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County SCHOOL DISTRICT

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*TECHNOLOGY DESIGN SPECIFICATIONS FOR  
NEW CONSTRUCTION*

*Department of Information Technology*

*Charleston County School District*

*Charleston, South Carolina*

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*Version 2012.0*

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## Revisions

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2012.0	01/2011	Department of Information Technology, CCSD Chris Heironimus, Connie Britton, Elliott Pace, Winchester Brown, Alan Levy, Judith Wyndham, and Kathleen Roberts	Incorporated updates, defined standard data/voice outlet boxes, antenna specs, and add new drawings. Added SMART Board, cable tray, conduit, box and outlet, sleeve, and fire stopping specifications. Major revision.

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## Overview

This document provides the general specifications and specific requirements for architects and designers to incorporate the technology and telecommunication systems in Charleston County schools. The specifications and requirements apply to any new building, addition, or major renovation. The specifications are not meant to supersede code requirements.

## Purpose

The purpose of this document is to define the minimum requirements necessary to design and install the technology systems in the Charleston County School District (CCSD).

- Data systems
- PA systems
- SMART Board™ interactive whiteboards
- Sound systems
- Video communication
- Voice communication
- Wireless LAN

## Abbreviations, acronyms, terminology, and symbols

Abbreviations, Acronyms, Terminology, and Symbols	Definition
ACEG	Alternating current equipment ground
AHU	Air handling units
AFF	Above finished floor
AV	Audio visual
CATV	Cable television
CCSD	Charleston County School District
Data/Voice Outlet Box	4"x4"x2 1/8" deep box with a single gang plaster ring and appropriate conduit cutouts
EC	Electrical contractor
EMT	Electrical metallic tubing
ETV	Educational television
Head End Room	The room where termination and grounding of cable runs for satellite and cable television, from the exterior of the school, occurs.
HVAC	Heating, ventilation, and air conditioning
IMC	Intermediate metal conduit
IT	Information Technology
J-box	Junction box
LB	An L-shaped fitting ("Ells") where the inlet is in line with the access cover and the outlet is on the back. In addition to providing access to wires for pulling, "L" fittings allow a 90-degree turn in conduit where there is insufficient space for a full-radius 90-degree sweep.
MTR	Main telecommunications room
NEC	National Electrical Code
OSF	South Carolina Dept. of Education – Office of School Facilities
PA System	Public address and intercom system
SCETV	South Carolina educational television
T-Bar	A metal bar having a T-shaped cross section
TBB	Telecommunications bonding backbone
TGB	Telecommunications grounding busbar
TMGB	Telecommunications main ground busbar
TR	Telecommunications room
TVSS	Transient voltage surge suppression
VAV	Variable air volume



## 1. General specifications

Use the following general specifications when designing a new school, major renovation, or addition.

### Infrastructure general specifications

Design the infrastructure with safe, protected, and sufficient pathways and spaces to accommodate the present and future technology needs of each school building. These specifications are not intended to replace any code. In all cases, the design must meet the applicable electrical codes. Refer to BICSI "Telecommunications Distribution Methods" manual and ANSI/TIA/EIA-569 "Commercial Building Standard for Pathways and Spaces".

### Boxes and outlets

All outlet boxes should be 4"x4"x 2 1/8" deep with a single gang plaster ring and appropriate conduit cutouts unless otherwise specified.

#### Electrical outlet box

Coordinate with the CCSD/IT Project Manager to plan electrical box spacing.

#### Data/voice outlet box

Use the following specifications for data box design and installation.

- Provide 4"x4"x 2 1/8" deep data/voice outlet boxes with single gang plaster rings and conduit cutouts for data/voice communication.
- Provide an electrical receptacle next to each data/voice outlet.
- Mount data/voice outlet boxes on walls next to an interior corridor to enable the shortest conduit and cable placement when possible.
- All data/voice outlet boxes must be within 250 linear feet of a telecommunications room.

#### Wireless outlet box

- Provide a 4"x4"x2 1/8" deep outlet box with single gang plaster ring, mounted 12" below the ceiling grid. **Note:** If the ceiling is higher than 9', place the wireless outlet box at 96" AFF.
- Provide a blank outlet cover for all wireless boxes.

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### PA/Intercom boxes and outlets

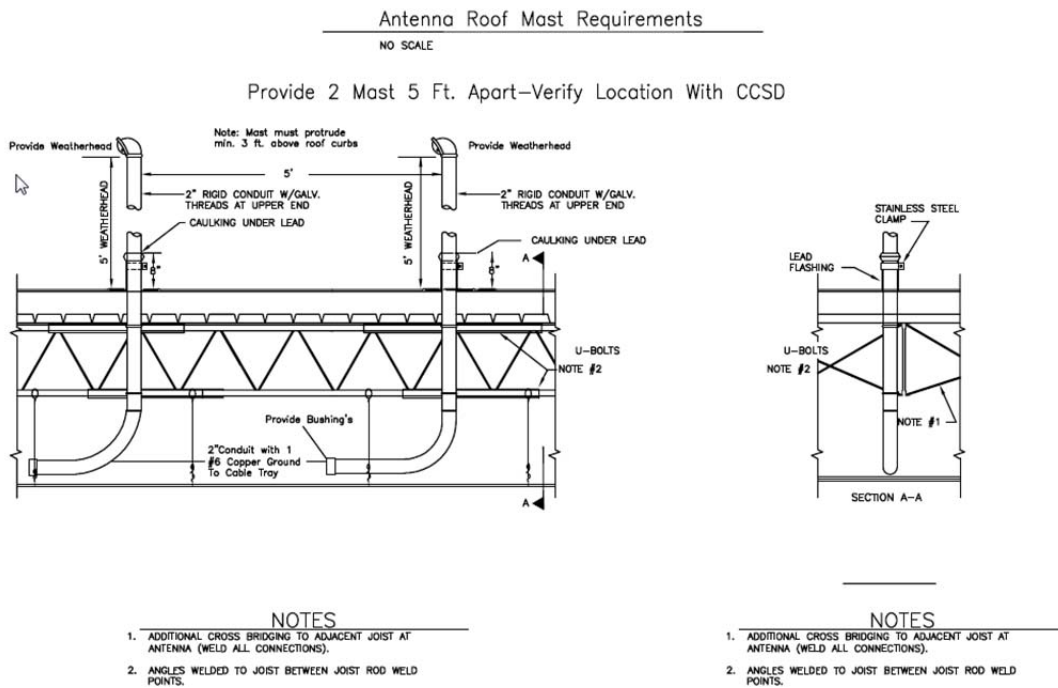
- In classrooms, provide a 4"x4" overhead junction box with 3/4" flex conduit with pull string and a connector to each speaker back box location. Speaker back boxes and tile supports are provided and installed by the Electrical Contractor.
- In corridors, provide 3/4" conduit with a connector at each end and attached to the cable tray with an appropriate clip to each speaker's back box location.

### Antenna roof mast

Use the following specifications for antenna roof mast design and installation.

Provide two antenna roof masts 5' apart. Verify location with CCSD/IT Project Manager.

### Antenna roof mast requirements



## Cable installation timeline

Schedule the completion of cable work **at least five weeks before occupancy** in all schools.

Before installing cable, complete the following requirements:

- Complete all construction of telecommunications rooms.
- Install a lockable door.
- Seal concrete floors.
- Verify that all pathways are complete and free from obstructions.
- Install all communications conduits.  
**Note:** All conduits must have bushings and pull strings.
- Install all sleeves required for communications pathways.
- Install all flex to the speakers.
- Install all electrical receptacles.
- Verify grounding system is in place.

The CCSD/IT Project Manager determines whether cable installers can begin work once the TR is complete and there is finished installation of pathways and pull strings in a wing or significant portion of the building.

## Cable supports

Use the following specifications for cable support designs and installation.

- Provide the following types of support for cables:
  - Cable tray or NEC and OSF approved wireway/raceway
  - EMT, rigid, or IMC conduits (flex is acceptable in proper lengths)
  - Manufacturer sleeve assembly should be used for all wall/floor penetration
- Provide cable tray supports from the same manufacturer as the cable tray.

