ceiling mount.

2. Projector Pole

   Chief Extension Column. Column length is to be determined by screen mounting height. The threaded bottom end of the pole is to be at the same height as the top of the screen housing.

   The contractor shall install the pole.

3. Projector Mount for retrofits: Otherwise contractor to install custom mount as needed to the ceiling.

4. Chief RPMAUW Projector Mount with (A) Key Lock Chief RPM installed by the **ITS staff**.

5. Power for Projector & lectern/teaching station

   Power to classroom projectors shall be on a dedicated circuit. NOT shared with other electrical. Two projectors in the same room can share the same circuit.

   Non-Suspended Ceiling:

   Each projector requires one duplex 120VAC 20A circuit, located 12" +/- 6" behind or a side the projector.

   Suspended Ceiling:

   Each projector requires one duplex 120VAC 20A circuit, located above the suspended ceiling.

6. Data for Projector

   Non-Suspended Ceiling:

Each projector shall consist of three data links, located 12" +/- 6" behind or a side the projector.

Suspended Ceiling:

Each projector requires 3ea CAT6A data links, located above the suspended ceiling.

7. **For AV cabling between teaching station lectern and projector, refer to Section G below**

B. Teaching Position Location and Infrastructure

The teaching position will be the location where the instructor will base their laptop/device during instruction. The teaching position will also serve as the central location where the instructor controls and operates the room technology. At this location, the core classroom technology will be housed in a locked media cabinet.

The teaching position is typically located in the front of the room, 4-5 feet off the wall (based on ADA requirement), opposite side of classroom entryway, and generally 5 ft. from the side of the projection screens and with power and cable access (data, AV, speakers and Assisted listening) from the floor via quantity 3, 1-1/2 inch conduit stub-up conduits. All conduit stub-ups shall be 5-6 inches off the floor. Conduit for power shall be accounted for separately.

The teaching position and instructor furniture layout shall meet ADA requirement.

Power for Teaching Position

A dedicated 20Amp circuit, quad receptacles, on a single gang box

Data for Teaching Position

Qty 6 CAT6A individual telecom (data) outlets --- terminated inside media cabinet, through conduit stub-ups. In larger classrooms, additional data drops may be required.

Conduit Pathways for Teaching Position (No floorBoxes – See diagram below)
All lectern locations in the classrooms are to have stub-ups (see diagram below) for AV, Data, and Speaker, and assistive listening wires. Power should also have its own conduit. Floorboxes are NOT to be used for teaching station lecterns.

Quantity three (3) 1-½ inch conduits shall be installed.

Conduit contents will house the following:

1) Data quantity (x8) (Cat-6A) from the MDF/IDF
2) AV quantity (x4) (Shielded Cat-6A) from the lectern to each ceiling projector or classroom display unit
3) Wallbox quantity (x2) (Shielded Cat-6A) from wallbox to the lectern
   Wallbox data quantity (x4) Cat-6A from wallbox to IDF
4) Spare 1.5" conduit from the lectern to the projector in the room.

Each conduit to be stubbed out to above the suspended ceiling from the lectern location. (Photo below).

Each power AV/Data conduit to be stubbed up off the floor in the lectern is to be located with a 4x4 box for the connections.

Typically, cable hangers will support the cables above ceilings.

2. Instructor's Lectern and Podium (Contact ITS for updated specs for new custom lectern)

   Fixture must address ADA standards for accessible design

   Fixtures may vary according to the specific program of the classroom.

   Fixture options include, but are not limited to:

   One-piece lectern and media cabinet with a freestanding table and attached desk (see below conceptual rendering).

   Instructor's lectern is designed to SMCCCD's specifications and encompasses a wide fixed-angled table-top with pop-up power and retractable cable system which allows laptops or BYOD connection, a locked AV cabinet beneath the podium which houses the core technology for classroom operation, middle shelf to for DVD/Bluray player, and a document camera.

Left Hand Orientation (Instructor Side)

Left Hand Orientation (Classroom side)

Right Hand Orientation (Instructor Side)

Right Hand Orientation (Classroom side)

Refer to Appendix B below for Instructor's Lectern cut sheet and dimension details

C. Projections Screens: Electric Screens are Preferred

Ceiling conditions or light fixtures may require a modification to optimize the projection. Contact ITS for a variance.

1. Standard Rooms with Suspended Ceiling (10 feet +)

   The projection screen shall be Da-Lite Tensioned Advantage Electrol 16:10 screen, 72.5"x116 (137" Diag) HD Progressive 1.1.

   Screen shall be installed in the ceiling.

   The screen location shall be determined based on instructional needs.

2. Large Rooms with Suspended Ceiling (12 feet +) Two Projectors:

   There shall be two projections screens. The projection screens shall be Da-Lite Tensioned Advantage Deluxe Electrol 16:10 screen, 87"x139" (164" Diag) HD Progressive 1.1

   Screens shall be installed in the ceiling.

3. Large Rooms with Suspended Ceiling (12 feet +) One Projector:

)

   a. Contact ITS Staff if a smart classroom is thought to be better suited to one large screen.

   For non-conforming rooms size and or shape, screen TBD by ITS staff on an individual basis. (Not for reg use)

4. Standard Rooms Without Suspended Ceiling (10 feet +): The projection screen shall be Da-Lite Model C with CSR (Controlled Screen Return), 16:10 screen, 72.5"x116" (137" Diag) Matt White.

a. (70296), with Da-Lite Model No. 6 installation metal brackets (40932).

Screen shall be installed between 10 and 11 feet high from the floor.

The screen location shall be determined based on instructional needs.

.

D. Lighting Controls

Ceiling lighting that occurs between the projector and screen shall be switched on/off or dimmable independent of other ceiling lights. The switch shall be of a different color than other switches for easy identification and to be located near the screen control.

E. Speakers

For any room type, consult ITS for speaker layout.

Standard set up is ceiling speakers in suspended ceilings:

1. Smart Classrooms with Suspended Ceilings:

The speakers shall be JBL Control 26CT. Contractor shall install all speakers. Speakers shall be evenly placed in the ceiling. Typical room installation will include 4-6ea 70v speakers, though speaker quantities and locations shall be determined according to room purpose, room size, and seating orientation. No speakers over the lectern or along the front teaching area. Set tap to 15W.

A. Small to Medium Size Rooms

B. Typical room installation will include 4ea 70v speakers. 2ea front & 2ea rearLarge Rooms

Typical room installation will include 6ea 70v speakers. 3ea front & 3ea rear. Middle speaker to be centered in the room. End speakers to be placed approx. 1/3 distance of the room from the center speakers.

2. Smart Classrooms without Suspended Ceilings

Rooms without suspended ceilings require wall-mount speakers. Typical room installation will include two speakers on either side of the projection screen, though speaker quantities and locations shall be determined according to room purpose, room size, and seating orientation. The speakers shall be installed at the same height as the screen equally spaced on either side 18" +/- 6 inches.

The speakers shall be JBL Control 1.

Contractor shall install all speakers.

3. Speaker Wiring:

Speakers require 14 AWG stranded wire (14/2 shielded) from the teaching position with a 10-foot tail coiled at the teaching position. Contractor shall install all speaker wires as one loop for front & one loop for rear. Mark the supply side with black tape 6in from the connector.

The color scheme is to be:

If Red/White: red (+) white (-)

If Red/Black: red (+) black (-)

If White/Black: white (+) black (-)

F. Sound System / Audio Amplifier

The sound system shall consist of an audio amplifier and an appropriate quantity of loudspeakers. Due to the number of variables that can affect sound in a classroom, contact ITS for an appropriate sound solution.

The Project shall fund the audio amplifier and loudspeakers. SMCCCD ITS shall install the amplifier.

