International Leadership of Texas (ILT)
K-8 Projects RFP
November 11, 2022

The following is an invitation to bid for the following projects and scope of work. COMBS Consulting Group has assisted ILT with development of drawings, specifications, and bid forms for the projects and are seeking bids for the low voltage scope of work including structured cabling and audiovisual systems. Currently the security system work will be provided by a previously selected contractor and security systems documents provided will be for reference only. Please provide responses to Darren Graves with COMBS Consulting Group (Darren.Graves@combs-group.com) and Mark Calvo (Mark.Calvo@combs-group.com) for confirmation of documents received and all bid documents requested. The project documents including drawings, specifications, and bid forms can be downloaded here:

ILT K-8 Projects RFP

Project Note: The contractor selected will be contracted with ILT and not through the General Contractor. However, the selected contractor will be responsible for coordination between the General Contractor and Electrical Contractor as required on the project. As noted in specifications; submittal process, commissioning and testing, training, and record drawings (As-Builts) will be required.

RFP Schedule:

- November 11, 2022- RFP Issued by COMBS
- November 18, 2022- Bid RFIs due to COMBS
- November 29, 2022- Bid RFIs responses by COMBS
- December 07, 2022- RFP Bids due to COMBS (End of Day)

Projects Included in RFP:

- Heritage K-8
  - Anticipated Rough-In Start- February 2023
  - Anticipated Substantial Completion- August 2023
- Pearland K-8
  - Anticipated Rough-In Start- February 2023
  - Anticipated Substantial Completion- August 2023
- MSG Ramirez K-8
  - Anticipated Rough-In Start- February 2023
  - Anticipated Substantial Completion- August 2023
- Richmond K-8
  - Anticipated Rough-In Start- TBD, Possibly January 2024
  - Anticipated Substantial Completion- TBD Possibly July 2024

Each Project shall include the following documentation:

Drawings:

- T0.00 TECHNOLOGY SYMBOLS & LEGEND
- T1.01 TECHNOLOGY SITE PLAN
- T2.01 TECHNOLOGY LEVEL 1 COMPOSITE FLOOR PLAN
- T2.11a TECHNOLOGY LEVEL 1 AREA A FLOOR PLAN
- T2.11b TECHNOLOGY LEVEL 1 AREA B FLOOR PLAN
- T3.00 TECHNOLOGY ENLARGED PLANS & ELEVATIONS
- T4.00 TECHNOLOGY TYPICAL DETAILS
- T5.00 TECHNOLOGY LABELING SCHEME
- TA0.00 AUDIOVISUAL SYMBOLS & LEGEND
- TA2.11a AUDIOVISUAL LEVEL 1 AREA A FLOOR PLAN
- TA2.11b AUDIOVISUAL LEVEL 1 AREA B FLOOR PLAN
- TA4.00 AUDIOVISUAL TYPICAL DETAILS
- TA4.01 AUDIOVISUAL TYPICAL DETAILS
- TS0.00 SECURITY SYMBOLS & LEGEND
- TS1.01 SECURITY SITE PLAN
- TS2.11a SECURITY LEVEL 1 AREA A FLOOR PLAN
- TS2.11b SECURITY LEVEL 1 AREA B FLOOR PLAN
- TS4.00 SECURITY TYPICAL DETAILS
- TS4.01 SECURITY TYPICAL DETAILS
- TS5.00 SECURITY SCHEDULES

Specifications:

- 27 10 00 STRUCTURED CABLING SYSTEM
- 27 41 00 AUDIOVISUAL SYSTEMS
- 27 51 00 DISTRIBUTED COMMUNICATION

Bid Form:

- Intent of the bid form is to provide cost breakout per system and unit costs averages established for add, moves, and changes. Additional line items can be added to bid form as needed to provide cost information. Please save the file name as the project name (Example: Heritage K-8 Bid Form)

END OF DOCUMENT

SECTION 27 10 00
STRUCTURED CABLING

PART 1 - GENERAL

1.1 SUMMARY

A. This section identifies the requirements, technical design, and specifications for the structured cabling system at the ILT K-8 Projects RFP (“Owner”). The structured cabling system as specified is an Industry-Standard Category 6 and 6A structured cabling system and includes backbone cabling, horizontal cabling and equipment room hardware as specified.

B. The Contractor shall provide a minimum Manufacturer’s 20-Year Performance Certification for the installed structured cabling system, certified by Commscope for copper and fiber cabling and communications.

C. Contractor shall include materials, equipment, and labor necessary to provide a complete and functional structured cabling system regardless of any items not listed or described in this specification or associated drawings.

1.2 REQUIREMENTS TABLE OF CONTENT

A. Contractor Experience Requirements

B. Submittal Requirements

C. Acceptable Manufacturers

D. Codes, Standards and Regulations

E. General Requirements

F. System Requirements

G. Testing Requirements

H. Project Closeout Documentation

I. Attachments

1.3 RELATED REQUIREMENTS

A. The Drawings, Specifications, General Conditions, Supplementary General Conditions, and other requirements of Division 1 apply to the work specified in Division 27, and shall be complied with in every respect. The Contractor shall examine all of the items which make up the Contract Documents, and shall coordinate them with the work on the project.

B. Contractor Experience Requirements

1. The Contractor shall be a Commscope Installer prior to submitting a bid for the work.
2. The Contractor shall possess all relevant Manufacturer Certifications (i.e. structured cable systems, testing equipment, etc,) for both the company and individual technicians prior to submitting a bid for the work.
3. The Contractor’s Project Manager shall be a Registered Communications Distribution Designer (RCDD) and available for all on-site coordination meetings.
4. The Contractor shall have been in business for a minimum of five (5) years.
5. The Contractor shall have a local office with local technicians and an adequate workforce to complete this project within a 100-mile radius of the project site.

6. The Contractor shall have completed a minimum of three (3) projects similar in size and scope to the Owner's installation, where the systems have been in continuous satisfactory operation for at least one (1) year.

C. Subcontractors shall be identified at the time of bid and comply with the requirements and intentions of these specifications, associated drawings, and related contract documents.

1.4 SUBMITTAL REQUIREMENTS

A. Pre-Installation Submittal

1. Contractor shall not order, purchase, or install any equipment until pre-installation submittals have been accepted in writing by the Architect/Design Consultant.
2. Contractor shall ensure submittals are submitted in a timely manner to ensure all products can be ordered and received on site in order to not cause any delays. If there are any concerns with any products having long lead times, those products shall be clearly identified in writing so the review and approval can be expedited.
3. All submittals shall be submitted in the same sequence as they are listed in the specifications (i.e. product data in the sequence items are listed in the product data section, manufacturer product certifications for company, manufacturer product certifications for installers, etc.). Submittals not in the proper sequence will not be approved.
4. Manufacturer product data sheets for each proposed system component.
    a. For product data sheets containing more than one (1) part number or product, the Contractor shall clearly identify the specific part number or product being submitted. Product data sheets without the part number clearly identified will not be approved.
5. Manufacturer Product Certifications for Company.
6. Manufacturer Product Certifications for Installers.
7. Manufacturer Certifications for testing equipment technicians.
8. Manufacturer Certifications for testing equipment calibration.
9. RCDD Certificate for Contractor's Project Manager.
10. Manufacturer Warranty letter.
11. Documentation indicating that Contractor has been in business for (3) years.
12. Address of Contractor's local office within a 100-mile radius of the project site.
13. Quantity of full time local technicians within a 100-mile radius of the project site.
14. List of three (3) contractor-installed projects of a similar size and scope that have been in operation for at least (1) year. The Contractor shall provide the following information for each project: Project Name, Project Location, Project Start Date, Project Completion Date, Project Start Cost, Project Completion Cost, Brief Description of Project, Client Point of Contact Name and Phone Number.
15. List of completed and ongoing projects with the Owner. The Contractor shall provide the following information for each project: Project Name, Project Location, Project Start Date, Project Completion Date, Project Start Cost, Project Completion Cost, and Brief Description of Project.
16. List of subcontractors performing any work on the project. List shall clearly identify the subcontractor's legal name and address, the scope of work to be performed by the subcontractors and the overall percentage of the project being provided by the subcontractor. If there are no subcontractors performing any work on the project, submit a statement on company letterhead clearly indicating no subcontractors will be performing any work on this project.
17. Contractor shall maintain a set of shop drawings on site at all times and shall update the shop drawings on a weekly basis. Shop drawings shall be made available for inspection at the request of the Architect/Design Consultant.
18. Contractor shall submit a line, by line specification review acknowledging conformance to the contract documents If any variances are taken due to a product being discontinued or factory recommended replacement for product reaching end of life the contractor shall note

it on the review as a variance. The specified products will be itemized and listed as an attachment.

PART 2 - **PRODUCTS**

2.1 GENERAL REQUIREMENTS

A. The following sections specifically list the acceptable equipment types and items for this project.

B. Architect/Design Consultant will have final determination of acceptability of all proposed equipment and must approve submitted equipment prior to purchase or installation.

C. Proposed equivalent items must be approved in writing by the Architect/Design Consultant prior to purchase or installation. Proposed equivalent items must meet or exceed these specifications and the specifications of the specified item.

D. In the event a manufacturer's specified product or part number has changed or is no longer available, Contractor shall substitute the appropriate equivalent manufacturer's part number and add the required information to the submittal package.

E. In the event of a discrepancy between the specifications and the drawings, the greater quantity and/or better quality will be furnished.

F. For listed products with no part number specified, Contractor shall provide a product that meets the performance requirements of these specifications, industry standard practices, and intended application.

G. All wiring, equipment, and installation materials shall be new and of the highest quality.

H. Labels on all cabling, materials, and equipment must indicate a nationally recognized testing laboratory.

I. Original Equipment Manufacturer (OEM) documentation must be provided to the Architect/Design Consultant which certifies performance characteristics and compliance with ANSI/TIA 568-D standards.

J. Contractor shall review all products specified and required for this project to determine if there are any lead times for any products that may cause any delay. Contractor shall clearly identify any concerns with lead times in writing to the Architect/Design Consultant prior to submitting a proposal for this work. If the Contractor does not identify any concerns with products having long lead times, it will be understood there are no long lead time issues and the Contractor will have all products on-site when needed to complete the job as required.

2.2 FIBER OPTIC BACKBONE CABLE

A. Indoor

1. Multimode Plenum Rated 12 Strand Armored – Commscope 760128017 | P-012-DZ-5K-FSUAQ.
2. Corning approved equal.

2.3 HORIZONTAL CABLE

A. Category 6 / 6A UTP Plenum

1. Network Access (Blue Sheath)

a. Commscope Uniprise Category 6 U/UTP - Part Number – UN874049914/10 | CS34P BLU C6

2. Wireless Access (Blue Sheath)
    a. Commscope Category 6A – Part Number UN874035104/10 | CS44P BLU C6A
3. Video Surveillance Cameras and Access Control Panels (Blue Sheath)
    a. Commscope Category 6 – Part Number UN874049914/10 | CS34P BLU C6

2.4 FIBER OPTIC CABLE TERMINATION

A. Fiber Enclosure

1. Fiber Optic Enclosure –
    a. 1RU – Commscope – Part Number 760231449 | SD-1U
    b. Corning approved Equal.

B. Multimode Fiber Pigtailed Splice Cassette

1. Commscope 760221739 | PNL-CS-12LCX-PT
2. Corning approved equal.

2.5 CATEGORY 6 HORIZONTAL RACK MOUNTED PATCH PANELS

A. Network Access

1. Commscope 48 Port Patch Panel - Flat - 760162834 | UNPA-6A-DM-2U-48
2. Commscope 24 Port Patch Panel - Flat - 760180067 | UNPA-6-DM-1U-24
3. Contractor shall provide Patch Panel Port Matrix for each patch panel indicating patch panel number, port number, cable label, and device type scheduled for data drop. Matrix shall be provided at MDF and IDF turnover.

B. Wireless Access

1. Commscope 48 Port CAT 6A Patch Panel – 760162834 | UNPA-6A-DM-2U-48

2.6 CATEGORY 6 / 6A JACKS

A. Network Access

1. Commscope CAT 6 U/UTP – Part Number 760237778 | UNJ600-BL

B. Wireless Access

1. Commscope CAT 6A/10G – Part Number 760241176 | UNJ10G-BL

2.7 CATEGORY 6 BUILDING ENTRANCE PROTECTORS

A. Category 6 Building Entrance Protector – Wall-Mounted

1. Solid state building entrance protector for Category 6 cables serving outlets on the exterior face and outside of the building
2. Approved per UL497 and UL497B
3. Shall support a minimum of 1G-BASE-T and Power-over-Ethernet applications
4. Manufacturer:
    a. Ditek – DTK-VM6WM
    b. Or equal from ITWLinx
    c. Or Approved Equivalent

B. Category 6 Building Entrance Protector – Rack-Mounted

1. Solid state building entrance protector for Category 6 cables serving outlets on the exterior face and outside of the building
2. Approved per UL497 and UL497B
3. Shall support at least 1G-BASE-T and Power-over-Ethernet applications
4. Rack-mounted
5. RJ45 in and out
6. Manufacturer:
    a. Ditek DTK-RM12ETHS
    b. Or equal from ITWLinx
    c. Or Approved Equivalent

C. Category 6 In-Line Surge Suppression – at Device end

1. Shielded surge protector
2. Approved per UL497B
3. Shall support at least 1G-BASE-T and Power-over-Ethernet applications
4. RJ45 in and out
5. Manufacturer:
    a. Ditek – DTK-MRJEXTS
    b. ITWLinx – CT6-POE-RJ45
    c. Or Approved Equivalent

2.8 TELECOMMUNICATIONS FACEPLATES

A. With Designation Window – Coordinate color with Architect prior to ordering.

B. 4 Port, Single Gang Flush (White)

1. Commscope Single Gang Plastic Faceplate – 108168543 | M14L-262
2. Commscope blank dust cover- 107067928 | M20AP-262

C. 2-Port Surface Mount Box (White)

1. Commscope Surface Mount Biscuit – 760067207 | M202 Plenum SMB-262

D. Wall Phone Faceplate

1. Stainless construction
2. With mounting tabs to wall-mount telephone
3. Manufacturer:
    a. Commscope – 760100891 | M10LW4SP

E. Combined AV Multimedia Faceplate

1. As noted on drawings provide single gang faceplate with (1) data, (1) HDMI, (1) USB
    a. Provide HDMI and USB insert with pigtails.
1. As noted on drawings provide dual gang faceplate with (2) data, (1) HDMI, (1) USB
    a. Provide HDMI and USB insert with pigtails.

2.9 PATCH CABLES

A. Fiber Patch Cables

1. Multimode Duplex Fiber Optic Patch Cords LC – LC
    a. Provided and installed by owner contractor GXA / C2M

B. Copper Patch Cables

1. Equipment Room / Telecommunications Rooms

a. Network / Voice -Commscope CAT 6 U/UTP Patch Cords – Part Number UC1BBB2 | UC1BBB2-0ZF001 (blue)
b. Wirless Access Points- Commscope Cat 6A U/UTP Patch Cords – BC1AAA2 | BC1AAA2-0MM001 (green)
c. Security Panels- Commscope Cat 6 STP Patch CordsUC1BBB2 | UC1BBB2-09F001 (yellow)
d. Security Cameras- Commscope Cat6 Patch Cords – Part Number UC1BBB2 | UC1BBB2-07F001 (red)
e. Contractor shall verify Patch Cord quantity and lengths shall be verified with the owner prior to purchase.

2. Workstations

a. Commscope CAT 6 U/UTP Patch Cords – Part Number UC1BBB2 | UC1BBB2-0ZF007 (blue)
b. Contractor shall verify Patch Cord quantity and lengths shall be verified with the owner prior to purchase.

2.10 EQUIPMENT RACKS, CABINETS, CABLE MANAGEMENT, AND ACCESSORIES

A. Two-Post Rack

1. Chatsworth – 55053-703
2. Or equal from Belden
3. Or equal from Commscope
4. Or equal from Hoffman
5. Or equal from Hubbell Premise
6. Or equal from Commscope
7. Or Approved Equivalent

B. Four-Post Rack - 19” x 84” Open Frame (Black)

1. Shall be same manufacturer as Two-Post Rack
2. Manufacturer

a. Chatsworth – Part Number 15213-703
b. Or equal from Belden
c. Or equal from Commscope
d. Or equal from Hoffman
e. Or equal from Hubbell Premise
f. Or equal from Commscope
g. Or Approved Equivalent

C. Wall-mounted equipment cabinet

1. Fully enclosed cabinet, with locking front door and locking rear swing-out functionality.
2. Height: [12RU / 24-inches] [19RU / 36-inches] [26RU / 48-inches]
3. Depth: [18-inches] [24-inches] [30-inches]
4. Minimum weight capacity: 250 pounds
5. Steel construction for cabinet body
6. Front door: [solid metal] [tempered glass panel]
7. Equipped with the following accessories:
   a. Fan Kit
   b. Filter Kit
8. Manufacturer:
   a. Chatsworth CUBE-iT – 11996-748

b. Include Standard Fan
c. Include Vertical Cable Management
d. Include Power Strip
e. Or Approved Equivalent

D. Vertical Cable Managers

1. Provide 6-inch wide, dual-sided Vertical Cable Manager at both ends of a row of equipment racks in the MDF and each IDF.
2. Provide 8-inch wide, dual-sided Vertical Cable Managers between each equipment rack.
3. Shall have integral cover/door on both sides.
4. Manufacturer:

a. Chatsworth Evolution g2

1) 6-inch wide: 35521-703 with floor bracket (35506-701

b. Or equal from 2-post rack manufacturer.

E. Horizontal Cable Managers (Black)

1. Chatsworth Rack Cabling Manager - Part Number 30530-719

2.11 CABLE RUNWAY (LADDER TYPE)

A. Universal Cable Runway

1. 18-inch Chatsworth - Part Number 10250-718
2. Or approved equal from 2-post rack manufacturer

B. Cable Runway Radius Drop, Cross Member

1. 18-inch Chatsworth - Part Number 12100-718
2. Or approved equal from 2-post rack manufacturer

C. Cable Runway Radius Drop, Stringer

1. Chatsworth - Part Number 12101-711
2. Or approved equal from 2-post rack manufacturer

D. Cable Runway Butt-Splice Kit

1. Chatsworth - Part Number 11301-701
2. Or approved equal from 2-post rack manufacturer

E. Cable Runway Junction-Splice Kit

1. Chatsworth - Part Number 11302-701
2. Or approved equal from 2-post rack manufacturer

F. Cable Runway Butt-Swivel Splice Kit

1. Chatsworth - Part Number 10487-701
2. Or approved equal from 2-post rack manufacturer

G. Rack-to-Runway Mounting Kit

1. 15 to 18-inch runway Chatsworth - Part Number 10595-718
2. Or approved equal from 2-post rack manufacturer

H. Cable Runway Elevation Kit for Racks

1. Chatsworth - Part Number 10506-706
2. Or approved equal from 2-post rack manufacturer

I. Triangular Support Bracket, Aluminum

1. 12 to 18-inch runway Chatsworth - Part Number 11312-718
2. Or approved equal from 2-post rack manufacturer

J. Wall Angle Support Kit, Cable Runway

1. 18-inch runway Chatsworth - Part Number 11421-718
2. Or approved equal from 2-post rack manufacturer

K. 90 Degree Runway-Splice Kit

1. Chatsworth - Part Number 11314-701
2. Or approved equal from 2-post rack manufacturer

L. 45 Degree Runway-Splice Kit

1. Chatsworth - Part Number 11313-701
2. Or approved equal from 2-post rack manufacturer

M. Foot Kit, Cable Runway

1. Chatsworth - Part Number 11309-701
2. Or approved equal from 2-post rack manufacturer

N. Vertical Wall Brackets (pair)

1. Chatsworth - Part Number 10608-701
2. Or approved equal from 2-post rack manufacturer

O. Threaded Ceiling Kit, Cable Runway

1. Chatsworth - Part Number 11310-001
2. Or approved equal from 2-post rack manufacturer

P. Threaded Rod Cover

1. Chatsworth - Part Number 11085-001
2. Or approved equal from 2-post rack manufacturer

Q. Protective End Caps for Cable Runway

1. Chatsworth - Part Number 10642-001
2. Or approved equal from 2-post rack manufacturer

R. End Closing Kit, Cable Runway

1. Chatsworth - Part Number 11700-718
2. Or approved equal from 2-post rack manufacturer

2.12 J-HOOKS / HOOK & LOOP STRAPS

A. J-Hooks

1. Shall be listed as meeting UL 2239 requirements
2. Shall be listed/approved for installation in return-air plenum spaces
3. Shall be designed and equipped with accessories (if needed) to be supported by the following methods:

a. Threaded rod from structure
b. Wall-mounted to concrete/CMU walls or wood or metal studs
c. Beam clamps
d. Optional “multi-tiered” mounting to bottom of J-hook
e. Optional Fastener to raised floor pedestal

4. Equipped with retainer or strap over top of J-hook once cables are installed
5. Sized to support quantity of installed cables, plus 25% spare capacity
6. Manufacturer:

a. Erico – Caddy CAT Links
b. Commscope – J-Mod Cable Supports
c. Or Approved Equivalent

B. Hook & Loop Straps

1. Plenum-rated
2. Velcro construction with hook/loop strap
3. Color: black
4. Manufacturer:

a. Commscope Tak-Ty Plenum Ties
b. VELCRO ONE-WRAP
c. Or Approved Equal

C. Grid Wire Clips

1. Caddy 6Z4S WR RD FLANGE CLIP
2. Or Approved Equal

2.13 TELECOM GROUNDING AND BONDING

A. TMGB (Telecommunications Main Grounding Busbar) / PBB (Primary Bonding Busbar)

1. Copper construction
2. Size: per Drawings
3. UL 467 Listed
4. TIA-607 hole pattern (pairs of lugs at 5/8” hole centers and 1” hole centers)
5. Part of kit that includes: busbar, two insulators, two steel stand-off brackets, and mounting accessories
6. Manufacturer:

a. 4” x 12” x 1/4"

1) Chatsworth 40153-012
2) Harger GBI14412TMGBKT
3) Or equal from Hubbell
4) Or equal from Commscope
5) Or Approved Equal

B. TGB (Telecommunications Grounding Busbar) / SBB (Secondary Bonding Busbar)

a. 4” x 12” x 1/4"

1) Chatsworth 40153-012
2) Harger GBI14412TMGBKT
3) Or equal from Hubbell
4) Or equal from Commscope
5) Or Approved Equal

C. Two-Hole Lugs

1. UL listed
2. Two-hole, long barrel, electro tin-plated compression lug with inspection port
3. Manufacturer:
    a. Chatsworth 40162-XXX
    b. Harger – GECLB series
    c. Burndy
    d. Or equal from Hubbell
    e. Or Approved Equal

D. Conductors

1. Minimum conductor size shall be #6 AWG; sized based on length per Table on Drawings
2. Green sheath
3. Insulation shall be rated for the environment where it is installed
4. Manufacturer:
    a. Chatsworth
    b. Harger
    c. Hubbell
    d. Or Approved Equal
    e. Or approved conductors listed in Division 26.

E. Conduit Clamps

1. Tinned copper with 1-1/2-inches of contact area.
2. Can be connected to conductors via exothermic connection or standard compression lugs.
3. Manufacturer:
    a. Harger – UPC series
    b. Or equal from Hubbell
    c. Or Approved Equal

F. Cable Tray Clamps

1. Electro-tin plated cast bronze connector
2. UL 467 approved
3. Manufacturer:
    a. Harger - TBCTC
    b. Or equal from Hubbell
    c. Or Approved Equal

G. Cable to Cable Connections

1. T-tap or Exothermic Weld
2. Manufacturer:
    a. Harger RT series (T-tap) or UltraShot Weld Metal (Exothermic Weld)
    b. Or equal from Hubbell
    c. Or Approved Equal

H. Cable to Structural Steel Connections

1. Exothermic Weld – types VA, VD, or VU
2. Manufacturer:
    a. Harger – Ultraweld series
    b. Or equal from Hubbell
    c. Or Approved Equal

2.14 LABELING

A. Cable Labeling

1. For Horizontal Cables and Inside-Plant Backbone Cables

a. Laser/Ink Jet Self Laminating Labels
b. Manufacturer:

1) Commscope – S100X Series
2) Or equal from Brady
3) Or equal from Dymo
4) Or equal from Hellermann Tyton
5) Or Approved Equivalent

B. Rack and Patch Panel Labeling

1. Vinyl cloth label
2. Lettering/numbering text height 3/8” to 1/2"
3. Manufacturer:

a. Brady PTL series
b. Commscope PCL037 series
c. Or Approved Equivalent

2.15 PLYWOOD BACKBOARD

A. Fire-treated, AC grade plywood

B. 8’ tall by 4’ wide by ¾” thick

C. Locations as noted on Drawings

D. Painted with two-coats of fire-retardant white paint (mask out a minimum of one stamp on each piece of plywood used)

2.16 FIRESTOPPING SYSTEMS

A. Fire-Rated Pathway Device (Sleeve)

1. Steel pathway (sleeve) with integral intumescent firestopping material to facilitate the initial installation - and frequent moves, adds, and changes - of low-voltage voice/data, fiber, video, security, paging, etc cabling.
2. UL System meeting the hourly fire-rating of the wall or floor type
3. Multiple pathways in the same location shall be ganged together.
4. Plenum-rated
5. Manufacturer:

a. Specified Technologies Inc – EZ Path Fire-Rated Pathway

1) 4” – Series 44

B. Firestopping for conduit penetrations

1. For metallic conduit or tube to be installed through 1 or 2 hr fire-rated wall or floor.
2. Manufacturer:

a. Gypsum board stud walls

1) Specified Technologies - UL System No. W-L-1222 with SpecSeal LCI Sealant

b. Concrete floors or walls

1) Specified Technologies – UL System No. C-AJ-1353 with SpecSeal LCI Sealant

C. Firestopping for backboxes in fire- or smoke-rated wall

1. For Communications backboxes to be installed in 1 or 2 hr fire-rated or smoke-rated walls.
2. STC sound rating – 64 or higher (related to specific construction)
3. Shall meet criteria of UL263 and classified for up to hrs as a Wall Opening Protective Material (Category CLIV)
4. Manufacturer:

a. Specified Technologies – SpecSeal Power Shield

D. Smoke-Rated or Acoustical Sleeves

1. Metallic or non-metallic pathway (sleeve) with integral self-adjusting smoke and sound sealing system to facilitate the initial installation – and frequent moves, ads, and changes – of low-voltage voice/data, fiber, video, security, paging, etch cabling.
2. L Rating – Air Leakage Test Procedure tested per UL1479 without a Fire Test
3. Less than 1.25 cubic feet per minute for 0% fill (cable) capacity
4. Less than 2.5 cubic feet per minute for 1 to 100% fill (cable) capacity
5. Sound Transmission Classification (STC) – 59 or higher (related to specific construction)
6. Plenum-rated
7. Manufacturer:

a. Specified Technologies Inc – NEZ Pathway

E. Fire-rated Conduit (Circuit Integrity) Wrap

1. Endothermic wrap for EMT and RMC for protection of cable pathways for critical life safety circuits.
2. Tested to ASTM E1725 for circuit integrity
3. Manufacturer:

a. Specified Technologies – E-Wrap Endothermic Wrap

PART 3 - EXECUTION

3.1 CODES, STANDARDS, REGULATIONS

A. American National Standards Institute (ANSI)

B. American Society for Testing and Materials (ASTM)

1. ASTM B 1 Standard Specification for Hard-Drawn Copper Wire
2. ASTM B 8 Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
3. ASTM D 1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3) (2700 kN-m/m3)
4. ASTM D 709 Laminated Thermosetting Materials

C. Alliance for Telecommunications Industry Solutions (ATIS)

D. Building Industry Consulting Service International (BICSI)

1. Telecommunications Distribution Methods Manual 14th Edition
2. Outside Plant Design Reference Manual 6th Edition
3. ANSI/BICSI Data Center Design and Implementation Best Practices
4. NECA/BICSI 568-D Standard for Installing Commercial Building Telecommunications Cabling

5. NECA/BICSI 607-D, Standard for Telecommunications Bonding and Grounding Planning and Installation Methods for Commercial Buildings

E. Federal Communications Commission (FCC)

1. FCC Part 15, Radiated Emissions Limits
2. FCC Part 68, Connection of Terminal Equipment to the Telephone Network
3. FCC Part 76, Cable Television Service

F. Insulated Cable Design Consultants Association (ICEA)

1. ICEA S-87-640 Fiber Optic Outside Plant Communications Cable
2. ICEA S-98-688 Broadband Twisted Pair, Telecommunications Cable Aircore, Polyolefin Insulated Copper Conductors
3. ICEA S-99-689 Broadband Twisted Pair Telecommunications Cable Filled, Polyolefin Insulated Copper Conductors

G. International Electrotechnical Commission (IEC)

H. Institute of Electrical and Electronics Design Consultants, Inc. (IEEE)

1. IEEE Standard IEEE Guide for Measuring Earth Resistance, Ground Impedance, and Earth Surface Potential of a Ground System
2. IEEE Standard 1100 Recommended for practice for Powering and Grounding Sensitive
3. Electronic Equipment in Industrial and Commercial Power Systems (IEEE Emerald Book)
4. IEEE C2 Errata INT National Electrical Safety Code
5. IEEE Std 100 The Authoritative Dictionary of IEEE Standards Terms

I. International Organization for Standardization (ISO)

1. International Organization of Standardization/International Electrotechnical Commission (ISO/IEC)
2. ISO/IEC 11801, Information Technology-Generic Cabling for Customer Premises,
3. ISO/IEC 14763-1, Information Technology-Implementation and Operation of Customer Premises Cabling-Administration
4. ISO/IEC 11801, Information Technology-Generic Cabling for Customer Premises
5. ISO/IEC 14763-1, Information Technology-Implementation and Operation of Customer Premises Cabling-Administration

J. National Cable Television Association (NCTA)

K. National Electrical Manufacturers Association (NEMA)

1. NEMA C62.61 Gas Tube Surge Arresters on Wire Line Telephone Circuits

L. National Fire Protection Association (NFPA)

1. NFPA-70, National Electrical Code
2. NFPA-75, Protection of Electronic Computer Data Processing Equipment.
3. NFPA-101, Life Safety Code
4. NFPA-297, Guide on Principles and Practices for Telecommunications Systems
5. NFPA-780, Standard for the Installation of Lightning Protection Systems.

M. National Institute Standards and Technology (NIST)

N. Occupational Safety and Health Administration (OSHA)

O. Telecommunications Industry Association (TIA)

1. ANSI/TIA-568-D, Generic Telecommunications Cabling for Customer Premises.

2. ANSI/TIA-568-D, Commercial Building Telecommunications Cabling Standard.
3. ANSI/TIA -568-D, Balanced Twisted-Pair Telecommunications Cabling and Components Standard.
4. ANSI/TIA-568-D, Optical Fiber Cabling Components Standard.
5. ANSI/TIA–569-E Commercial Building Standard for Telecommunications Pathways and Spaces.
6. ANSI/TIA-606-D, Administration Standard for the Telecommunications Infrastructure.
7. ANSI/TIA-607-D, Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises.
8. ANSI/TIA-758-B, Customer-Owned Outside Plant Telecommunications Infrastructure Standard.