## Cable trays

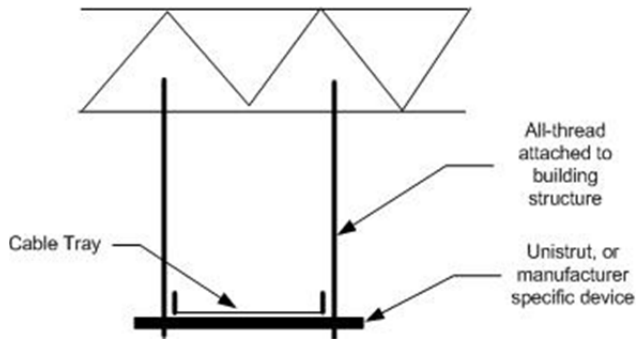
Use the following specifications for cable tray design.

- Always use flexible, basket-type cable trays and a wall or trapeze mounting bracket. Never use solid bottom, whalebone, or covered cable trays. Never use a center mount for a cable tray.
- Coordinate with HVAC and other trades for placement of cable trays.
- Preferred cable tray manufacturers include Chatsworth™, Cablofil®, and MP Husky™. Cable trays and supports must be from the same manufacturer.
- Ensure that installation contractors use proper mounting methods in accordance with the manufacturer's maximum weight load specifications. If there is not a manufacturer's specification, provide support at a minimum of every 5'.
- Install cable trays in all main corridors and any other area that has a large cable count.  
**Note:** Cable trays should not pass through classrooms.
- Stop cable trays 6" to 12" away from firewalls and transition to conduit.
- Design for minimal elevation changes.
- Trays cannot pass over solid ceilings – where this occurs, a transition to conduit must be made.

Examples of methods to fasten cable trays

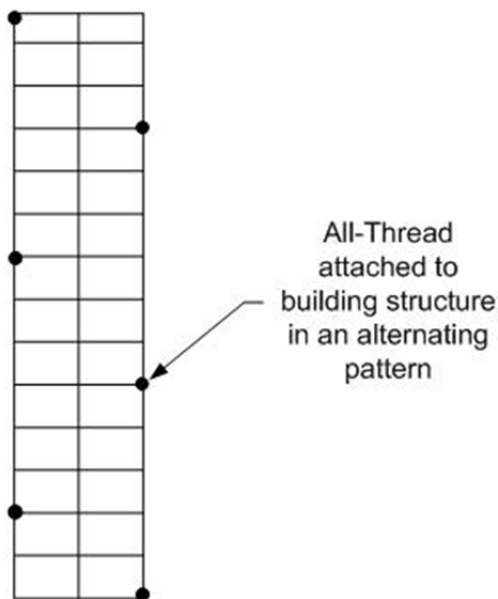
**Trapeze**

Trapeze - Style Method



**Direct**

Direct Fastening Method



## Conduits

Use the following specifications for conduit design and installation (see also TR conduits pg 30)

- Provide conduit behind walls in all new schools and additions. Conduits should not be in or under the slab of a building. A written exception from the CCSD/IT Project Manager must be obtained if there are data/voice outlets in casework that require conduit in or under the slab.
- Terminate conduit within 6" of the cable tray. Do not pass any plane of the cable tray. There must be at least 8" clearance if parallel and 12" if perpendicular.
- In renovated spaces, design conduit to protrude a minimum of 2" into each ceiling space. Never flush mount conduit.
- Provide all conduits with bushings and pull strings unless otherwise specified.
- Provide all outdoor conduits with footage markers (Mule tape).
- Use a minimum of 1" in diameter EMT conduit with uncut bushings and pull string for all technology applications unless otherwise authorized by the CCSD/IT Project Manager.
- Use conduit above the ceiling from the cable tray to surface mounted raceways for block walls in major renovations. If the walls are not block material, install conduit behind walls.
- Provide pull boxes for every 100' of conduit. Do not use more than two 90-degree bends between pull boxes. Pull boxes must not change the direction of the conduit run.
- Do not use LB or other tight 90-degree fittings.
- Install a separate conduit that turns out to the cable tray for each outlet box.
- If outside plant (OSP) cable enters the building more than 50' from the nearest TR, install an approved pull box at the building entrance. Run a rigid or IMC threaded conduit from the pull box to the nearest TR, preferably the MTR. This allows the outdoor cable to run straight into the TR with no transition to plenum cables.
- Install one 4" conduit from a site location (to be coordinated with the cable television service provider) to the media center workroom. This should terminate on the backboard designated for the video distribution equipment as shown on page 27.

## Manholes/handholes

- Install manholes or handholes where necessary to provide pulling points and splicing access.
- The maximum distance between handholes must not exceed 200' unless authorized in writing by the CCSD/IT Project Manager. Mark all covers with Telecommunications.
- Locate devices out of the normal flow of foot or vehicle traffic.

## Pathways and raceways

- Provide PANDUIT® Corp.'s Pan-Way® T-70 or LD-10 (IW) raceway when it is necessary to add power or data cables in a major renovation with block walls.
- Provide recessed, identically colored raceways in major renovations with sheetrock.
- Design each exterior pathway separately and in detail.
- Design exterior pathways underground unless it is impractical to do so.
- Telecommunications service entrance pathways should terminate in the Main Telecommunication Room (MTR). Confirm the street side location with the service provider.

## Sleeves

Use the following specifications for sleeve design and installation.

- The general contractor providing general construction work is responsible for creating the openings to accept sleeves in new buildings.
- Use throat, screw-on, or knock-on type uncut plastic protective bushings on each side of the sleeve. Seal the bushings according to the original rating of the penetrated wall.
- Install sleeves that provide the same square inch capacity as the cable tray that serves that wall. For example, if a cable tray is 12"x4", provide 48" square inches of sleeve area.
- Locate sleeves directly in line with the cable tray to ensure that there is minimal change in pathway elevation.
- Provide mechanical support for all cables outside of the sleeve to prevent slippage of the cable to the lower end of the sleeve.
- Use fire rated sleeve assemblies, equal to the capacity of the cable tray, wherever a cable tray pathway penetrates a firewall. Minimum size for these sleeves is 4".
- Install only fire-rated, listed sleeve assemblies on communication penetrations through CMU walls or gypsum walls.
- For all exterior penetrations, provide sleeves and sealant for protection against the weather. Use the manufacturer provided gaskets/seal or color appropriate caulking.
- Seal voids between sleeves and building construction with joint sealants. Make allowances for and coordinate the work with installation of firestopping, conduit insulation, and waterproofing, as applicable.
- Use split sleeve assemblies over existing conduit where necessary.
- Permanently affix the installation and re-entry label on a wall within 12" of the sleeve.
- Provide a minimum of 1" of space between sleeves.



## Grounding and bonding framework general specifications

These specifications provide grounding and bonding infrastructure that supports a multi-vendor, multi-product environment. These specifications are not intended to replace any code. In all cases, the design must meet the applicable electrical codes for bonding and grounding. For further information regarding grounding and bonding requirements, refer to ANSI/TIA/EIA-607, Commercial Building Grounding and Bonding Requirements for Telecommunications.

### Grounding and bonding infrastructure

The bonding conductor bonds the Telecommunications Main Grounding Busbar (TMGB) to the service equipment (power) ground.

The TMGB serves as the dedicated extension of the building grounding electrode system for the telecommunications infrastructure. In addition, it serves as the central attachment point for telecommunications bonding backbones (TBB) and equipment.

Use the following specifications for the TMGB.

- Locate the TMGB in the MTR.
- Provide a pre-drilled copper busbar with standard NEMA bolt-hole sizing and spacing for the type of connectors it uses.
- Base the TMGB size on immediate and future application requirements. Minimum dimensions for the TMGB are 4”Tx12”Wx1/4”TH(6mmTx100mmW) and of variable length.
- Bond the panel board’s Alternating Current Equipment Ground (ACEG) bus or the enclosure to the TMGB when the panel board for telecommunications is in the same room or space as the TMGB.
- Use listed 2-hole compression connectors, exothermic type welded connection or the equivalent, to connect the bonding conductor for telecommunications and the TBBs to the TMGB.
- Bond all metallic raceways for telecommunications cabling to the TMGB when they are in the same room or space as the TMGB.
- Bond all continuous sections of cable trays.

## Telecommunications bonding backbone

The Telecommunications Bonding Backbone (TBB) originates at the TMGB and extends throughout the building using the telecommunications backbone pathways. The TBB connects to the TGBs in all TRs. Use the following specifications when designing and installing the TBB.

- Design telecommunications backbone cabling systems in a consistent manner.
- Permit multiple TBBs according to building size requirements.
- Verify that the routing minimizes the lengths of the TBBs.
- Size and install telecommunications bonding backbone according to NEC guidelines.

## Telecommunications grounding busbar

The Telecommunications Grounding Busbar (TGB) is the common central point of connection for telecommunications systems and equipment in each TR.