G. Assistive Listening System
Contractors are responsible for the installation of Assistive Listening Systems as required by code for new and renovated classrooms and event spaces.
1. Classroom space

     a. ListenIR LS-93 – This kit includes all the necessary equipment

     b. 22 AWG balanced mic audio cable

        1) Belden 9451P
        2) Or approved equivalent
     c. ListenIR Expansion Radiotor (LA-141)

     d. Category 6A patch cable

     e. Refer to Appendix

H. Wall Box Configurations
Contractors are responsible for the installation of Wall Boxes and related conduits. Wall Box configuras will be as follows

1. Digital Signage
a. Chief PAC526FWP4 installed at 63" to the center, above finish floor.
b. Conduit 1: Houses electrical (see diagram)
c. Conduit 2 (1.25"): Spare with J-box
d. Conduit 3 (1.25"): Three (3) CAT6A with J-box that goes to IDF
e. Conduit 4 (1.5"): Dedicated for AV cabling

Digital Signage

Conduit #1
Electrical Conduit

Conduit #2
1-1/4" w/ J-Box (Empty)

Conduit #3
1-1/4" w/ J-Box (3 Data)

Conduit #4
1-1/2" AV

CHIEF
PAC526FWP4

63 in
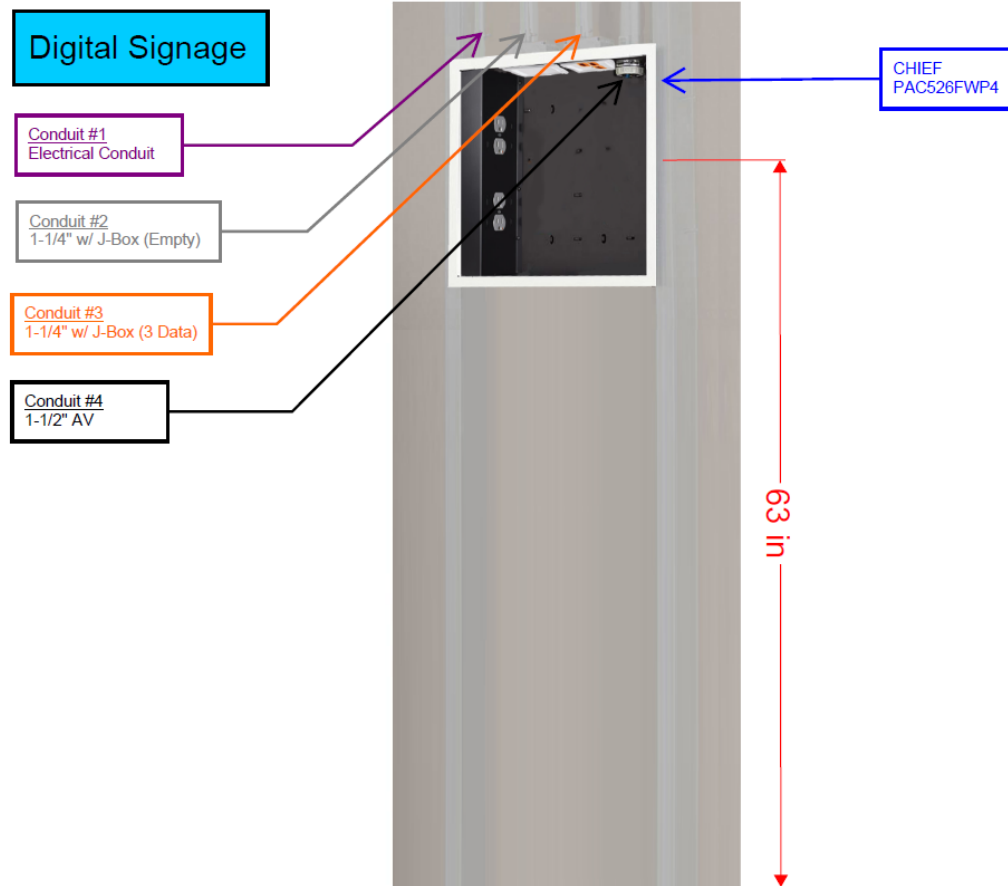
2. Huddle Space
   a. Chief PAC526FWP4 installed at 60" to the center, above finish floor.
   b. Conduit 1: Houses electrical (see diagram)
   c. Conduit 2 (1.25"): AV conduit with J-box; Two (2) CAT6A Shielded cable that goes to lectern
   d. Conduit 3 (1.25"): Four (4) CAT6A with J-box that goes to IDF
   e. Conduit 4 (1.5") : Dedicated for AV cabling
   f. Conduit 5 : Electrical conduit continued down to 34" AFF
   g. Conduit 6 (1.5"): Spare conduit continued down to 34" AFF

Huddle

Conduit #1
Electrical Conduit

Conduit #2
1-1/4" w/ J-Box (2 AV)

Conduit #3
1-1/4" w/ J-Box (4 Data)