P. U.S. Department of Agriculture (USDA)

1. RUS 1755 Telecommunications Standards and Specifications for Materials, Equipment and Construction
2. RUS Bull 1751F-643 Underground Plant Design
3. RUS Bull 1751F-815 Electrical Protection of Outside Plant
4. RUS Bull 1753F-201 Acceptance Tests of Telecommunications Plant (PC-4)
5. RUS Bull 1753F-401 Splicing Copper and Fiber Optic Cables (PC-2)
6. RUS Bull 345-65 Shield Bonding Connectors (PE-65)
7. RUS Bull 345-72 Filled Splice Closures (PE-74)
8. RUS Bull 345-83 Gas Tube Surge Arrestors (PE-80)

Q. Underwriters Laboratories, Inc. (UL)

1. UL 510 Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape
2. UL 910 (NFPA 262) Applicable Flame Test

3.2 GENERAL REQUIREMENTS

A. In the event of any conflicts between documents referenced herein and the contents of this specification, the Contractor shall notify the Architect/Design Consultant in writing of any such occurrences before purchasing or installing any equipment or materials. The Architect/Design Consultant will notify the Contractor of any actions required to resolve these conflicts. Such actions may include but are not limited to: design changes, equipment, materials and/or installation changes. In any event Contractor shall not supersede specifications and standards from the latest NFPA and NEC publications. In the event of any conflicts between Standards and Codes the more stringent shall take precedence.

B. Contractor shall comply with the requirements of local Authority Having Jurisdiction (AHJ), State of Texas, the National Fire Protection Association (NFPA), and the National Electrical Code (NEC). If the Contractor identifies any item in the plans or specifications that will not strictly comply with the aforementioned laws, ordinances, and rules, the matter shall be referred to the Architect/Design Consultant for direction before proceeding with that part of the work.

C. The Contractor shall be responsible for coordination with other trades to ensure any conflicts or potential conflicts are resolved prior to any work beginning on the project.

D. The Contractor shall install the materials in accordance with these specifications and the manufacturer’s installation guidelines.

E. No deviations from the plans or specifications shall be made without full consent in writing of the Architect/Design Consultant. The Contractor shall have written approval from the Architect/Design Consultant for any additional work beyond the Contract Documents prior to beginning such work. If the Contractor does not obtain written approval from the Architect/Design Consultant prior to proceeding with the work, the contractor shall not be reimbursed for the work.

F. The Contractor shall obtain written permission from the Architect/Design Consultant before proceeding with any work that would necessitate cutting into or through any part of the building structure such as, but not limited to girders, beams, floors, walls, roofs, or ceilings.

G. Contractor shall perform onsite coordination with the General Contractor, Structural, MEP, and Civil as required to discuss outside plant and inside plant clash detection with other trades.

Contractor shall notify the Architect/Design Consultant a minimum of (2) weeks prior to beginning work and will participate in a pre-construction meeting with the Architect/Design Consultant to perform a walkthrough, review the scope of work, schedule, and escalation procedures.

H. The Contractor shall maintain a work area free of debris, trash, empty cable reels, scrap cable, etc., and dispose of such items on a daily basis and return the site to the original state of cleanliness. The Contractor shall not use Owner's facilities for the disposal of excess or scrap materials.

I. Equipment and materials installed by the Contractor shall be free of defects and damage.

J. Contractor shall be responsible for the repair of any damage caused by the contractor during the installation.

K. Contractor shall test all cables prior to installation. By failing to perform this testing operation, the Contractor shall accept the cable as compliant and assume all liability for the replacement of the cable at no cost to the Owner should it be found defective at a later date.

L. Contractor shall maintain a set of working specifications, design drawings, and record drawings to be kept on site at all times and shall update the record drawings with any changes on a weekly basis. Record drawings shall be made available for inspection at the request of the Architect/Design Consultant.

M. Equipment and materials shall be consistent throughout the installation. Where multiple units of the same type of equipment and materials are required, these units shall be a standard product with the same manufacturer and model number.

N. Equipment and materials shall be delivered and stored in accordance with the manufacturer's guidelines at the Contractor's expense.

O. Contractor shall make all stored equipment and materials available for inspection at the request of the Architect/Design Consultant.

P. All equipment and material used in the installation shall be approved by the manufacturer for the environment in which it is being installed.

Q. Cables shall be properly supported in accordance with industry standards at all times. Improperly supported cables shall be corrected by the Contractor at no cost to the Owner.

R. Contractor shall be responsible to properly protect information outlets from damage by other trades during construction.

S. Cables shall be routed at 90-degree angles to the building structure. At no time shall a diagonal pull be installed.

T. The Contractor shall not install cables in conduits or sleeves without nylon bushings. Cables installed through conduits or sleeves without nylon bushings shall be removed and replaced at no cost to the Owner.

3.3 SYSTEM REQUIREMENTS

A. The contractor is responsible for furnishing materials as required to provide a complete and functioning system. Quantities are not noted, so the information may be obtained from the

technology drawings.

B. Inter-Building Cable Plant

1. Fiber Optic Cable

a. Multimode

1) Contractor shall furnish and install fiber optic cables as indicated on the Drawings
2) Contractor shall install a 10-foot service loop at the ends of each cable to be coiled, mounted, and stored on the wall above the ladder rack.
3) Cables shall be routed utilizing the pathways as indicated in the technology drawings.

2. Fiber Optic Termination

a. Contractor shall terminate all installed fiber optic strands with fusion splice connectors and place into fiber optic enclosures with splice trays as indicated in the technology drawings.
b. Contractor shall furnish fiber optic enclosures and coupler panels for all fiber optic strands and blank panels for all unused slots.

C. Intra-Building Cable Plant

1. Fiber Optic Cable

a. Multimode

1) Contractor shall furnish and install plenum rated fiber optic cables as indicated on the technology drawings.
2) Contractor shall install a 10-foot service loop at the ends of each cable to be coiled, mounted, and stored on the wall above the ladder rack.
3) Cables shall be routed utilizing the pathways as indicated in the technology drawings.

2. Fiber Optic Termination

a. Contractor shall terminate all installed fiber optic strands with fusion splice connectors and place into fiber optic enclosures with splice trays as indicated in the technology drawings.
b. Contractor shall furnish fiber optic enclosures and coupler panels for all fiber optic strands and blank panels for all unused slots.

D. Horizontal Cable

1. No horizontal cable shall be longer than two hundred ninety-five (295) feet. If any station cable will be longer than two hundred ninety-five (295) feet, Contractor shall stop installation of the cable and immediately notify Architect/Design Consultant in writing. If Contractor fails to notify the Architect/Design Consultant in writing, Contractor shall replace cable at no cost to the Owner.
2. The Contractor shall furnish and install horizontal cables within each Technology Region from the respective ER or TR to each outlet location as indicated in the technology drawings.
3. The Contractor shall install a 10-foot service loop to be coiled, mounted, and stored above the ladder rack in each respective Equipment Room or Telecommunications Room.
4. The Contractor shall provide a 2-foot service loop coiled and supported directly above the workstation outlet.

E. Horizontal Cable Termination

1. Contractor shall terminate cables as defined by the ANSI/TIA 568-D Commercial Building Wiring Standard with the EIA-568B sequence.

2. Workstations

a. Contractor shall furnish and install modular jacks to terminate UTP horizontal cables.
b. Contractor shall furnish and install faceplates, systems furniture faceplates, or surface-mount boxes to house modular jacks as indicated in the technology drawings.

1) Any unused faceplate positions shall have the appropriate number and color of blanks installed.

3. Equipment Rooms / Telecommunications Rooms

a. Horizontal Cable for Data

1) Contractor shall furnish and install patch panels and horizontal cable managers to terminate horizontal data cables as indicated in the technology drawings.

b. Horizontal Cable requiring lightning protection

1) Contractor shall furnish and install lightning protection on both ends of any cables on the exterior of the building as indicated in the technology drawings.
2) All lightning protection shall be installed per manufacturer's instructions including but not limited to placement and bonding requirements.

F. Patch Cables

1. Fiber

a. Equipment Rooms / Telecommunications Room

a) Provided and Installed by owner contractor GXA / C2M.

2. Copper

a. Workstations

1) The Contractor shall furnish patch cables in original manufacturer packaging for each cable terminated.
2) 100% of the patch cables shall be Per product specification in length and provided and installed by data contractor.

b. Equipment Rooms / Telecommunications Rooms

1) The Contractor shall furnish and store patch cables in original manufacturer packaging for each cable terminated per Equipment Room / Telecommunications Room:
2) 100% of the patch cables shall be . Per product specification in length and provided and installed by data contractor.

G. Cable Support

1. All cables shall be installed and supported in conduit systems, cable trays, cores, sleeves, etc. as indicated in the technology drawings.
2. When cables leave the main pathway systems as indicated on the technology drawings, they shall be installed and supported in Contractor furnished and installed j-hooks or adjustable cable supports.
3. No cable pathway shall exceed 40% fill ratio.
4. The contractor shall furnish a separate j-hook or adjustable cable support pathway for each cable type (data, paging/clock, and security).
5. J-hooks and adjustable cable supports shall be installed no more than five-feet (5') apart on center, using only manufacturer-approved installation methods and hardware.
6. J-hooks and adjustable cable supports shall be installed no higher than 3-feet above the accessible ceiling to allow for ease of access for future moves, adds and changes

7. Do not utilize ceiling grid support wire; support j-hooks via wall, structure, or threaded rod support to structure.
8. J-hooks shall be furnished with closure clips.
9. Maximum sag between supports shall not exceed twelve-inches (12”).
10. Contractor shall establish j-hook and adjustable cable supports pathways and shall coordinate pathways with all other disciplines. Under no-circumstances shall these pathways be used to support other low-voltage applications not included in this specification.
11. Contractor shall provide and install horizontal cabling in unison with the construction process and prior to the gypsum ceiling being installed.
12. UNDER NO CIRCUMSTANCES SHALL ZIP TIES BE USED ON ANY HORIZONTAL CABLING.
13. Cable Dressing
    a. No nylon cable ties shall be used at any time during the installation of the cable.
    b. Above Ceiling
        1) Contractor shall furnish and install plenum-rated hook & loop straps in plenum-rated airspaces.
            a) The Contractor shall install no more than (1) hook & loop strap between each j-hook or saddle strap or at service loop locations.
    c. Equipment Rooms / Telecommunications Rooms
        1) The Contractor shall bundle all visible cables by with Contractor furnished and installed hook & loop straps.
            a) Hook & loop straps shall be installed twenty-four (24) inches apart on center.

H. Equipment Rooms / Telecommunications Room Build-Out

1. Plywood
    a. The Contractor shall furnish and install 8’ H x 4’ W x ¾” D sheets of AC grade fire-rated plywood as indicated in the technology drawings.
    b. The Contractor shall mount all plywood vertically starting at 24” AFF.
    c. The Contractor shall cover the plywood with two (2) coats of Contractor furnished white fire-retardant paint leaving exposed (1) fire rating stamp per sheet.
2. Cable Runway (Ladder Type)
    a. Contractor shall furnish and install cable runway using manufacturer-approved hardware and installation methods as indicated in the technology drawings.
    b. Contractor shall furnish and install vertical sections of cable runway using manufacturer-approved hardware and installation methods to provide transition and support where cables enter or exit the room using a vertical pathway.
    c. Contractor shall furnish and install radius drops cross member and stringers above each rack using manufacturer-approved hardware and installation methods where cables exit the horizontal section of the ladder rack.
    d. Contractor shall ground and bond each cable runway section to the next utilizing ground straps and ensure metal-to-metal contact.
3. Equipment Racks and Cabinets
    a. Contractor shall furnish and install equipment racks with vertical management using manufacturer approved hardware and installation methods as indicated in the technology drawings.
    b. Contractor shall secure relay racks to the concrete floor utilizing expandable concrete anchors.
    c. Contractor shall secure the equipment racks to the cable runway using cable runway elevation kits and manufacturer approved hardware and installation methods.
    d. Contractor shall bolt all equipment racks and vertical cable managers together.

e. Contractor shall individually ground and bond each equipment rack and ensure metal-to-metal contact.

4. Patch Panels

a. Horizontal Cabling patch Panels shall be installed as indicated in the Technology Drawings.

I. Grounding and Bonding

1. General Requirements:

a. Ensure metal-to-metal contact for all terminations.
b. All materials shall be UL Listed.
c. Cable-to-cable connections and cable-to-building steel connections shall be exothermic welds. All other connections shall be made with UL Listed compression 2-hole lugs with anti-oxidation compound, utilizing both lug openings.
d. Only one lug shall occupy a hole on the busbar. No stacking lugs or “double lugging” shall be permitted.
e. Bonding conductors shall be sized based on length per the table on the Drawings; minimum size #6 AWG and maximum size 750kcmil.
f. For Communications Rooms / Data Centers with a raised floor, provide a supplementary bonding grid (SGB) below the raised floor comprised of the following:

1) Bare copper conductor around the perimeter of the room
2) 12”x4” TGB/SBB, bonded to two points of the perimeter conductor and to the TGB/SBB above the access floor
3) Bond all piping and conduit entering raised floor at the perimeter.
4) Bond floor pedestal to Computer Room Air Conditioning Unit (if located in Communications Room)
5) Bare copper conductor between every four stringers, running the length/width of the room in both directions; bond to every fourth pedestal in both directions and to perimeter bonding conductor.
6) Bond floor pedestal to Power Distribution Unit feeder conduit below raised floor.

2. Telecom Bonding System shared with Electrical Ground System – Compliant with BICSI TDMM

a. For a building without structural steel, Telecommunications Bonding Backbone is not required. The TMGB/PBB shall be bonded to the Electrical Ground System via a Bonding Conductor for Telecommunications. TGB/SBB shall be bonded to the grounding busbar of the serving electrical panelboard. Bonding conductor routing shall be indicated on Record Drawings.
b. Provide label above TGB/SBB shall indicated name of electrical panelboard and the room it is located. Indicate routing on pre-construction Shop Drawings, and update with final installed routing as part of As-Built Drawings.

3. Main Communication Room (MDF / Server Room) requirements

a. Install TMGB/PBB at 84-inches above finished floor.
b. Bonding Conductor for Telecommunications (BCT)

1) Division 26 Contractor shall provide Bonding Conductor for Telecommunications from the Electrical Ground System to the TMGB/PBB in the MDF Room.
2) BCT conductor size shall be sized based on length per the table on the Drawings and shall be no smaller than the largest TBB conductor. If installed underground, install in dedicated 2-inch diameter conduit.

c. Provide bonding conductors to the following equipment within the Communication Room (where available/installed):

1) Structural steel or support beams located within the room.

2) If electrical distribution panelboard serving the Communications Room is located within the Communications Room, bond TGB/SBB to ground bus of the panelboard.
3) Overhead ladder rack
4) Equipment racks, cabinets, and enclosures
5) Surge protectors / building entrance terminals
6) Exposed cable shields
7) Continuous metallic conduits for low-voltage cabling that stub into the Communication Room
8) Any additional equipment or pathways where bonding/grounding is recommended by the equipment manufacturer or the referenced standards (TIA 607 and NECA/BICSI 607).

4. Secondary Communication Rooms (IDFs / Data Rooms)

a. Install TGB/SBB at 84-inches above finished floor.
b. Provide bonding conductors to the following equipment within the Communication Room (where available/installed):

1) Structural steel or support beams located within the room.
2) If electrical distribution panelboard serving the Communications Room is located within the Communications Room, bond TGB/SBB to ground bus of the panelboard.
3) Overhead ladder rack
4) Cable trays in corridor
5) Equipment racks, cabinets, and enclosures
6) Surge protectors / building entrance terminals
7) Exposed cable shields
8) Continuous metallic conduits for low-voltage cabling that stub into the Communication Room
9) Any additional equipment or pathways where bonding/grounding is recommended by the equipment manufacturer or the referenced standards (TIA 607 and NECA/BICSI 607).

J. Wire-mesh cable tray

1. Coordinate with all other disciplines to ensure cable tray routing and installation is coordinated with other systems.
2. Coordination with all other disciplines to ensure the 12-inch clearance above the tray is maintained.
3. Any elevation changes shall have radius drops installed to support the cables properly.
4. Install cable trays parallel with or at right angles to ceilings, walls, and structural members. Utilize 45-degree off-sets/routing to change elevation and horizontal routing.
5. Provide supports to resist forces of 0.5 times the equipment weight in any direction and 1.5 times the equipment weight in the downward direction.
6. Where cable trays encounter a non-fire-, smoke-, or acoustically-rated wall, cut opening through wall to facilitate continuous cable tray installation through wall.
7. Where cable trays encounter fire, smoke, or acoustically-rated wall, stop cable tray and provide Fire-or Smoke-Rated Pathway Devices. Provide number of devices to match square-inch capacity of cable tray. Devices shall be ganged together with manufacturer-specific accessory.
8. Ground and bond cable tray in accordance with NFPA 70, TIA-607, and NECA/BICSI-607.

a. Bond cable tray to the Telecom Ground Bar in each Communications Rooms. Utilize #6 AWG conductor for lengths up 13 feet, a #4 AWG conductor for lengths of 14 to 20 feet, and a #3 AWG conductor for lengths of 21 to 26 feet. Refer to TIA 607 standard for conductor size requirements for lengths longer than 26 feet.

b. Provide ground lugs between each section of cable tray to ensure electrical continuity of cable tray installation. Where cable tray sections are separated by conduit or firestopping sleeves, provide #6 AWG bonding jumper between cable tray sections.

9. Cable Tray Supports

a. Cable tray shall be supported by a trapeze or wall support brackets. No center support brackets shall be allowed.
b. A minimum of 3/8-inch all-thread shall be used for trapeze supports.
c. Support in accordance with manufacturer recommendations but at not more than 10 foot intervals.
d. Cable tray shall be no less than 3-inches above a lay-in ceiling.
e. Cable tray shall be rigidly supported and level.
f. All-thread shall be covered from the attachment to the trapeze system to 3-inches above the tray to protect the cables from being chaffed.
g. All supports shall attach to structure or a rigid surface such as a plywood backer in a sheet rock wall.
h. Supports shall not be shared with any other discipline.

K. Firestopping

1. Fire-Rated Pathway Devices

a. Provide Fire-Rated Pathway Device(s) wherever Communications cabling routed above accessible ceiling needs to be routed through a fire-rated wall. Quantity and size of devices shall be sized per manufacturer's published cable fill counts, leaving 25% spare capacity.
b. Coordinate quantity, size and locations with other Division 27 Subcontractors and indicate quantity, size, location, product make and model number, and UL System number on Pre-Construction Shop Drawings.
c. Coordinate quantity, size and locations with other Division 27 Subcontractors and indicate quantity, size, location, product make and model number, and UL System number on Pre-Construction Shop Drawings.
d. Affix adhesive wall label immediately adjacent to devices to communicate to future cable technicians, authorities having jurisdiction and others the manufacturer of the device and the corresponding UL System number installed.

2. Firestopping for Conduits

a. Provide firestopping components as part of a UL System for all conduit penetrations through fire-rated and smoke-rated walls and floors.
b. Coordinate locations and UL System with other Division 27 Subcontractors and indicate locations and UL System number on Pre-Construction Shop Drawings.
c. Affix adhesive wall label immediately adjacent to devices to communicate to future cable technicians, authorities having jurisdiction and others the manufacturer of the device and the corresponding UL System number installed.

3. Firestopping for Backboxes

a. Provide firestopping component(s) as part of a UL tested/approved solution for backboxes located in fire-rated and smoke-rated walls.
b. Coordinate locations with other Division 27 Subcontractors and indicate locations on Pre-Construction Shop Drawings.

4. Smoke-Rated / Acoustical Pathway Device

a. Provide Smoke-Rated Pathway Device(s) wherever Communications cabling routed above accessible ceiling needs to be routed through a smoke-rated wall or through a wall of a Noise Critical Room.
b. Quantity and size of devices shall be sized per manufacturer's published cable fill counts, leaving 40% spare capacity.

c. Coordinate quantity, size and locations with other Division 27 Subcontractors and indicate quantity, size, location, product make and model number, and UL System number on Pre-Construction Shop Drawings.
d. For smoke-rated partitions: Affix adhesive wall label immediately adjacent to devices to communicate to future cable technicians, authorities having jurisdiction and others the manufacturer of the device and the corresponding UL System number installed.

5. Fire-rated Conduit (Circuit Integrity) Wrap

a. Provide Fire-rated Conduit (Circuit Integrity) Wrap for certain Communications conduits for the following systems:

1) Section 275129 Two-Way Communications System
2) Section 275319 Emergency Responder Radio Coverage (ERRC) DAS

b. Coordinate conduit size and lengths requiring wrap with Subcontractors of those sections prior to Bid and include cost to provide that wrap in the Bid.

L. System Labeling

1. Contractor shall verify room numbers and confirm the final room numbering scheme prior to generating any labels.
2. Horizontal Cables shall be labeled within (12) inches from the termination point inside the Equipment Room/Telecommunications Rooms.
3. Horizontal Cables shall be labeled within (6) inches from the termination point at the workstation end.
4. Backbone Fiber and Copper Cables shall be labeled within (12) inches of the visible end of the jacket and at each pull point location. If passing through an IDF it will be labeled when entering and leaving that IDF.
5. Fiber Innerduct shall be labeled within (12) inches of the point of entry of the fiber optic enclosure and at each pull point location. If passing through an IDF it will be labeled when entering and leaving that IDF.
6. Bonding conductors shall be labeled within (12) inches from their termination point.
7. Cables shall be labeled identically at both ends.
8. Equipment Racks

a. Equipment racks in each Equipment/Telecommunication Room shall be labeled in sequential numeric order.

1) Labels shall be centered on the top front of the equipment rack.

9. Cabinets

a. Cabinets in each Equipment/Telecommunication Room shall be labeled in sequential numeric order.

1) Labels shall be centered on the top front of the Cabinet.

10. Fiber Optic Enclosures

a. Fiber optic enclosures shall be labeled alpha-numeric starting with the 1st fiber optic enclosure in the top of the 1st equipment rack.
b. A label for each terminated strand shall be securely placed inside each fiber optic enclosure.

11. Backbone Cable

a. Fiber Optic Cable

1) Fiber optic backbone cable labels shall contain the cable origin room number, the cable destination room number, fiber strand numbers, and type (i.e. B126-A118/001-012MM).
2) Fiber optic couplers panels in fiber enclosures shall be labeled at each end by

strand denoting building code, Equipment Room and/or Telecommunications Room, enclosure number, and strand number to and from respectively (i.e. B126/01/01-12 – A118/01/01-12).

b. High Pair Count Copper Cable

1) For high pair count copper backbone cables, the label scheme shall contain, cable origin room number, the cable destination room number, and cable pairs (i.e. B126-A118/001-025).

12. Horizontal Cable

a. Inside Equipment Rooms

1) Horizontal cables shall be labeled at each end with the destination end and origin room number, patch panel number, and port number. (i.e. B126-B127-A01).
2) Patch panels in each closet shall be labeled sequentially starting with the first Patch Panel in the top of the first relay rack (A, B, C, D, E, etc.).
3) All patch panels will indicate the room number along with the patch panel port designation. The labels shall be mechanical labels that are neatly printed with uniform font and evenly spaced across the patch panel. Room numbers will be in sequential order throughout the panels as indicated on the drawings.
4) 110-type blocks shall contain the destination room number, pair numbers, and binder pair number under each pair termination. (example)

a) 110-type block labels shall be printed on product-specific label strips and placed into label holders.

13. Workstation Faceplates

a. Cables and wall plates shall be labeled denoting origin, Equipment Room/Telecommunications Room Number, Patch Panel, 110-type termination block, and Port Number. (i.e. B127-A01).

14. TMGB/PBB and TGB/SBB

a. TMGB/PBB and TGB/SBB shall be labeled with a unique identifier (i.e. TMGB/PBB-B126, TGB/SBB-A118).

15. Bonding Conductors

a. The following conductors shall be labeled at each end with the destination end and origin room number (i.e. B126 – IDFA118).

1) Bonding Conductor for Telecommunications
2) Telecommunications Bonding Backbone
3) Grounding Equalizer

3.4 TESTING REQUIREMENTS

A. Fiber Optic Cable

1. Installed strands shall be tested and certified in accordance with industry standards.
2. Only Manufacturer Certified Technicians shall perform testing.
3. The Contractor shall test and certify all fiber optic cable strands with approved field tester(s) that are within their calibration period. The Contractor shall be liable for all re-testing required in the event tests are performed with non-approved test equipment or tester(s) that are not within their calibration period.
4. The Contractor shall provide calibration results from the manufacturer showing the current calibration of the testers.
5. The Contractor shall notify the Architect/Design Consultant a minimum of five (5) days in advance to observe cable testing.

6. The Architect/Design Consultant may randomly select 5% of the installed strands for test verification purposes. The Contractor shall re-test these strands in the presence of the Architect/Design Consultant and the results shall be compared to the previously Contractor submitted test results. In the event that any of the verification tests differ in results from the previously submitted test results, all testing shall be declared a failure and the Contractor shall re-test 100% of the installed strands at no cost to the Owner.

B. Category 6 and 6A UTP Cable

1. Cable links shall be tested in accordance with industry standards.
2. Only Manufacturer Certified Technicians shall perform testing.
3. The Contractor shall test and certify the structured cable system with approved field tester(s) that are within their calibration period. The Contractor shall be liable for all re-testing required in the event tests are performed with non-approved test equipment or tester(s) that are not within their calibration period.
4. No Fail or *Pass results will be accepted.
5. The Contractor shall notify the Architect/Design Consultant a minimum of five (5) days in advance to observe field testing.
6. The Architect/Design Consultant may randomly select 5% of the installed links for test verification purposes. The Contractor shall re-test these links in the presence of the Architect/Design Consultant and the results shall be compared to the previously Contractor submitted test results. In the event that any of the verification tests differ in results from the previously-submitted test results, all testing shall be declared a failure and the Contractor shall re-test 100% of the installed links at no cost to the Owner.

C. Grounding and Bonding

1. Main Building Ground

   a. Coordinate with electrical contractor and provide a copy of their test results for the main building ground. The results shall be below 25 Ohms.

2. Two-Point Ground/Continuity Testing

   a. Prior to the two-point ground testing, a visual inspection shall be performed to verify that the bonding and grounding system is installed according to the drawings and specifications and in compliance with the TIA-607-D Standard.
   b. All testing shall be conducted prior to any active equipment is installed.
   c. The Contractor shall use an earth ground resistance tester that is configured for a continuity test. This is also known as a two-point tester or a “dead earth” test.
   d. Prior to the two-point continuity test conduct a voltage test to ensure there is no stray voltage in the system.
   e. The testing shall include but is not limited to the following points.

      1) Building electrical grounding electrode and the TMGB/PBB.
      2) TGMB/PBB TGB/SBB to electrical ground in ER/TR.
      3) TGMB/PBB TGB/SBB to the building steel (if present).
      4) TMGB/PBB to each TGB/SBB.
      5) Building steel (if present) to the electrical ground.

   f. Per the TIA-607-D, the maximum value for resistance between any point in the telecommunications bonding and grounding system and the building’s electrical grounding electrode system is 100 milliohms. In the case of long TBB and Grounding Equalizer conductor runs, the resistance of the conductor must be factored into the total resistance. For example 1 km of a No. 3/0 conductor has a resistance of 0.2028 ohms. (0.06180 ohms per 1000 ft.)
   g. The Contractor shall notify the Architect/Design Consultant a minimum of five (5) days in advance to observe field testing.

3.5 PROJECT CLOSEOUT DOCUMENTATION

A. As-Built Drawings

1. Drawings shall be provided to the Architect/Design Consultant at the time of substantial completion. Final payment will not be recommended until drawings are received and approved by the Architect/Design Consultant.
2. Provide Drawings depicting the condition of the structured cabling system as installed.
3. As-Built drawings shall be produced in AutoCAD 2017 or higher and provided in hardcopy and electronically in .dwg and PDF format.
4. Drawings shall retain the formatting and title block of the original drawings as issued by the Architect/Design Consultant.
5. Drawings shall be provided utilizing the original scale and shall include the exact dimensions and locations of all equipment room/telecommunication room layouts, wall elevations, equipment rack elevations, ladder racks, cable tray, sleeves, backbone and horizontal cable pathways, workstation locations, and labeling scheme.
6. A laminated copy of the telecommunications room service region with the labeled work areas outlet shall be provided and hung in each telecommunications room. Drawing size will be 30”x42”.

B. Test Documentation

1. Test documentation shall be provided to the Architect/Design Consultant at the time of substantial completion. Final payment will not be recommended until these test results are received and approved by the Architect/Design Consultant.
2. Provide test documentation for the structured cabling system as installed.
3. Test results shall be provided in original electronic format (i.e., manufacturer’s proprietary testing software along with applicable reader software) and PDF electronic format.
4. Test documentation shall be bound, sectioned, and tabbed in the following sequence as applicable:

    a. Tester(s) Calibration Certificate(s)
    b. Inter-Building Backbone Fiber Optic Cable
    c. Inter-Building Backbone Copper Cable
    d. Intra-Building Backbone Fiber Optic Cable
    e. Intra-Building Backbone Count Copper
    f. Horizontal Category 3 Cable
    g. Horizontal Category 5e Cable
    h. Horizontal Category 6 Cable
    i. Horizontal Category 6A Cable
    j. Main Building Ground
    k. Two-Point Ground/Continuity Test

C. Manufacturer’s Performance Certification

1. Certificate shall be provided to the Architect/Design Consultant at the time of final system acceptance. Final payment will not be recommended until the certificate of certification is received and approved by the Architect/Design Consultant.

    a. The manufacturer of the solution shall furnish a performance certification as per the specifications starting at final system acceptance.
    b. One original and two copies of the Manufacturer’s Certificate shall be provided.

D. Manufacturer’s Product Warranty

1. Certificate of product warranty shall be provided to the Architect/Design Consultant at the time of final system acceptance. Final payment will not be recommended until this certificate of product warranty is received and approved by the Architect/Design Consultant.

a. The manufacturer of the solution shall furnish a product warranty as per the specifications starting at final system acceptance.
b. One original and two copies of the Manufacturer's product warranty shall be provided.

E. Contactor's Statement of Warranty

1. Statement of warranty shall be provided to the Architect/Design Consultant at the time of substantial completion. Final payment will not be recommended until statement of warranty is received and approved by the Architect/Design Consultant.

a. Contractor shall furnish a minimum of a one (1) year warranty on all materials, labor and workmanship starting at final system acceptance.
b. One original and two copies of Contractor's warranty terms and conditions to include contact information (i.e. Contractor name, Point of Contact, address, phone number and email address) and start and end date for warranty call outs.

END OF SECTION

SECTION 27 41 16 - INTEGRATED AUDIO-VIDEO SYSTEMS AND EQUIPMENT

PART 1 – GENERAL

1.00 RELATED WORK

A. 26 05 00 – Grounding and Bonding

B. 26 05 29 – Electrical Hangers and Supports

C. 26 05 33 – Raceway and Boxes

D. 27 10 00 – Structured Cabling System

F. 27 51 00 – Distributed Communications

1.01 This section identifies the requirements, technical design, and specifications for the audiovisual systems at IL Texas K-8 Projects RFP (“Owner”). The audiovisual systems as specified are industry standard and may include (but not be limited to) the following: flat panel display(s), flat panel display mounting hardware, audio visual switching and distribution equipment, audio systems, microphone systems, speaker systems, and audiovisual hardware as specified.

1.02 Contractor shall include materials, equipment, and labor necessary to provide a complete and functional audiovisual system regardless of any items not listed or described in this specification or the associated drawings.

1.03 Contractor shall verify presence and proper operation of all OFE prior to beginning work. Contractor shall inventory all existing equipment and turn over all unused equipment to Owner.