Use the following specifications when providing the TGB.

- Provide a TGB that is pre-drilled copper busbar with standard NEMA bolt hole sizing and spacing for the type of connectors to be used
- Ensure that the bonding conductor between the TBB and TGB is continuous and routed in the shortest possible straight-line path.

## Bonding to the metal frame of a building

Use these specifications in buildings where the metal frames (structural steel) are grounded effectively.

- Bond TGB to the metal frame according to the NEC Guidelines.
- Bond the metal frame to the TMGB and the TGB according to the NEC Guidelines.

## Classrooms

A classroom is any space that is a minimum of 300 square feet where a group of students receives instruction.

Use the following specifications when designing classrooms.

- Design classrooms in preparation for present and future technologies. Each classroom has the following minimum requirements.
  - Data communication
  - PA speaker(s)
  - SMART Board interactive whiteboard
  - Sound enhancement system
  - Voice communication
  - Wireless LAN
- Provide TVSS protection at each power panel.

Wireless outlet box 1 Based on site survey  
Classroom specific requirements on page 24 for details regarding conduit and outlet placement.

## Computer labs

The typical school in CCSD hosts between 1 and 15 computer labs. Use these specifications to enable a more efficient and effective design.

Use the following specifications when designing the infrastructure for Computer Lab areas.

- Provide a consistent configuration for all computer labs.
- Place all computer labs adjacent to or in the immediate vicinity of a TR where possible.
- Provide a minimum of 1,140 square feet for a 32 student computer lab using 16 6' tables. **Note:** Use 5' tables for elementary schools.
- Provide 1" conduit with bushings and pull string to data/voice outlet boxes.
- Never use floor receptacles or tombstones.
- Provide the infrastructure for the instructional wall. See page 18.

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- Provide one quad receptacle with a dedicated electrical circuit for each row of four computers.
- Provide TVSS protection at each power panel.

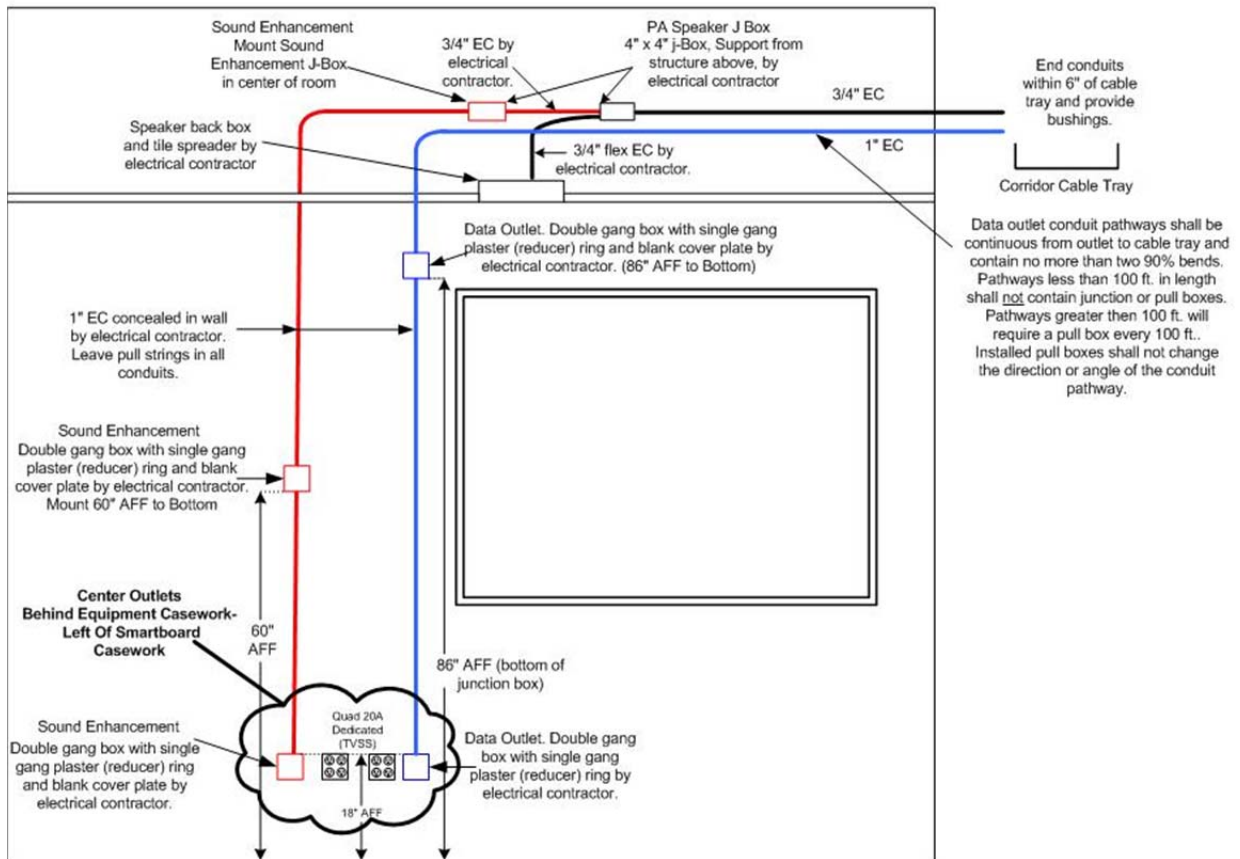
See Computer labs specific requirements on page 27.

## Instructional wall

Use the following specifications when designing an area for an instructional wall.

- Coordinate the location of all outlet boxes and electrical receptacles with the CCSD/IT Project Manager during the design review process.
- Use a 32"x20" 16-gauge metal sheet backing at 85" AFF in the center of the SMART Board location. **Note:** Block walls do not require the metal sheet backing for the SMART Board.
- Provide a data/voice outlet box at 18" AFF and a data/voice outlet box mounted above at 86" AFF with a 1" conduit pathway to the corridor cable tray.
- Provide a 4"x4" sound enhancement junction box at 18" AFF with an additional 4"x4" sound enhancement junction box mounted about at 60" AFF.
- Provide a 1" conduit pathway to a 4"x4" sound enhancement junction box mounted in the ceiling in the center of the room.
- Provide a ¾" conduit pathway from the sound enhancement junction box in the ceiling to the closest ceiling mounted PA speaker junction box.
- Provide two quadraplex power outlets mounted side by side at 18" AFF between the data/voice outlet and the sound enhancement outlet.
- Mount all outlets on the instructional wall horizontally as close as possible. If there is no casework, mount outlets centered 60" left of the SMART Board centerline. In locations where there is casework, mount outlets in the center of the equipment cabinet casework located to the left of the SMART Board casework.

Example of an Instructional Wall



LCD television monitor general specifications

Use the following specifications when designing a location for a LCD television.

- Use a wall mounted video outlet box. **Note:** The general contractor provides and installs all mounts for LCD television monitors.
- Provide a duplex electrical receptacle
- Use a Peerless® SmartMount®. Mounts (cut sheet provided by IT)

## PA/intercom systems general specifications

The purpose of the public address (PA) system is to enable the following:

- Campus wide announcements
- Communication between front office staff and classrooms
- Class schedule bells and tones

Campus wide announcements, bells, and tones require placement of speakers and horns around the exterior of the building and within the building. Communication between office staff and classrooms requires a two-way intercom system. PA systems use the telecommunication system with telephone interface cards and an amplifier.

Use the following specifications when designing and installing PA systems.

- Consult with an experienced sound engineer to design the placement of speakers throughout the school facility.
- Place outside horns so that all exterior areas of the building, such as the bus loop, playground area, and student or teacher parking lots, have sufficient coverage. Ensure that they have the appropriate sleeves and are sealed.
- Condition large open areas so that the reverberation of sound is at a minimum and there is no distortion.
- Install flexible conduit with bushings and pull strings for each speaker back box. Other vendors install the speaker. **Note:** Speaker back boxes and tile supports are provided and installed by the Electrical Contractor (EC).

## SMART Board general specifications

There are three SMART Board interactive whiteboard models.

1. Wall-mounted SMART Board with integrated Unifi projector
2. SMART Board with integrated Unifi projector using a mounted stand
3. SMART Board with portable projector using a portable rolling stand

Considerations for selection include viable wall space for mounting and appropriate location for mounting stand.

See Instructional wall on page 18.

## Telecommunication room

The only purpose of the Telecommunications Room (TR) is the distribution of technology infrastructure and application resources.