Conduit #4
1-1/2" AV

Conduit #5
Electrical Conduit

Conduit #6
1-1/2" AV

CHIEF
PAC526FWP4

60 in

34 in
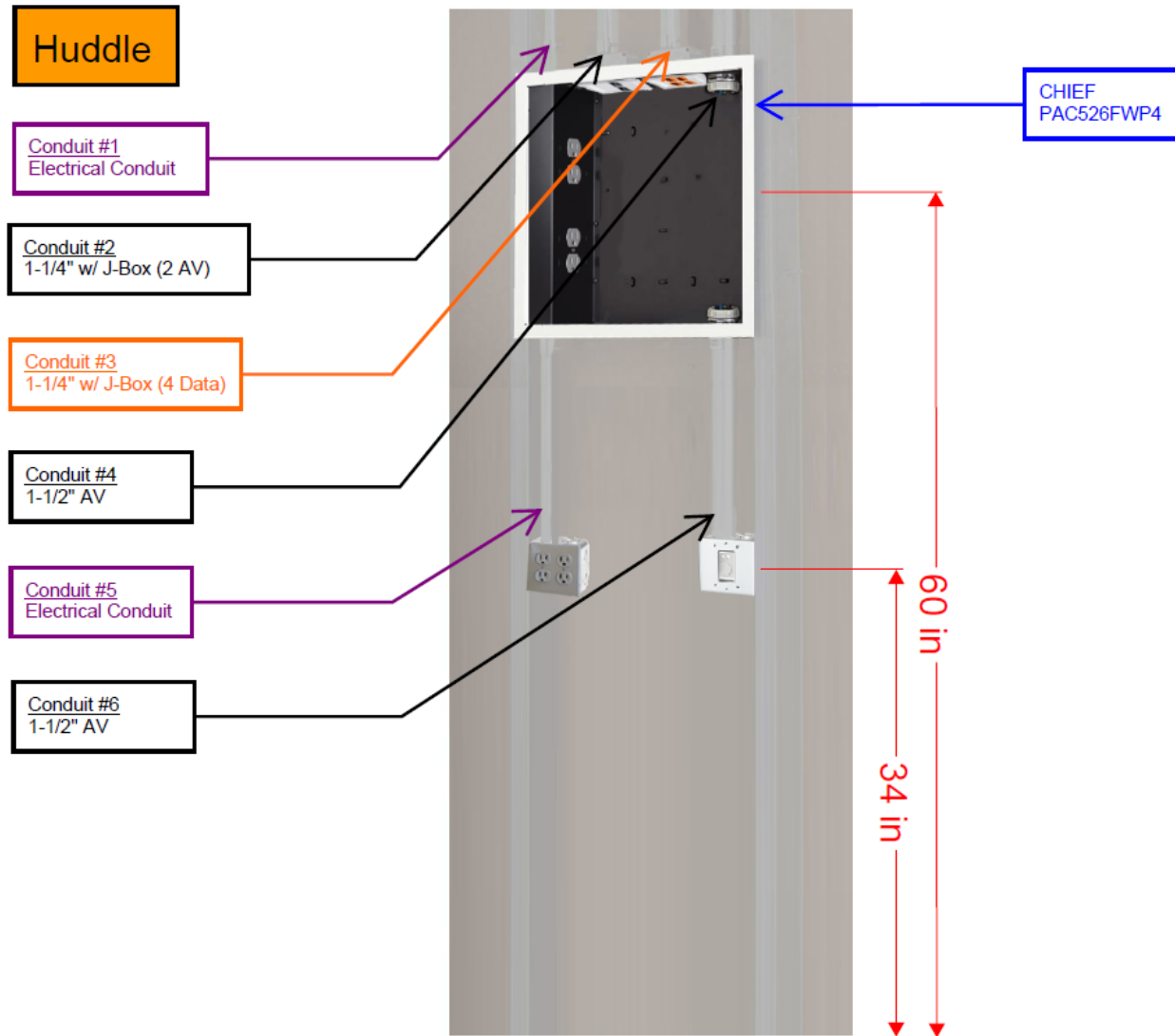
3. Meeting Room
   a. Chief PAC526FWP4 installed at 66" to the center, above finish floor.
   b. Conduit 1: Houses electrical (see diagram)
   c. Conduit 2 (1.25"): Spare
   d. Conduit 3 (1.25"): Four (4) CAT6A with J-box that goes to IDF
   e. Conduit 4 (1.5") : Dedicated for AV cabling
   f. Conduit 5 : Electrical conduit continued down to 18" AFF
   g. Conduit 6 (1.5"): Spare conduit continued down to 18" AFF
   f. Conduit 7 (1.25"): Three (3) CAT6A with J-box that goes to IDF. Installed at 18" AFF
   g. Conduit 8 (1.25"): Display Control Mounted at 48" AFF
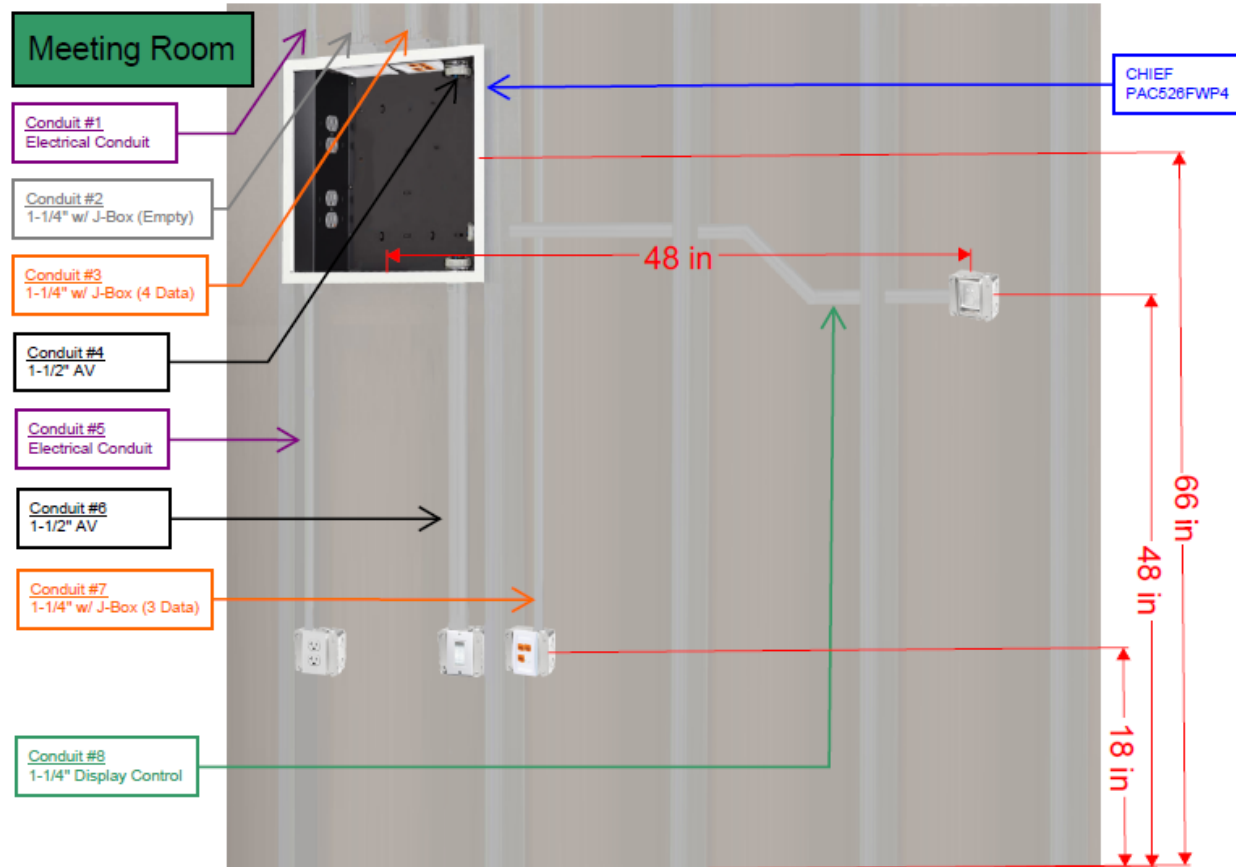
4. Hybrid Room
   a. Chief PAC526FWP4 installed at 63" to the center, above finish floor.
   b. Conduit 1: Houses electrical (see diagram)
   c. Conduit 2 (1.25"): Two (2) CAT6A with J-box that goes to IDF
   d. Conduit 3 (1.25"): Four (4) CAT6A with J-box that goes to IDF
   e. Conduit 4 (1.5") : Dedicated for AV cabling
   f. Conduit 5 : Electrical conduit continued down to 34" and extends to 18" AFF
   g. Conduit 6 (1.5"): Spare conduit continued down to 34" and extends to 18" AFF
   f. Conduit 7 (1.25"): Display Control Mounted at 48" AFF
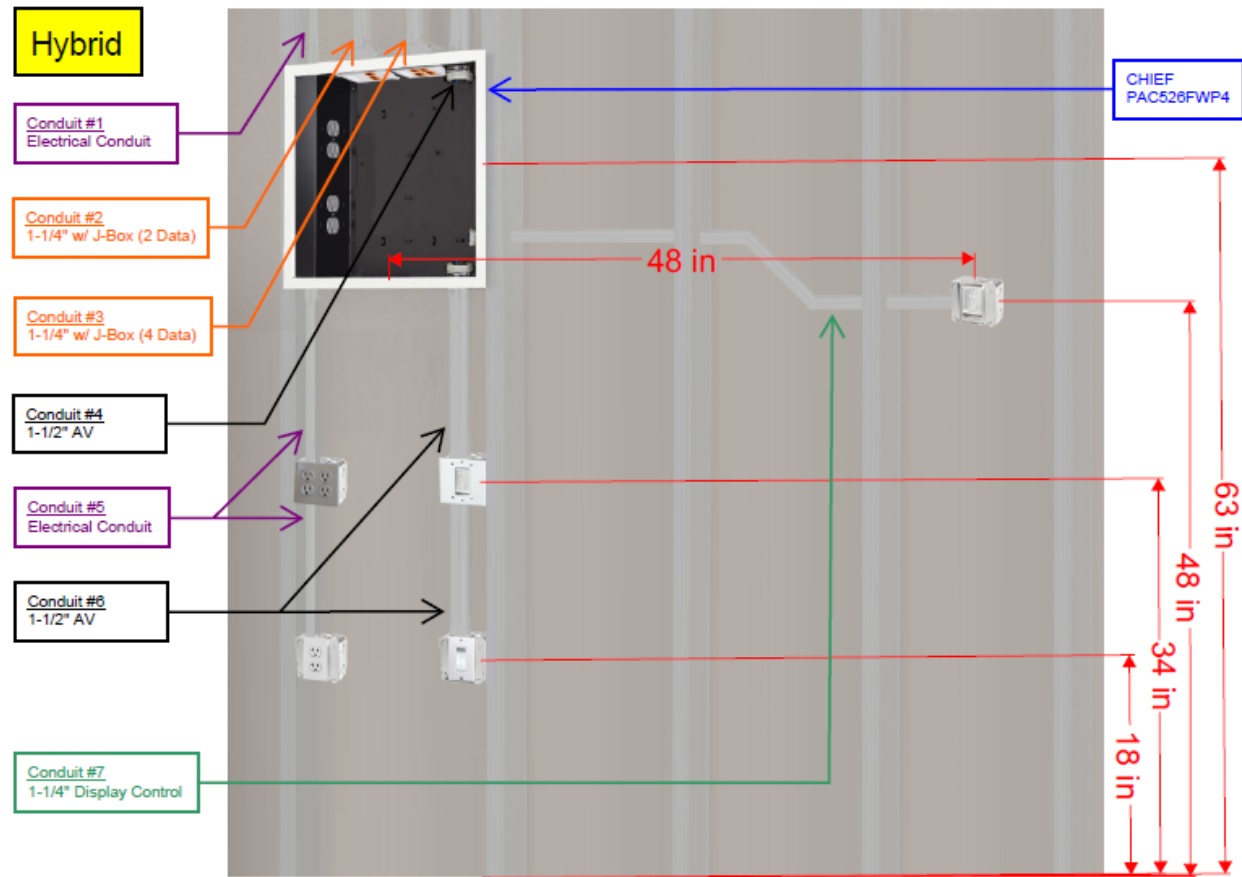
I.   AV Cabling Bundle