1.04 It is strongly recommended that each prospective Contractor perform a site visit to determine any site conditions that may impact the installed system cost prior to submitting a bid. Failure to perform a site visit does not release the Contractor from responsibility for any existing conditions.

1.05 This project requires advance configuration and programming of Control Systems and Audio DSP systems. Contractor will be required to have a background in the programming of these and all manufacturer required certifications. If the contractor does not currently possess these experience and certification requirements, then the contractor will be required to use a third party contractor that specializes in these services intrinsically.

1.06 DESCRIPTION

A. Summary of Work:

1. Provide a complete and tested audiovisual system in various spaces. The Audiovisual (AV) system shall include:
    a. Functionally complete Audiovisual Systems shall be provided in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated result shall be provided whether or not specifically called for, at no additional cost to Owner.
2. Classrooms
    a. Teacher’s desk presentation HDMI and USB input plate and cabling to interactive flat panel display.
    b. Secondary teacher’s desk presentation HDMI and USB input plate and cabling to interactive flat panel display.
    c. Owner provided Interactive Flat Panel Display and Mount, Contractor installed.
    d. Alternate for Contractor provided, Contractor Installed Interactive Flat Panel.
    e. Interactive Flat Panel Display location faceplate with HDM and USB ports for integrated teacher’s desk and secondary desk HDMI and USB cabling.
    f. HDMI and USB patch cables at Teacher’s desk locations.
    g. HDMI and USB patch cables at Interactive Flat Panel Displays.
3. Lobby
    a. Flat panel display.
    b. Flat panel display mount.
    c. Digital Signage.
4. Cafeteria
    a. Flat panel display.
    b. Flat panel display mount.
    c. Digital Signage.
5. Gym / Stage / Athletic Field

a. Audiovisual system including projector, projector screen, control systems, media inputs, and sound reinforcement.
b. Audiovisual contractor for these areas shall coordinate rough-in locations with general contractor.

1.07 QUALITY ASSURANCE

A. Installer Qualifications:
1. The contractor providing and installing the integrated audiovisual systems and associated infrastructure shall be an authorized dealer of the specified projector manufacturer and be capable of providing the manufacturer's maximum available product warranty.
2. All individuals installing the audio-video system must be employees of the authorized dealer and at least 75% of the installing staff shall have undergone a training class given by the manufacturer. Current certification indicating the successful completion of the training course shall be available upon request at the project and submitted in the contractor's product submittals.
3. The proposing contractor and the installing contractor must be the same company. No subcontractor to the proposing audio-video contractor will be allowed for any portion of the audio-video scope of work.
4. The Projector System Installer shall meet all applicable regulations of the State of Texas and Department of Labor insofar as they apply to this type of system. The bidder shall be a firm normally employed in the audio-video industry and shall provide a reference list of ten (10) projects of equivalent size or larger and contact names confirming successful completion of projection system installations.
5. The bidder shall have an authorized service center within 75 miles of the project's location for the brand of equipment that is submitted for bid. The owner reserves the right to perform an on-site inspection.
6. The bidder must produce a letter from the manufacturer guaranteeing the delivery of all the equipment outlined in the specification herein.
7. The bidder shall have a full-time local service personnel capable of servicing the projector system described herein.
8. Installing contractor shall have a Infocomm CTS-D certification overseeing the installation of the audiovisual systems

B. Pre-Construction Meeting:
1. The successful Contractor shall attend a mandatory pre-construction meeting with individuals deemed necessary by the Owner's representative prior to the start of the work.
2. All proposing contractors must have ability to demonstrate a/v system being proposed and provide owner with completely installed system to evaluate performance and operation.

C. Acceptance:
1. The Owner's representative reserves the right to reject all or a portion of the work performed, either on technical or aesthetic grounds.

D. Warranty:
1. The selected system installer shall be factory authorized service center and shall provide an end-to-end performance warranty of not less than one (1) year. The proposer shall provide current certification documentation. The performance warranty shall be issued by the manufacturer and shall warrant that video projection system projectors have been tested to the district's approval. This end-to-end warranty shall cover the labor associated with removing/reinstalling any associated hardware or equipment as well as the replacement of all defective equipment or hardware.
2. The bidder shall also submit with the materials mentioned in section 1.9 submittals of this specification a written explanation outlining the terms and conditions of product warranty of all parts and service of the integrated a/v solutions.
3. The Contractor shall provide separate pricing for a two (2) year support/maintenance/service plan in lieu of the standard warranty period. The extended support/maintenance/service plan shall cover the scope of the standard workmanship warranty and preventative maintenance. Include options for technical support response.

1.08 REGULATORY REQUIREMENTS

A. Standards: All work shall be performed in accordance with the latest revisions of the following standards and codes:
1. Latest Local Codes and Amendments
2. 2008 National Electrical Code

B. Other References:
1. TIA/EIA-568-A Commercial Building Telecommunications Wiring

Standard
2. EIA/TIA-569 Commercial Building Standard for Telecommunication Pathways and Spaces.
3. TIA/EIA-606 The Administration Standard for the Telecommunications Infrastructure of Commercial Buildings.
4. TIA/EIA-607 Commercial Building Grounding and Bonding Requirements for Telecommunications.
5. EIA/TIA 455-A Standard Test Procedure for Fiber Optic Fibers, Cables, Transducers, Sensors, Connecting and Terminating Devices and Other Fiber Optic Components.
6. TIA/EIA TSB 67 Transmission Performance Specification for Field Testing of Unshielded Twisted-Pair Cabling Systems.
7. TIA/EIA TSB 72 Centralized Optical Fiber Cabling Guidelines
8. ISO/IEC 1180 Generic Cabling Standard
9. EN 50173 Generic Cabling Standards for Customer Premises
10. ANSI/EIA/TIA 526-14 Optical Power Loss Measurements of Installed Multimode Fiber Cable Plan.

C. Governing Codes and Conflicts:
1. If the requirements of these specifications or the Project Drawings exceed those of the governing codes and regulations, then the requirements of these specifications and the Drawings shall govern. However, nothing in the Drawings or Specifications shall be construed to permit work not conforming to all governing codes and regulations.

1.09 SUBMITTAL REQUIREMENTS

A. Proposal Submittal

1. Submit the Contractors standard proposal format with the following included in the proposal or as an attachment:
a. Itemized list of all equipment and materials. This list shall contain: quantity, manufacturer, part number and description to provide a complete and functional audio visual system. Acceptance of the proposal does not accept the equipment list “as-is” and any Contractor oversights during the proposal process are to be included at no additional cost.

b. Manufacturer Product Certifications (Project Specific) for Company, Installers and Programmers including Subcontractors. (Crestron, Extron, Biamp, etc.)

c. Key staff profiles with documentation of industry certifications. Preference is given for personnel with Infocomm CTS, CTS-I and CTS-D certifications.

d. List of three (3) contractor-installed projects of a similar size and scope in operation for at least one (1) year. The Contractor shall provide the following information for each project: project name, project location, project completion date (Month/Year), brief description of project, and client point of contact name/information.

e. Provide a Warranty Statement that contains specific details on the Contractors’ Warranty being proposed for this scope of work.

f. The proposal shall include an itemized breakdown of the cost of equipment, materials, labor, the standard workmanship warranty, and any shipping and taxes (if applicable). Line item pricing of equipment is not required. Do not include optional warranties or alternates in the total where applicable. Any optional warranties or alternates should be itemized separately and proposed as “in-addition-to.”

2. Manufacturer product specification sheets for pre-submittal substitution requests.
a. For product data sheets containing more than one (1) part number or product, the Contractor shall clearly identify the specific part number or product being submitted.

b. Submit specification sheets only. Do not submit a user or operator’s manual in lieu of a specification sheet. If a specification sheet is not available from the manufacturer, submit a catalog page or the specification appendix (only) from the operation manual. The last resort acceptable submittal is a pdf of the specification section of the product from the manufacturer’s website.

B. Pre-Installation Submittal

1. Contractor shall not order, purchase or install any equipment until pre-installation submittals have been accepted in writing by the Owner/Consultant.

2. Include the Proposal Submittal from the previous section in the event the Proposal Submittal was not previously provided.
3. Manufacturer product specification sheets for post award substitution requests. The requirements are the same as described in proposal substitution requests above.
4. Line by line conformance review of the specifications. Any variance from the specification will be annotated and an explanation given.
5. Product Configuration Sheets.
   a. Contractor shall provide a product configuration report in PDF format completed by a certified designer/engineer for the configurable device when a manufacturer provides a tool for the applicable product. For example, but not all inclusive, a Crestron DM Switcher Configuration Report.

6. Shop drawings of the proposed system installation.
   a. Shop drawings shall be provided clearly depicting any proposed modification to the project drawings. Any modifications shall be highlighted on the shop drawings.

   b. Shop drawings shall include system line diagrams, floor plans (include projector installed distance from screen with dimensioned distance), rack elevations, and/or detail drawings as required. Shop drawings shall be submitted electronically in pdf format for a 30”x42” paper size. Shop drawings shall not contain copies of, snippets of or depictions of Combs Consulting Group’s drawings.

   c. Contractor shall maintain a set of shop drawings on site at all times and shall update the shop drawings on a weekly basis. Consultant drawings and specifications shall be made available during the installation of the project for reference only. Both sets of drawings are the responsibility of the Contractor to provide and maintain. Drawings shall be made available for inspection at the request of the Owner/Consultant.

7. Itemized list of all equipment and materials including any substitutions that were approved and any proposal discrepancies. This list shall contain: quantity, manufacturer, part number and description to provide a complete and functional audio visual system.
8. When custom built HDBASET and/or Digital Audio Network cables are in the project the contractor shall provide termination samples. The termination samples are to be complete cables with terminations on both ends. Provide one sample of each cable/signal type per technician. Label each sample with the name of the technician. The sample is to be created by the field technician(s) that will be performing the work.

C. Custom Programmed Control System Submittal

1. Provide the control system submittal prior to initiating any substantial programming work and/or production of custom produced keys/labeling. Do not proceed with custom work until the proposed work product is approved in writing.
2. Proposed touch panel/keypad control layouts for each room/panel.
   a. Initial touch panel/keypad control layouts will be required for each room/panel as part of the product submissions.

   b. Contractor will design and modify control interface(s) based on Owner feedback. Contractor shall participate in an initial control system kick-off meeting along with progress meetings to review control system layout and design with the owner to ensure the control system fully meets the Owner’s needs and expectations.

   c. Contractor shall fully brief Owner on available programming options. Record Owner's decisions and set up initial system program. Prepare a written record of decisions, implementation methodology and final results.

   d. Contractor will also be expected to make reasonable adjustments to completed control systems based on Owner feedback once system is in use.

   e. Once initial system programming is implemented; allow owner a two-month period to utilize the system and make comments.

   f. After initial evaluation period coordinate with Owner. Record Owner’s feedback and provide adjustments as requested.

D. Project Closeout Submittal

1. The Contractor shall provide comprehensive drawings accurately depicting the “as-built” condition of the audio visual systems as it was installed to the Owner/Consultant at the time of substantial completion. Final payment will not be made until these as-built documents are received and approved by the Owner/Consultant.
   a. As-built drawings must be provided in digital format on a CD-ROM, other memory device(s) and/or delivered electronically.

2. Documentation shall include but not be limited to:

a. Equipment O & M manuals

b. Installed equipment list (manufacturer model numbers, serial numbers, installed locations, etc.)

c. Configuration information in Microsoft Excel format (IP addresses, Passwords and Usernames etc.)

d. Warranty support information

e. Documentation shall be bound, sectioned and tabbed in the following order (when applicable):

1. Equipment O&M Manuals (Bound Separately)

2. Installed Equipment List

3. Configuration Information

4. Warranty Support Information

3. All custom programming files (control systems, audio DSP's etc.) shall be delivered to the Owner. The Programmer shall transfer all source code/files related to the system. All programming shall be delivered in both compiled and un-compiled form. Upon system acceptance, ownership of the programmed system files shall be transferred to the Owner for their future use or modification. No claim shall be made by the programmer for continued licensing or other ongoing fees for continued usage of the system(s).

PART 2 – PRODUCTS

2.01 GENERAL REQUIREMENTS

A. The following sections specifically list the acceptable equipment types and items for this project.

B. Owner/Consultant will have final determination of acceptability of all proposed equipment and must approve submitted equipment prior to purchase or installation.

C. Proposed equivalent items must be approved in writing by the Owner/Consultant prior to submitting a bid. Proposed equivalent items must meet or exceed these specifications and the specifications of the specified item.

D. In the event a manufacturer's specified product or part number has changed or is no longer available, Contractor shall substitute the appropriate equivalent manufacturer's part number.

E. In the event of a discrepancy between the specifications and the drawings, the greater quantity and/or better quality will be furnished.

F. For listed products with no part number specified, Contractor shall provide a product that meets the performance requirements of these specifications, industry standard practices and intended application.

G. All wiring, equipment and installation materials shall be new and of the highest quality.

H. Labels on all wiring, materials and equipment must indicate a nationally recognized testing laboratory.

I. All new equipment shall be received, stored, and staged at the Contractor's facility until delivered and installed. Contractor shall store all materials and equipment in accordance with manufacturers' instructions in a weather-tight, secure enclosure. All equipment shall be protected from dust, debris and environmental contamination. Contractor shall be responsible for safety and security of all Contractor furnished equipment and OFE until project close-out.

2.02 AV DISTRIBUTION

A. Teacher's Desk Presentation HDMI and USB Inputs (MM1)

1. Provide Single gang face plate with (1) HDMI and (1) USB inputs.
2. Provide pigtail for HDMI and USB inputs.
3. Provide HDMI and USB cabling to Interactive Flat Panel Display.
4. Provide HDMI and USB patch cords (7 ft.).
5. Legrand / C2G CG39874
   a. Approved equal.

B. Secondary Teacher's Desk Presentation HDMI and USB Inputs (MM1)

1. Provide Single gang face plate with (1) HDMI, (1) USB inputs, and (1) Data port.
2. Provide pigtail for HDMI and USB inputs.
3. Provide HDMI and USB cabling to Interactive Flat Panel Display.
4. Provide HDMI and USB patch cords. (7 ft.).
5. Legrand / C2G
   a. Approved Equal

C. Interactive Flat Panel Display (MM2)

1. Provide dual gang faceplate with (2) HDMI, (2) USB, and (2) Data ports.
2. Provide HDMI and USB patch cords. (As required for connectivity to Interactive Flat Panel Display).

2.03 FLAT PANEL DISPLAYS

A. Lobby and Cafeteria

1. Reference drawing for display designation and location
   a. FPD65- 65” Display
2. Commercial grade
3. Minimum resolution 3840 x 2160 (4K UHD)
4. Contrast Ratio 4000:1
5. Minimum brightness of 350 nis
6. Minimum of (2) HDMI and (1) RS-232 inputs
7. Minimum 3-year Manufacturer Warranty
8. Integrated Digital Signage
9. Manufacturers:
   a. Samsung QB65R
   b. Approved equivalent

10. Digital Signage
    a. Provide digital signage for flat panel displays.
    b. Digital signage player shall be integrated into flat panel display.
    c. Provide license and software as required.
    d. BrightSign Player XT244

B. Interactive Flat Panel Display

1. Base proposal shall be Owner provided display and mount, Contractor installed.
2. Alternate shall include pricing for Contractor provided, Contractor installed.
3. Interactive Flat Panel Display
   a. Newline TRUTOUCH 7519RS 75”- TT7519RS (QTY 67)
   b. Newline TRUTOUCH 6519RS- TT6519RS (QTY 4)
   c. Newline Wall Mount Stand- EPR850600-00 (QTY 71)

2.04 GYM / STAGE / ATHLETIC FIELD / STAGE

A. Audiovisual Equipment

1. Contractor shall coordinate rough-in locations with General Contractor and Electrical.
2. Contractor shall provide an integrated system for projector, projection screen, control system, multimedia inputs, microphone systems, sound reinforcement.
3. AV equipment shall include:
4. Epson Pro Laser Projector - 16:10 - 1920 x 1200 L1505UHNL
5. Epson Pro-Lens Long Throw -ELPLL08
6. Chief PG3A Large Projector Security Cage
7. Chief XL Projector Mount
8. Draper Motorized Screen Premier Electric 190" HDTV M1300 110V widescreen 16:10
9. Speakers - QSC K8.2 powered self-amplified speaker (for mobile cart).
10. Mid Atlantic -Lectern L2
11. JBL Control29AV surface mounted speakers.
12. JBL Speakers Mount JBL Yokes
13. Speaker Amplifier- Crown or approved equal.
14. Shure wired microphones (QTY 6)
15. Shure Wireless Microphones (QTY 4)
16. Stage Mixer
17. Stage Floor box connections and wall plates (QTY 4)
18. Stage-Audio JBL Control26AV surface mounted speakers (QTY 2)
19. QSC DSP 110F Audio sound processor
20. Crestron Room Controller RMC4
21. Mid Atlantic -4 Post Rack
22. Crestron Automation Crestron DigitalMedia 8G+® 4K60 4:4:4 HDR Wall Plate Transmitter, Black (QTY 2).
23. Crestron Panel Wall Mount Touch Screen- TSW-1070

24. Crestron Crestron AirMedia
25. Crestron Scaler DM-RMC-4KZ-100-C.
26. Middle Atlantic UPS 2000VA
27. Middle Atlantic UPS Network card for SNMP monitoring
28. Middle Atlantic Middle Atlantic PD-920R 8 outlet Rack mount power
29. Network Switch- PoE.
30. Crestron Presentation Switcher- DMPS3-4K-250-C. CRESTRON NVX ALTERNATE IS APPROVED.
31. Gym and Athletic Field pendant mount speakers shall allow for integration into the Valcom Public Address system.

B. Training

1. Contractor shall provide training for AV Gym System with owner upon substantial completion. Provide (2) Training Sessions for (2) hours each.

2.11 CABLE/CONNECTOR REQUIREMENTS

All indoor cabling shall be plenum rated. All outdoor cabling shall be outdoor rated and direct-burial rated when in contact with grade or within conduit in contact with grade. Coordinate all cable colors with Owner/Consultant prior to ordering or installation. Provide connectors and termination as specified by manufacturer for each application.

2. Provide all cabling with Black jacketing unless otherwise noted.
3. Acceptable manufacturers include Extron, Crestron, Belden, West Penn Wire, Gepco and Liberty. Liberty is specified to establish a cabling baseline. Cross reference equal or greater cabling and connectors when making substitutions with the acceptable manufacturers. Submit substitution requests as described in the submittal requirements section when using a manufacturer not identified as acceptable.

A. Pathway Wire Support

1. Panduit J-Mod Cable Support System
2. Erico Caddy Cat Links J-Hook Series
3. Panduit Plenum Rated Hook & Loop (Black)

B. Fire Stop

1. STI Spec Seal Part Number
2. 3M Products Part Number

C. HD-SDI | Analog Video | Genlock Cabling | CATV(RF):

1. <50’:
   a. Liberty Cable Part# 20-CMP-VID-COAX-BLK.
   b. Terminate with Liberty Part# CM-RG59M-BNC or Liberty Part# 112975 for BNC style Connectors.
   c. Terminate with Liberty Part# CM-RG59M-F for ‘F’ style connectors.

2. 50’-200’:
   a. Liberty Cable Part# 18-CMP-VID-COAX-BLK.
   b. Terminate with Liberty Part# CM-RG6M-BNC for BNC style connectors.
   c. Terminate with Liberty Part# CM-RG6L-F for ‘F’ style connectors. HDBASET Cabling:

3. Liberty Cable Part# 24-4P-P-L7SH-BLU.
   a. Shielded Plenum CAT7 Cable, Blue.
   b. Terminate with Liberty Part# 1401405012-I.
      1. Use Conductive Copper Foil Tape 3M 3313 series 1-inch to bond the drain connection and the connector. Dress uncovered copper foil tape and cable with heat shrink.
      2. Use Igarashi IPS PH-165 or similar type non-marring plastic jaw pliers for connector compression.
   c. Space constricted back box or bend radius restricted installations.
      1. Terminate with Liberty #A68IPZA-STP keystone insert and install into a keystone plenum rated surface mount box Hubbel #ISB1BKP or similar. Mount in an accessible ceiling space or accessible concealed space and run a plenum rated patch cable from the jack to the device. The plenum rated patch cable is to be same rating/quality or better than the field terminated cabling.

D. Digital Audio Network Cabling:

1. Liberty Cable Part# 24-4P-P-L6ASH-BLK
   a. Foil Shielded CAT6a Cable, Black.
   b. Terminate with Liberty Part# 1401405012-I.

1. Use Conductive Copper Foil Tape 3M 3313 series 1-inch to bond the drain connection and the connector. Dress uncovered copper foil tape and cable with heat shrink.

2. Use Igarashi IPS PH-165 or similar type non-marring plastic jaw pliers for connector compression.

c. Space constricted back box or bend radius restricted installations.

1. Terminate with Liberty #A68IPZA-STP keystone insert and install into a keystone plenum rated surface mount box Hubbel #ISB1BKP or similar. Mount in an accessible ceiling space or accessible concealed space and run a plenum rated patch cable from the jack to the device. The plenum rated patch cable is to be same rating/quality or better than the field terminated cabling.

E. Network | USB/KVM Extension Cabling

1. Liberty Cable Part# 24-4P-P-L6-EN-BLK.
   a. Unshielded CAT6 cable, Black.
   b. Terminate with Liberty Part# 11108080034 RJ45 Connector.

F. HDMI | Displayport | DVI | USB Passive Cabling

1. Provide cable/signal transport of sufficient length to reach from source device to destination device. No digital cable shall exceed a length of 15 feet unless otherwise specified. Provide a high retention cable when available.
   a. HDMI - Liberty Cable Part# HD-600 Series.

G. Serial Control Cabling

1. Single data pair only.
   a. Liberty Part# 22-1P-CMP-EZ-BLK.

2. Two data pair RS232(RTS/CTS or RS485).
   a. Liberty Part# 24-2P-P485.

3. Terminate all data cabling with a reliable termination system, include hoods and retention mechanisms when available.

H. Relay | Control Cabling:

1. Liberty 18 Gauge, 2-Conductor Plenum-Rated Cabling – Part Number 18-2C-P-BLK.

I. Cresnet Cabling:

1. <500’:
   a. Liberty Part# LLINX-U-P.

2. > 500’
   a. Consult with Manufacturer/Consultant prior to ordering / installation.

J. Analog Audio | Microphone | Intercom | IFB Cabling

a. Liberty Part# 22-1P-CMP-EZ-BLK.
b. Terminate cabling with Neutrik XX series for XLR connectors. For ¼” TRS/TS, 1/8” and RCA connectors use Rean manufactured connectors.

K. High Impedance Speaker Level Cabling (25v/70v):

1. < 300’:
   a. Liberty 16 Gauge, 2-Conductor Plenum-Rated Cabling – Part Number 16-2C-P-BLK.

2. 300’ to 500’
   a. Liberty 14 Gauge, 2-Conductor Plenum-Rated Cabling – Part Number 14-2C-P

      1. Provide Cable with Black Jacket – Coordinate Cable Color with Architect.

3. > 500’
   a. Consult with Manufacturer/Consultant prior to ordering / installation.

4. Terminate when available with Neutrik “Speakon” type connectors.

L. Low Impedance Speaker Level Cabling:

1. < 50’:
   a. Liberty 14 Gauge, 2-Conductor Plenum-Rated Cabling – Part Number 14-2C-P-BLK.

2. 50’ to 100’
   a. Liberty 12 Gauge, 2-Conductor Plenum-Rated Cabling – Part Number 12-2C-P-BLK.

3. > 100’
   a. Consult with Manufacturer/Consultant prior to ordering / installation.

4. Terminate when available with Neutrik ‘Speakon’ type connectors.

M. Low Voltage Power Supply Cabling:

1. Provide cabling of sufficient gauge and conductor count as required for power supply in use. Size cabling per manufacturer’s device specific minimum required voltage drop.

PART 3 – EXECUTION

3.01 CODES, STANDARDS AND REGULATIONS

A. American National Standards Institute (ANSI)

B. American Society for Testing and Materials (ASTM)

1. ASTM B 1 (2001; R 2007) Standard Specification for Hard-Drawn Copper Wire
2. ASTM B 8 (2004) Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
3. ASTM D 1557 (2007) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3) (2700 kN-m/m3)
4. ASTM D 709 (2001; R 2007) Laminated Thermosetting Materials

C. Alliance for Telecommunications Industry Solutions (ATIS)

D. Building Industry Consulting Service International (BICSI)

1. Telecommunications Distribution Methods Manual 13th Edition
2. NECA/BICSI 568-2006 – Standard for Installing Commercial Building Telecommunications Cabling
3. NECA/BICSI 607-2011, Standard for Telecommunications Bonding and Grounding Planning and Installation Methods for Commercial Buildings

E. Electronics Industry Alliance (EIA)

F. Federal Communications Commission (FCC)

1. FCC Part 15, Radiated Emissions Limits, revised 1998
2. FCC Part 68, Connection of Terminal Equipment to the Telephone Network, revised 1998
3. FCC Part 76, Cable Television Service, revised 1998

G. Insulated Cable Engineers Association (ICEA)

1. ICEA S-87-640 (2006) Fiber Optic Outside Plant Communications Cable
2. ICEA S-98-688 (2006) Broadband Twisted Pair, Telecommunications Cable Aircore, Polyolefin Insulated Copper Conductors
3. ICEA S-99-689 (2006) Broadband Twisted Pair Telecommunications Cable Filled, Polyolefin Insulated Copper Conductors

H. International Electrotechnical Commission (IEC)

I. Institute of Electrical and Electronics Engineers, Inc. (IEEE)

1. IEEE Standard 81-1983, IEEE Guide for Measuring Earth Resistance, Ground Impedance, and Earth Surface Potential of a Ground System
2. IEEE Standard 1100-1999, Recommended for practice for Powering and Grounding Sensitive
3. Electronic Equipment in Industrial and Commercial Power Systems (IEEE Emerald Book)
4. IEEE C2 (2007; Errata 2007; INT 2008) National Electrical Safety Code
5. IEEE Std 100 (2000) The Authoritative Dictionary of IEEE Standards Terms

J. International Organization for Standardization (ISO)

1. International Organization of Standardization/International Electrotechnical Commission (ISO/IEC)
2. ISO/IEC 11801, Information Technology-Generic Cabling for Customer Premises, 1995
3. ISO/IEC 14763-1, Information Technology-Implementation and Operation of Customer Premises Cabling-Administration, 1999
4. ISO/IEC 11801, Information Technology-Generic Cabling for Customer Premises, 1995
5. ISO/IEC 14763-1, Information Technology-Implementation and Operation of Customer Premises Cabling-Administration, 1999

K. National Cable Television Association (NCTA)

L. National Electrical Manufacturers Association (NEMA)

1. NEMA C62.61 (1993) Gas Tube Surge Arresters on Wire Line Telephone Circuits

M. National Fire Protection Association (NFPA)

1. NFPA-70, National Electrical Code
2. NFPA-101, Life Safety Code
3. NFPA-297, Guide on Principles and Practices for Telecommunications Systems
4. NFPA-780, Standard for the Installation of Lightning Protection Systems.

N. National Institute Standards and Technology (NIST)

O. Occupational Safety and Health Administration (OSHA)

P. Telecommunications Industry Association (TIA)

1. ANSI/TIA-568-C.0, Generic Telecommunications Cabling for Customer Premises, 2009
2. ANSI/TIA-568-C.1, Commercial Building Telecommunications Cabling Standard, 2009
3. ANSI/TIA -568-C.2, Balanced Twisted-Pair Telecommunications Cabling and Components Standard, 2009
4. ANSI/TIA-568-C.3, Optical Fiber Cabling Components Standard, 2008
5. ANSI/TIA/EIA–569-B, Commercial Building Standard for Telecommunications Pathways and Spaces, 2005
6. ANSI/TIA–569-B Amendment 1, Commercial Building Standard for Telecommunications Pathways and Spaces, 2009
7. ANSI/TIA/EIA-606-B, Administration Standard for the Telecommunications Infrastructure of Commercial Buildings, 2012
8. ANSI/TIA/EIA-607-B, Commercial Building Grounding and Bonding Requirements for Telecommunications, 2011
9. ANSI/TIA-758, Customer-Owned Outside Plant Telecommunications Infrastructure Standard, 2004

Q. Underwriters Laboratories, Inc. (UL)

1. UL 510 (2005; Rev thru Aug 2005) Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape
2. UL 910 (NFPA 262 1990) Applicable Flame Test

R. In the event of any conflicts between documents referenced herein and the contents of this specification, the Contractor shall notify the Architect/Engineer in writing of any such occurrences before purchasing or installing any equipment or materials. The Architect/Engineer will notify the Contractor of any actions required to resolve these conflicts. Such actions may include but are not limited to: design changes, equipment, materials and/or installation changes. In any event Contractor shall not supersede specifications and standards from the latest NFPA and NEC publications. In the event of any conflicts between Standards and Codes the more stringent shall take precedence.

2.05 GENERAL REQUIREMENTS

A. Contractor shall comply with the requirements of local Authority Having Jurisdiction (AHJ), Project State, the National Fire Protection Association (NFPA), and the National Electrical Code (NEC). If the Contractor identifies any item in the plans or specifications that will not strictly comply with the aforementioned laws, ordinances, and rules, the matter shall be referred to the Architect/Engineer for direction before proceeding with that part of the work.

B. The Contractor shall be responsible for coordination with other trades to ensure any conflicts or potential conflicts are resolved prior to any work beginning on the project.

C. The Contractor shall install the materials in accordance with these specifications and the manufacturer’s installation guidelines.

D. No deviations from the plans or specifications shall be made without full consent in writing of the Architect/Engineer. The Contractor shall have written approval from the Architect/Engineer for any additional work beyond the Contract Documents prior to beginning such work. If the Contractor does not obtain written approval from the Architect/Engineer prior to proceeding with the work, the contractor shall not be reimbursed for the work.

E. The Contractor shall obtain written permission from the Architect/Engineer before proceeding with any work that would necessitate cutting into or through any part of the building structure such as, but not limited to girders, beams, floors, walls, roofs, or ceilings.

F. Contractor shall notify the Architect/Engineer a minimum of (2) weeks prior to beginning work and will participate in a pre-construction meeting with the Architect/Engineer to perform a walkthrough, review the scope of work, schedule, and escalation procedures.

G. The Contractor shall maintain a work area free of debris, trash, empty cable reels, scrap cable, etc., and dispose of such items on a daily basis and return the site to the original state of cleanliness. The Contractor shall not use Owner’s facilities for the disposal of excess or scrap materials.

H. Equipment and materials installed by the Contractor shall be free of defects and damage.

I. Contractor shall be responsible for the repair of any damage caused by the contractor during the installation.

J. Contractor shall test all cables prior to installation. By failing to perform this testing operation, the Contractor shall accept the cable as compliant and assume all liability for the replacement of the cable at no cost to the Owner should it be found defective at a later date.

K. Contractor shall maintain a set of working specifications, design drawings, and record drawings to be kept on site at all times and shall update the record drawings with any changes on a weekly basis. Record drawings shall be made available for inspection at the request of the Architect/Engineer.

L. Equipment and materials shall be consistent throughout the installation. Where multiple units of the same type of equipment and materials are required, these units shall be a standard product with the same manufacturer and model number.

M. Equipment and materials shall be delivered and stored in accordance with the manufacturer's guidelines at the Contractor's expense.

N. Contractor shall make all stored equipment and materials available for inspection at the request of the Architect/Engineer.