TRs are for telecommunication systems use only. Do not design these rooms for any other purpose, such as facility security systems, fire alarm systems, electrical, equipment storage, or any other trades equipment. The contents of this room include some or all of the following:

- Building entrance cable for telecommunications (point of demarcation)
- Computer server cabinets
- PA cabinet
- Telecommunications backboards
- Telecommunications racks (cabling, fiber optics, network electronics, voice server, and more)

There are two types of telecommunications room.

1. Main telecommunications room (MTR) – 12'x14'
2. Telecommunications room (TR) – 6'x 9'

See Telecommunications rooms specific requirements on page 34.

## Specific drawing requirements

Provide the CCSD Information Technology Office of Infrastructure and Support with the following sets of drawings for each revision of the project.

- A set of full size drawings
- A set of small (quarter size) electrical construction drawings with a furniture layout
- A set of T-drawings that include all technology related information including but not limited to the following items:
  - Building entrance conduits
  - Cable trays
  - Facility security rooms (FSRs)
  - PA systems
  - Riser diagrams
  - SMART Board location
  - Sound enhancement systems
  - Telecommunication outlets
  - Telecommunication rooms (TRs)
  - SCTV, ETV, and video data outlets

**Note:** Deliver the drawings to the Information Technology Office of Infrastructure and Support. Obtain a signature and date from the person who accepts delivery of the drawings.



## Administrative Office Suite specific requirements

Use the following specifications when designing the infrastructure for the Administrative Office Suite.

- Locate a data/voice outlet box with an electrical receptacle on separate walls to accommodate multiple furniture layouts or the placement of two desk locations in all offices.
- Provide standard data/voice outlet boxes with appropriate power.

**Table 1: Minimum infrastructure for administrative suite**

Item	Quantity	Location
<b>Data/voice outlet box</b>	2	Opposite walls in offices
<b>SMART Board infrastructure</b>	1	Primary conference room. See pages 19 and 20.
<b>LCD television monitor infrastructure</b>	1	Confirm location with CCSD/IT Project manager. See page 19.
<b>Wireless outlet box</b>	1	Based on site survey

## Auditorium or theater specific requirements

Use the following specifications when designing the infrastructure for an Auditorium or Theater. **Note:** In some schools, the Multi-purpose room takes the place of the auditorium/theater.

- Use standard data/voice outlet boxes with appropriate power receptacles.
- Use standard telecommunications conduit.
- Coordinate the exact locations of all data/voice outlet boxes and electrical receptacles with the CCSD/IT Project Manager during the design review process.

**Table 2: Minimum infrastructure for an auditorium or theater**

Item	Quantity	Location
<b>Data/voice outlet box</b>	4	Throughout the area
<b>Data/voice outlet box</b>	2	In all office or technical spaces, such as sound booth, ticket booth, concessions, rehearsal rooms, and more
<b>Data/voice outlet box</b>	2	On both sides of the stage front
<b>Wireless outlet box</b>	2 - 4	Based on site survey

## Bookrooms, storage areas, or workrooms specific requirements

Use the following specifications when designing the infrastructure for Bookrooms, Storage Areas, or Workrooms.

- Provide standard data/voice outlet boxes with appropriate power receptacles.
- Provide standard telecommunications conduit.

**Table 3: Minimum infrastructure for bookrooms, storage areas, or workrooms**

Item	Quantity	Location
<b>Data/voice outlet box</b>	2	Either side of the area
Wireless outlet box	1	Based on site survey

## Classroom specific requirements

Use these specifications when designing the infrastructure for the classroom.

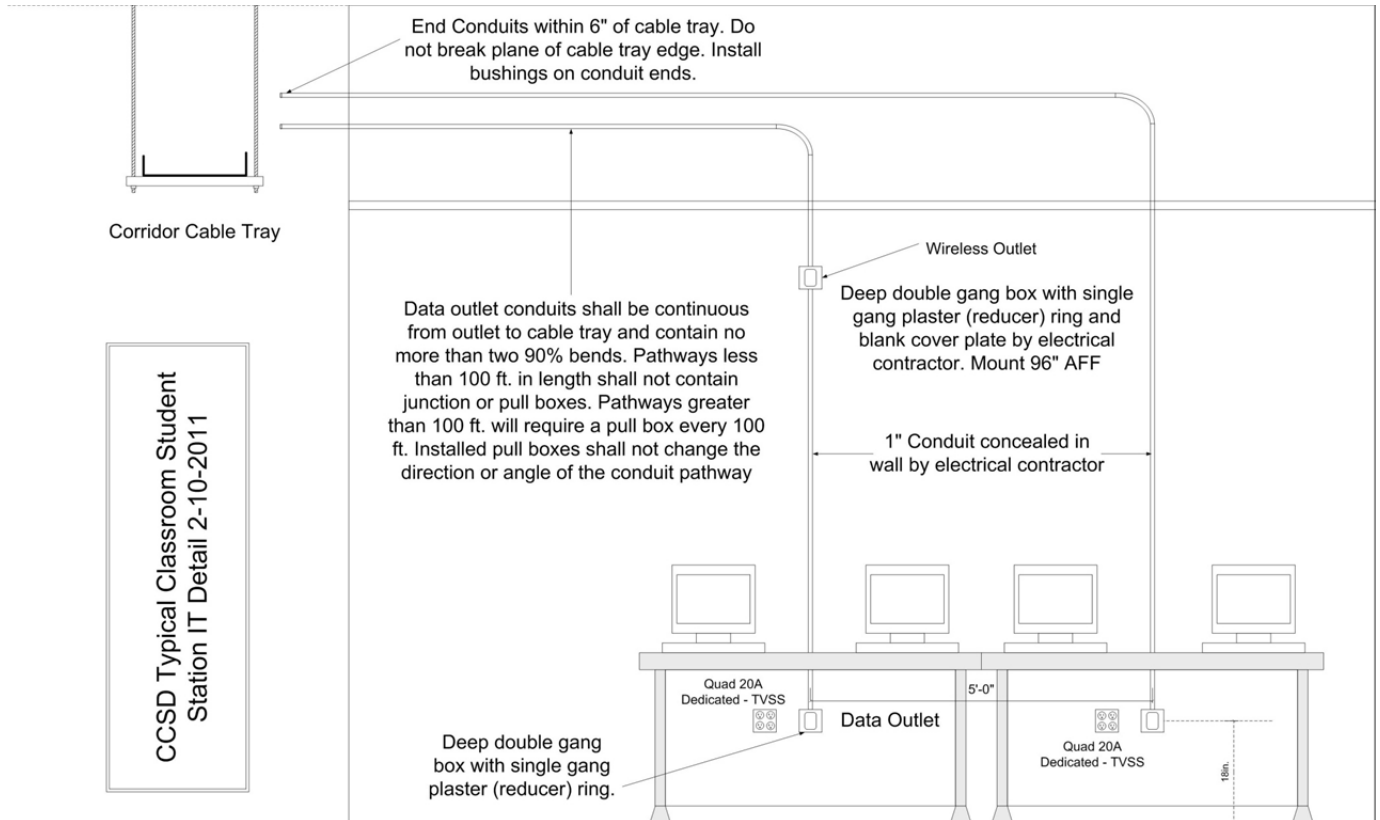
- Place student’s computer stations on the wall closest to an interior corridor.
- Never place outlet boxes under a window.
- If the ceiling is higher than 9’, place the wireless box at 96” AFF. Place the box on the wall next to an interior corridor when possible.
- Provide standard data/voice outlet boxes unless otherwise specified.
- Never have more than two quad receptacles on a single 120 V/20 A circuit.
- Provide TVSS protection at each power panel.
- Refer to the diagrams in this section for details regarding conduit and outlet placement.
- Provide the infrastructure for an Instructional wall at the front of the room. See page 18 for design instructions.

**Table 4: Minimum infrastructure for a classroom**

Item	Quantity	Location
<b>Data/voice outlet box with quadraplex receptacle</b>	2	Student computer station*
<b>Instructional Wall infrastructure</b>	1	Front of class. See page 18.
<b>Wireless outlet box</b>	1	Mount 12” below the ceiling grid and in line with communication conduit. When possible, mount near an interior corridor. If the ceiling is higher than 9’, place the wireless outlet box at 96” AFF.