The AV cabling bundle is from teaching position (media cabinet) to projector and loudspeakers. The AV cabling bundle shall consist of the following:

1.   4ea Shielded Cat6A Shielded Audio/Visual Media cables.

   a.   Terminated to one 4-Port Faceplate on each end

      1)   Non-Suspended Ceiling:

         a)   Located 12" +/- 6" behind or beside the projector.

      2)   Suspended Ceiling

         a)   *Located above the suspended ceiling.*

      3)   Teaching Station

         a)   *Located inside the cabinet beside the power and data connections.*

   b.   Each port on the faceplate shall be labeled with the cable number.

   c.   Black shielded Cat6A modules. e.g., Panduit CJS6X88TGY

   d.   Labeling: In room point to point & from classroom to MDF/IDF shall be as listed in the data labeling section.

2.   AV Equipment:

The Project shall fund the cabling and all equipment.

Contractor shall install all screens, projector mount, pole, speakers, data lines, and all addressed wiring between teaching station and projector.

SMCCCD ITS staff shall install the projector, amplifier, blue-ray player, and video signal processor and extenders.

PART 12 PRODUCTS

12.1   APPROVED MANUFACTURERS

Refer to Appendix A

PART 13 EXECUTION

13.1   SUBSTITUTES ALLOWED?

No substitutes allowed.

Pursuant to Section 3400 of the Public Contract: Certain telecommunications systems are now in use on the particular public improvement described as San Mateo County Community College District. At each instance in Appendix A that a designated material, product, thing or service is designated by a manufacturer's name and product number, that manufacturer's name and product number is designated to support the existing telecommunications systems that are in place at Skyline College, College of San Mateo, Cañada College and the District Administration Building. The Contractor will furnish and install only those products as required, and no substitutions shall be deemed to be "or equal" or allowed.

13.2   ASSOCIATED DESIGN STANDARDS AND CONSTRUCTION SPECIFICATIONS

A. Physical Access Controls and Security Management Design Standard
B. Space Design Standard – Academic Spaces
C. Space Design Standard – Instructional Spaces
D. Space Design Standard – Circulation and Public Spaces
E. Division 27 Design Standards and Construction Specifications
F. Section 33 00 00 Utilities Design Standard

End of Document

Appendix A – Approved Products List					
	Primary Products Listing			**Alternate Products**	
Product/Description	**Mnfr**	**Product Number**	**Comment**	**Mnfr**	**Product Number**
27 05 28 - TELECOMMUNICATIONS BUILDING PATHWAYS					
Hangers and Straps	CEAS Eaton B-Line Erico Panduit	"Stiffy" BCH21-W2, BCH32-W2, BCH21, BCH32 CAT12, CAT21, CAT32, CAT425 JMJH2-X20	Low voltage supports	Allowed	-
Drop Wire	Hilti Armstrong Dottie Garvin Industries Oregon Wire Products	CC27 X-AL-H22P8T 7891 CWC	-	Allowed	-
Drop Rod	CEAS	01014801	"Stiffy" straight rod	Allowed	-
Fire Rated Sleeve	Hilti STI	236323, 236324	-	Allowed	-
Spiral Wrap	Panduit		Black	Allowed	-
27 05 33 - TELECOMMUNICATIONS CONDUITS AND BOXES					
Electrical Metal Tubing (Type EMT) Conduit	Allied Tube and Conduit Co Cal Conduit Products Republic Conduit Western Tube and	"EZ-Pull" "CalBrite"	EMT conduit EMT conduit		
Fittings for EMT	Appleton Electric Co O-Z Gedney Thomas & Betts Corp		-		
Deflection/Expansion Sleeve for EMT	Cooper Crouse-Hinds O-Z Gedney	"XD" series "DX" series	-		
Expansion Sleeve for EMT	Cooper Crouse-Hinds O-Z Gedney	"XJG-EMT" series "TX" series	-		
Intermediate Metal Conduit (Type IMC) Conduit	Allied Tube and Conduit Co Western Tube and Conduit Corp	"Kwik-Couple" conduit	-		
Fittings for IMC	Appleton Electric Co O-Z Gedney Thomas & Betts Corp		-		
Deflection/Expansion Sleeve for IMC	O-Z Gedney Thomas & Betts Corp	"DX" series "XD" series	-		

Expansion Sleeve for IMC	Cooper Crouse-Hinds O-Z Gedney	"XJG" series "TX" series	-		
Expansion Sleeve at Box Termination for IMC	O-Z Gedney	"EXE" series	-		
Rigid Metal Conduit (Type RMC) Conduit	Allied Tube and Conduit Co Western Tube and Conduit Corp	"Kwik-Couple" conduit	-		
Fittings for RMC Conduit	Appleton Electric Co O-Z Gedney Thomas & Betts Corp		-		
Deflection/Expansion Sleeve for RMC	O-Z Gedney Thomas & Betts Corp	"DX" series "XD" series	-		
Expansion Sleeve	Cooper Crouse-Hinds O-Z Gedney	"XJG" series "TX" series	-		
Expansion Sleeve at Termination Box	O-Z Gedney	"EXE" series	-		
Rigid Nonmetallic Conduit (Type RNC) and Fittings – Electrical PVC Conduit (EPC) – Schedule 40 and Schedule	Allied Tube & Conduit Carlon JM Eagle Ridgeline Pipe Manufacturing		-		
Liquid-Tight Flexible Metal Conduit (Type LFMC) Conduit	AFC Cable Systems, Inc. (Atkore) ANAMET Electrical Electri-Flex Company Southwire Company		-		
Fittings for LFMC	Appleton Electric Co O-Z Gedney Cooper Industries Thomas & Betts Corp		-		
Pull Tape	Neptco Inc. Pacific Strapping Inc.	MULTETAPE ® HERCULINE ®	-		
Pull String	Ideal Industries Inc. Klein Tools	Powr-Fish ® or Valu-Line ™ poly pull line 56110 poly pull line	-		
Duct Plugs	Tyco	"JACKMOON"	-		
Pull Boxes	Cooper B-Line (Eaton) Hoffman (Pentair) Hubbell Wiegmann		-		
Steel Outlet Boxes and Covers, Square Box and Cover/Rings- 5"	Randl Industries		-		
Steel Outlet Boxes and Covers, Square Box – 4-11/16", Extra Deep	Garvin Industries RACO (Hubbell)		-		