O. All equipment and material used in the installation shall be approved by the manufacturer for the environment in which it is being installed.

P. Cables shall be properly supported in accordance with industry standards at all times. Improperly supported cables shall be corrected by the Contractor at no cost to the Owner.

Q. Contractor shall be responsible to properly protect information outlets from damage by other trades during construction.

R. Cables shall be routed at 90-degree angles to the building structure. At no time shall a diagonal pull be installed.

S. The Contractor shall not install cables in conduits or sleeves without nylon bushings. Cables installed through conduits or sleeves without nylon bushings shall be removed and replaced at no cost to the Owner.

T. Contractor shall immediately report to the Engineer any design or installation irregularities, particularly architectural elements that interfere with the intended coverage angles of loudspeakers and projector, so that appropriate action may be taken.

U. Contractor shall observe all HDBaseT Alliance cable types, lengths, bundling, termination, and patching requirements and limitations when installing audio/video over twisted-pair cabling.

V. Contractor shall observe signal separation and signal separation best practices at all times.

W. Any cabling found to be damaged shall be replaced at no cost.

X. Signals shall be separated and grouped according to type and voltage level.

Y. Contractor shall provide all required conduit and sleeves unless otherwise specified. Contractor shall provide conduit bushings even when it is the responsibility of other trades prior to cable installation.

Z. Contractor shall provide and utilize rear rack rails, lacing bars, and any other required cable dressing equipment/supplies to ensure proper industry-standard signal separation is achieved.

3.02 AUDIO VISUAL CONTROL SYSTEM(S)

A. Contractor shall furnish, install and configure a complete audio/video switching, transport and control system as specified and indicated on the technology drawings.

B. Contractor is responsible for all ancillary AV switching or active components necessary to provide a complete and functional AV system.

C. Contractor is responsible for all AV specific cabling, interconnects, patch cords and other ancillary devices required to provide a complete system.

D. Contractor shall coordinate the programming of the touch panels with the Owner/Design Team. Touch panels shall be branded to reflect the colors and logos of the Owner. This coordination may consist of multiple in-person meetings to ensure that the finished product fully meets the Owner's needs and expectations.

a. Contractor shall fully brief Owner on available configuration settings / options of the program(s).

b. Contractor shall record the Owner's preferences / decisions and build the initial system program(s).

c. Contractor shall deliver a written record including (at minimum):

1. The Owner's preferences / decisions

2. Contractor's plan for implementation and its methodology.

3. The final programming / implementation results.

d. Once the system programming has been completed and implemented, the Contractor shall allow a minimum 2-month evaluation period for the Owner to use the system and provide feedback.

e. After the evaluation period, the Contractor shall coordinate with the Owner to gain feedback on the system operation. The Contractor shall record the Owner's feedback and provide programming adjustments to resolve any items as directed by the Owner.

E. Contractor shall install the entire control system as specified in accordance with manufactures guidelines and industry best practices.

F. Control processor(s) shall be connected to an un-switched power outlet. Control processor(s) shall be connected to UPS outlet(s) if available.

G. Control system shall be programmed in a manner consistent with current industry best practices.

1. Control functions include (but are not limited to) the following:
   a. System/Device Power On/Off.
   b. Display Source and Sink Switching.
   c. Program Volume Adjustment.
   d. Audio DSP Control.

H. All network-enabled control systems shall be provided with virtual 'soft' control panel client(s)

I. All control system programming shall be delivered to the Owner. The Programmer shall transfer all source code/files related to the system. All programming shall be delivered in both compiled and non-compiled form. Upon system acceptance, ownership of the control programming shall be transferred to the Owner for their future use or modification. No claim shall be made by the programmer for continued licensing or other ongoing fees for continued usage of the control system program.

3.03 CABLE INSTALLATION

A. Cable Support

1. All cables shall be installed and supported in conduit systems, cable trays, cores, sleeves, etc.
2. When cables leave the main pathway systems, they shall be installed and supported in Contractor furnished and installed j-hooks or saddle straps.
3. No cable pathway shall exceed NEC limited low voltage fill ratios.
4. The contractor shall furnish a separate j-hook or saddle strap pathway for each cable type (data, voice, video and security).
5. J-hooks and saddle straps shall be installed no more than five-feet (5') apart on center, using only manufacturer-approved installation methods and hardware.
6. J-hooks shall be furnished with closure clips.
7. Maximum sag between supports shall not exceed twelve-inches (12").
8. Contractor shall establish j-hook and saddle strap pathways and shall coordinate pathways with all other disciplines. Under no-circumstances shall these pathways be used to support other low-voltage applications not included in this specification.
9. Cable Dressing
   a. No nylon cable ties shall be used at any time during the installation of the cable.
   b. Signal separation guidelines and best practices shall be observed for the complete length of all cable runs.
10. Above Ceiling
    a. Contractor shall furnish and install plenum-rated hook & loop straps in plenum-rated airspaces.

       1. The Contractor shall install no more than (1) hook & loop strap between each j-hook or saddle strap or at service loop locations.

11. Equipment Rooms / Telecommunications Rooms
    a. The Contractor shall bundle all visible cables with Contractor furnished and installed hook & loop straps.

        1. Hook & loop straps shall be installed twenty-four (24) inches apart on center.

    b. Plywood

        1. The Contractor shall furnish and install 8’ H x 4’ W x ¾” D sheets of BC grade fire-rated plywood as when in the technology drawings.

        2. The Contractor shall mount all plywood vertically starting at 24” AFF.

        3. The Contractor shall cover the plywood with two (2) coats of Contractor furnished white fire retardant paint leaving exposed (1) fire rating stamp per sheet

3.04 IDENTIFICATION

B. Contractor will permanently affix labels to each cable. Labels will be affixed at a distance of 3” from the end of each cable end. If label cannot be easily viewed from this placement, cable may be placed 1” from the cable end. Cable label shall include unique cable number, source system name, source termination point, and destination system name and destination termination point. Cable labels will be identical on each cable end. Contractor to contact Consultant for additional information, if necessary.

C. Contractor will provide equipment labeling for each device front and back according to the system name used in the shop drawings. Contractor may use laminated labels (white print on black labels in front, black print on yellow in back) or equivalent.

D. Contractor will provide engraved plastic laminate labels for all racks. Rack labels to be 1” x 2” with white lettering (Arial font) on black matte finish, plastic.

1. Contractor will provide all Input/Output (I/O) panels. I/O panels will be produced from black anodized aluminum and engraved with white lettering

2.05 TESTING REQUIREMENTS

A. Audio Visual System Testing and Configuration

1. Contractor shall un-pack and pre-test equipment prior to installation into the production environment. All configurations shall be re-verified prior to the units being placed into service.
2. Contractor shall test and commission each component per the specifications and manufacture’s installation instructions.
3. Contractor shall test and verify for full operational and network support control functionalities and connections per the specifications and manufacturer’s installation instructions.
4. All network devices shall be verified for link and auto negotiation to the highest connection rate.
5. Audio conferencing systems shall be configured to provide excellent audio performance. Verify POTS or VoIP phone system with Owner/Owner/Consultant prior to ordering and installation. Contractor shall place test calls utilizing the audio conferencing system to the system manufacturer for system calibration and testing.
6. Video conferencing systems shall be configured to provide excellent audio performance. Contractor shall place test calls utilizing the video conferencing system to the system manufacturer for system calibration and testing.
7. Contractor shall test and verify all functionalities as installed per the specifications and manufacturer’s installation instructions.
8. All Crestron Digitalmedia demonstration and acceptance tests shall be performed by a Crestron Digitalmedia Certified Engineer (DMC-E).
9. Projector(s) shall be installed square in relation to the screen, and shall be adjusted to fit and fill the screen fully. Projector(s) shall be overscanned slightly into the screen border (if applicable). Projected image shall be square and level. Projector(s) shall be installed so that digital keystone correction is not utilized.
    a. In situations where keystone correction may be required, notify Owner/Consultant and coordinate solution prior to installation.

    b. Projector(s) shall be installed in such a way that the axis of the lens is perpendicular to the plane of the projection surface.

    c. In case of mismatch between projector aspect ratio and screen aspect ratio, projector shall be configured to output at screen aspect ratio.

d. In case of mismatch between display device and signal aspect ratio, system shall be configured such that the source image best fits and fills the display device.

10. Unless noted otherwise, all projection screens shall be mounted with the lower edge of the viewable image area at 48” A.F.F.
    a. Provide additional black drop as required.

11. Video display system(s) minimum test protocols:
    a. Test each video display system with test signal generating equipment capable of outputting the following resolutions. (Ultra HD and 4K resolutions required only when testing 4K systems)

        1. 4:3 - 640x480, 800x600, 1024x768

        2. 16:9 - 1280x720 (720p), 1366x768, 1600x900, 1920x1080 (1080p), 3840x2160 (Ultra HD), 4096x2160 (DCI 4K).

        3. 16:10 - 1280x800, 1440x900, 1680x1050, 1920x1200

    b. Test signal generator must be capable of outputting the correct signal protocol using the applicable connectivity (RCA/BNC, S-Video, VGA, DVI, HDMI, Displayport, Etc.).

    c. The test signal generator must be capable of outputting a standard set of color bars, grid pattern, grayscale, checkerboard and multi-burst.

2.06 AUDIO VISUAL SYSTEMS TRAINING

A. Contractor shall provide a proposed training schedule to the Owner/Consultant prior to substantial completion.

B. Contractor shall provide a proposed training syllabus for both administrative users and end-users prior to substantial completion.

C. Training shall include all aspects of the Audio/Visual System as specified and installed.

D. Contractor shall include provisions within the total cost proposal for a minimum of two (2) System Administrator training sessions. It is anticipated these trainings will cover advanced functions of the system, trouble-shooting techniques and other subject matter pertinent to the on-going support of the video conference system at the installed facility. System administration training sessions should be planned for approximately 5 persons. Each training session shall be planned for at least 2 hours per session.

Contractor shall include provisions within the total cost proposal for a minimum of three (3) End-User training sessions. It is anticipated this training will cover basic function and operation of the system by faculty. This would include event display management, source control and general systems operation for all installed system. User training sessions should be planned for approximately 10 persons each session. Each training session shall be planned for at least 2 hours per session.

SECTION 27 5100 - DISTRIBUTED COMMUNICATION SYSTEMS (PA)

PART 1 - GENERAL

1.01 This section identifies the requirements, technical design, and specifications for the Distributed Communication Systems (PA) at the ILT K-8 Projects RFP. The Distributed Communication Systems (PA) as specified are Industry-Standard and include paging/public address systems.

1.02 The Contractor shall provide a Manufacturer's Performance Certification for the installed PA Systems.

1.03 Contractor shall include materials, equipment, and labor necessary to provide a complete and functional PA System regardless of any items not listed or described in this specification or associated drawings.

1.04 In case of discrepancy between or within these specifications and the associated drawings, the Contractor will be assumed to have provided the greater quantity, higher quality, and/or more difficult and therefore higher cost option. Contractor is responsible to submit any questions that may arise in writing. Contractor is not to proceed with work in question without formal written approval from the design team.

1.05 Requirements

A. Contractor Experience Requirements

B. Submittal Requirements

C. Acceptable Manufacturers

D. Codes, Standards and Regulations

E. General Requirements

F. System Requirements

G. Testing Requirements

H. Project Closeout Documentation

I. Attachments

1.06 Description of Work

A. The Public Address (PA) System is comprised of the Valcom Public Address System. with all speakers, horns, and equipment unless otherwise noted are tied to this system.

B. The Public Address System shall consist of the Central Control Unit, Administrative Control Console(s), Speakers, Horns, volume controls and all other necessary auxiliary devices to provide a complete and operational communications system.

C. The system shall be capable of multiple open voice intercom paths used for intercom, paging, program distribution, or emergency paging.

D. Paging system contractor to coordinate interconnection with all other relevant systems and to provide interconnect equipment/interfaces/cabling as required to facilitate this interconnection. Systems that the paging contractor may need to interface may include (but not be limited to) systems such as local or large venue A|V system(s), building access control system(s), building

fire alarm(s), digital signage systems or other building-wide or district-wide mass notification systems.

E. The public address system shall be compatible with and provide for integration with the school's IP Phone system.

F. Contractor shall coordinate layout and installation of ceiling-mounted speaker and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

G. The intent of this specification is to maximize communications between the classroom and administrative areas while enhancing school safety and reducing maintenance and operational cost.

H. Under this specification, the system shall provide a complete Communication System for the entire school including the outdoor recreational areas.

I. The Communication System shall provide distribution of intercom, overhead paging, class change time tones, and program material.

J. The Contractor shall furnish and install all equipment including, but not limited to, outlet boxes, wiring, speakers, and all other necessary equipment to provide a complete operating system as indicated with the contract documents. Provide all necessary wall plates, specialty boxes, etc., not provided by others.

K. Contractor is responsible to provide shop drawings of the as-installed system.

L. Loudspeakers to be connected in parallel as appropriate. To facilitate future troubleshooting, no parallel speaker chain shall include more than eight (8) loudspeakers. Areas with more than eight (8) loudspeakers shall include home runs of sufficient quantity to ensure that no single run has more than eight loudspeakers.

1.07 RELATED REQUIREMENTS

A. The Drawings, Specifications, General Conditions, Supplementary General Conditions, and other requirements of Division 1 apply to the work specified in Division 27, and shall be complied with in every respect. The Contractor shall examine all of the items which make up the Contract Documents, and shall coordinate them with the work on the project.

B. Contractor Experience Requirements

1. The Contractor shall possess all relevant Manufacturer Certifications for both the company and individual technicians prior to submitting a bid for the work.

2. Submitting contractor must be a Valcom Certified Partner with full warranty privileges prior to submitting a proposal.

3. The Valcom Authorized Integrator must have installed a minimum of 3 (three) projects of this size and application or shall arrange for onsite factory assistance during system commissioning.

4. The Contractor shall have been in business for a minimum of five (5) years.

5. The contractor shall maintain an adequate parts inventory to perform necessary service and upgrades.

6. The Contractor shall have a local office with local technicians and an adequate workforce to complete this project within a 300-mile radius of the project site.

7. The Contractor shall have completed a minimum of five (5) projects similar in size and scope to the Owner's installation, where the systems have been in continuous satisfactory operation for at least one (1) year.

C. Subcontractors shall be identified at the time of bid and comply with the requirements and intentions of these specifications, associated drawings, and related contract documents.

1.08 WARRANTY

A. The Contractor shall provide a 1 year (5-days x 8 hours x NBD) parts and services warranty on the audio-visual systems and all installed components.

B. Contractor shall provide separate/broken out pricing for a 2-year support/maintenance/service plan beginning at the end of the standard warranty period. The extended support/maintenance/service plan shall cover all materials, labor, workmanship, and preventative maintenance.

1.09 SUBMITTAL REQUIREMENTS

A. Pre-Installation Submittal

1. Contractor shall not order, purchase, or install any equipment until pre-installation submittals have been accepted in writing by the Architect/Design Consultant.

2. Manufacturer product data sheets for each proposed system component.

a. For product data sheets containing more than one (1) part number or product, the Contractor shall clearly identify the specific part number or product being submitted.

3. Shop drawings of the proposed system installation.

a. Shop drawings shall be provided clearly depicting any proposed modification to the project drawings. Any modifications shall be highlighted on the shop drawings.

b. Shop drawings shall be provided indicating proposed mounting arrangements and details of all equipment, including positioning devices, framework supports and interface with adjacent architecture.

c. Shop drawings shall include equipment locations, equipment mounting method, wall elevations, outlet locations, preliminary cable numbers, proposed cable pathways, system schematics, wiring diagrams, and riser diagrams. Shop drawings shall be submitted on 30" X 42" bond paper.

1) Shop drawings shall include equipment details. Detail equipment assemblies and indicate dimensions, weights, required clearances, field assembly methods, components, and location of each field connection.

2) Wiring diagrams at a minimum shall include single-line diagram(s) showing interconnection of components along with cabling diagram(s) showing cable routing.

d. Contractor shall maintain a set of shop drawings on site at all times and shall update the shop drawings on a weekly basis. Shop drawings shall be made available for inspection at the request of the Architect/Engineer.

4. Itemized list of all equipment, materials and labor required for the installation of the system as specified herein.

   a. This list shall be provided in printed and electronic format (Microsoft Excel) and shall contain: Part Number, Description, Unit of Measure, Unit Cost, Quantity, Labor Cost and Extended Cost to provide a complete and functional PA system.

5. Unit pricing for all equipment, materials and labor required for the installation of the systems as specified herein.

   a. This list shall be provided in printed and electronic format (Microsoft Excel) and shall contain: Part Number, Description, and Unit Price to Add/Deduct Each Item.

6. Manufacturer Product Certifications for Company.

7. Manufacturer Product Certifications for Installers.

8. Manufacturer Warranty letter.

9. Documentation indicating that Contractor has been in business for (5) years.

10. Address of Contractor's local office within a 300-mile radius of the project site.

11. Quantity of full time local technicians within a 300-mile radius of the project site.

12. List of five (5) contractor-installed projects of a similar size and scope in operation for at least (1) year. The Contractor shall provide the following information for each project: Project Name, Project Location, Project Start Date, Project Completion Date, Project Start Cost, Project Completion Cost, Brief Description of Project, Client Point of Contact Name and Phone Number.

13. List of completed and ongoing projects with the Owner. The Contractor shall provide the following information for each project: Project Name, Project Location, Project Start Date, Project Completion Date, Project Start Cost, Project Completion Cost, and Brief Description of Project.

14. System commissioning plan detailing the proposed testing and calibration to verify satisfactory system operation.

B. Post-Installation Submittal

1. The Contractor shall provide three (3) sets of comprehensive drawings accurately depicting the "as-built" condition of the audio-visual systems as it was installed to the Architect/Engineer at the time of substantial completion. Final payment will not be made until these as-built documents are received and approved by the Architect/Design Consultant.

   a. As-built drawings shall include but not be limited to:

      1) Equipment layouts

      2) Wall elevations

3) System schematics

4) Wiring diagrams

b. As-Built drawings must be provided in original hardcopy format and on digital format in AutoCAD rel. 2018 or higher.

c. The Contractor shall provide three (3) sets of as-built documentation for the audio-visual systems to the Architect/Design Consultant at the time of substantial completion. As-Built documentation shall be provided in original hardcopy format and on digital format.

Documentation shall include but not be limited to:

1) Equipment O & M manuals

2) Installed equipment list (manufacturer model numbers, serial numbers, installed locations, etc.)

3) Configuration information (MAC addresses, IP addresses, etc.)

4) Warranty support information

5) Documentation shall be bound, sectioned and tabbed in the following order (when applicable):

6) Equipment O&M Manuals

7) Installed Equipment List

8) Configuration Information

9) Warranty Support Information

a) The Contractor shall furnish the original Letter of Warranty to include the name, address and phone number contacts for warranty call outs to the Architect/Design Consultant at the time of substantial completion.

b) Contractor shall provide a “By Name” point of contact for contingencies during the one year warranty period.

PART 2 - PRODUCTS

2.01 General Requirements

A. The following sections specifically list the acceptable equipment types and items for this project.

B. Architect/Engineer will have final determination of acceptability of all proposed equipment and must approve submitted equipment prior to purchase or installation.

C. Proposed equivalent items must be approved in writing by the Architect/Design Consultant prior to submitting a bid. Proposed equivalent items must meet or exceed these specifications and the specifications of the specified item.

D. In the event a manufacturer’s specified product or part number has changed or is no longer available, Contractor shall substitute the appropriate equivalent manufacturer’s part number.

E. In the event of a discrepancy between the specifications and the drawings, the greater quantity and/or better quality will be furnished.

F. For listed products with no part number specified, Contractor shall provide a product that meets the performance requirements of these specifications, industry standard practices, and intended application.

G. All wiring, equipment, and installation materials shall be new and of the highest quality.

H. Labels on all wiring, materials, and equipment must indicate a nationally recognized testing laboratory.

I. Original Equipment Manufacturer (OEM) documentation must be provided to the Architect/Engineer which certifies performance characteristics and compliance with industry standards.

2.02 Acceptable Manufacturers

A. Public Address System

1. Valcom Server - VE-6025
2. Valcom Gateway- VE8014BR
3. Valcom Network Audio Port- VE8004BR
4. Valcom External Power Supply – VP-4124D
5. Valcom Paging Interface- V-9972
6. Valcom Desktop Microphone- V-400
7. Valcom Microphone Adapter- V-9939C
8. Valcom Paging Speakers – VE-9022A-2
    a. V-1020C
    b. V-1030C-GY
    c. VIP-422A- Alternate 1 (each classroom)
    d. VL520-F- Alternate 2 (each classroom)
9. Valcom Interactive Console- VE8092- Alternate 1
10. Provide, install integration to IP phone system, Genetec system, and Gym / Athletic Field speaker system.
11. Programming the Timed Message and Tone Generator for bell system. Provide programming for speaker zones, schedule, and integrations with other systems.
12. Contractor shall provide and install all required parts and pieces to support a complete Turnkey PA System to include parts and pieces not listed in this specification.

PART 3 - EXECUTION

3.01 Codes, Standards, Regulations

A. TIA-526-7 Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant – OFSTP-7 - (February 2002)

B. TIA-526-14-A Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant – OFSTP-14 - (August 1998)

C. TIA-568-D, Commercial Building Telecommunications Cabling Standard Part 1: General Requirements

D. TIA-568-D, Commercial Building Telecommunications Cabling Standard Part 1: General Requirements - Addendum 1 – Minimum 4-Pair UTP and ScTP Patch Cable Bend Radius

E. TIA-568-D, Commercial Building Telecommunications Cabling Standard Part 1: General Requirements Addendum 2 – Grounding and Bonding Requirements for Screened Balanced Twisted-Pair Horizontal Cabling

F. TIA-568-D, Commercial Building Telecommunications Cabling Standard Part 1: General Requirements Addendum 3 – Supportable Distances and Channel Attenuation for Optical Fiber Applications by Fiber Type

G. TIA-568-D, Commercial Building Telecommunications Cabling Standard Part 1: General Requirements > Addendum 4 – Recognition of Category 6 and 850 nm Laser Optimized 50/125 µm Multimode Optical Fiber Cabling -

H. TIA-568-D, Commercial Building Telecommunications Cabling Standard Part 1: General Requirements Addendum 5 – Telecommunications Cabling for Telecommunications Enclosures

I. TIA-568-D, Commercial Building Telecommunications Cabling Standard Part 1: General Requirements Addendum 7 - Guidelines for Maintaining Polarity Using Array Connectors

J. TIA-568-D, Commercial Building Telecommunications Cabling Standard Part 2: Balanced Twisted-Pair Cabling Components

K. TIA-568-D, Commercial Building Telecommunications Cabling Standard Part 2: Balanced Twisted-Pair Cabling Components – Addendum 1 – Transmission Performance Specifications for 4-Pair 100 ohm Category 6 Cabling

L. TIA-568-D, Commercial Building Telecommunications Cabling Standard Part 2: Balanced Twisted-Pair Cabling Components – Addendum 2 – Revision of Sub-clauses

M. TIA-568-D, Commercial Building Telecommunications Cabling Standard Part 2: Balanced Twisted-Pair Cabling Components – Addendum 3 – Additional Considerations for Insertion Loss & Return Loss Pass/Fail Determination

N. TIA-568-D, Commercial Building Telecommunications Cabling Standard Part 2: Balanced Twisted-Pair Cabling Components – Addendum 4 – Solderless Connection Reliability Requirements for Copper Connecting Hardware

O. TIA-568-D, Commercial Building Telecommunications Cabling Standard Part 2: Balanced Twisted-Pair Cabling Components

P. TIA-568-D, Commercial Building Telecommunications Cabling Standard Part 2: Balanced Twisted-Pair Cabling Components – Addendum 6 – Category 6 Related Component Test Procedures

Q. TIA-568-D, Commercial Building Telecommunications Cabling Standard Part 2: Balanced Twisted-Pair Cabling Components – Addendum 11 - Specification of 4-Pair UTP and SCTP Cabling

R. TIA-568-D, Optical Fiber Cabling Components Standard

S. TIA-569-E Commercial Building Standard for Telecommunications Pathways and Spaces -

T. TIA-606-D, Administration Standard for Commercial Telecommunications Infrastructure

U. ANSI J-STD-607-D Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications

V. TIA-758-E Customer-owned Outside Plant Telecommunications Infrastructure Standard

W. AIA

X. Local

Y. NEC

Z. ISO

AA. FCC

BB. UL

CC. OSHA

DD. NFPA

EE. NEMA

FF. Plenum Applications

GG. Applicable Flame Test: UL 910 (NFPA 262).

3.02 Contract documents are detailed only to the extent required to show design intent. It shall be understood and agreed upon by the Contractor that all work described herein shall be complete in every detail. Contractor Shall:

A. Furnish additional items not mentioned herein to meet requirements as specified without claim for additional payments. Items, may include hardware, rack panels, 66 Blocks etc., and other devices that are required for installation.

B. Ensure that all labor furnished be manufacture trained and experienced in telecommunication and networked systems.

C. Ensure that all equipment unless otherwise specified, shall be new, free from defects, and of the best craftsmanship in its class.

D. Perform initial programming of system and audio level adjustments.

E. Perform final programming of system and audio level adjustments.

F. Provide system documentation including equipment manuals and drawings.

G. Guarantee all equipment and components for their specified period from date of acceptance.

H. Provide information on system requirements to any Contractor responsible for supplying related materials for this system.

I. The Contractor shall verify all ceilings with specified speaker types prior to installation. Contractor is responsible to provide speaker types as required to mount in the specified locations. If the speaker types are found to be incompatible with the ceiling types, the contractor shall notify the Architect / Design Consultant. If the contractor does not notify the Architect / Design Consult of any discrepancies, the installation will be assumed to be accounted for in the highest quality and most costly and/or difficult manner.

J. The Contractor shall be responsible for, and repair all damage to buildings due to carelessness of workmen, including ceiling tiles, and exercise all reasonable care to avoid any damage to the Owner's property. The Contractor shall make note of all existing damage, and provide photographs of the damage, prior to beginning any work.

3.03 In the event of any conflicts between documents referenced herein and the contents of this specification, the Contractor shall notify the Architect/Engineer in writing of any such occurrences before purchasing or installing any equipment or materials. The Architect/Design Consultant will notify the Contractor of any actions required to resolve these conflicts. Such actions may include but are not limited to: design changes, equipment, materials and/or installation changes. In any event Contractor shall not supersede specifications and standards from the latest NFPA and NEC publications.

3.04 General Requirements

A. Contractor shall comply with the requirements of local Authority Having Jurisdiction (AHJ), State of Texas, the National Fire Protection Association (NFPA), and the National Electrical Code (NEC). If the Contractor identifies any item in the plans or specifications that will not strictly comply with the aforementioned laws, ordinances, and rules, the matter shall be referred to the Architect/Design Consultant for direction before proceeding with that part of the work.

B. The Contractor shall install the materials in accordance with these specification and the manufacturer’s installation guidelines.

C. No deviations from the plans or specifications shall be made without full consent in writing of the Architect/Engineer. The Contractor shall have written approval from the Architect/Design Consultant for any additional work beyond the Contract Documents prior to beginning such work. If the Contractor does not obtain written approval from the Architect/Design Consultant prior to proceeding with the work, the contractor shall not be reimbursed for the work.

D. The Contractor shall obtain written permission from the Architect/Design Consultant before proceeding with any work that would necessitate cutting into or through any part of the building structure such as, but not limited to girders, beams, floors, walls, roofs, or ceilings.

E. Contractor shall notify the Architect/Design Consultant a minimum of (2) weeks prior to beginning work and will participate in a pre-construction meeting with the Architect/Engineer to perform a walkthrough, review the scope of work, schedule, and escalation procedures.

F. The Contractor shall maintain a work area free of debris, trash, empty cable reels, scrap wire, etc., and dispose of such items on a daily basis and return the site to the original state of

cleanliness. The Contractor shall not use Owner's facilities for the disposal of excess or scrap materials.

G. Equipment and materials installed by the Contractor shall be free of defects and damage.

H. Contractor shall be responsible for the repair of any damage caused by the contractor during the installation.

I. Contractor shall test all equipment prior to installation. By failing to perform this testing operation, the Contractor shall accept the equipment as compliant and assume all liability for the replacement of equipment at no cost to the Owner should it be found defective at a later date.

J. Contractor shall maintain a set of working specifications, design drawings, and shop drawings to be kept on site at all times and shall update the shop drawings on a weekly basis. Shop drawings shall be made available for inspection at the request of the Architect/Engineer.

K. Equipment and materials shall be consistent throughout the installation. Where multiple units of the same type of equipment and materials are required, these units shall be a standard product with the same manufacturer and model number.

L. Equipment and materials shall be delivered and stored in accordance with the manufacturer's guidelines at the Contractor's expense.

M. Contractor shall make all stored equipment and materials available for inspection at the request of the Architect/Engineer.

N. All equipment and material used in the installation shall be approved by the manufacturer for the environment in which it is being installed.

O. Cables shall be properly supported in accordance with industry standards at all times. Improperly supported cables shall be corrected by the Contractor at no cost to the Owner.

P. Contractor shall be responsible to properly protect equipment from damage by other trades during construction.

Q. Cables shall be routed at 90-degree angles to the building structure. At no time shall a diagonal pull be installed.

R. Any cabling installed in or passing through a ceiling space must be plenum rated.

S. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess. Use lacing bars in cabinets.

T. Control-Circuit Wiring: Install number and size of conductors as recommended by system manufacturer for control functions indicated.

U. Separation of Wires: Separate speaker-microphone, line-level, speaker-level, and power wiring runs as specified by BICSI TDMM 14 Edition.

V. Match input and output impedances and signal levels at signal interfaces. Provide matching networks where required.

W. Weatherproof Equipment: For units that are mounted outdoors, in damp locations, or where exposed to weather, install consistent with requirements of weatherproof rating.

X. The Contractor shall not install cables in conduits or sleeves without nylon bushings. Cables installed through conduits or sleeves without nylon bushings shall be removed and replaced at no cost to the Owner.

Y. The Communication System shall provide at least the following functions and features:

1. The central control unit shall have the capacity for expanding the system to 300 stations, 125 staff phones, and 4 Administrative Consoles with the addition of plug in modules, as required.

2. It shall be complete with circuitry for accomplishing all functions for signaling and communications to all stations, page zones, and administrative control consoles. The unit shall contain all required electronics on modular, plug-in type boards for ease of service and future expansion.

3. All programmable functions shall be stored in a non-volatile EEPROM memory and shall not be lost in event of a power failure.

4. Programming functions shall be accomplished through the use of a standard Windows Internet browser. Any PC connected to the school network and provided with the proper authorization shall have multi-level access to the system for programming. Any off-site PC shall have multi-level access to the system through the use of the public Internet, provided they have been granted proper authorization by the school.

5. Diagnostic functions shall be accomplished through any PC connected to the school network and provided with the proper authorization and diagnostic software. Any off-site PC shall have access to the system for diagnostics through the use of the public Internet, provided that they have been granted proper authorization and have been provided diagnostic software.

6. The audio channel(s) shall be priority driven allowing for the highest priority signal type access to a voice channel. The system shall be user programmable to allocate, upon demand, either of the channel(s) to facilitate simultaneous intercom conversations, pages, program distributions, or combination thereof.

7. The Central Control Unit shall provide a 0 dB signal for connections to an external amplifier for distribution of program audio, time signals and paging announcements.

8. The system shall be capable of multiple open voice intercom paths used for intercom, paging, program distribution, or emergency paging.