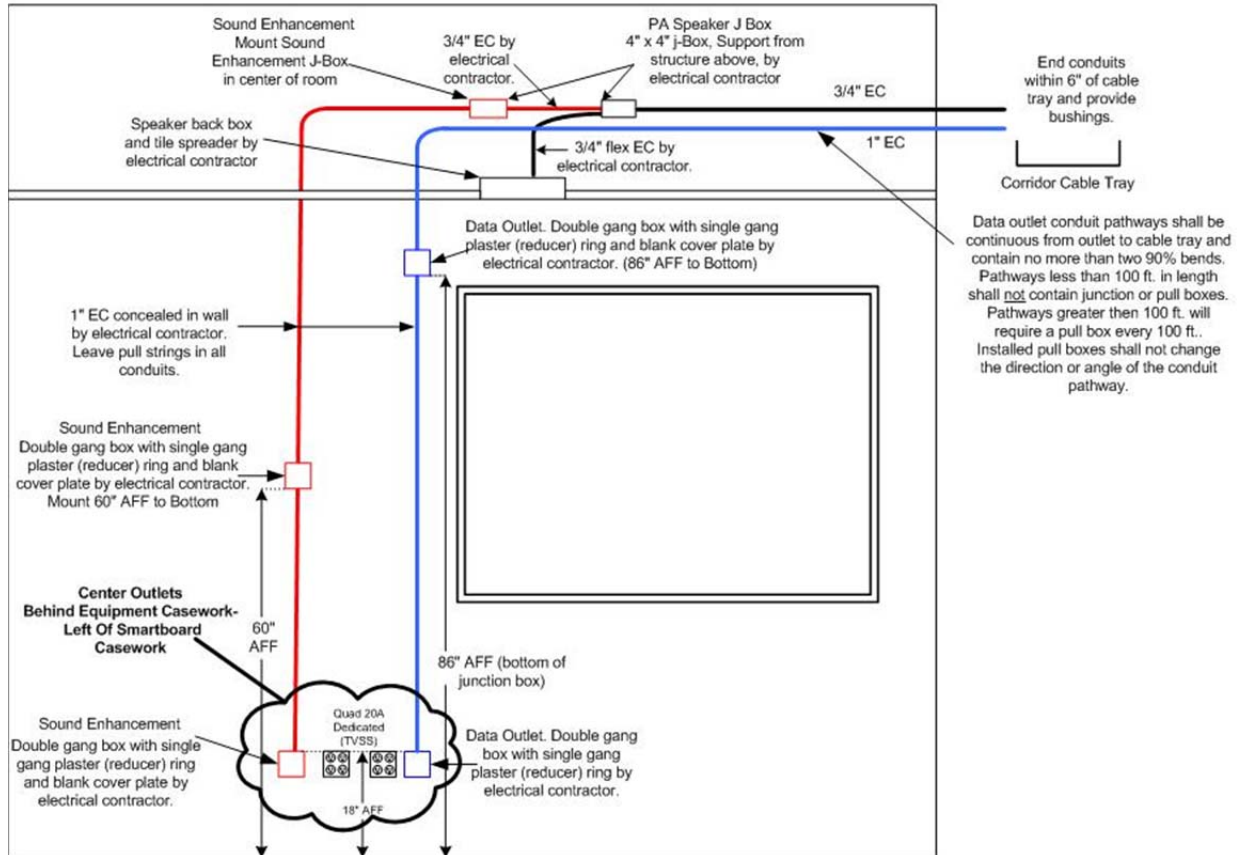
\*Special Education classrooms require four to six data/voice outlets and Project Rooms for Science/SAIL require six data/voice outlets.)

### Typical students' computer station



Typical classroom instructional wall

CCSD Typical Classroom Teaching Wall IT Detail  
12/16/2011



## Computer labs specific requirements

The typical school in CCSD hosts between 1 and 15 computer labs. Use these specifications to enable a more efficient and effective design.

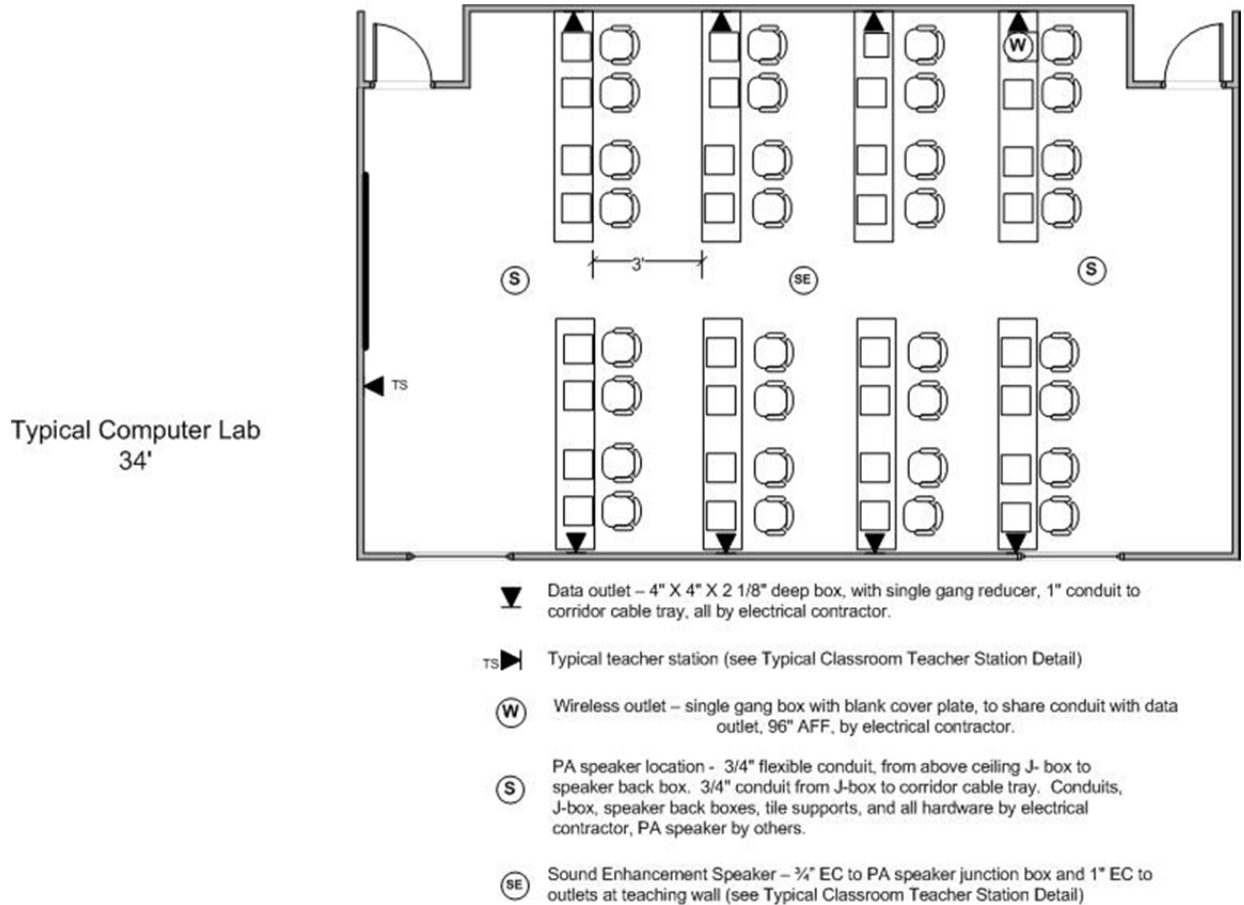
Use the following specifications when designing the infrastructure for Computer Lab areas.

- Refer to the diagrams in this section for details regarding conduit and outlet placement.
- Provide the infrastructure for an Instructional wall at the front of the room. See page 18 for design instructions.
- Provide a quadraplex receptacle per each row of computers.
- Never have more than two quad receptacles on a single 120 V/20 A circuit.
- Exact placement of the data/voice outlets must be specified so that no computer will be more than 10 ft from an outlet.
- Provide TVSS protection at each power panel.

**Table 5: Minimum infrastructure for a computer lab**

Item	Quantity	Location
<b>Data/voice outlet box with quadraplex receptacle</b>	8	1 per row of computer tables supporting 4 computers
<b>Instructional Wall infrastructure</b>	1	Front of class. See page 18.

## Example of a typical computer lab



## Facility security rooms

Refer to the CCSD Facility Security Access Control, Intrusion Detection, and Surveillance Design Specifications.

## Physical Education/Gymnasium and field house specific requirements

Use the following specifications when designing infrastructure for the gymnasium, field house, office, storage, ticket booths, and concession stands. Coordinate this design with the CCSD/IT Project Manager.