Steel Outlet Boxes and Covers, Square Box – 4-11/16", Deep	Appleton Electric Co O-Z Gedney Garvin RACO (Hubbell) Steel City		-		
Box Support Accessories – Stud-Mount Single-Box Bracket, Stud-Mount Multi-Box Bracket, Floor-Mount Box Mounting Bracket	Erico Garvin RACO		-		
Box Support Accessories – T-Bar Bracket	Erico	510HD	-		
Box Support Accessories – T-Bar Support	Erico	4ACS	-		
Multi-Service Floor Boxes	FSR Inc.		8 gangs, minimum		
Multi-Service Poke-Thrus	Wiremold	"Evolution" 8AT series "Evolution" 6AT series	-		
Multi-Service Wall Boxes for Flat Panel Displays	FSR Wiremold Chief Manufacturing		Capacity for power, telecom, AV, and conduit connections		
Weatherproof (Outdoor) Outlet Boxes and Covers	Bell (Hubbell) Garvin		-		
27 11 00 – COMMUNICATION EQUIPMENT ROOMS					
Cable Tray – Wire Mesh Type	Chatsworth Products	2" (H) x 6" (W) - 60212150-003 2" (H) x 8" (W) - 60212200-003 2" (H) x 12" (W) - 60212300-003 4" (H) x 6" (W) - 60213150-003 4" (H) x 8" (W) - 60213200-003 4" (H) x 12" (W) - 60213300-003			
Cable Runway Type for MDF/IDF Rooms	Chatsworth Products	CPI Cable Runway (10250-712) CPI BUTT-Splice Kit cable runway (11301-701) CPI Junction-Splice Kit cable runway (11302-701) CPI Cable Runway Elevation Kit (10506-X06) CPI Wall Angle Support Kit, Cable Runway (11421-7-18) CPI Rack-to-Runway Mounting Plate Using Hat-Shaped-Bracket (12730 Kit) CPI Triangular Support Bracket, Aluminum (11312-718) CPI Cable RunWay Radius Drop: (12100-718) CPI Combination Pan Head, Pilot Point Mounting Screws (40605-001) CPI Ground Wire, #6 AWG, 100' (30 m) Spool (40159-001) CPI Cable Runway Ground Strap Kit (40164-001) CPI Compression Lugs (40162-901)			
Vertical cable runway type between room above each other	Chatsworth Products	CPI Cable Runway (10250-712)			

Sheet Hardwood/Plywood (as Backboard)					
Fasteners, for Plywood	Phillips Drill Co. Wej-It Expansion Products Inc.	"Red Head" masonry anchors "Wej-It" concrete anchors			
Equipment Rack, 2-Channel, Black	CPI	48353-703			
Seismic Gusset, for 2-Channel Equipment Rack, 7'0" Black	CPI	11592-701			
Vertical Mgmt Section, 7'-0"H x 8"W, Double Sided,	CPI	35522-703			
Horizontal Mgmt Panel, 1 RMU, Single Side	CPI	35441-701	For Data		
Horizontal Mgmt Panel, 2 RMU, Single Sided	CPI	35441-702	For AV		
Label Plates, for Equipment Racks					
Termination Equipment – Twisted Pair Cabling Patch Panel					
Strain Relief Bar, Extended 7"	PANDUIT	SRB19D7BL			
Labels	PANDUIT	S200X400YAJ; labels for 25-100 pair cables S200X650YAJ; labels for 100-400 pair cables			
27 13 13 – NETWORK PATCH CABLING					
CAT6A Performance, 28AWG, UTP Patch Cord (**Indoor**)	PANDUIT	UTP28X*^	"*" = length (in) "^" = color		
CAT6A 10UTP Plenum Cable (**Outdoor**)	GenSPEED (General Cable)	Refer to 27 15 13 below for product requirements	Can be used to create Outdoor Patch Cable		
TX6A CAT6A U/UTP **Outdoor** Copper Cable	PANDUIT	Refer to 27 15 13 below for product requirements PUO6AS04BL-G	Can be used to create Outdoor Patch Cable		
27 13 23 – BACKBONE ISP FIBER CABLING					
CORNING OPTICAL COMMUNICATIONS Freedm Cable, Indoor/Outdoor; 900um Plenum; 50um OM4; 8.0mm OD; 24 Fiber	Corning	024T8P-31190-29	-		
Fiber Optic Patch Panel, 1U, 2 adapter modules	Corning	CCH-01U, Connector Closet Housings	-		
Closet Connector Housin (CCH) Panel, LC Adapters, 24 Fiber aqua SM	Corning	CCH-CP24-A9			
Closet Connector Housing (CCH) Panel, LC Adapters, 24 fiber OM3/OM4, aqua (MM 50/125)	Corning	CCH-CP24-E4			
Connector, LC multimode, Aqua	Corning	95-051-98-SP-X			
Connector, LC singlemode	Corning	95-200-99			
Labels	Panduit	S200X225YAJ S200X400YAJ S200X650YAJ			
Fiber Slack Storage Reel	Leviton	48900-OFR			
Velcro Cable Ties, black, 15' roll	Panduit	HLS-15R-0			

	Primary Products Listing	**Alternate Products Listing**

Product/Description	Mnfr	Product Number	Comment	Mnfr	Product Number
27 13 14 – BACKBONE OSP TWISTED PAIR CABLING					
Cable, OSP, Underground Cables – Duct/Conduit	Superior-Essex General Cable Belden	Filled ASP-type series	-		
Splice Closure, Underground/Vault	3M Telcom	"Better Buried" series 4460; shield bond connector for cables 4460-D; shield bond connector for cables 25T; ground brain w/ or w/o eyelets	-		
Encapsulant	3M Telcom	4442; "High Gel" re-enterable encapsulant			
Splice Module, 710-Type, 25-pair, Filled	3M Telcom	3M710-SC1-25	-	Allowed	-
Splice Closure, Building Entrance	3M Telcom	5-26; solid closure, up to 600 pair 5DS-26; split closure, up to 600 pair C5-100-6; end caps 4460; shield bond connector for cables 4460-D; shield bond connector for cables 25T; ground braid w/ or w/o eyelets	-	Allowed	-
Splice Module, 710-Type, 25-pair, Dry	3M Telcom	3M710-SD1-25	-	Allowed	-
BEP Terminal, Swivel Stub Input & Output	Circa SYSTIMAX	1900A1-100, 100-pair BEP terminal 489ACC1-100, 100-pair BEP terminal			
BEP Module, With Sneak Current Protection	Porta Systems Circa SYSTIMAX	115SCG-240V; solid-state module, 220V 4B1FS-240I solid-state module, 240V 4C1S; solid-state module, 220V-300V			
Termination Apparatus, "66 Block" Type	Siemon	S66M1-50; 66 block, 'split 50' S89B; mounting bracket for 66 block S89D; mounting bracket for 66 block SA1; bridging clip MC4LH-x, 2-9	"x" represents the color (default color is white ("2"))		
Termination Equipment – Twisted Pair Cabling Patch Panel – Refer to Section 27 15 13 for product requirements					
Labels	Panduit	S200X400YAJ; labels for 25-100 pair cables S200X650YAJ; labels for 100-400 pair cables			
Duct Plugs	Tyco Carlon				
27 13 24 - BACKBONE OSP FIBER OPTIC CABLING					