9. The system shall support direct-dialing, two-way communications between all locations equipped with Administrative Control Consoles or telephones to any location equipped with a speaker.

10. The system shall provide communications between telephone and public address/ intercom system. Systems providing broadcast only and are not capable of listening to rooms are not acceptable.

11. Pre-announce tones shall alert the classroom of incoming calls with distinct tones for each priority level.

12. The system shall be integrated with customer phone system allowing the capability to page and conduct voice intercom with any speaker in the system.

13. Provide emergency and All Call paging through All Call and a minimum of 24 zones of group paging. The paging zones shall be independent of the time tone and audio program distribution zones. Systems sharing zones for both paging and time tone shall not be acceptable.

14. The system must have the capability of distributing audio program sources from any administrative control console, telephone system phone or intercom system DTMF phone. Program distribution shall be accomplished on an all rooms basis, selected rooms basis or an individual room.

15. The paging system and the phone system must be integrated together to allow the phone system to call over the paging system.

16. The system shall support the automatic distribution of user programmable, class change time signals (Bell Schedule) to all selected areas.

17. Furnish and install all system equipment, devices, accessories, and material in accordance with these specifications and drawing to provide a complete and operating system.

18. All bids shall be based on the equipment as specified herein. The model designations are that of Valcom. The specifying authority must approve any alternate system.

Z. Cabling and Pathways

1. The Intercom contractor shall provide cabling and the means to support page ducking (override) in the Gym, Cafeteria, Library, breakout areas and all classrooms. If the intercom system is IP based it may mean providing additional IP relay modules.

3.05 System Requirements

A. Any quantities listed are for reference only. Contractor is responsible for furnishing materials as required to provide a complete and functioning system. Where quantities are not noted, they may be obtained from the drawings. In the event of a discrepancy between the specifications and the drawings, the greater quantity/quality shall be furnished.

1. Contractor shall provide installation in accordance with Manufacturer’s installation instructions.

2. Contractor shall load the latest firmware updates on all equipment and components.

3. Contractor shall energize and commission equipment in accordance with manufacturer’s instructions and guidelines.

4. Contractor shall provide final adjustments. Upon completion, the equipment shall be clean, adjusted and left in perfect operating condition.

5. Equipment shall be clean, adjusted and left in perfect operating condition.

B. Public Address System:

1. Contractor shall furnish and install the following as indicated on the technology drawings and associated equipment schedules and diagrams.

2. Contractor shall provide installation in accordance with Manufacturer’s installation instructions.

3. Contractor shall load the latest firmware updates on all equipment and components.

4. Contractor shall energize and commission equipment in accordance with manufacturer's instructions and guidelines.

5. Contractor shall provide final adjustments. Upon completion, the equipment shall be clean, adjusted and left in perfect operating condition.

C. System Rack

1. Contractor shall coordinate exact rack location/placement with Owner and Architect before system installation.

2. Contractor shall furnish and install the following as indicated on the technology drawings and associated equipment schedules and diagrams.

D. Uninterruptible Power Supply:

1. Contractor shall integrate power supplies and system equipment with UPS provided and installed by others.

E. Volume Controls

1. Contractor shall furnish and install volume controls in each MDF and IDF for corresponding speakers installed to that technology room.

2. Contractor shall provide final adjustments. Upon completion, the equipment shall be clean, adjusted and left in perfect operating condition.

F. Paging System Cabling:

1. All indoor cabling shall be plenum rated. All outdoor cabling shall be outdoor rated and direct-burial rated when in contact with grade or within conduit in contact with grade. Coordinate all cable colors with Owner/Consultant prior to ordering or installation. Provide connectors and termination as specified by manufacturer for each application.

2. The PA system shall be designed so the speakers in each applicable MDF and/or IDF wiring boundary are cabled from the applicable MDF and/or IDF.

3. The speaker cables shall maintain separation from all other cables (data, voice, video, clock, intrusion detection, Access Control/Data Gathering Panel, CCTV, etc.) and shall not share the same J-hook pathway or conduit.

4. Each PA system cable shall be provided with 10 foot service loop at each end and at each speaker where daisy-chained.

a. Speakers in large areas such as gymnasiums, cafeterias, hallways, courtyard, or the exterior may be daisy-chained with the specific area. This cable shall be installed and terminated by the cable contractor in the MDF and/or IDF room.

b. Paging system and Infrastructure installation:

c. Paging system and Infrastructure: Provide and install Valcom Page Control Unit in the MDF and IDF rooms. Provide and installation will include new power supply and will be cross-connected to IP phone system.

G. Cable Support:

1. All cables shall be installed and supported in conduit systems, cable trays, cores, sleeves, etc. as indicated in the technology drawings.

2. When cables leave the main pathway systems as indicated on the technology drawings, they shall be installed and supported in Contractor furnished and installed j-hooks or saddle straps.

3. No cable pathway shall exceed 40% fill ratio.

4. The contractor shall furnish a separate j-hook or saddle strap pathway for each cable type (data, voice, video and security).

5. J-hooks and saddle straps shall be installed no more than five-feet (5') apart on center, using only manufacturer-approved installation methods and hardware.

6. J-hooks shall be furnished with closure clips.

7. Maximum sag between supports shall not exceed twelve-inches (12").

8. Contractor shall establish j-hook and saddle strap pathways and shall coordinate pathways with all other disciplines. Under no-circumstances shall these pathways be used to support other low-voltage applications not included in this specification.

9. Cable Dressing

   a. No nylon cable ties shall be used at any time during the installation of the cable.

   b. Above Ceiling

      1) Contractor shall furnish and install plenum-rated hook & loop straps in plenum-rated airspaces.

         a) The Contractor shall install no more than (1) hook & loop strap between each j-hook or saddle strap or at service loop locations.

   c. Equipment Rooms / Telecommunications Rooms

      1) The Contractor shall bundle all visible cables with Contractor furnished and installed hook & loop straps.

         a) Hook & loop straps shall be installed twenty-four (24) inches apart on center.

H. Public Address System Labeling

1. All speakers shall be labeled with the same designation as the PA cables.

2. The Public Address System designation shall consist of three fields with a dash between each field.

3. The first field shall identify the wiring closet origination of the cable. This field will be a letter of the alphabet with the MDF always being A, IDF 1 being B, IDF 2 being C, IDF 3 being D, etc.

4. The second field shall be a 1 – 3 digit cable number that is unique for a particular wiring closet. The first cable in a wiring closet shall be 1, the second cable shall be the third cable shall be 3, etc.

5. The third field shall be a 1 – 5 character alphabetic field to identify the system the cable supports. For the PA system, it will be PA.

6. The fourth field will be a numeric character to identify a particular daisy-chained cable within that daisy-chained group.

7. Contractor shall Field Verify all labeling schemes and rooms numbers with the architect and owner prior to installing the final labels.

8. Contractor shall utilize permanent Labels. No hand written labels shall be used.

Example:

	1st	2nd	3rd
MDF------	Classroom----------	Classroom----------	Classroom
	A-1-PA	A-2-PA	A-3-PA
MDF------	Hallway----------	Hallway----------	Hallway
	A-4-PA-1	A-4-PA-2	A-4-PA-3

3.06 Field Quality Control

A. Manufacturer's Field Service: A factory representative shall be onsite to assist in system programming and commissioning.

1. Perform the following field tests and inspections:

2. Schedule tests with at least seven days' advance notice of test performance.

3. After installing school intercom and program equipment and after electrical circuitry has been energized, test for compliance with requirements.

4. Operational Test: Test originating station-to-station, all-call, and page messages at each intercom station. Verify proper routing and volume levels and that system is free of noise and distortion. Test each available message path from each station on system.

5. Inspection: Verify that units and controls are properly labeled and interconnecting wires and terminals are identified.

6. Verify the server and devices are running the latest software revisions.

B. Startup Service

1. Engage a factory-authorized service representative to perform startup service and initial system programming.

2. Verify that electrical wiring installation complies with manufacturer's submittal and installation requirements.

C. Adjusting

1. On-Site Assistance: Engage a factory-authorized service representative to provide on-site assistance in adjusting sound levels and for any initial troubleshooting.

D. Demonstration

1. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain school intercom and program equipment.

3.07 Training

A. Distributed Communication Systems Training

1. Contractor shall provide a proposed training schedule to the Architect/Design Consultant prior to substantial completion.

2. Contractor shall provide a proposed training syllabus for both administrative users and end-users prior to substantial completion.

3. Training shall include all aspects of the Audio/Visual System as specified and installed. Contractor shall include provisions within the total cost proposal for a minimum of two (2) System Administrator training sessions. Each session shall be planned for a minimum of 4 hours. It is anticipated this training will cover advanced functions of the system, basic trouble-shooting techniques and other subject matter pertinent to the on-going support of the PA Systems at the installed facility.

4. Contractor shall include provisions with the total cost proposal for a minimum of two (2) End-User training sessions. Each session shall be planned for a minimum of 4 hours. It is anticipated this training will cover basic function and operation of the system by faculty. This would include event display management, source control and general systems operation for all installed systems.

5. Programming:

a. Fully brief Owner on available programming options. Record Owner's decisions and set up initial system program. Prepare a written record of decisions, implementation methodology, and final results.

b. Once initial system programming is implemented, allow owner a 2 month period to utilize system and make comments.

c. After initial evaluation period coordinate with Owner. Record Owner’s feedback and provide adjustments as requested.

3.08 Testing Requirements

A. Distributed Communication Systems Testing

1. Contractor shall un-pack and pre-test equipment prior to installation into the production environment. All configurations shall be re-verified prior to the units being placed into service.

2. Contractor shall test and commission each component per the specifications and manufacture’s installation instructions.

3. Contractor shall test and verify for full operational and network support control functionalities and connections per the specifications and manufacturer's installation instructions.

4. All PA network devices shall be verified for link and auto negotiation to the highest connection rate.

5. Contractor shall test and verify all audio-visual functionalities as installed per the specifications and manufacturer's installation instructions.

6. Call Back Switches and speakers shall be checked tested by the installing contractor to ensure the system is free of grounds, opens and shorts. The test results shall be provided to the Architect and Owner for review.

3.09 Project Closeout Documentation

A. As-Built Drawings

1. Drawings shall be provided to the Architect/Design Consultant at the time of substantial completion. Final payment will not be recommended until drawings are received and approved by the Architect/Engineer.

2. Three (3) sets of drawings depicting the condition of the audio visual system as installed.

3. As-Built drawings shall be produced in AutoCAD 2010 or higher and provided in hardcopy and electronically in .dwg and PDF format.

4. Hardcopy drawings shall be provided in the original size as issued by the Architect/Engineer.

5. Drawings shall retain the formatting and title block of the original drawings as issued by the Architect/Engineer.

6. Drawings shall be provided utilizing the original scale and shall include the exact dimensions and locations of all projectors, projector mounts, projection screens, wall elevations, cable tray, sleeves, pathways, workstation locations, and labeling scheme.

B. Contactor's Statement of Warranty

1. Statement of warranty shall be provided to the Architect/Design Consultant at the time of substantial completion. Final payment will not be recommended until statement of warranty is received and approved by the Architect/Engineer.

2. Contractor shall furnish a minimum of a one (1) year warranty on all materials, labor and workmanship starting at final system acceptance.

3. One original and two copies of Contractor's warranty terms and conditions to include contact information (i.e. Contractor name, Point of Contact, address, phone number and email address) and start and end date for warranty call outs.

END OF SECTION 27 51 00

TECHNOLOGY SYMBOLS & LEGEND

VOICE SYMBOLS

	SINGLE VOICE OUTLET, CABLE TYPE AS SPECIFIED, MOUNTED +18-INCHES A.F.F. UNLESS OTHERWISE NOTED.
X	VOICE OUTLET, CABLE TYPE AS SPECIFIED, MOUNTED +18-INCHES A.F.F. UNLESS OTHERWISE NOTED. X = NUMBER OF CABLE TERMINATIONS PER LOCATION.
	SINGLE VOICE OUTLET, CABLE TYPE AS SPECIFIED, MOUNTED +6-INCHES ABOVE COUNTER OR BACKSPLASH UNLESS OTHERWISE NOTED.
X	VOICE OUTLET, CABLE TYPE AS SPECIFIED, MOUNTED +6-INCHES ABOVE COUNTER OR BACKSPLASH UNLESS OTHERWISE NOTED, X = NUMBER OF CABLE TERMINATIONS PER LOCATION AS INDICATED.
	POWER/COMMUNICATIONS POLE WITH A SINGLE VOICE OUTLET, CABLE TYPE AS SPECIFIED, MOUNTED AT 18" A.F.F. UNLESS OTHERWISE NOTED.
X	POWER/COMMUNICATIONS POLE WITH X = NUMBER OF VOICE OUTLETS, CABLE TYPE AS SPECIFIED, MOUNTED AT 18" A.F.F. UNLESS OTHERWISE NOTED.
	SINGLE VOICE OUTLET, CABLE TYPE AS SPECIFIED, TERMINATED IN FLOOR BOX/POKE-THRU AS SPECIFIED.
X	VOICE OUTLET, CABLE TYPE AS SPECIFIED, TERMINATED IN FLOOR BOX/POKE -THRU AS SPECIFIED WITH X = NUMBER OF VOICE TERMINATIONS PER LOCATION.
W	SINGLE VOICE OUTLET FOR WALL-MOUNTED PHONE, CABLE TYPE AS SPECIFIED, MOUNTED +52-INCHES A.F.F. UNLESS OTHERWISE NOTED.

DATA SYMBOLS

	SINGLE DATA OUTLET, CABLE TYPE AS SPECIFIED, MOUNTED +18-INCHES A.F.F. UNLESS OTHERWISE NOTED.
X	DATA OUTLET, CABLE TYPE AS SPECIFIED, MOUNTED +18-INCHES A.F.F. UNLESS OTHERWISE NOTED. X = NUMBER OF CABLE TERMINATIONS PER LOCATION.
	SINGLE DATA OUTLET, CABLE TYPE AS SPECIFIED, MOUNTED AT SPECIAL MOUNTING HEIGHT.
X	DATA OUTLET, CABLE TYPE AS SPECIFIED, MOUNTED AT SPECIAL MOUNTING HEIGHT, X = NUMBER OF CABLE TERMINATIONS PER LOCATION AS INDICATED.
	POWER/COMMUNICATIONS POLE WITH A SINGLE DATA OUTLET, CABLE TYPE AS SPECIFIED, MOUNTED AT 18" A.F.F. UNLESS OTHERWISE NOTED.
X	POWER/COMMUNICATIONS POLE WITH X = NUMBER OF DATA OUTLETS, CABLE TYPE AS SPECIFIED, MOUNTED AT 18" A.F.F. UNLESS OTHERWISE NOTED.
	SINGLE DATA OUTLET, CABLE TYPE AS SPECIFIED, TERMINATED IN FLOOR BOX/POKE-THRU AS SPECIFIED.
X	DATA OUTLET, CABLE TYPE AS SPECIFIED, TERMINATED IN FLOOR BOX/POKE -THRU AS SPECIFIED WITH X = NUMBER OF CABLE TERMINATIONS PER LOCATION.
W	SINGLE DATA OUTLET FOR WALL-MOUNTED IP PHONE, CABLE TYPE AS SPECIFIED, MOUNTED +52-INCHES A.F.F. UNLESS OTHERWISE NOTED.
	SINGLE ABOVE CEILING DATA OUTLET, CABLE TYPE AS SPECIFIED.
X	ABOVE CEILING DATA OUTLET, CABLE TYPE AS SPECIFIED WITH X = NUMBER OF CABLE TERMINATIONS PER LOCATION.

ROUGH-IN & MISC. SYMBOLS

	ROUGH-IN LOCATION, INFRASTRUCTURE AS SPECIFIED, MOUNTED +18-INCHES A.F.F. UNLESS OTHERWISE NOTED.
	ROUGH-IN LOCATION, INFRASTRUCTURE AS SPECIFIED, MOUNTED AT SPECIAL MOUNTING HEIGHT.
	POWER POLE WITH ROUGH-IN LOCATION, INFRASTRUCTURE AS SPECIFIED, MOUNTED AT 18" A.F.F. UNLESS OTHERWISE NOTED.
	ROUGH-IN LOCATION, TERMINATED IN FLOOR BOX/POKE-THRU AS SPECIFIED.
WAP	WIRELESS ACCESS POINT.

GENERAL SYMBOLS

# SHEET — DRAWING TITLE — SCALE: SCALE	DRAWING TITLE CALLOUT, # = DETAIL NUMBER.
# SHEET	DETAIL CALLOUT, # = DETAIL NUMBER.
# SHEET	SECTION CALLOUT, # = DETAIL NUMBER.
SHEET #	ELEVATION CALLOUT, # = DETAIL NUMBER.
#	KEYED NOTE, # = KEYED NOTE NUMBER.
#	REVISION TRIANGLE, # = REVISION NUMBER (PER SHEET).
TR (IDF XXX)	INDICATES TELECOMMUNICATIONS REGION

VOICE/DATA SYMBOLS

	SINGLE VOICE & SINGLE DATA OUTLET, CABLE TYPE AS SPECIFIED, MOUNTED +18-INCHES A.F.F. UNLESS OTHERWISE NOTED.
X Y	VOICE & DATA OUTLET, CABLE TYPE AS SPECIFIED, MOUNTED +18-INCHES A.F.F. UNLESS OTHERWISE NOTED. X = NUMBER OF VOICE TERMINATIONS , Y = NUMBER OF DATA TERMINATIONS PER LOCATION.
	SINGLE VOICE & SINGLE DATA OUTLET, CABLE TYPE AS SPECIFIED, MOUNTED +6-INCHES ABOVE COUNTER OR BACKSPLASH UNLESS OTHERWISE NOTED.
X Y	VOICE & DATA OUTLET, CABLE TYPE AS SPECIFIED, MOUNTED +6-INCHES ABOVE COUNTER OR BACKSPLASH UNLESS OTHERWISE NOTED, X = NUMBER OF VOICE OUTLETS AND Y = NUMBER OF DATA OUTLETS PER LOCATION AS INDICATED.
	POWER/COMMUNICATIONS POLE WITH A SINGLE VOICE OUTLET AND SINGLE DATA OUTLET, CABLE TYPE AS SPECIFIED, MOUNTED AT 18" A.F.F. UNLESS OTHERWISE NOTED.
X Y	POWER/COMMUNICATIONS POLE WITH X = NUMBER OF VOICE TERMINATIONS, Y = NUMBER OF DATA TERMINATIONS, CABLE TYPE AS SPECIFIED, MOUNTED AT 18" A.F.F. UNLESS OTHERWISE NOTED.
	SINGLE VOICE OUTLET, CABLE TYPE AS SPECIFIED, TERMINATED IN FLOOR BOX/POKE-THRU AS SPECIFIED.
X Y	VOICE OUTLET, CABLE TYPE AS SPECIFIED, TERMINATED IN FLOOR BOX/POKE -THRU AS SPECIFIED WITH X = NUMBER OF VOICE TERMINATIONS, Y = NUMBER OF DATA TERMINATIONS PER LOCATION.

FIBER OPTIC SYMBOLS

	SINGLE FIBER OPTIC OUTLET, CABLE TYPE AS SPECIFIED, MOUNTED +18-INCHES A.F.F. UNLESS OTHERWISE NOTED.
X	FIBER OPTIC OUTLET, CABLE TYPE AS SPECIFIED, MOUNTED +18-INCHES A.F.F. UNLESS OTHERWISE NOTED. X = NUMBER OF CABLE TERMINATIONS PER LOCATION.
	SINGLE FIBER OPTIC OUTLET, CABLE TYPE AS SPECIFIED, MOUNTED +6-INCHES ABOVE COUNTER OR BACKSPLASH UNLESS OTHERWISE NOTED.
X	FIBER OPTIC OUTLET, CABLE TYPE AS SPECIFIED, MOUNTED +6-INCHES ABOVE COUNTER OR BACKSPLASH UNLESS OTHERWISE NOTED, X = NUMBER OF CABLE TERMINATIONS PER LOCATION AS INDICATED.
	POWER/COMMUNICATIONS POLE WITH A SINGLE FIBER OPTIC OUTLET, CABLE TYPE AS SPECIFIED, MOUNTED AT 18" A.F.F. UNLESS OTHERWISE NOTED.
X	POWER/COMMUNICATIONS POLE WITH X = NUMBER OF FIBER OPTIC OUTLETS, CABLE TYPE AS SPECIFIED, MOUNTED AT 18" A.F.F. UNLESS OTHERWISE NOTED.
	SINGLE FIBER OPTIC OUTLET, CABLE TYPE AS SPECIFIED, TERMINATED IN FLOOR BOX/POKE-THRU AS SPECIFIED.
X	FIBER OPTIC OUTLET, CABLE TYPE AS SPECIFIED, TERMINATED IN FLOOR BOX/POKE -THRU AS SPECIFIED WITH X = NUMBER OF CABLE TERMINATIONS PER LOCATION.

CABLE PLANT & RISER DIAGRAM

	MAINTENANCE HOLE, SIZE & TYPE AS SPECIFIED.
	PULLBOX, SIZE AND TYPE AS SPECIFIED.
UCC	DIRECT BURIED COMMUNICATIONS, CABLE TYPE AS SPECIFIED.
AER	AERIAL COMMUNICATIONS, CABLE TYPE AS SPECIFIED.
	CONDUIT, SIZE AND TYPE AS SPECIFIED.

ABBREVIATIONS

A.F.F.	ABOVE FINISHED FLOOR
A.F.G.	ABOVE FINISHED GRADE
AER	AERIAL
DEMARC	DEMARCATION POINT
EMT	ELECTRIC METALLIC TUBE
F.O.C.	FIBER OPTIC CABLE
GIP	GALVANIZED IRON PIPE
HE	PA/INTERCOM HEAD-END
IMC	INTERMEDIATE METAL CONDUIT
ISP	INSIDE CABLE PLANT
IDF	INTERMEDIATE DISTRIBUTION FRAME
MDF	MAIN DISTRIBUTION FRAME
MH	MAINTENANCE HOLE
MM	MULTIMODE
OSP	OUTSIDE CABLE PLANT
PB	PULLBOX
PR	PAIR
PVC	POLYVINYL CHLORIDE
RSC	RIGID STEEL CONDUIT
SM	SINGLE MODE
SP	SERVICE PROVIDER
STP	SHIELDED TWISTED PAIR
TB	TERMINAL BLOCK
TR	TELECOMMUNICATION REGION
UGC	UNDERGROUND COMMUNICATION
UON	UNLESS OTHERWISE NOTED
UTP	UNSHIELDED TWISTED PAIR

NOTES

1. CONTRACTOR SHALL REVIEW DRAWINGS AND SPECIFICATIONS THAT MAKE UP THE CONTRACT DOCUMENTS AND COMPLETE ALL WORK INCLUDED THEREIN.
2. SCALE OF TECHNOLOGY DRAWINGS IS PROVIDED FOR REFERENCE ONLY. CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER CABLE LENGTHS, SIZE OF PATHWAYS, DIMENSIONS, ETC.
3. TECHNOLOGY DRAWINGS SHALL BE USED TO COMPLEMENT THE WRITTEN SPECIFICATIONS.
4. ANY DISCREPANCY OR CONFLICT WITHIN OR BETWEEN THE DRAWINGS AND SPECIFICATIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT/DESIGN CONSULTANT. DISCREPANCIES OR CONFLICTS NOT BROUGHT TO THE ATTENTION OF THE ARCHITECT/DESIGN CONSULTANT AND SUBSEQUENTLY CLARIFIED DURING THE BIDDING OF THE PROJECT WILL BE DEEMED TO HAVE BEEN BID OR PROPOSED IN THE MORE COSTLY OR DIFFICULT MANNER, AND THE BETTER QUALITY OR GREATER QUANTITY OF WORK SHALL BE PROVIDED BY THE CONTRACTOR IN ACCORDANCE WITH THE ARCHITECT'S/DESIGN CONSULTANT'S INTERPRETATION.
5. ARCHITECT'S/DESIGN CONSULTANT'S INTERPRETATION.

INDEX OF DRAWINGS

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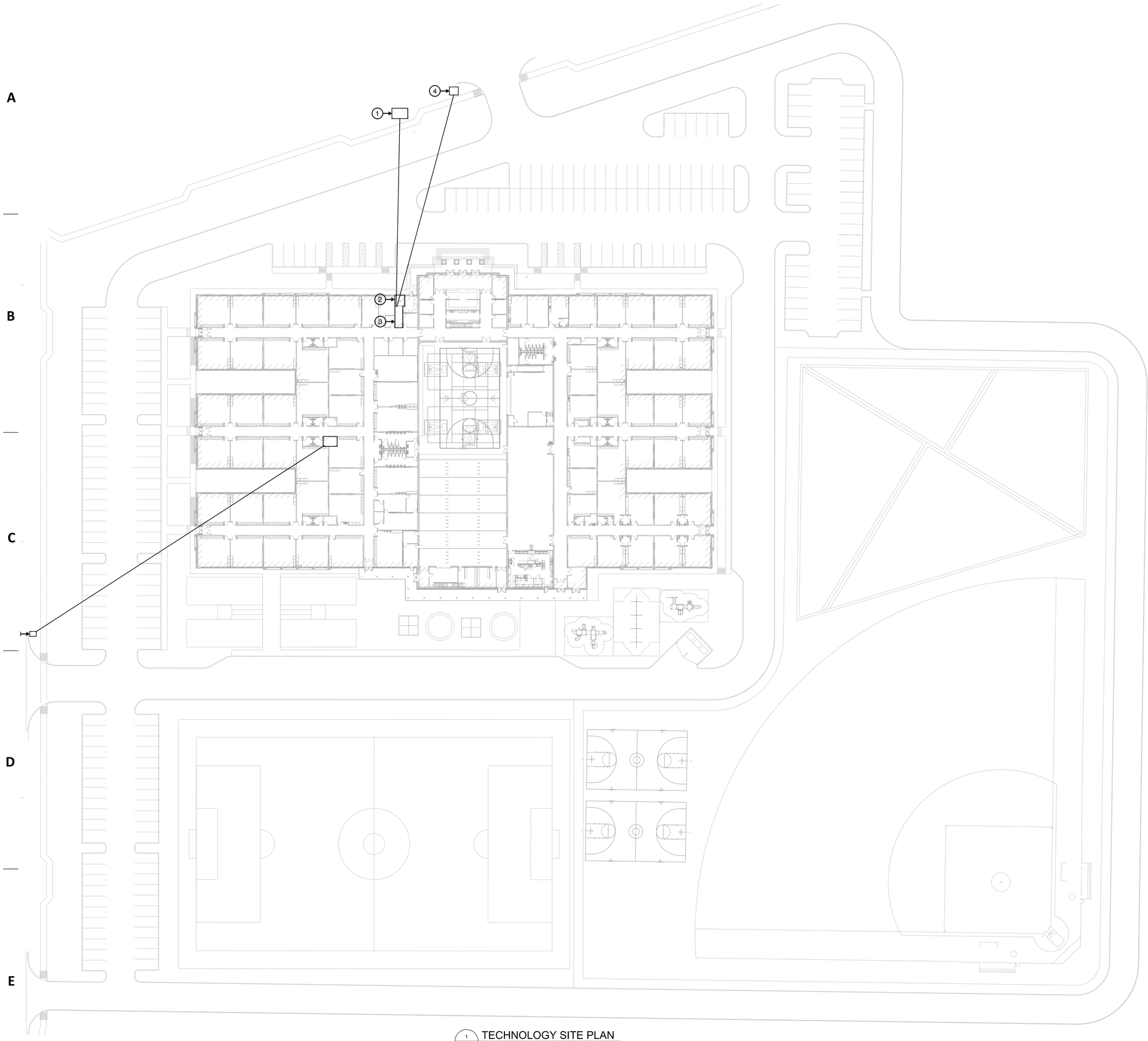
Project: IL TEXAS PEARLAND K-8
SITE TBD, NEW CANEY, TX ZIP TBD

COMBS RFP- 11/11/22

Project No:	21-049
Date:	11/11/22
Checked By:	DG
Drawn By:	JR

Sheet Name:
TECHNOLOGY SYMBOLS & LEGEND

Sheet No:
T0.00



1 T1.01 TECHNOLOGY SITE PLAN
SCALE: 1/32" = 1'-0"

GENERAL NOTES

1. ALL CONDUIT PATHWAYS, ROUGH-INS, CONDUIT SLEEVES, ETC. INDICATED ON THE TECHNOLOGY DRAWINGS ARE TO BE PROVIDED AND INSTALLED BY DIVISION 26.
2. ALL POWER INDICATED ON THE TECHNOLOGY DRAWINGS IS TO BE PROVIDED AND INSTALLED BY DIVISION 26.
3. CONTRACTOR SHALL RESTORE ALL PENETRATIONS PROVIDED THROUGH FIRE RATED WALLS/STRUCTURES FOR TECHNOLOGY CABLING BACK TO THE ORIGINAL RATING.
4. CONTRACTOR SHALL RESTORE ALL PENETRATIONS PROVIDED THROUGH NON-RATED WALLS/STRUCTURES FOR TECHNOLOGY CABLING FOR SOUND TO REDUCE NOISE TRAVELING THROUGH PENETRATIONS.
5. CONTRACTOR SHALL RESTORE ALL PENETRATIONS PROVIDED THROUGH WALLS/STRUCTURES FOR TECHNOLOGY CABLING TO PREVENT WATER INFILTRATION INTO THE SPACE.
6. CONDUITS SHALL MAINTAIN A MINIMUM OF 12-INCHES OF WELL TAMPED EARTH OR 3-INCHES OF CONCRETE SEPARATION BETWEEN ANY FOREIGN CONDUITS AND/OR PIPES THROUGHOUT THE ENTIRE CONDUIT PATHWAY.
7. CONDUIT SEGMENTS SHALL BE NO MORE THAN 600-FEET IN LENGTH WITH NO MORE THAN THE EQUIVALENT OF (2) 90 DEGREE BENDS BETWEEN PULLING POINTS.
8. CONDUITS SHALL MAINTAIN A BEND RADIUS OF 6 TIMES THE DIAMETER OF THE CONDUIT FOR CONDUITS 2-INCHES OR SMALLER AND 10 TIMES THE DIAMETER OF THE CONDUIT FOR CONDUITS GREATER THAN 2-INCHES.
9. CONTRACTOR SHALL PROVIDE DETECTABLE WARNING TAPE 12-INCHES BELOW GRADE ON TOP OF ALL CONDUITS THROUGHOUT THE ENTIRE CONDUIT TRENCH.
10. CONTRACTOR SHALL COORDINATE ALL CONDUIT PATHWAYS WITH THE ARCHITECT AND LANDSCAPE PLAN PRIOR TO BEGINNING ANY TRENCHING.
11. ALL CONDUITS SHALL HAVE A PULL STRING INSTALLED FOR PULLING OF CABLE.
12. ALL SPARE CONDUITS OR CONDUITS FILLED WITH LESS THAN THE MAXIMUM ALLOWED FILL RATIO SHALL HAVE A PULL STRING INSTALLED AND LEFT FOR FUTURE PULLING OF CABLE. CLEARLY LABEL AS "PULL STRING" INDICATING OPPOSITE END LOCATION.

KEYED NOTES

1. SERVICE PROVIDERS ENTRANCE LOCATION. PROVIDE (2) 4" CONDUITS ROUTED TO MDF / SERVER ROOM. (BY DIV. 26)
2. FIRE RISER ROOM LOCATION.
3. MDF / SERVER ROOM LOCATION.
4. (1) 1" CONDUIT TO TECHNOLOGY ROOM FOR MARQUE / MONUMENT.