- Provide wireless outlet boxes depending on site survey.
- Provide standard data/voice outlet boxes with appropriate power unless otherwise specified.
- Use an experienced sound engineer to recommend the placement of the PA speakers in the gymnasium, the field house, and outside playgrounds. Design the exterior of the building and condition the landscape to provide the best sound with the least distortion.
- Provide flex conduit for each speaker back box. The electrical contractor installs the back boxes and flex conduit.
- Never mount a video display on a wall or suspend from a ceiling in this area.
- **Note:** In some cases, the Physical Education area is part of a Multi-purpose room. Refer to the stage/platform requirements in a multi-purpose room on page 33.
- When the field house is separate from the gymnasium, provide 2" conduit with bushings and pull string between the closest TR and the field house.

Table 6: Minimum infrastructure for Gymnasium

Item	Quantity	Location
Data/voice outlet box	2	Coaches office, training rooms, and storage rooms
Data/voice outlet box	1	Concession stands and ticket booths
Data/voice outlet box	2	Field house if separate from gymnasium
Data/voice outlet box	1	Press box and announcers area
Data/voice outlet box	2	On each side in front of the stage or platform location if this area also serves as the general assembly area (multi-purpose room)
Wireless outlet box	3	Based on site survey

## Health clinic

Use the following specifications when designing the infrastructure for the Health Clinic area.

- Use standard data/voice outlets with the appropriate power receptacles.

Table 7: Minimum infrastructure for a health clinic

Item	Quantity	Location
Data/voice outlet box	1	Each nurse's station

## Library/media center specific requirements

Use the following specifications to design the infrastructure for the Library/Media Center. Locate the Library/Media center next to a computer lab.

- Use standard data/voice outlet boxes with appropriate power receptacles.
- Provide outlet boxes and electrical receptacles that mount on the wall. If necessary, mount them inside the casework. Never use floor outlet or tombstones.
- The media workroom is the termination and grounding point of satellite and cable television cable runs. Coordinate the media workroom location with the CCSD/IT Project Manager and CCSD/ITV Officer.
- Provide space for a 24"x24" cabinet in the Media Workroom. **Note:** Terminate the ETV and cable television (CATV) cabling in the Media Workroom unless told to do otherwise by the CCSD/IT Project Manager. Refer to ANSI/TIA/EIA-569 and BICSI specifications.
- Use the Video rack location pathway and power requirements diagram on page 32 when designing the Media Workroom.
- Never install cabinetry or a SMART Board in a production studio.
- A cabinet is to be installed in the media center workroom. It is preferred this be recessed where possible. This cabinet will house the backboard required for this room.



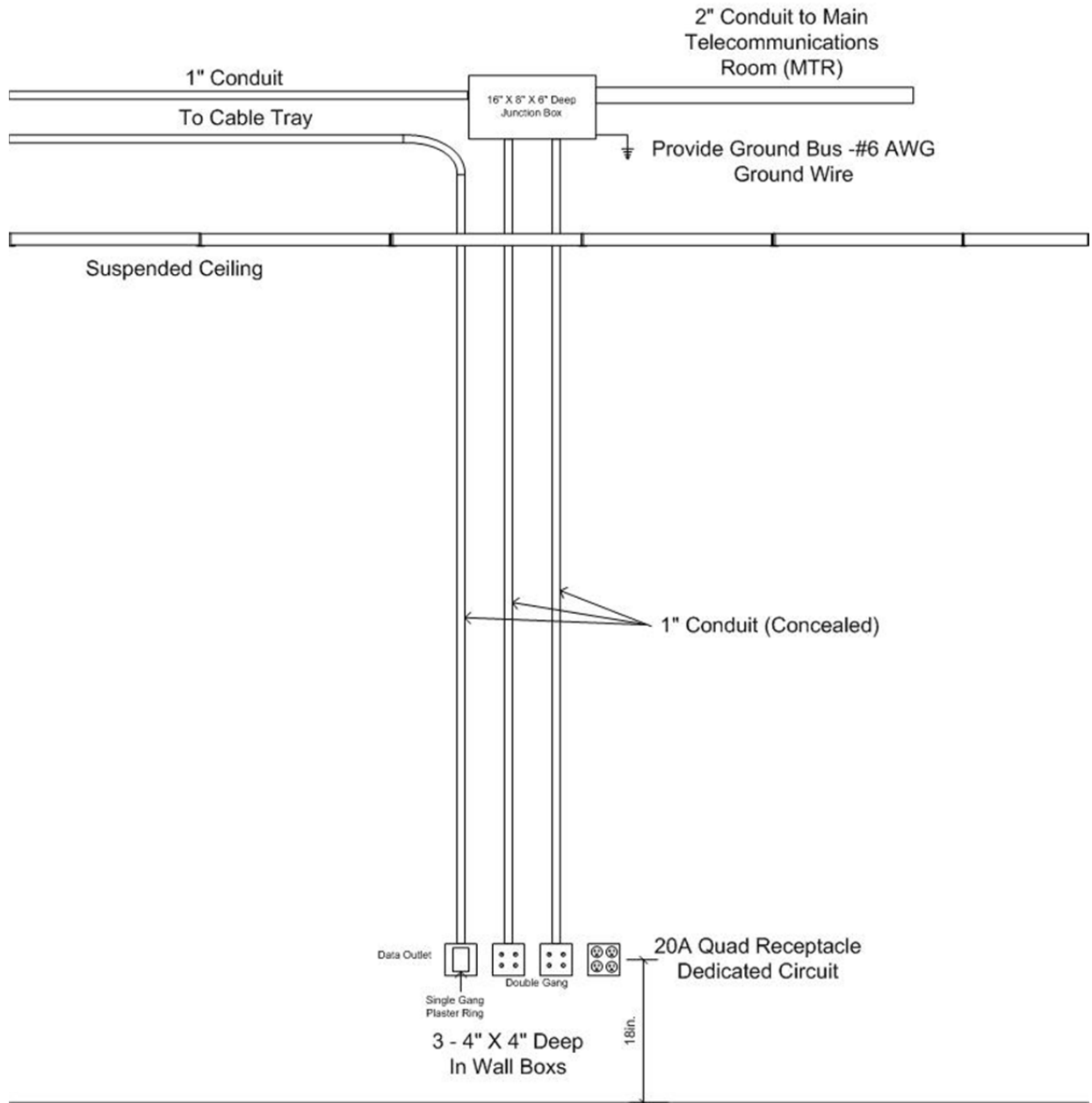
## Charleston County School District

**Table 8: Minimum infrastructure for a library/media center**

Item	Quantity	Location
<b>Data/voice outlet box</b>	2	Circulation desk
<b>Data/voice outlet box</b>	8 to 24	Common Area/Reading room
<b>Instructional wall infrastructure</b>	1	Common Area/Reading room. See page 18.
<b>2'Wx2'Hx3/4"T backboard with two coats of white fire retardant paint on all six sides</b>	1	Media workroom-Mount this backboard for cable service termination. Contact the CCSD/IT Project Manager for the exact mounting location.
<b>Data/voice outlet box</b>	2	Media workroom
<b>Data/voice outlet box</b>	4	Production studio
<b>Data/voice outlet box</b>	2	Media office.
<b>Data/voice outlet box</b>	1	AV storage room
<b>Wireless outlet box</b>	2	Based on site survey

## Video rack location pathway and power requirements

### VCR Rack Location Pathway and Power Requirements



## Main corridors, common areas, courtyards

**Note:** It is imperative that the designer contact the CCSD/IT Project Manager to coordinate plans in these areas.

Consider applications, such as network based video surveillance, wireless access in common areas, and network based video display systems, prior to final design acceptance. Coordinate with the CCSD/IT Project Manager and the other vendors.

## Student dining/food service area specific requirements

Use the following specifications when designing the Student dining/food service area (Cafeteria or Cafetorium).

- Use standard data/voice outlet boxes with appropriate power receptacles.
- Provide television outlet boxes and matching power receptacles above the serving lines for menu or assembly video display. Coordinate locations with the CCSD/IT Project Manager.
- Install 1” conduit with bushings and pull string from the data outlet location to the nearest corridor’s cable tray in new construction projects with solid ceilings.
- Locate data outlet boxes and electric receptacles in the casework to avoid exposed cable on the floor. **Note:** Never design this room with columns, power poles, or floor boxes.