Outside Plant Innerduct – "Corrugated", orange, black, blue, and yellow	A-D Technologies Carlon Endot				
Cable, OSP, 24 Fiber singlemode (OS2)	Corning	024EU4-T4701D20		Allowed	-
Fiber Optic Patch Panel, 4U, 12 adapter modules	Corning	CCH-04U, "Connector Closet Housings"	-	Not Allowed	-
Fiber Optic Patch Panel, 2U, 4 adapter modules	Corning	CCH-02U, "Connector Closet Housings"	-	Allowed	-
Fiber Optic Patch Panel, 1U, 2 adapter modules	Corning	CCH-01U, "Connector Closet Housings"	-	Allowed	-
Closet Connector Housing (CCH) Panel, LC Adapters, 24 fiber, OC2	Corning	CCH-CP24-A9	-	Allowed	-
Connector, LC Singlemode, blue	Corning	95-200-99	-	Allowed	-
Labels	Panduit	S200X225YAJ S200X400YAJ S200X650YAJ			
Duct Plugs	Carlon Tyco	Refer to Specification Section 27 15 13 below for specific information			
Breakout Kits	Corning	Refer to Specification Section 27 15 13 below for specific information			
Fiber Slack Storage Reel	Leviton	48900-OFR			
Velcro Cable Ties, Black, 15' roll	Panduit	HLS-15R-0			
27 15 13 - HORIZONTAL CABLING					
Cable, CAT6A 4-pair, CMP (plenum), blue (**Indoor**)	Panduit	Panduit PUP6AHD04BU-G	BU=Blue Indoor		
CAT6A Shielded F/UTP CMP	PANDUIT	PFP6X04BL-UG	BL=Black Indoor		
CAT6A 10UTP **Outdoor** Plenum Cable	PANDUIT	PUO6AS04**BL**-G	BL= Black Outdoor		
CAT6A 10UTP **Outdoor** Plenum Cable	GenSPEED (General Cable)		Outdoor		
Horizontal Cable Support Bar	Panduit	SRBCT; straight strain relief bar			
Modular Connector/Jack, CAT6A 8-position	Panduit	Refer to Section 8.7 RJ45 Modular Jack Color			
Patch Panel, 24 Discrete Ports	Panduit	CPPL24M6BLY			
Faceplate, "Mini-Com" line "Executive" series	Panduit	CFPExyy	"x" represents the port count; "yy" represents the color (default color is white ("IW")	None	-

Faceplate, Wall-phone faceplate, with "Keystone" line jack	Panduit	CFPExyy	"x" represents the port count; "yy" represents the color (default color is white ("IW")	None	-
Frame for GFCI / "Decora"-style coverplate, "Mini-Com" line	Panduit	CFGxyy	"x" represents the port count; "yy" represents the color (default color is white ("IW")	None	-
Frame for "106"-style coverplate, "Mini-Com" line	Panduit	CF106xyy CFGxyy	"x" represents the port count; "yy" represents the color (default color is white ("IW")	None	-
Faceplates for Modular Furniture Mount Outlets	Panduit	CFFP4BL; fourplex furniture faceplate MFFPHMBL; adapter for Hermin-Miller			
Surface outlet box, "Mini-Com" series, white	Panduit	CBX2WH-AY; 2 ports CBX4WH-AY; 4 ports			
Poke-Thru Floor Outlet, for Keystone mount connectors	Wiremold	CM2-U2KEYA; 2 mount connectors			
Bezel Adapter, for Wiremold devices and Panduit Mini-Com connectors	Panduit	CHI2MEI-X; 2 port CH02MEI-X; 2 port			
Faceplate for Furniture Feeds	Levitron	80704-4; 1.4" round opening			
Labels	Panduit	S100X150YAJ; labels for cables C125X030FJJ; Equipment Room Identifier C061X030FJJ; Unique Cable Number CPPLF-5; for modular patch panels			
CAT HP J-Hook	Caddy	CAT32HP	35 Cables		
CAT HP J-Hook	Caddy	CAT48HP	80 Cables		
CAT HP J-Hook	Caddy	CAT64HP	140 Cables		
Velcro Cable Ties	Panduit	"Tak-Ty" series HLS-15R-0			
Plenum Cable Ties	Panduit	PLT1M-xxxx PLT2S-xxxx PLT3S-xxxx			
Phone Type with Mounting kit					
Stainless steel wall phone plate with one Category 6 punch down keystone jack module	Panduit	KWP6PY	Used when applicable; Consult with ITS	None	

Courtesy/Area of Refuge					
Courtesy/AOR Phone	TALK-A-PHONE	VOIP-600ECK		None	
Mounting Sleeve	TALK-A-PHONE	MS-600	Required with VOIP-600 (flush mount kit)		
Mounting Sleeve	TALK-A-PHONE	ETP-SM-1-SS	Required with VOIP-600 (surface mount - solid concrete and exterior walls)		

END OF APPENDIX A

Appendix B – Instructor's Lectern

1"THK. STARON PANEL.

³/₁₆" RADIUS EDGE
DETAIL AA

Note: Overall height shown does not include adjustable glides which adds an average height of ½".

THIS SYMBOL DENOTES WOOD GRAIN DIRECTION

woodtech
p (510) 534.4930 f (510) 534.3389
4611 maint st. oakland, ca. 94601
12/12/2017   44756_LN1_OptionF_Ri

For company/Q.C use only:
STG
ASY
FSH
F.I.
DATE: REV: DATE: FILE NAME:
Observations:

AXIL Z POWER UNIT IN:
GLOSSY BLACK FINISH WITH -
2 POWER, 1 RJ-45 - 1 Blank Plate.

1" THK. TOP IN:
CORIAN DEEP NIGHT SKY
MATTE FINISH.

CUTOUT FOR: CRESTRON
FT2-1200-MECH-B UNIT.

1" THK. TOP IN:
CORIAN DEEP NIGHT SKY
MATTE FINISH.

AXIL Z POWER UNIT IN:
GLOSSY BLACK FINISH WITH -
2 POWER, 1 RJ-45 - 1 Blank Plate.

HINGED DOOR.
PLAM: FORMICA
NATURAL MAPLE - 756-58.
MATTE FINISH.
• KEYED ALIKE.

PERFORATED ALUMINUM
SHEET METAL-NATURAL FINISH.

AA

STANDARD 2 ½"
BLACK PLASTIC
GROMMET.

OVERLAY PANEL IN:
PLAM: FORMICA
NATURAL MAPLE - 756-58.
MATTE FINISH.

SELF EDGE
LAMINATE
EDGES.

PODIUM - ¾" THK. PANEL
PLAM: FORMICA
NATURAL MAPLE - 756-58.
MATTE FINISH.

BOX - FILE PEDESTAL IN:
PLAM: FORMICA
NATURAL MAPLE - 756-58.
MATTE FINISH.
• SIDE FINGER PULL.

DESK - 1" THK. PANEL
PLAM: FORMICA
NATURAL MAPLE - 756-58.
MATTE FINISH.

1A.- PERSPECTIVE VIEW

PODIUM: ¾" THK. PANEL CONSTRUCTION IN:
PLAM: FORMICA
NATURAL MAPLE - 756-58.
MATTE FINISH.

¾" THK. MODESTY PANEL IN:
PLAM: FORMICA
NATURAL MAPLE - 756-58.
MATTE FINISH.
6" CLEARANCE FROM FLOOR.

HINGED DOOR.
PLAM: FORMICA
NATURAL MAPLE - 756-58.
MATTE FINISH.

1B.- PERSPECTIVE VIEW

(7) LEFT HAND
Tag: TEACHING STATION

DEALER:
CLIENT: SAN MATEO COUNTY COMMUNITY COLLEGE
CONTACT: YOSEPH DEMISSIE
DRAWN BY: GN

JOB #: 44756
PO #: P1902347
EDGE: SELF EDGE
SCALE: NOT TO SCALE

SERIES: TEACHING STATION
FINISH: FORMICA: NATURAL MAPLE - 756-58 MATTE FINISH | | CORIAN DEEP NIGHT SKY - MATTE FINISH
** WOODTECH can not be responsible for installation clearances in hall ways, elevators, doors or stairs. Product WILL BE MANUFACTURED in 2 pcs with sizes as drawn.

QTY
11 UNIT (S)

BUILD AS SHOWN:

APPROVED BY:

Note: Overall height shown <u>does not</u> include adjustable glides which adds an average height of ½".