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Drawn By:	JR

Sheet Name:
TECHNOLOGY SITE PLAN

Sheet No:
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1 T2.01 TECHNOLOGY LEVEL 1 - COMPOSITE FLOOR PLAN

SCALE: 1/16" = 1'-0"

GENERAL NOTES

1. THE TECHNOLOGY REGION / WIRING BOUNDARIES ARE IDENTIFIED ON THE OVERALL SHEETS ONLY AND NOT ON THE ENLARGED SHEETS. CONTRACTOR SHALL REFER TO THE OVERALL SHEETS FOR ALL TECHNOLOGY REGIONS / WIRING BOUNDARIES.
2. ALL CONDUIT PATHWAYS, ROUGH-INS, BACKBOXES, FLOOR BOXES, CONDUIT SLEEVES, ETC. INDICATED ON THE TECHNOLOGY DRAWINGS ARE TO BE PROVIDED AND INSTALLED BY DIVISION 26.
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5. CONTRACTOR SHALL RESTORE ALL PENETRATIONS PROVIDED THROUGH NON-RATED WALLS/STRUCTURES FOR TECHNOLOGY CABLING FOR SOUND TO REDUCE NOISE TRAVELING THROUGH PENETRATIONS.
6. TECHNOLOGY CABLING SHALL BE ROUTED IN SEPARATE PATHWAYS IN J-HOOKS, CONDUITS, CONDUIT SLEEVES, CORES, ETC. THROUGHOUT THE ENTIRE PATHWAY. DIFFERENT MEDIA TYPES (DATA, VIDEO, SECURITY, ETC.) SHALL NOT SHARE THE SAME J-HOOK, CONDUIT, CONDUIT SLEEVE, CORE, ETC.
7. UNLESS NOTED OTHERWISE, ALL CONDUITS FOR TECHNOLOGY DEVICES SHALL ROUTE FROM THE DEVICE LOCATION AND TERMINATE ABOVE AN ACCESSIBLE CEILING (AN OPEN CEILING OR CLOUD TYPE CEILING IS NOT CONSIDERED AN ACCESSIBLE CEILING) IN THE SAME ROOM WHERE THE DEVICE IS LOCATED. IF THE ROOM WHERE THE DEVICE IS LOCATED DOES NOT HAVE AN ACCESSIBLE CEILING, THE CONDUIT SHALL ROUTE TO THE NEAREST ACCESSIBLE CEILING OFF A MAIN CORRIDOR. CONDUIT PATHWAY SHALL TAKE THE SHORTEST ROUTE TO THE APPLICABLE MDF / IDF ROOM TO MINIMIZE THE CABLE LENGTH ENSURING CABLE LENGTH DOES NOT EXCEED 275 FEET.
8. UNLESS NOTED OTHERWISE ALL CONDUITS SHALL BE HOMERUN FROM THE DEVICE LOCATION AND NO DAISY CHAINING OF DEVICES / ROUGH-INS SHALL BE ALLOWED.
9. CONDUIT SEGMENTS SHALL BE NO MORE THAN 100-FEET IN LENGTH WITH NO MORE THAN THE EQUIVALENT OF (2) 90 DEGREE BENDS BETWEEN PULLING POINTS.
10. CONDUITS SHALL MAINTAIN A BEND RADIUS OF 6 TIMES THE DIAMETER OF THE CONDUIT FOR CONDUITS 2-INCHES OR SMALLER AND 10 TIMES THE DIAMETER OF THE CONDUIT FOR CONDUITS GREATER THAN 2-INCHES.
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13. EQUIPMENT NOT RELATED TO THE SUPPORT OF THE TELECOMMUNICATIONS ROOM (E.G., PIPING, DUCTWORK, PNEUMATIC TUBING) SHALL NOT BE INSTALLED IN, PASS THROUGH, OR ENTER THE TELECOMMUNICATIONS ROOM
14. ALL CONDUITS FOR TECHNOLOGY DEVICES SHALL ROUTE FROM THE DEVICE LOCATION AND TERMINATE ABOVE A LAY- IN TYPE CEILING IN THE SAME ROOM WHERE THE DEVICE IS LOCATED. IF THE ROOM WHERE THE DEVICE IS LOCATED DOES NOT HAVE A LAY-IN TYPE CEILING TO PREVENT THE CABLES FROM BEING EXPOSED, THE CONDUIT SHALL ROUTE TO THE NEAREST LAY-IN TYPE CEILING OFF A MAIN CORRIDOR OR THE NEAREST MDF/IDF. THE CONDUIT PATHWAY SHALL TAKE THE SHORTEST ROUTE TO THE MAIN CORRIDOR OR THE NEAREST MDF/IDF TO MINIMIZE THE CABLE LENGTH ENSURING THE CABLE LENGTH DOES NOT EXCEED 275 FEET. CONDUIT, CONNECTIONS, J-BOXES, SUSPENSION, ANCHORAGES, AND OTHER CONDUIT COMPONENTS EXPOSED TO VIEW IN PUBLIC SPACES SHALL BE ROUTED AND INSTALLED CAREFULLY TO MINIMIZE VISUAL IMPACT AND SHALL BE FULLY PAINTED TO MATCH UNLESS NOTED OTHERWISE

KEYED NOTES

1. SECONDARY TEACHER PRESENTATION LOCATION. SINGLE GANG FACEPLATE WITH COMBINED DATA AND AUDIOVISUAL. REFER TO SPECIFICATIONS.
2. INTERACTIVE FLAT PANEL DISPLAY LOCATION. DUAL GANG FACEPLATE WITH COMBINED DATA AND AUDIOVISUAL. REFER TO SPECIFICATIONS. PROVIDE DUAL GANG BACKBOX WITH (2) 1-INCH CONDUITS (BY DIV 26)
3. DATA CABLE WITH 20-FEET OF SLACK NEATLY COILED AND STORED ON J-HOOK ABOVE ACCESSIBLE CEILING FOR OWNER PROVIDED / OWNER INSTALLED CEILING MOUNTED WIRELESS ACCESS POINT.
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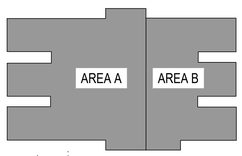
8. CONDUIT PENETRATION LOCATIONS FOR LOW VOLTAGE CABLING ROUTED TO IDF 221.
9. (4) 4-INCH CONDUIT SLEEVES FOR LOW VOLTAGE CABLING.
10. TEACHER'S DESK LOCATION.

KEYPLAN



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COMBS RFP- 11/11/22

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Sheet Name:

TECHNOLOGY LEVEL 1 COMPOSITE FLOOR PLAN

Sheet No:

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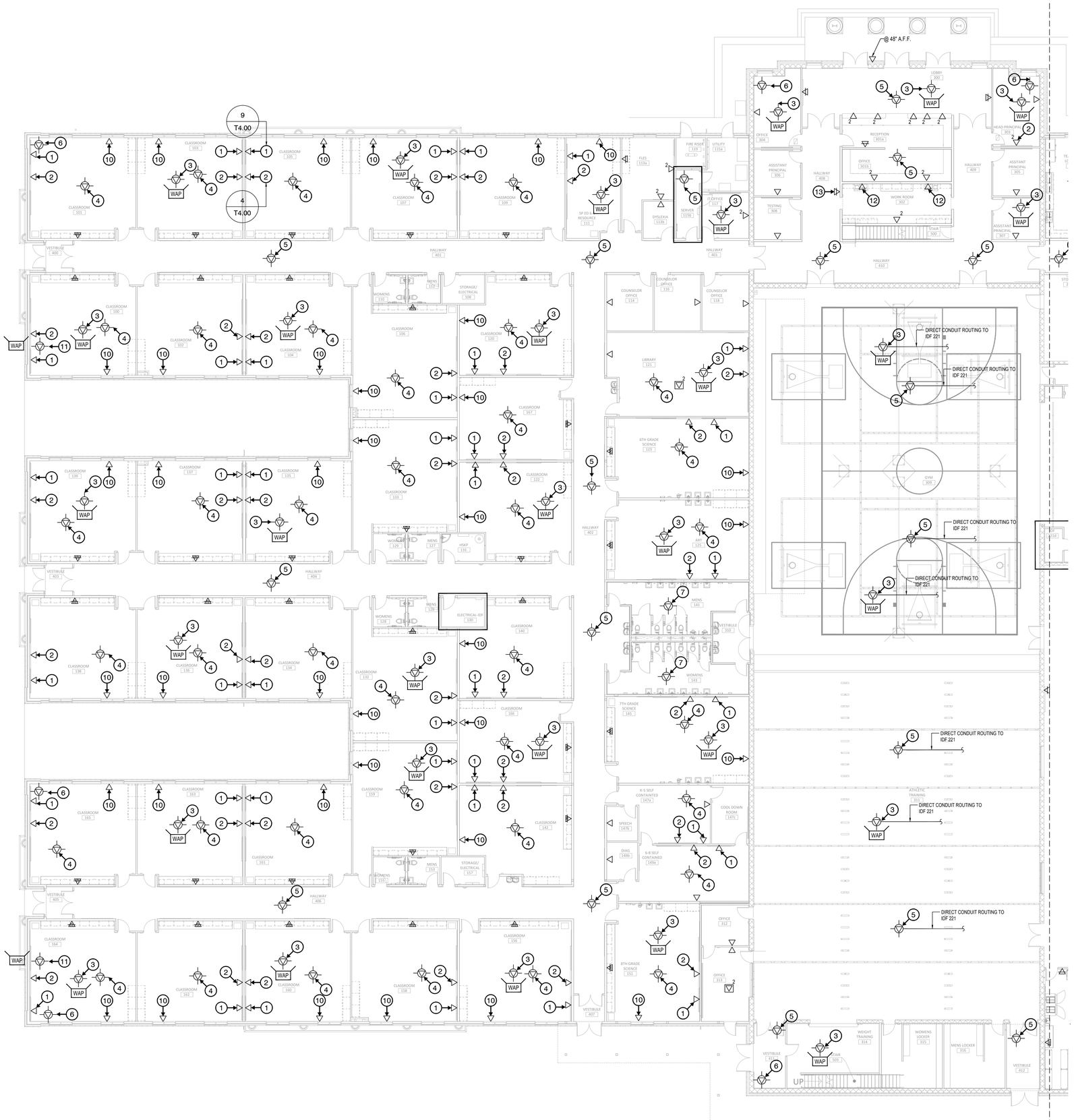

1 T2.11a TECHNOLOGY LEVEL 1 - AREA A FLOOR PLAN

SCALE: 3/32" = 1'-0"

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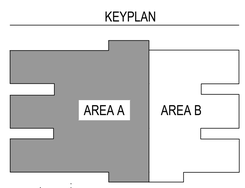
9. (4) 4-INCH CONDUIT SLEEVES FOR LOW VOLTAGE CABLING.
10. TEACHER'S DESK LOCATION.
11. DATA CABLE WITH 20-FEET OF SLACK NEATLY COILED AND STORED ON J-HOOK ABOVE ACCESSIBLE CEILING FOR OWNER PROVIDED / OWNER CONTRACTOR INSTALLED EXTERIOR MOUNTED WIRELESS ACCESS POINT.
12. DATA CABLING FOR COPIER / PRINTER.
13. DATA CABLING FOR TIME CLOCK.

KEYPLAN



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TECHNOLOGY LEVEL 1 AREA A FLOOR PLAN

Sheet No:

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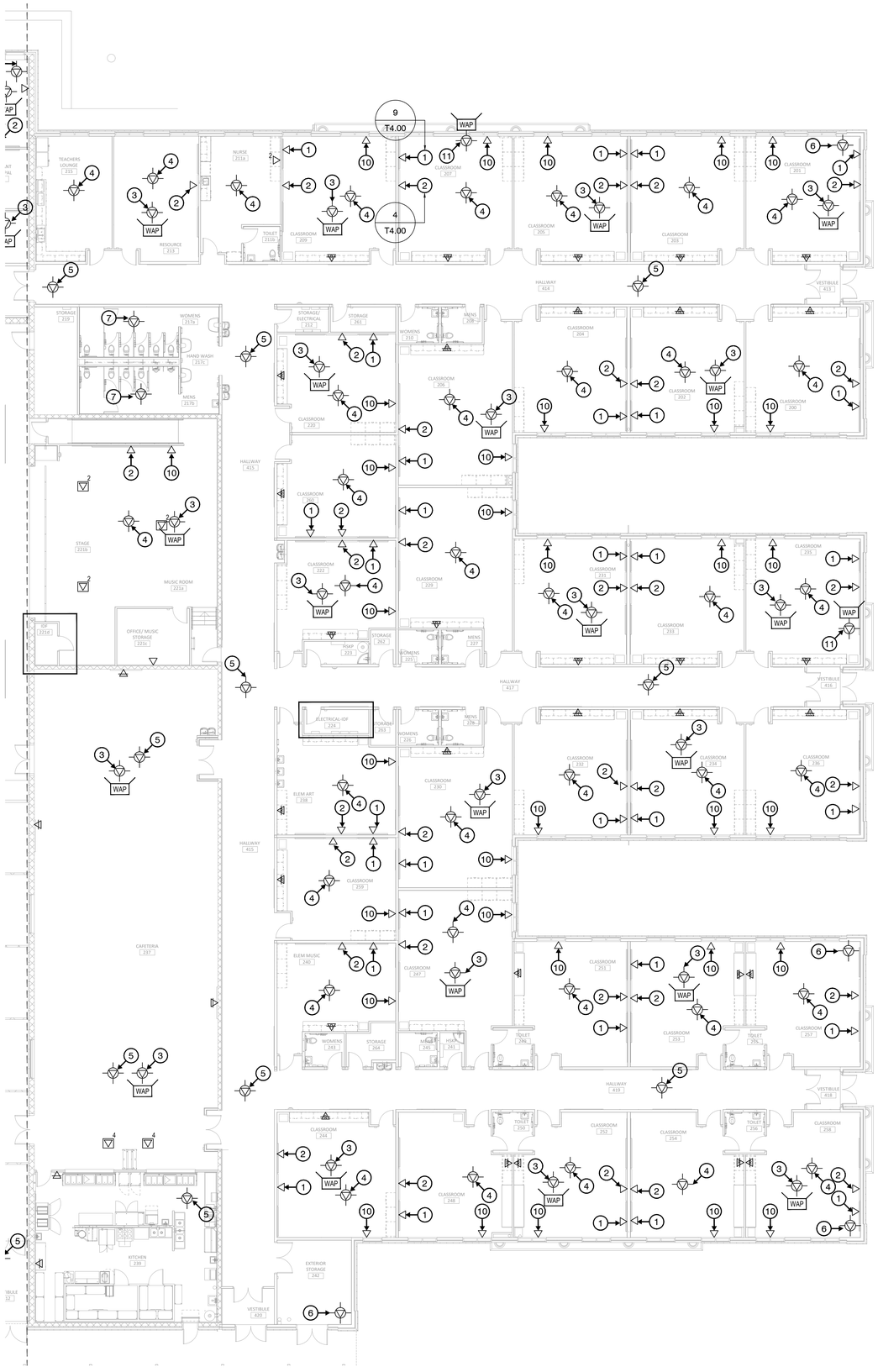
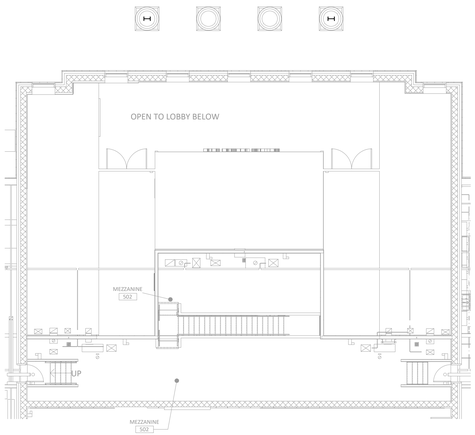


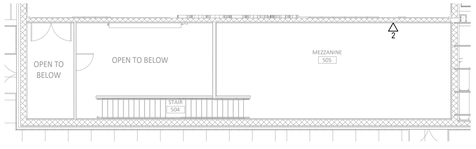
1 T2.11b — TECHNOLOGY LEVEL 1 - AREA B FLOOR PLAN

SCALE: 3/32" = 1'-0"



2 TA2.11b — TECHNOLOGY MEZZANINE 502 FLOOR PLAN

SCALE: 3/32" = 1'-0"



3 TA2.11b — TECHNOLOGY MEZZANINE 504 FLOOR PLAN

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14. ALL CONDUITS FOR TECHNOLOGY DEVICES SHALL ROUTE FROM THE DEVICE LOCATION AND TERMINATE ABOVE A LAY- IN TYPE CEILING IN THE SAME ROOM WHERE THE DEVICE IS LOCATED. IF THE ROOM WHERE THE DEVICE IS LOCATED DOES NOT HAVE A LAY-IN TYPE CEILING TO PREVENT THE CABLES FROM BEING EXPOSED, THE CONDUIT SHALL ROUTE TO THE NEAREST LAY-IN TYPE CEILING OFF A MAIN CORRIDOR OR THE NEAREST MDF/IDF. THE CONDUIT PATHWAY SHALL TAKE THE SHORTEST ROUTE TO THE MAIN CORRIDOR OR THE NEAREST MDF/IDF TO MINIMIZE THE CABLE LENGTH ENSURING THE CABLE LENGTH DOES NOT EXCEED 275 FEET. CONDUIT, CONNECTIONS, J-BOXES, SUSPENSION, ANCHORAGES, AND OTHER CONDUIT COMPONENTS EXPOSED TO VIEW IN PUBLIC SPACES SHALL BE ROUTED AND INSTALLED CAREFULLY TO MINIMIZE VISUAL IMPACT AND SHALL BE FULLY PAINTED TO MATCH UNLESS NOTED OTHERWISE

KEYED NOTES

1. SECONDARY TEACHER PRESENTATION LOCATION. SINGLE GANG FACEPLATE WITH COMBINED DATA AND AUDIOVISUAL. REFER TO SPECIFICATIONS.
2. INTERACTIVE FLAT PANEL DISPLAY LOCATION. DUAL GANG FACEPLATE WITH COMBINED DATA AND AUDIOVISUAL. REFER TO SPECIFICATIONS. PROVIDE DUAL GANG BACKBOX WITH (2) 1-INCH CONDUITS (BY DIV 26)
3. DATA CABLE WITH 20-FEET OF SLACK NEATLY COILED AND STORED ON J-HOOK ABOVE ACCESSIBLE CEILING FOR OWNER PROVIDED / OWNER INSTALLED CEILING MOUNTED WIRELESS ACCESS POINT.
4. DATA CABLE WITH 20-FEET OF SLACK NEATLY COILED AND STORED ON J-HOOK ABOVE ACCESSIBLE CEILING FOR CEILING MOUNTED SPEAKER. PROVIDE LINE-ITEM PRICING FOR ALTERNATE 1, INCLUDING CABLING, INSTALL, PATCH PANELS, AND PATCH CORDS.
5. DATA CABLE WITH 20-FEET OF SLACK NEATLY COILED AND STORED ON J-HOOK ABOVE ACCESSIBLE CEILING FOR CEILING MOUNTED VIDEO SURVEILLANCE CAMERA. REFER TO SECURITY DRAWINGS FOR EXACT LOCATION AND CONDUIT ROUGH-IN REQUIREMENTS.
6. DATA CABLE WITH 20-FEET OF SLACK NEATLY COILED AND STORED ON J-HOOK ABOVE ACCESSIBLE CEILING FOR EXTERIOR WALL MOUNTED VIDEO SURVEILLANCE CAMERA. REFER TO SECURITY DRAWINGS FOR EXACT LOCATION AND CONDUIT ROUGH-IN REQUIREMENTS.
7. DATA CABLE WITH 20-FEET OF SLACK NEATLY COILED AND STORED ON J-HOOK ABOVE ACCESSIBLE CEILING FOR CEILING MOUNTED VAPE SENSOR.
8. CONDUIT PENETRATION LOCATIONS FOR LOW VOLTAGE CABLING ROUTED TO IDF 221.
9. (4) 4-INCH CONDUIT SLEEVES FOR LOW VOLTAGE CABLING.
10. TEACHER'S DESK LOCATION.
11. DATA CABLE WITH 20-FEET OF SLACK NEATLY COILED AND STORED ON J-HOOK ABOVE ACCESSIBLE CEILING FOR OWNER PROVIDED / OWNER CONTRACTOR INSTALLED EXTERIOR MOUNTED WIRELESS ACCESS POINT.
12. DATA CABLING FOR COPIER / PRINTER.
13. DATA CABLING FOR TIME CLOCK.

KEYPLAN

PIVOT NORTH architecture
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STAMP :

Project:
IL TEXAS PEARLAND K-8
SITE TBD, NEW CANEY, TX ZIP TBD

COMBS RFP- 11/11/22

Project No:	21-049
Date:	11/11/22
Checked By:	DG
Drawn By:	JR

Sheet Name:

SECURITY LEVEL 1
AREA B FLOOR PLAN

Sheet No:

T2.11b

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A

B

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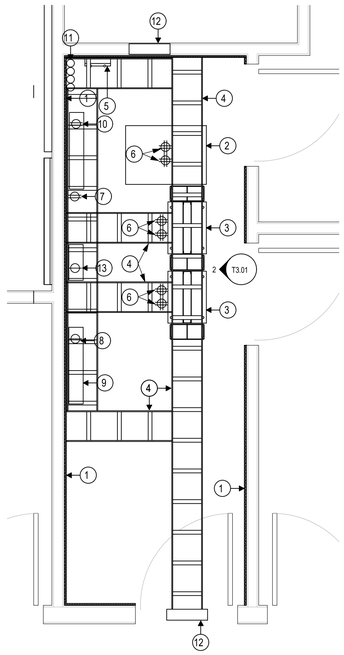
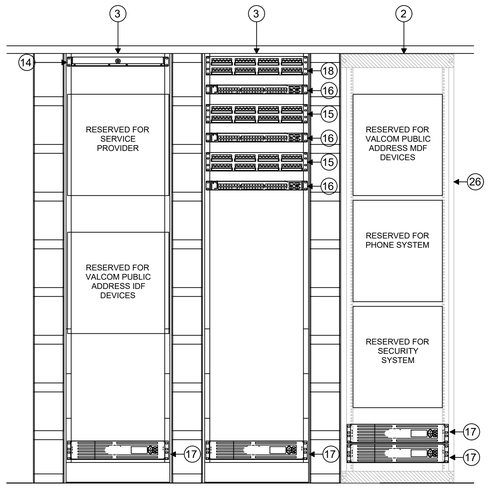
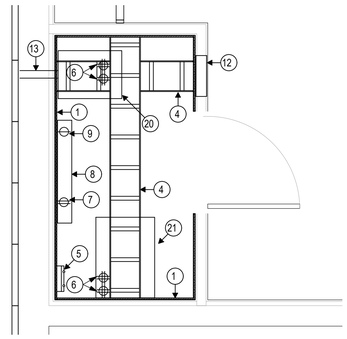
E



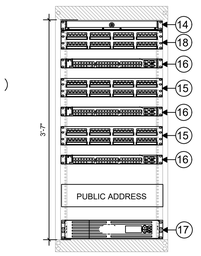
1 T3.00 SERVER ROOM 115B
1/2" = 1'-0"



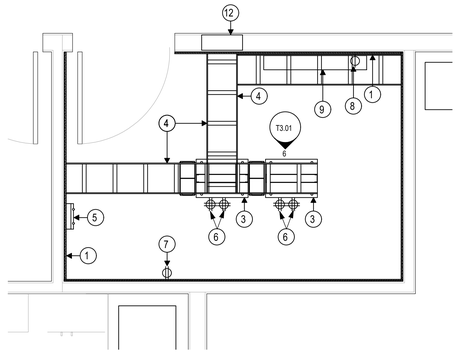
2 T3.00 SERVER ROOM 115B ELEVATION RACK
1" = 1'-0"



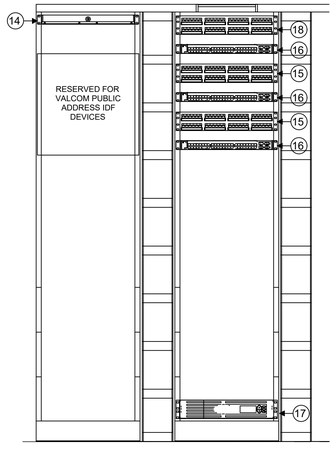
3 T3.00 IDF ROOM 221D
1/2" = 1'-0"



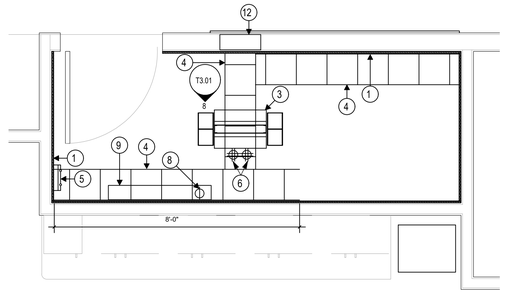
4 T3.00 IDF ROOM 221D CABINET ELEVATION
1" = 1'-0"



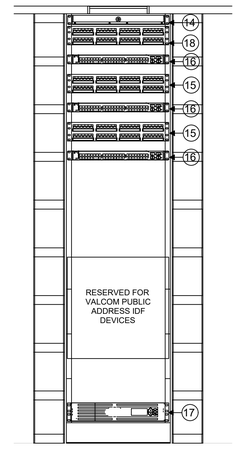
5 T3.00 ELECTRICAL-IDF ROOM 130
1/2" = 1'-0"



6 T3.00 ELECTRICAL-IDF ROOM 130 RACK ELEVATION
1" = 1'-0"



7 T3.00 ELECTRICAL-IDF ROOM 224
1/2" = 1'-0"



8 T3.00 ELECTRICAL-IDF ROOM 224 RACK ELEVATION
1" = 1'-0"

GENERAL NOTES - ENLARGED PLANS AND ELEVATIONS

1. IN THE EVENT THE CONTRACTOR PROVIDES AND INSTALLS 2-POST EQUIPMENT RACKS IN THE MDF/IDF ROOMS, THE DIVISION 27 CONTRACTOR SHALL COORDINATE WITH THE OWNER TO DETERMINE IF THE OWNER NEEDS ADDITIONAL EQUIPMENT RACK SUPPORT SUCH AS RAILS OR DEEP SHELVING TO SUPPORT FUTURE OWNER PROVIDED/OWNER INSTALLED UPS SYSTEM EQUIPMENT.
2. CONTRACTOR SHALL CONFIRM PATCH PANEL COUNTS WITH CABLE QUANTITIES PRIOR TO BIDDING.

KEYED NOTES (GENERAL):

1. 4-FEET X 8-FEET X ¾-INCH A-B GRADE, VOID FREE, FIRE RATED PLYWOOD INSTALLED VERTICALLY STARTING AT 24-INCHES ABOVE FINISHED FLOOR ON ALL PERIMETER WALLS. PAINT WITH (2) COATS OF FIRE-RETARDANT PAINT. (BY DIV. 27)
2. 4-POST NETWORK RACK WITH VERTICAL WIRE MANAGERS. (BY DIV. 27) (VERTICAL PDU BY GXA / C2M)
3. 2-POST NETWORK RACK WITH VERTICAL WIRE MANAGERS. (BY DIV. 27) (VERTICAL PDU BY GXA / C2M)
4. 12-INCH LADDER RACK MOUNTED AT 87-INCHES ABOVE FINISHED FLOOR. (BY DIV. 27)
5. GROUND BUS BAR MOUNTED AT 84-INCHES ABOVE FINISHED FLOOR. (BY DIV. 27)
6. DEDICATED 20 AMP CIRCUIT WITH QUAD 5-20R RECEPTACLE MOUNTED TO LADDER RACK AT REAR SIDE OF EQUIPMENT RACKS. (REFERENCE ONLY, BY DIV. 26)
7. 20 AMP CIRCUIT WITH DUPLEX NEMA 5-20R RECEPTACLE MOUNTED TO THE FINISHED WALL SURFACE AT 18-INCHES ABOVE FINISHED FLOOR. (REFERENCE ONLY, BY DIV.26)
8. DEDICATED 20 AMP CIRCUIT HARDWIRED TO ACCESS CONTROL SECURITY PANEL. (REFERENCE ONLY, BY DIV. 26)
9. RESERVED FOR ACCESS CONTROL SYSTEM. (BY DIV. 28) DATA CONTRACTOR TO PROVIDE (2) PATCH CABLES TO NETWORK SWITCH.
10. RESERVED FOR SERVICE PROVIDER TERMINATION. (BY DIV. 27) 20 AMP CIRCUIT WITH DUPLEX NEMA 5-20R RECEPTACLE. PROVIDE (6) PATCH CABLES TO NETWORK SWITCH.
11. ENTRANCE FACILITIES CONDUIT STUB-UPS IN MDF / SERVER ROOM. ROUTE CABLING VIA EZ-PATH TO MDF LADDER RACK.
12. 4-CHANNEL EZ-PATH FIRE RATED CABLING PATHWAY.
13. DEDICATED 20 AMP CIRCUIT HARDWIRED TO SECURITY INTRUSION PANEL. (REFERENCE ONLY, BY DIV. 26)
14. 1 RU RACK MOUNTED FIBER OPTIC ENCLOSURE (BY DIV 27). PROVIDE AND INSTALL 12 STRAND OM4 WITH LC CONNECTORS FROM MDF TO EACH IDF.
15. 48 PORT CAT 6 PATCH PANEL NETWORK CABLING (BY DIV 27). PROVIDE PATCH PANEL AS REQUIRED PLUS 20% GROWTH.
16. 48 PORT SWITCH (PROVIDED AND INSTALLED BY GXA / C2M)
17. RACK MOUNT UPS. (PROVIDED AND INSTALLED BY GXA / C2M)
18. 48 PORT CAT 6A PATCH PANEL FOR WIRELESS ACCESS POINTS.
19. CONDUIT STUB-UP FOR MARQUE SIGN / MONUMENT.
20. WALL MOUNTED RACK FOR IDF BACKBONE AND HORIZONTAL CABLING.
21. AV CABINET FOR GYM AND STAGE AV EQUIPMENT.

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COMBS RFP- 11/11/22

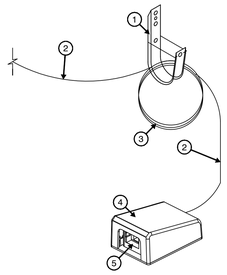
Project No:	21-049
Date:	11/11/22
Checked By:	DG
Drawn By:	JR

Sheet Name:

TECHNOLOGY ENLARGED PLANS & ELEVATIONS

Sheet No:

T3.00

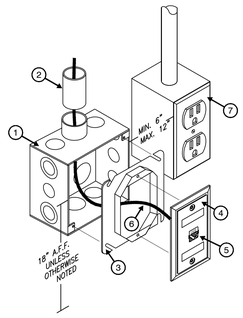


KEYED NOTES:

1. J-HOOK WITH RETAINER CLIP ABOVE ACCESSIBLE CEILING (BY DIV 27).
2. DATA CABLE ABOVE ACCESSIBLE CEILING (BY DIV 27).
3. 20 FOOT SERVICE LOOP ABOVE ACCESSIBLE CEILING NEATLY COILED AND SECURED TO J-HOOK (BY DIV 27).
4. SURFACE MOUNT BOX ABOVE ACCESSIBLE CEILING SECURED TO BUILDING STRUCTURE (BY DIV 27).
5. DATA INSERT (BY DIV 27).