Table 9: Minimum infrastructure for a food service area (cafeteria or cafetorium)

Item	Quantity	Location
Data/voice outlet box	1	Kitchen area wall mount telephone
Data/voice outlet box	2	Opposite walls in the Food services manager’s office
Data/voice outlet box	1	Each POS register
Data/voice outlet box	4	Throughout dining area
Data/voice outlet box	2	On each side in front of the stage or platform location if this area also serves as the general assembly area (multi-purpose room)
LCD television monitor infrastructure	1	Above serving line
Wireless outlet box	2	Based on site survey

## Telecommunications rooms specific requirements

Use these specifications when designing the infrastructure for the MTR and TRs. Refer to the diagrams on pages 38 through 39.

TR spaces shall be dedicated solely to the telecommunications functions. TR space shall not be shared with electrical installations other than those for telecommunications support. TR spaces will not be used for fire alarm, surveillance, video distribution, security or any other trade's equipment

### TR backboards

Coordinate the number and location of TR backboards with the CCSD/IT Project Manager.

Provide a minimum of one ¾"x 48"x96" piece of AC plywood with two coats of white fire retardant paint on all six sides that mount vertically on each wall at 12" AFF.

### TR cable trays

Each cable tray must have a waterfall at the end.

### TR ceilings

- Ceilings must be solid. Never design a suspended ceiling for a TR.
- The only allowable penetrations in the ceiling are for riser sleeves from one TR to another.
- Do not design or install plumbing, such as water, gas, or drains in or over this room. The only exception to this rule is fire suppression lines that are for this room only.

### TR conduits

- Four 4" trade size conduits interconnecting multiple TRS on the same floor
- Three 3" trade size conduits or equivalent pathways interconnecting multiple TRs that are stacked vertically
- One 4" conduit from the nearest TR to the outside of the building that is the most likely location for future placement of portable classrooms
  - This conduit must be clear of obstructions, capped, and labeled IT.
  - This conduit must have a 24"x36"x24" handhole that has a lid labeled Telecommunications.

## Charleston County School District

- Install one 4" conduit from a site location (to be coordinated with the telecommunications service provider) to the Main TR.

### TR dimensions

**Note:** These dimensions are literal. Do not use the dimensions as a square footage calculation. The literal dimensions of a TR can never be less than 6'Wx 9'L. Final decisions regarding the classification of TRs are the responsibility of the CCSD/IT Project Manager.

- MTR—12'Wx14'L
- TR—6'Wx9'L

### TR doors

- Provide an access control door with a proximity card reader on the exterior wall of the TR and hinged to open outward (code permitting). See the CCSD Design Specifications for Facility Security for requirements for an access control door.
- Door dimensions must be a minimum of 36"W x 80"H without a doorsill. Never use a double, center opening door.
- Mag locks are to be installed on all TR doors.
- Install a gasket or sweep to prevent water, wax, and dirt from entering the TR.
- Locate the door in a corner of the room to maximize usable wall space.

### TR floors

.TR floors must be sealed concrete.

- Locate floor cores at the backboard location.

### TR HVAC

- Do not use variable air volume (VAV) devices or allow any air handling units in the TR.
- Do not place supply grilles over the racks.
- Plan for 24 hours a day and 7 days a week operation.
- Maintain a positive pressure with a minimum of one air change per hour.
- Place the thermostat as far away from the equipment as possible.

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- Maintain a temperature not to exceed 80 °F with 50% to 70% humidity.

For reference, the average equipment heat load in a typical school is:

- Elementary/Middle MTR—approximately 14,000–16,000 BTUs
- Elementary/Middle TR—approximately 4,000–6,000 BTUs
- High School MTR—approximately 16,000–18,000 BTUs
- High School TR—approximately 4,000–6,000 BTUs

### TR lighting

- A minimum of 50 Lux (50 footcandles) as measured at 3' AFF
- Installation at 8 1/2' AFF

### TR locations

- Locate the MTR in the center of the area that it serves, preferably in the core area with direct access to a main corridor.
- Provide a minimum of one TR per floor in each building.
- The location of each TR shall provide a distribution system that will create a horizontal cable run of no more than 250 feet\*\*as measured to the furthest point in each room in which cable is terminated. All TRs must be accessible from the main hallway. Provide access to all TRs from a main corridor.

### TR power

- Support power distribution using a building based transient voltage surge suppression (TVSS) system. Install a separate panel inside to feed only this room.
- Provide TVSS protection at each power panel in renovations that do not allow for a building based protection system.
- Provide support from the building's backup generator when possible.
- Coordinate with CCSD/IT Project Manager for placement of all electrical receptacles and outlet boxes.
- Provide one single L5-20R power receptacle mounted next to the rack in the MTR.
- Provide one dedicated 20 amp/120V circuit feeding a 4-plex power receptacle mounted on each rack in all TRs.
- Provide one duplex electrical receptacle on each wall for convenience outlets in all TRs.

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- Provide a grounding plate that is bonded to the building ground in all TRs. (Refer to the grounding and bonding framework section on page 16.)

### TR racks

The TR rack type is the Panduit NFR84. See power requirements for the TR rack on page 36.

### TR signs

Provide two signs with the following information.

- Sign #1 - Letters TR and the room number. Label the Main TR as MTR. Label the next as TR2. Number rooms sequentially from the first floor, then the second floor, etc.
- Sign #2 - Words "Sensitive Electronic Equipment. Absolutely No Storage."

### TR sleeves

- Provide sleeves entering the TR from each corridor when the TR is at a corridor intersection.
- Install sleeves that have the same capacity as the cable trays.
- Install sleeves into the TR as close to the telecommunications racks as possible. Multiple sleeves may be necessary, depending on the location of the TR.
- Provide fire rated sleeves from an approved manufacturer.

Refer to the general specifications for sleeves on page 14.

### TR surveillance camera

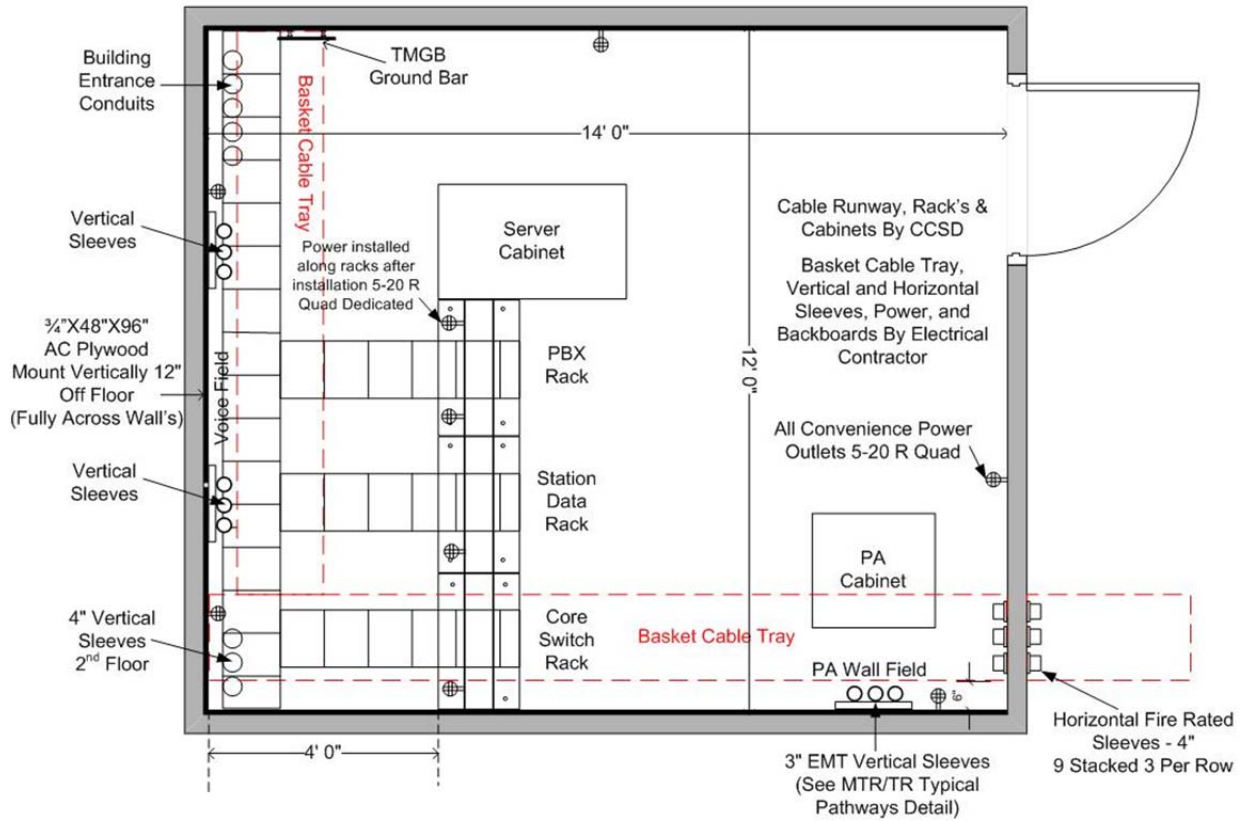
Provide an interior wall-mount surveillance camera facing the equipment inside the room. Refer to the CCSD Facility Security Design Specifications for details.