THIS SYMBOL DENOTES WOOD GRAIN DIRECTION

woodtech
p (510) 534.4930 f (510) 534.0389

For company Q.C. use only		
STG		
ASY		
FSH		
F.I.		

DATE REV/DATE: FILE NAME:
12/12/2017   44756_LN1_OptionF_Right

Observations:

³/₁₆" RADIUS EDGE.

SQUARE EASED EDGE

STANDARD PVC WIRE MANAGER.

1C.- TOP VIEW

1E.- ELEVATION VIEW "D-D"

1" HIGH LAMINATE LIP & **PERFORATED ALUMINUM** SHEET METAL-NATURAL FINISH.

TOWER

DESK

1D.- ELEVATION VIEW

L-ANGLE SUPPORT IN: SATIN BLACK POWDERCOAT FINISH.

1F.- SECTION VIEW "G-G"

(7) LEFT HAND
Tag: TEACHING STATION

DEALER:
CLIENT: SAN MATEO COUNTY COMMUNITY COLLEGE
CONTACT: YOSEPH DEMISSIE
DRAWN BY: GN
REV 1

JOB #: 44756
PO #: P1902347
EDGE: SELF EDGE
SCALE: NOT TO SCALE

SERIES: TEACHING STATION
FINISH: FORMICA: NATURAL MAPLE - 756-58 MATTE FINISH || CORIAN DEEP NIGHT SKY - MATTE FINISH
** WOODTECH can not be responsible for installation clearances in hall ways, elevators, doors or stairs. *Product WILL BE MANUFACTURED in* **2** *pcs with sizes as drawn.*

QTY
11 UNIT (S)

BUILD AS SHOWN:

APPROVED BY:

Note: Overall height shown <u>does not</u> include adjustable glides which adds an average height of 2".

THIS SYMBOL DENOTES WOOD GRAIN DIRECTION

woodtech
p (510)534.4930 f (510)534.3389

DATE: 12/12/2017   FILE NAME: 44756_LN1_OptionF_Rig

CRESTRON PTZ UNIT & RETRACTORS.
UNIT BY OTHERS.

BRUSHED ALUMINUM LIP.
EASED EDGE.

REFERENCE TOP VIEW

PENCIL LIP
DETAIL "R"

1G.- SECTION VIEW "M-M"

NOTCH ON DIVIDER.

RETRACTOR BY OTHERS.

GROMMET FOR WIRE MANAGEMENT.

RETRACTORS BY OTHERS.

OPEN TO FLOOR

CUT-OUT FOR BRACKET ACCESS.

1H.- SECTION VIEW "N-N"

L-ANGLE BRACKET IN SATIN BLACK POWDERCOAT FINISH

1I.- SECTION VIEW "P-P" (7) LEFT HAND
Tag: TEACHING STATION

DEALER:
CLIENT: SAN MATEO COUNTY COMMUNITY COLLEGE
CONTACT: YOSEPH DEMISSIE
DRAWN BY: GN

JOB #: 44756
PO #: P1902347
EDGE: SELF EDGE
SCALE: NOT TO SCALE

SERIES: TEACHING STATION
FINISH: FORMICA: NATURAL MAPLE - 756-58 MATTE FINISH | | CORIAN DEEP NIGHT SKY - MATTE FINISH
** WOODTECH can not be responsible for installation clearances in hall ways, elevators, doors or stairs. *Product WILL BE MANUFACTURED in* **2** *pcs with sizes as drawn.*

QTY
11 UNIT (S)

BUILD AS SHOWN:

APPROVED BY:

RAIL: 10-32, 3RU, 1.53"D X 0.68"W X 5.25"H. (BY OTHERS).

UTILITY RACKSHELF, 2 RU, 14.75"D, VENTED. 15.375"D X 19"W X 3.5"H (BY OTHERS).

RACKRAIL 10-32, 16 RU 1.53"D X 0.68"W X28"H (BY OTHERS).

1K PERSPECTIVE VIEW

RACKRAIL 10-32, 16 RU 1.53"D X 0.68"W X28"H (BY OTHERS).

UTILITY RACKSHELF, 2 RU, 14.75"D, VENTED. 15.375"D X 19"W X 3.5"H (BY OTHERS).

1J.- RACK AREA VIEW

RACKRAIL 10-32, 16 RU (BY OTHERS).

UTILITY RACKSHELF, 2 RU, 14.75"D, VENTED. 15.375"D X 19"W X 3.5"H (BY OTHERS).

1L.- RACK RAIL & RACK SHELF
DETAIL "Y"   **(7) LEFT HAND**
Tag: TEACHING STATION

DEALER:
CLIENT: SAN MATEO COUNTY COMMUNITY COLLEGE
CONTACT: YOSEPH DEMISSIE
DRAWN BY: GN

JOB #: 44756
PO #: P1902347
EDGE: SELF EDGE
SCALE: NOT TO SCALE

SERIES: TEACHING STATION
FINISH: FORMICA: NATURAL MAPLE - 756-58 MATTE FINISH | | CORIAN DEEP NIGHT SKY - MATTE FINISH
** WOODTECH can not be responsible for installation clearances in hall ways, elevators, doors or stairs. *Product WILL BE MANUFACTURED in* **2** *pcs with sizes as drawn.*

QTY
11 UNIT (S)

BUILD AS SHOWN:

APPROVED BY:

1"THK. STARON PANEL.

³/₁₆" **RADIUS EDGE**
DETAIL AB

STANDARD 2 ½"
BLACK PLASTIC GROMMET.

1" THK. TOP IN:
CORIAN DEEP NIGHT SKY
MATTE FINISH.

CUTOUT FOR: CRESTRON
FT2-1200-MECH-B UNIT.
(UNIT BY OTHERS).

1" THK. TOP IN:
CORIAN DEEP NIGHT SKY
MATTE FINISH.

AXIL Z POWER UNIT IN:
GLOSSY BLACK FINISH WITH-
2 POWER, 1 RJ-45 -
1 BLANK PLATE.

BOX - FILE PEDESTAL IN:
PLAM: FORMICA
NATURAL MAPLE - 756-58.
MATTE FINISH.
• **SIDE FINGER PULL.**

PODIUM: ¾" THK. PANEL
CONSTRUCTION
IN: PLAM: FORMICA
NATURAL MAPLE - 756-58.
MATTE FINISH.

HINGED DOOR.
PLAM: PLAM: FORMICA
NATURAL MAPLE - 756-58.
MATTE FINISH.
• KEYED ALIKE.

SELF EDGE
LAMINATE EDGES.

PERFORATED ALUMINUM
SHEET METAL-NATURAL FINISH.

AXIL Z POWER UNIT IN:
GLOSSY BLACK FINISH WITH-
2 POWER, 1 RJ-45 -
1 BLANK PLATE.

1M.- PERSPECTIVE VIEW

HINGED DOOR.
PLAM: FORMICA
NATURAL MAPLE - 756-58.
MATTE FINISH.
KEYED ALIKE.

OVERLAY PANEL IN:
PLAM: FORMICA
NATURAL MAPLE - 756-58.
MATTE FINISH.

AB

¾" THK. MODESTY PANEL IN:
PLAM: FORMICA
NATURAL MAPLE - 756-58.
MATTE FINISH.
6" CLEARANCE FROM FLOOR.

DESK - 1" THK. PANEL
PLAM: FORMICA
NATURAL MAPLE - 756-58.
MATTE FINISH.