1 / T4.00 TYPICAL ABOVE CEILING SINGLE DATA OUTLET

SCALE: N.T.S.

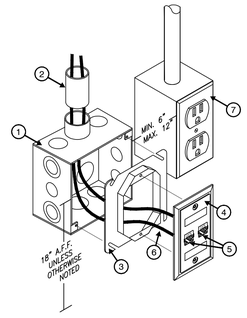


KEYED NOTES:

1. 4 11/16-INCH x 4 11/16-INCH x 2 1/8-INCH RECESSED DOUBLE GANG BOX (BY DIV 26).
2. 1-INCH EMT CONDUIT FROM DOUBLE GANG BOX WITH 200 LBS PULL STRING AND NYLON BUSHING STUBBED OUT ABOVE ACCESSIBLE CEILING IN THE SAME ROOM WHERE THE DEVICE IS LOCATED. IF THE ROOM WHERE THE DEVICE IS LOCATED DOES NOT HAVE AN ACCESSIBLE CEILING, THE CONDUIT SHALL ROUTE TO THE NEAREST ACCESSIBLE CEILING OFF OF A MAIN CORRIDOR. CONDUIT PATHWAY SHALL TAKE THE SHORTEST ROUTE TO THE APPLICABLE MDF/IDF ROOM TO MINIMIZE THE CABLE LENGTH (BY DIV 26).
3. SINGLE GANG REDUCER RING (BY DIV 26).
4. SINGLE GANG WALL PLATE WITH DESIGNATION IN WINDOW (BY DIV 27).
5. DATA INSERT (BY DIV 27).
6. CABLE AS SPECIFIED (BY DIV 27).
7. ELECTRICAL RECEPTACLE, GANG BOX AND CONDUIT SHOWN FOR REFERENCE ONLY (REFER TO DIV 26).

2 / T4.00 TYPICAL SINGLE DATA OUTLET CONFIGURATION

SCALE: N.T.S.

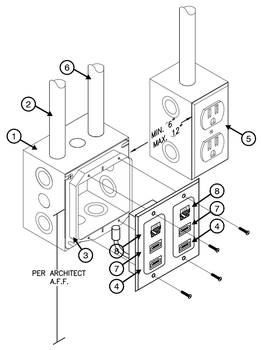


KEYED NOTES:

1. 4 11/16-INCH x 4 11/16-INCH x 2 1/8-INCH RECESSED DOUBLE GANG BOX (BY DIV 26).
2. 1-INCH EMT CONDUIT FROM DOUBLE GANG BOX WITH 200 LBS PULL STRING AND NYLON BUSHING STUBBED OUT ABOVE ACCESSIBLE CEILING IN THE SAME ROOM WHERE THE DEVICE IS LOCATED. IF THE ROOM WHERE THE DEVICE IS LOCATED DOES NOT HAVE AN ACCESSIBLE CEILING, THE CONDUIT SHALL ROUTE TO THE NEAREST ACCESSIBLE CEILING OFF OF A MAIN CORRIDOR. CONDUIT PATHWAY SHALL TAKE THE SHORTEST ROUTE TO THE APPLICABLE MDF/IDF ROOM TO MINIMIZE THE CABLE LENGTH (BY DIV 26).
3. SINGLE GANG REDUCER RING (BY DIV 26).
4. SINGLE GANG WALL PLATE WITH DESIGNATION IN WINDOW (BY DIV 27).
5. DATA INSERT (BY DIV 27).
6. CABLE AS SPECIFIED (BY DIV 27).
7. ELECTRICAL RECEPTACLE, GANG BOX AND CONDUIT SHOWN FOR REFERENCE ONLY (REFER TO DIV 26).

3 / T4.00 TYPICAL DUAL DATA OUTLET CONFIGURATION

SCALE: N.T.S.

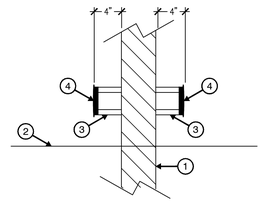


KEYED NOTES:

1. 4-11/16" X 4-11/16" X 2-1/8" RECESSED DOUBLE GANG BOX (BY DIV 26).
2. 1-INCH EMT CONDUIT FROM BACK BOX WITH 200 LBS PULL STRING AND NYLON BUSHING STUBBED OUT ABOVE ACCESSIBLE CEILING IN THE SAME ROOM WHERE THE DEVICE IS LOCATED (BY DIV 26).
3. DOUBLE-GANG PLASTER RING - DEVICE OPENING MUST HAVE RIGHT-ANGLE CORNERS TO AVOID PHYSICAL CONFLICTS WITH A/V DEVICE(S) (BY DIV 26).
4. AUDIO VISUAL INPUTS - HDMI INPUT PLATE - MANUFACTURER/MODEL NUMBER AS SPECIFIED.
5. ELECTRICAL RECEPTACLE, GANG BOX AND CONDUIT SHOWN FOR REFERENCE ONLY (REFER TO DIV 26).
6. 1-INCH EMT CONDUIT FROM BACK BOX WITH 200LBS PULL STRING AND NYLON BUSHING STUBBED OUT ABOVE ACCESSIBLE CEILING IN THE SAME ROOM WHERE THE DEVICE IS LOCATED. (BY DIV 26)
7. AUDIOVISUAL INPUT- USB INPUT JACK.
8. DATA JACK PROVIDED AND INSTALLED BY DATA CONTRACTOR.

4 / T4.00 TYPICAL CLASSROOM INTERACTIVE FLAT PANEL DISPLAY DETAIL

SCALE: N.T.S.

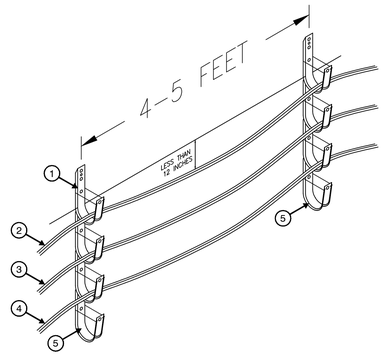


KEYED NOTES:

1. SCHEDULED WALL.
2. SCHEDULED CEILING.
3. CONDUIT SLEEVE (BY DIV 26).
4. NYLON BUSHING (BY DIV 26).

5 / T4.00 TYPICAL CONDUIT SLEEVE GOING THROUGH WALL

SCALE: N.T.S.



KEYED NOTES:

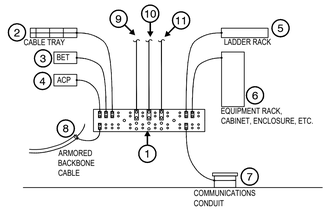
1. J-HOOK WITH RETAINER CLIP ABOVE ACCESSIBLE CEILING (BY DIV 27).
2. DATA CABLE ABOVE ACCESSIBLE CEILING (BY DIV 27).
3. A/V CABLE ABOVE ACCESSIBLE CEILING (BY DIV 27).
4. SECURITY CABLE ABOVE ACCESSIBLE CEILING (BY DIV 28).
5. SPARE J-HOOK (BY DIV 27).

6 / T4.00 TYPICAL J-HOOK CABLE PATHWAY

SCALE: N.T.S.

GENERAL NOTES:

1. MAKE ALL BONDING CONNECTIONS WITH TWO-HOLE COMPRESSION LUGS.
2. SIZE ALL BONDING CONDUCTORS PER TELECOM BONDING CONDUCTOR SIZING TABLE.
3. THIS IS A TYPICAL DETAIL, NOT ALL EQUIPMENT REQUIRING BONDING MAY BE PRESENT IN EACH TELECOM ROOM.

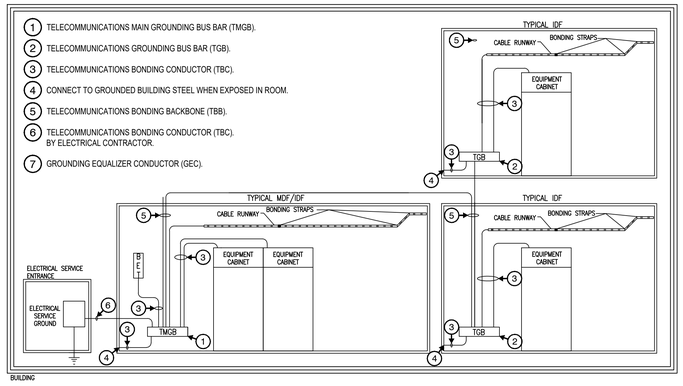


KEYED NOTES:

1. TELECOMMUNICATIONS GROUNDING BUSBAR WITH BICSI STYLE HOLE PATTERN, SIZED PER [DRAWINGS/SPECIFICATIONS] (BY DIV 27).
2. BOND TO CABLE TRAY IN CORRIDOR. (BY DIV 26)
3. BOND TO BUILDING ENTRANCE TERMINALS AND PROTECTORS. (BY DIV 27)
4. BOND TO ACCESS CONTROL PANELS AND OTHER SECURITY ENCLOSURES. (BY DIV 28)
5. BOND TO OVERHEAD LADDER RACK; ENSURE ALL LADDER RACK SECTIONS ARE BONDED TOGETHER. (BY DIV 27)
6. BOND TO EACH EQUIPMENT RACK, CABINET, ENCLOSURE, ETC. (BY DIV 27)
7. BOND TO EACH CONTINUOUS COMMUNICATIONS CONDUIT THAT ENTERS THE TELECOM ROOM. (SLEEVES DO NOT NEED TO BE BONDED). (BY DIV 26)
8. BOND TO EACH ARMORED BACKBONE CABLE THAT TERMINATES IN THE TELECOM ROOM. (BY DIV 27)
9. FOR TELECOMMUNICATIONS MAIN GROUNDING BUSBAR, PROVIDE BONDING CONDUCTOR FOR TELECOMMUNICATIONS TO MAIN ELECTRICAL GROUND. (BY DIV 26)
10. FOR TELECOMMUNICATIONS GROUNDING BUSBARS ONLY: BONDING CONDUCTOR TO [BUILDING STEEL] [TELECOMMUNICATIONS BONDING BACKBONE] [GROUND BUS OF ELECTRICAL PANEL SERVING TELECOM ROOM POWER]. (BY DIV 26)
11. [FOR TELECOMMUNICATIONS MAIN GROUNDING BUSBAR, PROVIDE TELECOMMUNICATIONS BONDING BACKBONE PER TYPICAL GROUNDING DIAGRAM.] (BY DIV 26)

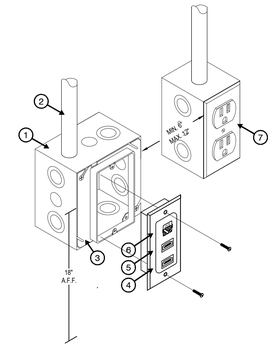
7 / T4.00 TELECOMMUNICATIONS BONDING BUSBAR DETAIL

SCALE: N.T.S.



8 / T4.00 TYPICAL GROUNDING DIAGRAM

SCALE: N.T.S.



KEYED NOTES:

1. 4-11/16" X 4-11/16" X 2-1/8" RECESSED DOUBLE GANG BOX (BY DIV 26).
2. 1.5-INCH EMT CONDUIT FROM BACK BOX WITH 200 LBS PULL STRING AND NYLON BUSHING STUBBED OUT ABOVE ACCESSIBLE CEILING IN THE SAME ROOM WHERE THE DEVICE IS LOCATED (BY DIV 26).
3. SINGLE-GANG PLASTER RING - DEVICE OPENING MUST HAVE RIGHT-ANGLE CORNERS TO AVOID PHYSICAL CONFLICTS WITH DEVICE(S) (BY DIV 26).
4. HDMI INPUT.
5. USB INPUT.
6. DATA JACK, PROVIDED AND INSTALLED BY DATA CONTRACTOR.
7. ELECTRICAL RECEPTACLE GANG BOX AND CONDUIT SHOWN FOR REFERENCE ONLY (REFER TO DIV 26).

9 / T4.00 TYPICAL TEACHER SECONDARY PRESENTATION LOCATION (DATA, HDMI, AND USB) DETAIL

SCALE: N.T.S.

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Project: IL TEXAS PEARLAND K-8
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COMBS RFP- 11/11/22

Project No:	21-049
Date:	11/11/22
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Drawn By:	JR

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TECHNOLOGY TYPICAL DETAILS

Sheet No:

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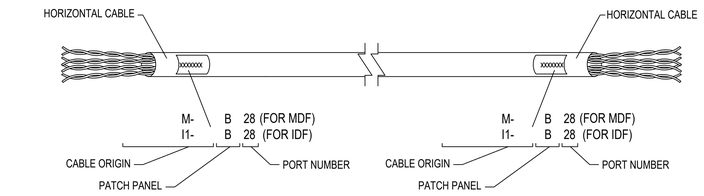
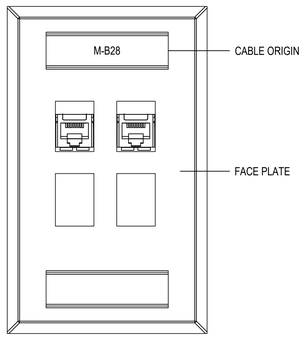
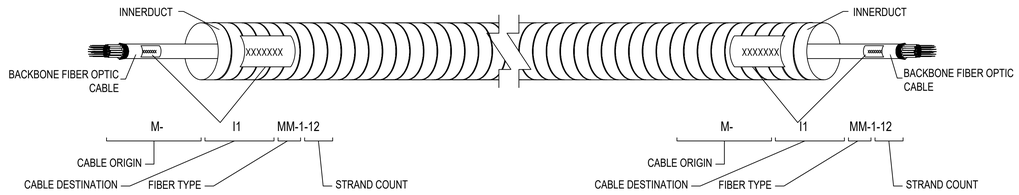
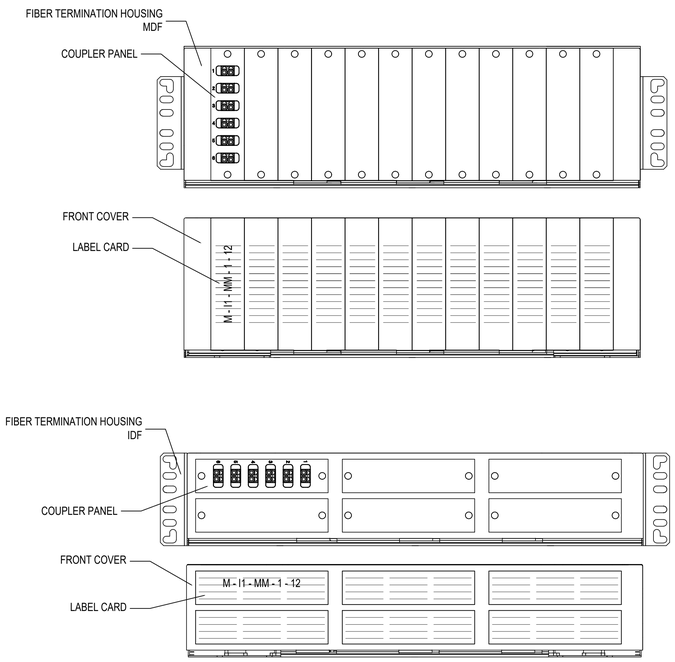




1 T5.00 TYPICAL HORIZONTAL DATA CABLE LABELING SCHEME

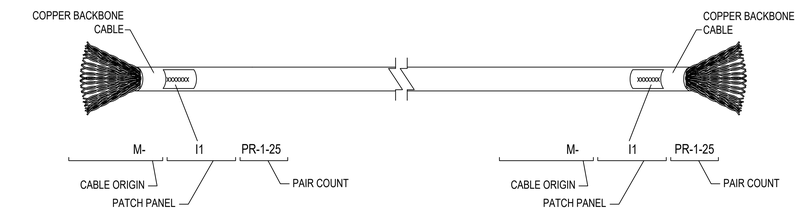
SCALE: N.T.S.





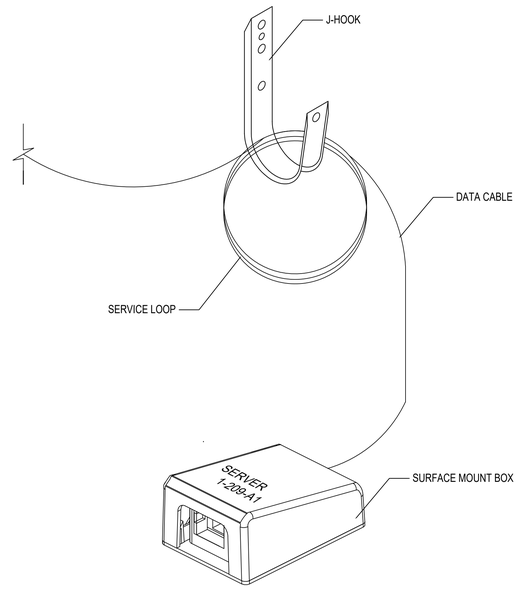
2 T5.00 TYPICAL FIBER BACKBONE LABELING SCHEME

SCALE: N.T.S.



3 T5.00 TYPICAL COPPER BACKBONE LABELING SCHEME

SCALE: N.T.S.



4 T5.00 ABOVE ACCESSIBLE CEILING LABELING SCHEME

SCALE: N.T.S.

PIVOT NORTH architecture

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BOISE, ID 83702
www.pivotnorthdesign.com

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Bicsi
Brian K Combs
BICSI ID # 118077
Expires on 12-31-24
11/11/22
RCDD

Project: IL TEXAS PEARLAND K-8
SITE TBD, NEW CANEY, TX ZIP TBD

COMBS RFP- 11/11/22

Project No:	21-049
Date:	11/11/22
Checked By:	DG
Drawn By:	JR

Sheet Name:

TECHNOLOGY LABELING SCHEME

Sheet No:

T5.00

6/9/2022 1:38:45 PM

AUDIOVISUAL SYMBOLS & LEGEND

AUDIOVISUAL SYMBOLS

AT#	CEILING-MOUNTED ANTENNA, # = TYPE AS SPECIFIED.
AT#	WALL-MOUNTED ANTENNA, # = TYPE AS SPECIFIED.
AV#	CEILING-MOUNTED AUDIOVISUAL DEVICE, # = TYPE AS SPECIFIED.
AV#	WALL-MOUNTED AUDIOVISUAL DEVICE, # = TYPE AS SPECIFIED.
C	CEILING-MOUNTED CLOCK.
C	WALL-MOUNTED CLOCK.
C D	DOUBLE-SIDED WALL-MOUNTED CLOCK.
CAM	CEILING-MOUNTED A/V CAMERA.
CAM	WALL-MOUNTED A/V CAMERA.
CB	WALL-MOUNTED CALL BUTTON.
CE	CEILING MOUNTED EQUIPMENT ENCLOSURE.
CP#	WALL-MOUNTED CONTROL PANEL, # = TYPE AS SPECIFIED.
EQ#	EQUIPMENT RACK, # = TYPE AS SPECIFIED.
FB#	FLOOR BOX, # = TYPE AS SPECIFIED.
IR	CEILING-MOUNTED INFRARED DEVICE.
IR	WALL-MOUNTED INFRARED DEVICE.
L	LECTERN.
MC#	CEILING-MOUNTED MICROPHONE, # = TYPE AS SPECIFIED.
MC#	WALL-MOUNTED MICROPHONE, # = TYPE AS SPECIFIED.
MM#	WALL-MOUNTED MULTIMEDIA PLATE, # = TYPE AS SPECIFIED.
MM#	CEILING-MOUNTED MULTIMEDIA PLATE, # = TYPE AS SPECIFIED.
OS	CEILING-MOUNTED OCCUPANCY SENSOR.
OS	WALL-MOUNTED OCCUPANCY SENSOR.
PS	CEILING-MOUNTED PARTITION SENSOR.
P#	PROJECTOR, # = TYPE AS SPECIFIED.
R/R	WALL-MOUNTED ROUGH-IN LOCATION FOR FUTURE USE.
S#	CEILING-MOUNTED SPEAKER, # = TYPE AS SPECIFIED.
S#	WALL-MOUNTED SPEAKER, # = TYPE AS SPECIFIED.
VC	WALL-MOUNTED VOLUME CONTROL.
WB#	WALL BOX, # = TYPE AS SPECIFIED.
WE	WALL-MOUNTED EQUIPMENT ENCLOSURE.
FPD#	FLAT PANEL DISPAY, # = TYPE AS SPECIFIED.
IFP#	INTERACTIVE FLAT PANEL, # = TYPE AS SPECIFIED.
SCR#	PROJECTION SCREEN, # = TYPE AS SPECIFIED.

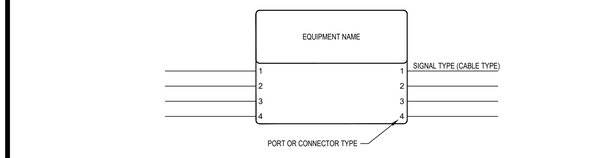
VIDEO BROADBAND SYMBOLS

	VIDEO OUTLET, CABLE TYPE AND TERMINATION AS SPECIFIED.
	VIDEO OUTLET, CABLE TYPE AND TERMINATION AS SPECIFIED, FLUSH FLOOR MOUNTED.
	VIDEO BROADCAST OUTLET, CABLE TYPE AND TERMINATION AS SPECIFIED.
	VIDEO SYSTEM HEADEND, EQUIPMENT AS SPECIFIED.
	AMPLIFIER AS SPECIFIED.
DC-8	DIRECTIONAL COUPLER, dB LOSS LEVEL AS INDICATED.
	2-WAY VIDEO SPLITTER.
	3-WAY VIDEO SPLITTER BALANCED.
	3-WAY VIDEO SPLITTER UNBALANCED WITH HI-LEG INDICATED.
#	2-PORT VIDEO TAP, # = dB LOSS LEVEL AS INDICATED.
#	4-PORT VIDEO TAP, # = dB LOSS LEVEL AS INDICATED.
#	8-PORT VIDEO TAP, # = dB LOSS LEVEL AS INDICATED.
	VIDEO CABLE TERMINATION.
	.500 COAXIAL CABLE AS SPECIFIED.
COAX	COAXIAL BACKBONE.
	RG6 COAXIAL CABLE AS SPECIFIED.

GENERAL SYMBOLS

# SHEET DRAWING TITLE SCALE: SCALE	DRAWING TITLE CALLOUT, # = DETAIL NUMBER.
# SHEET	DETAIL CALLOUT, # = DETAIL NUMBER.
# SHEET	SECTION CALLOUT, # = DETAIL NUMBER.
SHEET #	ELEVATION CALLOUT, # = DETAIL NUMBER.
#	KEYED NOTE, # = KEYED NOTE NUMBER.
#	REVISION TRIANGLE, # = REVISION NUMBER (PER SHEET).
TR (IDF XXX)	INDICATES TELECOMMUNICATIONS REGION

AUDIOVISUAL FLOW DIAGRAM SYMBOLS



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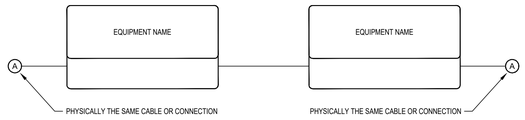

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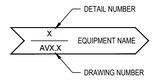

FEATHER

DATA DROP

ABBREVIATIONS

A.F.F.	ABOVE FINISHED FLOOR
A.F.G.	ABOVE FINISHED GRADE
AER	AERIAL
CATV	COMMUNITY ANTENNA TELEVISION
CCTV	CLOSED CIRCUIT TELEVISION
CLT	CLOSET
CO	CENTRAL OFFICE
DEMARC	DEMARCATION POINT
DPDT	DOUBLE PULL DOUBLE THROW
EMT	ELECTRIC METALLIC TUBE
F.O.C.	FIBER OPTIC CABLE
GIP	GALVANIZED IRON PIPE
HE	PA/INTERCOM HEAD-END
IMC	INTERMEDIATE METAL CONDUIT
ISP	INSIDE CABLE PLANT
IDF	INTERMEDIATE DISTRIBUTION FRAME
MDF	MAIN DISTRIBUTION FRAME
MH	MANHOLE
MM	MULTIMODE
OSP	OUTSIDE CABLE PLANT
PB	PULLBOX
PR	PAIR
PBX	PRIVATE BRANCH EXCHANGE
PVC	POLYVINYL CHLORIDE
SM	SINGLE MODE
SP	SERVICE PROVIDER
STP	SHIELDED TWISTED PAIR
TB	TERMINAL BLOCK
UON	UNLESS OTHERWISE NOTED
UTP	UNSHIELDED TWISTED PAIR

NOTES

1. CONTRACTOR SHALL REVIEW DRAWINGS AND SPECIFICATIONS THAT MAKE UP THE CONTRACT DOCUMENTS AND COMPLETE ALL WORK INCLUDED THEREIN.
2. SCALE OF AUDIOVISUAL DRAWINGS IS PROVIDED FOR REFERENCE ONLY. CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER CABLE LENGTHS, SIZE OF PATHWAYS, DIMENSIONS, ETC.
3. AUDIOVISUAL DRAWINGS SHALL BE USED TO COMPLEMENT THE WRITTEN SPECIFICATIONS.
4. ANY DISCREPANCY OR CONFLICT WITHIN OR BETWEEN THE DRAWINGS AND SPECIFICATIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT/DESIGN CONSULTANT. DISCREPANCIES OR CONFLICTS NOT BROUGHT TO THE ATTENTION OF THE ARCHITECT/DESIGN CONSULTANT AND SUBSEQUENTLY CLARIFIED DURING THE BIDDING OF THE PROJECT WILL BE DEEMED TO HAVE BEEN BID OR PROPOSED IN THE MORE COSTLY OR DIFFICULT MANNER, AND THE BETTER QUALITY OR GREATER QUANTITY OF WORK SHALL BE PROVIDED BY THE CONTRACTOR IN ACCORDANCE WITH THE ARCHITECT'S/DESIGN CONSULTANT'S INTERPRETATION.

INDEX OF DRAWINGS

PIVOT NORTH architecture

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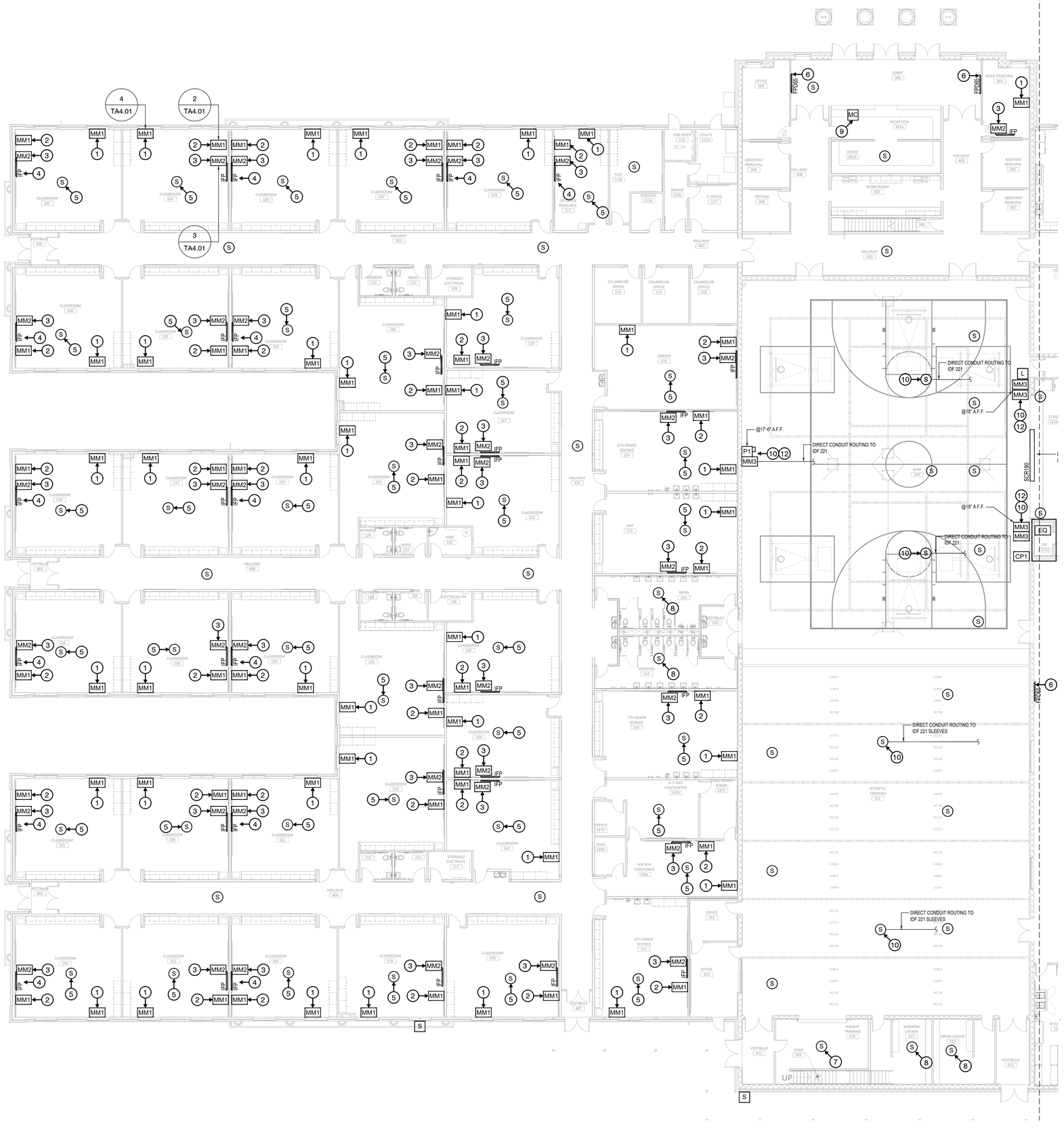


1 TA2.11a AUDIOVISUAL LEVEL 1 - AREA A FLOOR PLAN

SCALE: 3/32" = 1'-0"