### TR walls

Design TR walls that are built to the ceiling or deck above. Never design TRs with suspended ceilings.

Example of a MTR

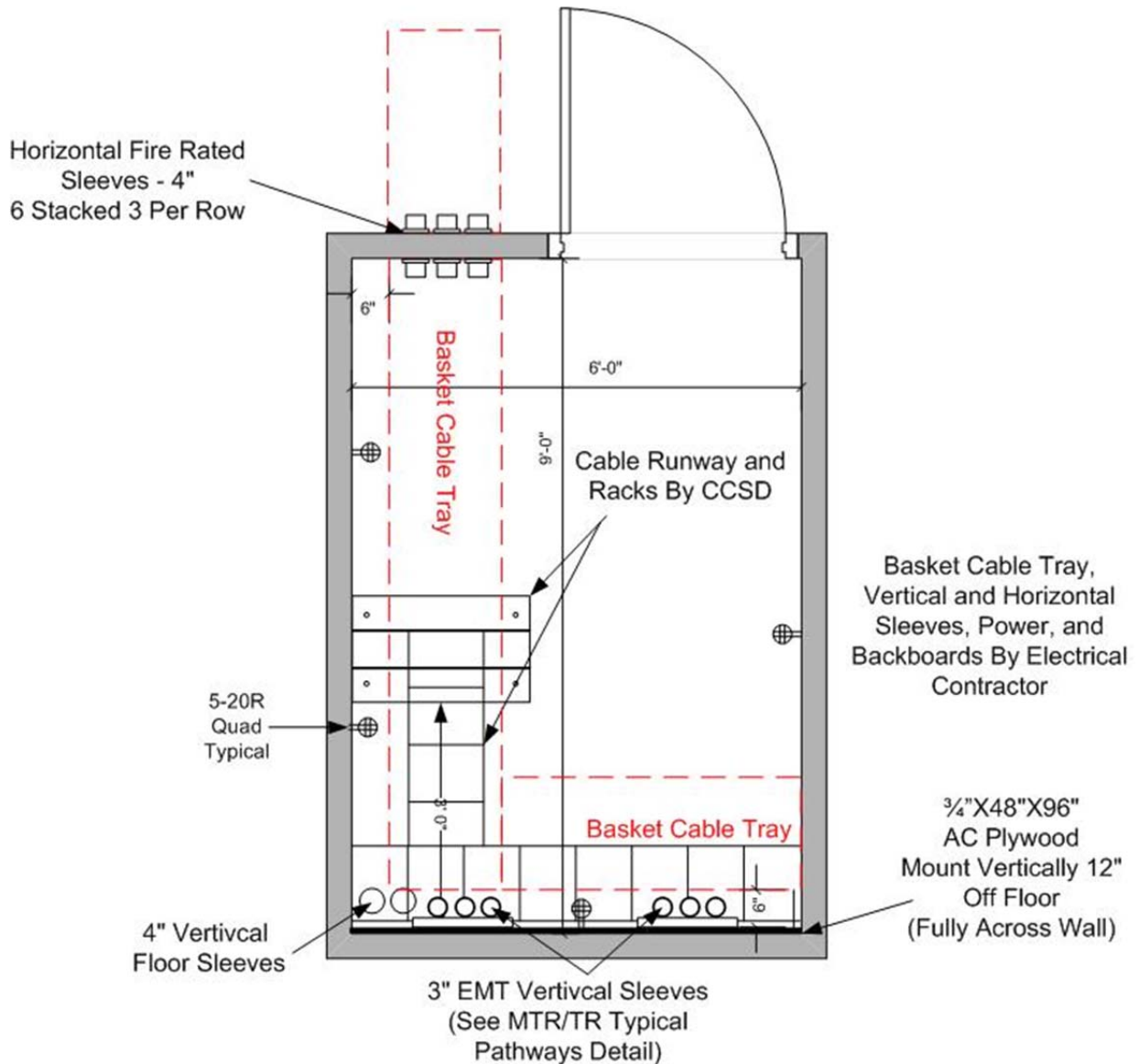
CCSD Main Telecommunications Room - MTR 12' X 14'



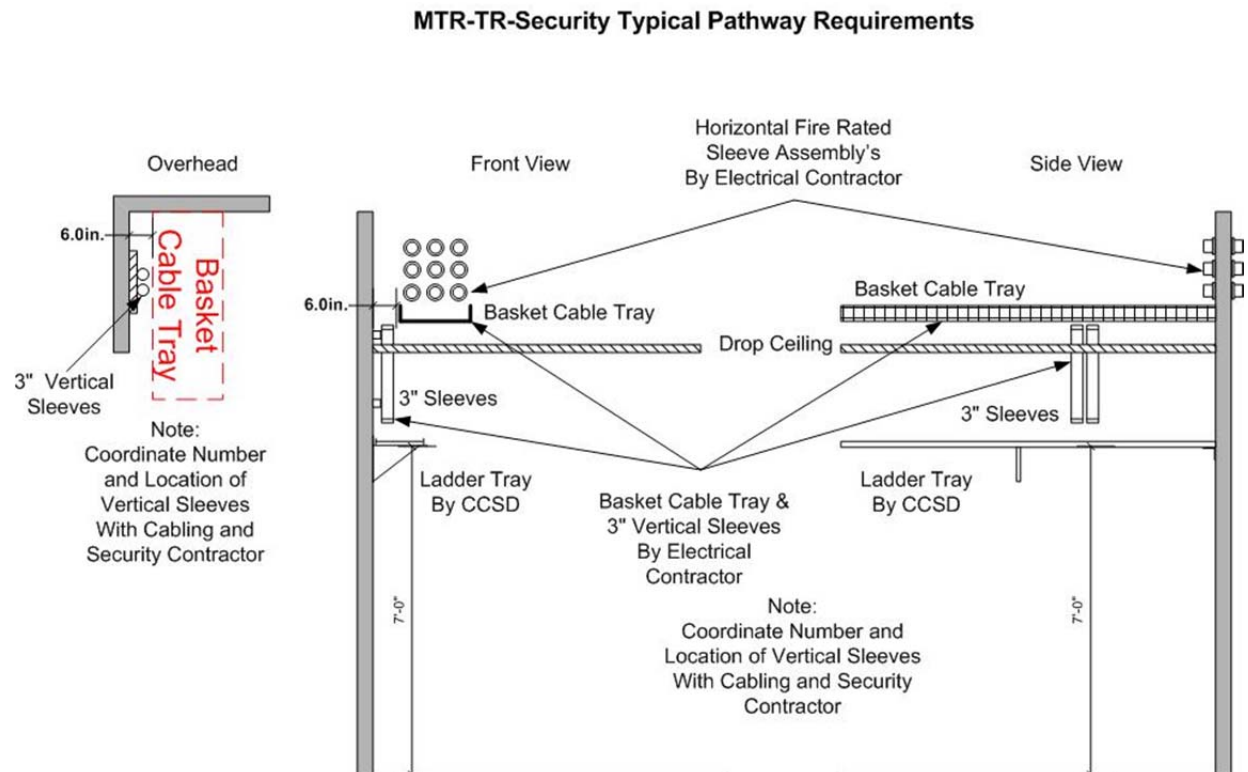


Example of a typical 6'x9' TR

### CCSD Typical TR layout 6' X 9'



## MTR/TR/Security typical pathway requirements



## Reference documents

Many of the specifications in this document are based on the following publications.

- BICSI. "Telecommunications Distribution Methods Manual".
- ANSI/TIA/EIA-569. "Commercial Building Standard for Pathways and Spaces".
- ANSI/TIA/EIA-607. "Commercial Building Grounding and Bonding Requirements for Telecommunications".

In addition, refer to the CCSD Design Specifications for Facility Security, LAN Cabling Specifications, and the most recent version of the SMART Board Installation Guidelines on the CCSD website, [www.ccsdschools.com](http://www.ccsdschools.com).

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