(4) RIGHT HAND
Tag: TEACHING STATION

1N.- PERSPECTIVE VIEW

woodtech
p (510) 534.4930 f (510) 534.6389
4611 maint st. oakland, ca. 94601

For company Q.C. use only
STG
ASY
FSH
F.I.
Observations:

DATE REV. DATE: FILE NAME:
12/12/2017   44756_LN1_OptionF_Rig

DEALER:
CLIENT: SAN MATEO COUNTY COMMUNITY COLLEGE
CONTACT: YOSEPH DEMISSIE
DRAWN BY: GN

JOB #: 44756
PO#: P1902347
EDGE: SELF EDGE
SCALE: NOT TO SCALE

SERIES: TEACHING STATION
FINISH: FORMICA: NATURAL MAPLE - 756-58 MATTE FINISH | | CORIAN DEEP NIGHT SKY - MATTE FINISH
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QTY
11 UNIT (S)

BUILD AS SHOWN:

APPROVED BY:

RADIUS EDGE DETAIL AD

STANDARD BLACK PVC GROMMET

R 3/16

Note: Overall height shown does not include adjustable glides which adds an average height of 1/2".

THIS SYMBOL DENOTES WOOD GRAIN DIRECTION

woodtech
p (510) 534.4930 f (510) 534.5389

	For company Q.C. use only
STG	
ASY	
FSH	
F.I.	

Observations:

1O.- TOP VIEW

90
54
27 1/8
26 7/8
36
1 1/2
1 1/2
3
5
11
8 3/4
33
24
15 1/4
23 1/4
18 1/4

1Q.- ELEVATION VIEW

8 1/8
33
32
2
2
3 1/2
12
11
30
6

1P.- ELEVATION VIEW

AC
AD
22
30
8
AC
3
5 5/16
44 5/8
31
3 1/2

1R.- SECTION VIEW

13
44 5/8
30
2
23 1/4
"L" ANGLE SUPPORT IN: SATIN BLACK POWDER COAT FINISH.

(4) RIGHTHAND

Tag: TEACHING STATION

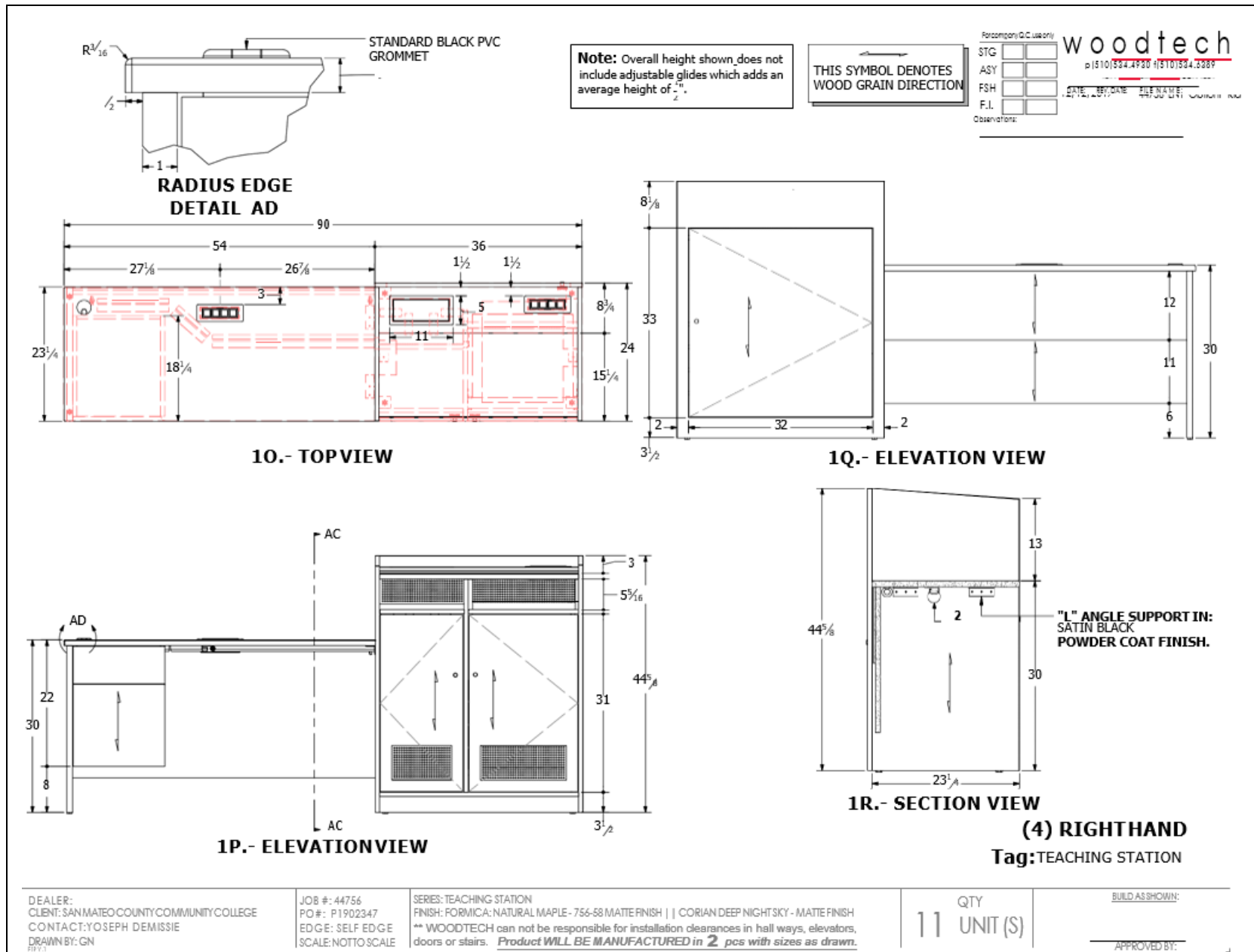| DEALER:	JOB #: 44756	SERIES: TEACHING STATION	QTY	BUILD AS SHOWN:
CLIENT: SAN MATEO COUNTY COMMUNITY COLLEGE	PO #: P1902347	FINISH: FORMICA: NATURAL MAPLE - 756-58 MATTE FINISH || CORIAN DEEP NIGHT SKY - MATTE FINISH	11 UNIT (S)	
CONTACT: YOSEPH DEMISSIE	EDGE: SELF EDGE	** WOODTECH can not be responsible for installation clearances in hall ways, elevators,		
DRAWN BY: GN	SCALE: NOT TO SCALE	doors or stairs. *Product WILL BE MANUFACTURED in 2 pcs with sizes as drawn.*		APPROVED BY:

LS-93
ListenIR Advanced iDSP Level I System

Configuration:

LS-93-01 ListenIR Advanced iDSP Level I
System (North America)

Product Overview:

The LS-93 Advanced iDSP Level I system comes with everything needed for immediate compliance in venues with up to 50 seats.

In addition to our LT-84 Radiator/Transmitter Combo, the LS-93 system includes two (2) LR-5200-IR Advanced iDSP Receivers for unmatched audio quality and reliability. The complete setup also includes the LA-423 4-port USB Charger to ensure that receivers are ready whenever needed. Universal ear speakers and Listen disinfecting wipes are also included.

Highlights:

- Advanced iDSP IR assistive listening system with our LR-5200-IR receivers included
- Pre-configured system designed for simple and immediate installation
- Ideal for small- to mid-size venues with up to 50 seats
- Provides outstanding coverage up to 2,787 m2 (30,000 ft2)
- Designed for multi-channel applications where users need the ability to select audio source/channel themselves

Includes:
One (1) LT-84-01 ListenIR Transmitter/Radiator Combo
Two (2) LR-5200-IR Advanced Intelligent DSP IR Receiver
Two (2) LA-430 Intelligent Ear Phone/Neck Loop Lanyard
Two (2) LA-401 Universal Ear Speaker
One (1) LA-423 4-Port USB Charger
One (1) LA-901 Listen Disinfecting Wipes (Cylinder 75 Count)

Product: 9451P ⧉

Audio Cable, 1 Pair 22 AWG, TC, Shielded, CMP

Product Description
Audio Cable, 1 Pair 22 AWG stranded tinned copper pair, FEP insulation, Beldfoil® shield, drain, Plenum Flamarrest® jacket.