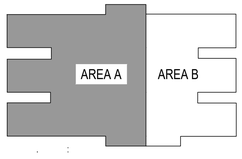
GENERAL NOTES

1. THE TECHNOLOGY REGION / WIRING BOUNDARIES ARE IDENTIFIED ON THE OVERALL SHEETS ONLY AND NOT ON THE ENLARGED SHEETS. CONTRACTOR SHALL REFER TO THE OVERALL SHEETS FOR ALL TECHNOLOGY REGIONS / WIRING BOUNDARIES.
2. ALL CONDUIT PATHWAYS, ROUGH-INS, BACKBOXES, FLOOR BOXES, CONDUIT SLEEVES, ETC. INDICATED ON THE TECHNOLOGY DRAWINGS ARE TO BE PROVIDED AND INSTALLED BY DIVISION 26.
3. ALL POWER INDICATED ON THE TECHNOLOGY DRAWINGS IS TO BE PROVIDED AND INSTALLED BY DIVISION 26.
4. CONTRACTOR SHALL RESTORE ALL PENETRATIONS PROVIDED THROUGH FIRE RATED WALLS/STRUCTURES FOR TECHNOLOGY CABLING BACK TO THE ORIGINAL RATING.
5. CONTRACTOR SHALL RESTORE ALL PENETRATIONS PROVIDED THROUGH NON-RATED WALLS/STRUCTURES FOR TECHNOLOGY CABLING FOR SOUND TO REDUCE NOISE TRAVELING THROUGH PENETRATIONS.
6. TECHNOLOGY CABLING SHALL BE ROUTED IN SEPARATE PATHWAYS IN J-HOOKS, CONDUITS, CONDUIT SLEEVES, CORES, ETC. THROUGHOUT THE ENTIRE PATHWAY. DIFFERENT MEDIA TYPES (DATA, VIDEO, SECURITY, ETC.) SHALL NOT SHARE THE SAME J-HOOK, CONDUIT, CONDUIT SLEEVE, CORE, ETC.
7. UNLESS NOTED OTHERWISE, ALL CONDUITS FOR TECHNOLOGY DEVICES SHALL ROUTE FROM THE DEVICE LOCATION AND TERMINATE ABOVE AN ACCESSIBLE CEILING (AN OPEN CEILING OR CLOUD TYPE CEILING IS NOT CONSIDERED AN ACCESSIBLE CEILING) IN THE SAME ROOM WHERE THE DEVICE IS LOCATED. IF THE ROOM WHERE THE DEVICE IS LOCATED DOES NOT HAVE AN ACCESSIBLE CEILING, THE CONDUIT SHALL ROUTE TO THE NEAREST ACCESSIBLE CEILING OFF A MAIN CORRIDOR. CONDUIT PATHWAY SHALL TAKE THE SHORTEST ROUTE TO THE APPLICABLE MDF / IDF ROOM TO MINIMIZE THE CABLE LENGTH ENSURING CABLE LENGTH DOES NOT EXCEED 275 FEET.
8. UNLESS NOTED OTHERWISE ALL CONDUITS SHALL BE HOMERUN FROM THE DEVICE LOCATION AND NO DAISY CHAINING OF DEVICES / ROUGH-INS SHALL BE ALLOWED.
9. CONDUIT SEGMENTS SHALL BE NO MORE THAN 100-FEET IN LENGTH WITH NO MORE THAN THE EQUIVALENT OF (2) 90 DEGREE BENDS BETWEEN PULLING POINTS.
10. CONDUITS SHALL MAINTAIN A BEND RADIUS OF 6 TIMES THE DIAMETER OF THE CONDUIT FOR CONDUITS 2-INCHES OR SMALLER AND 10 TIMES THE DIAMETER OF THE CONDUIT FOR CONDUITS GREATER THAN 2-INCHES.
11. ALL CONDUITS SHALL HAVE A PULL STRING INSTALLED FOR PULLING OF CABLE. CLEARLY LABEL AS "PULL STRING" INDICATING OPPOSITE END LOCATION.
12. ALL SPARE CONDUITS OR CONDUITS FILLED WITH LESS THAN THE MAXIMUM ALLOWED FILL RATIO SHALL HAVE A PULL STRING INSTALLED AND LEFT FOR FUTURE PULLING OF CABLE. CLEARLY LABEL AS "PULL STRING" INDICATING OPPOSITE END LOCATION.
13. EQUIPMENT NOT RELATED TO THE SUPPORT OF THE TELECOMMUNICATIONS ROOM (E.G., PIPING, DUCTWORK, PNEUMATIC TUBING) SHALL NOT BE INSTALLED IN, PASS THROUGH, OR ENTER THE TELECOMMUNICATIONS ROOM
14. ALL CONDUITS FOR TECHNOLOGY DEVICES SHALL ROUTE FROM THE DEVICE LOCATION AND TERMINATE ABOVE A LAY- IN TYPE CEILING IN THE SAME ROOM WHERE THE DEVICE IS LOCATED. IF THE ROOM WHERE THE DEVICE IS LOCATED DOES NOT HAVE A LAY-IN TYPE CEILING TO PREVENT THE CABLES FROM BEING EXPOSED, THE CONDUIT SHALL ROUTE TO THE NEAREST LAY-IN TYPE CEILING OFF A MAIN CORRIDOR OR THE NEAREST MDF/IDF. THE CONDUIT PATHWAY SHALL TAKE THE SHORTEST ROUTE TO THE MAIN CORRIDOR OR THE NEAREST MDF/IDF TO MINIMIZE THE CABLE LENGTH ENSURING THE CABLE LENGTH DOES NOT EXCEED 275 FEET. CONDUIT, CONNECTIONS, J-BOXES, SUSPENSION, ANCHORAGES, AND OTHER CONDUIT COMPONENTS EXPOSED TO VIEW IN PUBLIC SPACES SHALL BE ROUTED AND INSTALLED CAREFULLY TO MINIMIZE VISUAL IMPACT AND SHALL BE FULLY PAINTED TO MATCH UNLESS NOTED OTHERWISE

KEYED NOTES

1. TEACHERS DESK PRESENTATION LOCATION. SINGLE GANG FACEPLATE WITH HDMI AND USB INPUT. PROVIDE AND INSTALL CABLING TO INTERACTIVE FLAT PANEL DISPLAY. PROVIDE PATCH CABLES TO TEACHERS DESK.
2. SECONDARY PRESENTATION LOCATION. SINGLE GANG FACEPLATE WITH HDMI, USB, AND DATA. PROVIDE AND INSTALL CABLING TO INTERACTIVE FLAT PANEL DISPLAY. PROVIDE PATCH CABLES FOR FACEPLATE.
3. DUAL GANG FACEPLATE WITH COMBINED DATA AND AUDIOVISUAL. PROVIDE PATCH CABLES TO DISPLAY.
4. INTERACTIVE FLAT PANEL DISPLAY. OWNER PROVIDED. CONTRACTOR INSTALLED. PROVIDE ALTERNATE 2 FOR CONTRACTOR PROVIDED. PROVIDE DUAL GANG BACKBOX WITH (2) 1" CONDUITS (BY DIV 26).
5. OVERHEAD PAGING SPEAKER. PROVIDE LINE-ITEM PRICING FOR ALTERNATE 1 FOR IP SPEAKER WITH TWO-WAY COMMUNICATION.
6. FLAT PANEL DISPLAY, CONTRACTOR PROVIDED AND INSTALLED.
7. PENDANT MOUNTED SPEAKER, CONFIRM FINAL MOUNTING HEIGHT WITH OWNER.
8. HARD CEILING FLUSH MOUNT SPEAKER.
9. PUBLIC ADDRESS MICROPHONE.
10. AUDIOVISUAL DEVICE CABLING SHALL BE ROUTED TO IDF 221. TYPICAL GYM / ATHLETIC FIELD.
11. AUDIOVISUAL SPEAKER SHALL INTEGRATE INTO PUBLIC ADDRESS SYSTEM.
12. POWER AND AUDIOVISUAL BACKBOX LOCATION. PROVIDE 1.5 INCH CONDUIT TO IDF 221.

KEYPLAN



PIVOT NORTH architecture

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COMBS RFP- 11/11/22

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Checked By:	DG
Drawn By:	JR

Sheet Name:

AUDIOVISUAL LEVEL 1 AREA A FLOOR PLAN

Sheet No:

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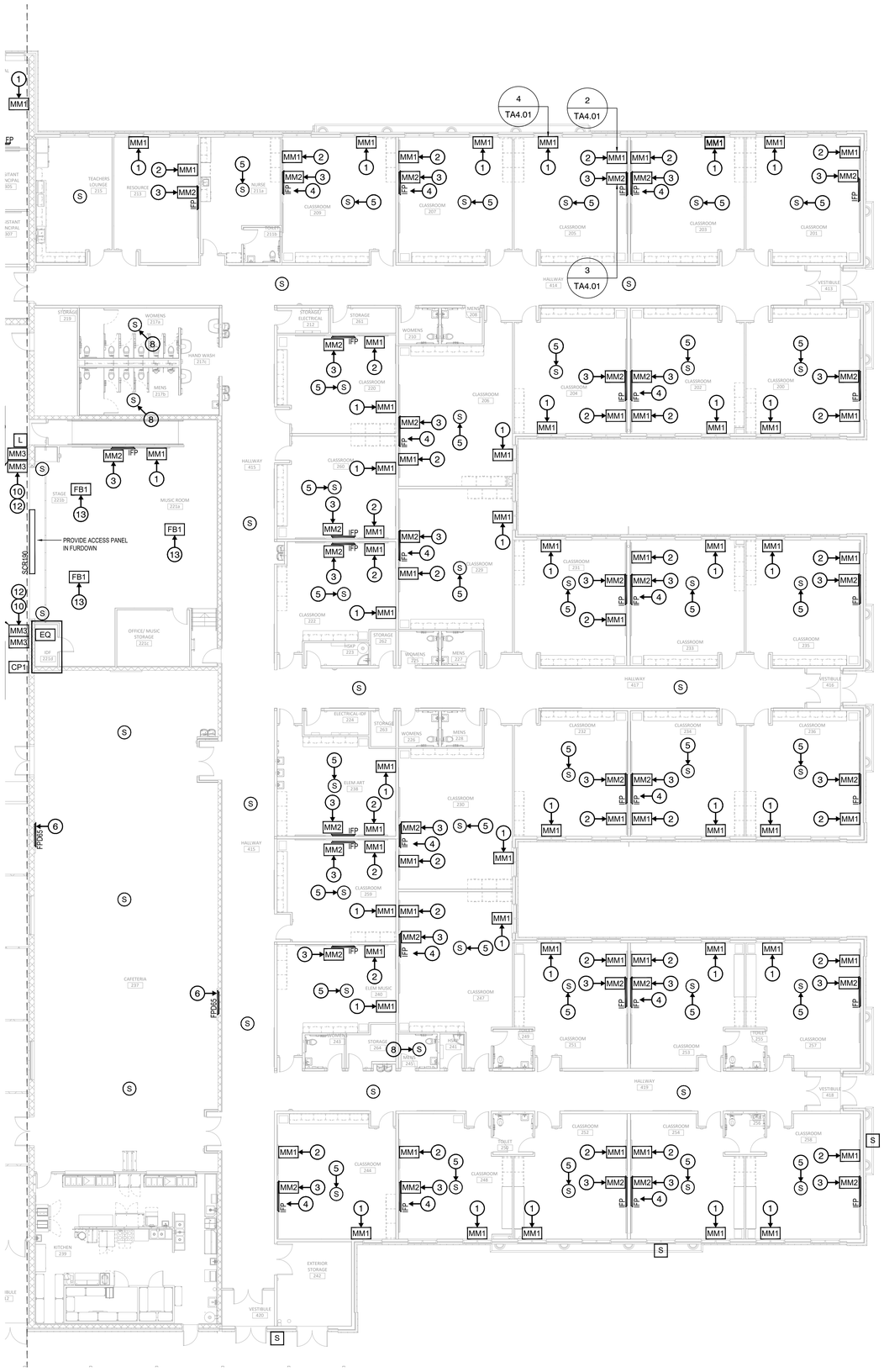
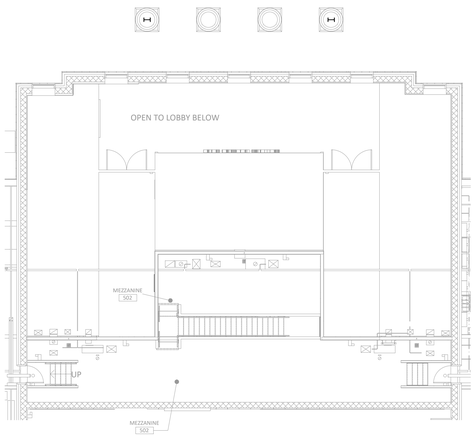


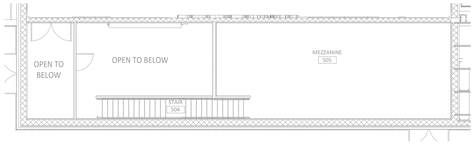
1 TA2.11b AUDIOVISUAL LEVEL 1 - AREA B FLOOR PLAN

SCALE: 3/32" = 1'-0"



2 TA2.11b AUDIOVISUAL MEZZANINE 502 FLOOR PLAN

SCALE: 3/32" = 1'-0"



3 TA2.11b AUDIOVISUAL MEZZANINE 504 FLOOR PLAN

SCALE: 3/32" = 1'-0"

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KEYED NOTES

1. TEACHERS DESK PRESENTATION LOCATION. SINGLE GANG FACEPLATE WITH HDMI AND USB INPUT. PROVIDE AND INSTALL CABLING TO INTERACTIVE FLAT PANEL DISPLAY. PROVIDE PATCH CABLES TO TEACHERS DESK.
2. SECONDARY PRESENTATION LOCATION. SINGLE GANG FACEPLATE WITH HDMI, USB, AND DATA. PROVIDE AND INSTALL CABLING TO INTERACTIVE FLAT PANEL DISPLAY. PROVIDE PATCH CABLES FOR FACEPLATE.
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7. PENDANT MOUNTED SPEAKER, CONFIRM FINAL MOUNTING HEIGHT WITH OWNER.
8. HARD CEILING FLUSH MOUNT SPEAKER.
9. PUBLIC ADDRESS MICROPHONE.
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11. AUDIOVISUAL SPEAKER SHALL INTEGRATE INTO PUBLIC ADDRESS SYSTEM.
12. POWER AND AUDIOVISUAL BACKBOX LOCATION. PROVIDE 1.5 INCH CONDUIT TO IDF 221.
13. PROVIDE POWER, (2) DATA, (2) XLR CONNECTIONS IN FLOOR BOX.

KEYPLAN

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AUDIOVISUAL LEVEL 1 AREA B FLOOR PLAN

Sheet No:

TA2.11b

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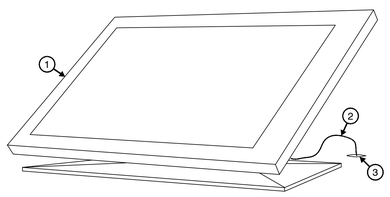


KEYED NOTES:

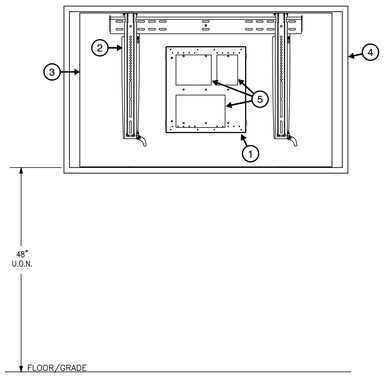
1. CONTROL PANEL WITH DESKTOP MOUNTING HARDWARE – MANUFACTURER/MODEL NUMBER AS SPECIFIED (BY DIV 27).
2. SIGNAL CABLE(S) FOR CONTROL PANEL (BY DIV 27).
3. GROMMET/HOLE IN TABLE SURFACE FOR SIGNAL CABLE PASSAGE. COORDINATE INSTALLATION WITH FURNITURE CONTRACTOR (BY DIV 27).

GENERAL NOTES:

PROVIDE ONE (1) 1-INCH DISCRETE/DEDICATED EMT CONDUIT FOR CONTROL PANEL SIGNAL CABLE. ROUTE CONDUIT TO ACCESSIBLE CEILING SPACE IN THE SAME ROOM WHERE THE DEVICE IS LOCATED (BY DIV 26).

1 TA4.00 TYPICAL DESKTOP/TABLETOP MOUNTED CONTROL PANEL DETAIL

SCALE: N.T.S.

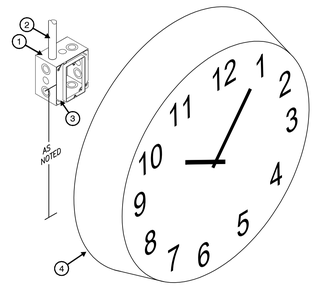


KEYED NOTES:

1. RECESSED BACK BOX FOR FLAT PANEL DISPLAY - CHIEF PAC526FCW. REFER TO DRAWINGS, SCHEDULES, AND SPECIFICATIONS FOR ADDITIONAL INFORMATION. COORDINATE FINISH WITH ARCHITECT (BY DIV 26).
2. FLAT PANEL DISPLAY MOUNTING BRACKET - MANUFACTURER / MODEL NUMBER AS SPECIFIED. REFER TO DRAWINGS, SCHEDULES, AND SPECIFICATIONS FOR ADDITIONAL INFORMATION (BY DIV 27).
3. IN-WALL BLOCKING FOR FLAT PANEL MOUNTING. BLOCKING TO BE PRESENT ON ALL SIDES OF RECESSED BACK BOX. PROVIDE 10" OF BLOCKING ABOVE AND BELOW RECESSED BACK BOX AND 16" OF BLOCKING TO THE LEFT AND RIGHT OF BACK BOX (BY DIV 26).
4. FLAT PANEL DISPLAY - MANUFACTURER / MODEL NUMBER AS SPECIFIED. REFER TO DRAWINGS, SCHEDULES, AND SPECIFICATIONS FOR ADDITIONAL INFORMATION (BY DIV 27).
5. VIDEO OVER TWISTED-PAIR RECEIVER, AUDIO AMPLIFIER, CONTROL EXPANSION MODULE, ETC., IF REQUIRED. WITH MOUNTING HARDWARE AS REQUIRED / APPROPRIATE. (BY DIV 27).

2 TA4.00 TYPICAL WALL-MOUNTED FLAT PANEL DISPLAY

SCALE: N.T.S.

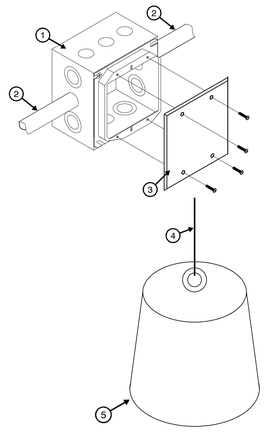


KEYED NOTES:

1. 4-11/16" X 4-11/16" X 2-1/8" RECESSED DOUBLE GANG BOX (BY DIV 26).
2. 1-INCH EMT CONDUIT FROM BACK BOX WITH 200 LBS PULL STRING AND NYLON BUSHING STUBBED OUT ABOVE ACCESSIBLE CEILING IN THE SAME ROOM WHERE THE DEVICE IS LOCATED (BY DIV 26).
3. SINGLE-GANG PLASTER RING - DEVICE OPENING MUST HAVE RIGHT-ANGLE CORNERS TO AVOID PHYSICAL CONFLICTS WITH DEVICE(S) (BY DIV 26).
4. ANALOG CLOCK - MANUFACTURER/MODEL NUMBER AS SPECIFIED. REFER TO DRAWINGS, SCHEDULES AND SPECIFICATIONS FOR ADDITIONAL INFORMATION (BY DIV 27).

3 TA4.00 TYPICAL WALL-MOUNTED ANALOG CLOCK DETAIL

SCALE: N.T.S.

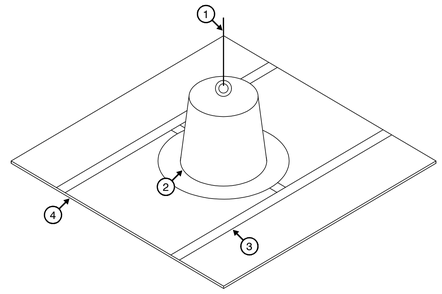


KEYED NOTES:

1. 4 11/16" X 4 11/16" X 2 1/8" DOUBLE GANG BOX SECURELY MOUNTED TO OVERHEAD STRUCTURE AT LOUDSPEAKER LOCATION. COORDINATE FINAL MOUNTING LOCATION AND ROUGH-IN DETAILS WITH AUDIO|VISUAL CONTRACTOR (BY DIV 26).
2. 1" EMT CONDUIT FROM DOUBLE GANG BOX WITH 200 LBS PULL STRING. ROUTE CONDUIT FROM BOX TO NEXT BOX IN THE CHAIN OR TO SOURCE/SINK DEVICE AS REQUIRED. COORDINATE FINAL MOUNTING DETAILS WITH AUDIO|VISUAL CONTRACTOR (BY DIV 26).
3. BLANK COVER PLATE (BY DIV 26).
4. SUPPORT CABLE/THREADED ROD SECURELY FASTENED TO OVERHEAD STRUCTURE. ALL MOUNTING HARDWARE/FRAMING/STRUCTURE/STRUCTURAL MOUNTING POINTS MUST BE CAPABLE OF SUPPORTING AT LEAST FIVE (5) TIMES THE COMBINED WEIGHT OF ALL SUSPENDED EQUIPMENT AND HARDWARE (BY DIV 27).
5. LOUDSPEAKER - MANUFACTURER/MODEL NUMBER AS SPECIFIED (BY DIV 27). COORDINATE FINISH WITH ARCHITECT.

4 TA4.00 TYPICAL OPEN CEILING LOUDSPEAKER MOUNTING DETAIL

SCALE: N.T.S.

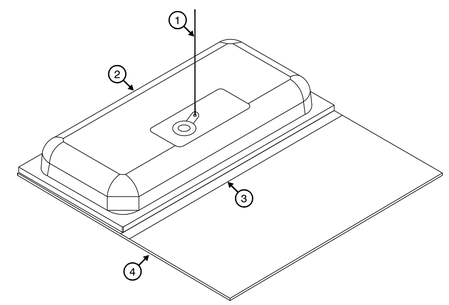


KEYED NOTES:

1. SUPPORT CABLE/THREADED ROD SECURELY FASTENED TO OVERHEAD STRUCTURE. ALL MOUNTING HARDWARE/FRAMING/STRUCTURE/STRUCTURAL MOUNTING POINTS MUST BE CAPABLE OF SUPPORTING AT LEAST FIVE (5) TIMES THE COMBINED WEIGHT OF ALL SUSPENDED EQUIPMENT AND HARDWARE (BY DIV 27).
2. LOUDSPEAKER - MANUFACTURER / MODEL NUMBER AS SPECIFIED (BY DIV 27). COORDINATE FINISH WITH ARCHITECT.
3. TILE BRIDGE/SUPPORT HARDWARE - MANUFACTURER/MODEL NUMBER AS SPECIFIED/REQUIRED (BY DIV 27).
4. SCHEDULED CEILING - REFER TO ARCHITECTURAL DRAWINGS FOR MORE INFORMATION.

5 TA4.00 TYPICAL CUT-IN LOUDSPEAKER MOUNTING DETAIL

SCALE: N.T.S.

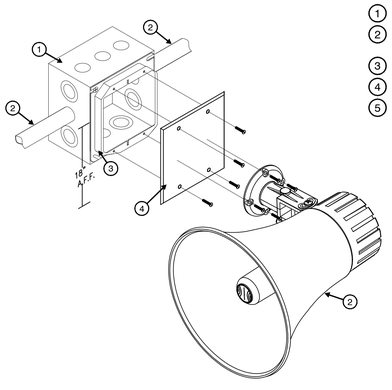


KEYED NOTES:

1. SUPPORT CABLE/THREADED ROD SECURELY FASTENED TO OVERHEAD STRUCTURE. ALL MOUNTING HARDWARE/FRAMING/STRUCTURE/STRUCTURAL MOUNTING POINTS MUST BE CAPABLE OF SUPPORTING AT LEAST FIVE (5) TIMES THE COMBINED WEIGHT OF ALL SUSPENDED EQUIPMENT AND HARDWARE (BY DIV 27).
2. LOUDSPEAKER - MANUFACTURER/MODEL NUMBER AS SPECIFIED (BY DIV 27).
3. T-RAIL CROSSPIECE (BY DIV 27).
4. SCHEDULED CEILING - REFER TO ARCHITECTURAL DRAWINGS FOR MORE INFORMATION.

6 TA4.00 TYPICAL LAY-IN LOUDSPEAKER MOUNTING DETAIL

SCALE: N.T.S.

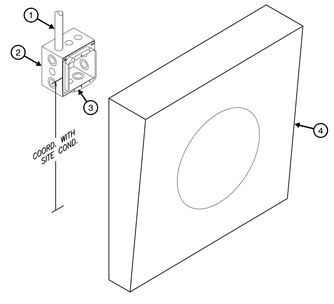


KEYED NOTES:

1. 4 11/16" x 4 11/16" x 2 1/8" DOUBLE GANG BOX (BY DIV 26).
2. 1-INCH EMT CONDUIT FROM DOUBLE GANG BOX WITH 200 LBS PULL STRING (BY DIV 26).
3. DOUBLE GANG PLASTER RING (BY DIV 26).
4. 2-GANG WEATHER RESISTANT COVER PLATE. (BY DIV 26).
5. LOUDSPEAKER - MANUFACTURER/MODEL NUMBER AS SPECIFIED. REFER TO DRAWINGS, SPECIFICATIONS, DETAILS AND EQUIPMENT SCHEDULES FOR FURTHER INFORMATION. (BY DIV 27).

7 TA4.00 TYPICAL HORN LOUDSPEAKER MOUNTING DETAIL

SCALE: N.T.S.

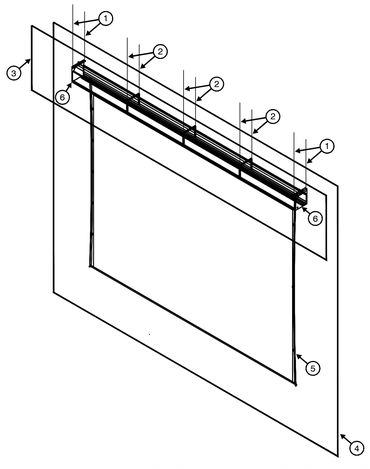


KEYED NOTES:

1. 1" EMT CONDUIT FROM DOUBLE-GANG BOX / ACCESSIBLE CEILING TO NEXT DOUBLE-GANG BOX IN SPEAKER CHAIN (BY DIV 16).
2. 4-11/16" X 4-11/16" X 2-1/8" SURFACE-MOUNTED DOUBLE-GANG BOX (BY DIV 16).
3. DOUBLE-GANG PLASTER RING - DEVICE OPENING MUST HAVE RIGHT-ANGLE CORNERS TO AVOID PHYSICAL CONFLICTS WITH DEVICE(S) (BY DIV 26).
4. SURFACE-MOUNTED INDOOR LOUDSPEAKER - MANUFACTURER / MODEL NUMBER AS SPECIFIED. REFER TO DRAWINGS, DETAILS, SPECIFICATIONS, AND EQUIPMENT SCHEDULES FOR ADDITIONAL INFORMATION. (BY DIV 17).

8 TA4.00 TYPICAL INDOOR SURFACE-MOUNTED LOUDSPEAKER MOUNTING DETAIL

SCALE: N.T.S.



1. 1/2" THREADED ROD SECURELY FASTENED TO OVERHEAD STRUCTURE. USED FOR MAIN SCREEN SUPPORT (BY DIV 27).
2. 3/8" THREADED ROD SECURELY FASTENED TO OVERHEAD STRUCTURE. USED TO ADJUST SCREEN DEFLECTION ONLY (BY DIV 27).
3. PROSCENIUM ARCH CURTAIN.
4. MAIN STAGE CURTAIN.
5. PROJECTION SCREEN - MANUFACTURER / MODEL NUMBER AS SPECIFIED. SCREEN TO BE MOUNTED SO THAT SCREEN OPENS BETWEEN MAIN CURTAIN AND PROSCENIUM ARCH CURTAIN. PROVIDE STANDARD OR REVERSE ROLLED SCREEN SURFACE AS REQUIRED (BY DIV 27).
6. POWER FOR PROJECTION SCREEN - COORDINATE LOCATION (LEFT OR RIGHT END OF SCREEN CASE) WITH DIVISION 27 CONTRACTOR (BY DIV 26).

9 TA4.00 TYPICAL AUDITORIUM STAGE PROJECTION SCREEN MOUNTING DETAIL

SCALE: N.T.S.

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SITE TBD, NEW CANEY, TX ZIP TBD

COMBS RFP- 11/11/22

Project No:	21-049
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Drawn By:	JR

Sheet Name:

AUDIOVISUAL TYPICAL DETAILS

Sheet No:

TA4.00

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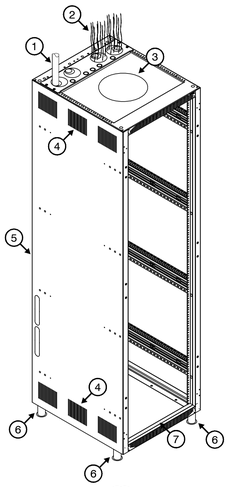
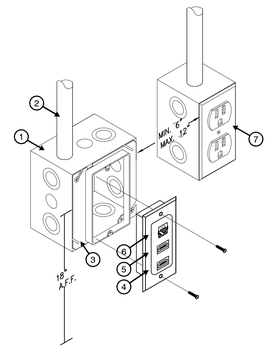


KEYED NOTES:

1. POWER CONNECTION TO A/V EQUIPMENT RACK - SHOWN FOR REFERENCE ONLY. COORDINATE POWER INSTALLATION WITH ELECTRICAL CONTRACTOR.
   a. POWER / CONDUIT / CONNECTION / ETC. BY DIVISION 26
   b. COORDINATION AND IN-RACK POWER DISTRIBUTION BY DIVISION 27.
2. A/V CABLING TO EQUIPMENT RACK. CABLING TO BE SEPARATED, DRESSED, AND SUPPORTED PER INDUSTRY BEST PRACTICES (BY DIV 27).
3. EQUIPMENT RACK WITH THERMOSTATICALLY CONTROLLED COOLING FAN(S) - MANUFACTURER / MODEL NUMBER AS SPECIFIED. REFER TO SPECIFICATIONS / DETAILS / EQUIPMENT SCHEDULES FOR FURTHER INFORMATION (BY DIV 27).
4. PROVIDE VENT BLOCKERS TO CONTROL AIRFLOW IN ANY EQUIPMENT RACK EQUIPPED WITH COOLING FANS (BY DIV 27).
5. EQUIPMENT RACK - MANUFACTURER / MODEL NUMBER AS SPECIFIED. REFER TO SPECIFICATIONS / DETAILS / EQUIPMENT SCHEDULES FOR FURTHER INFORMATION (BY DIV 27).
6. ADJUSTABLE FEET / CASTERS AS SPECIFIED - MANUFACTURER / MODEL NUMBER AS SPECIFIED. REFER TO SPECIFICAITONS / DETAILS / EQUIPMENT SCHEDULES FOR FURTHER INFORMATION (BY DIV 27).
7. EQUIPMENT RACK BASE PLATE. PROVIDE BASE PLATE FOR EQUIPMENT RACK TO CONTROL AIRFLOW IN ANY EQUIPMENT RACK EQUIPPED WITH COOLING FANS (BY DIV 27).

1 / TA4.01 TYPICAL EQUIPMENT RACK DETAIL

SCALE: N.T.S.

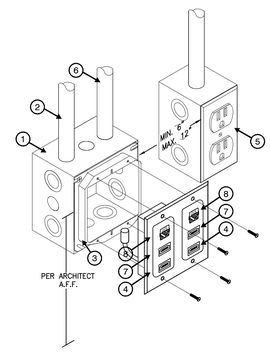


KEYED NOTES:

1. 4-11/16" X 4-11/16" X 2-1/8" RECESSED DOUBLE GANG BOX (BY DIV 26).
2. 1.5-INCH EMT CONDUIT FROM BACK BOX WITH 200 LBS PULL STRING AND NYLON BUSHING STUBBED OUT ABOVE ACCESSIBLE CEILING IN THE SAME ROOM WHERE THE DEVICE IS LOCATED (BY DIV 26).
3. SINGLE-GANG PLASTER RING - DEVICE OPENING MUST HAVE RIGHT-ANGLE CORNERS TO AVOID PHYSICAL CONFLICTS WITH DEVICE(S) (BY DIV 26).
4. HDMI INPUT.
5. USB INPUT.
6. DATA JACK, PROVIDED AND INSTALLED BY DATA CONTRACTOR.
7. ELECTRICAL RECEPTACLE, GANG BOX AND CONDUIT SHOWN FOR REFERENCE ONLY (REFER TO DIV 26).

2 / TA4.01 TYPICAL TEACHER SECONDARY PRESENTATION LOCATION (DATA, HDMI, AND USB) DETAIL

SCALE: N.T.S.

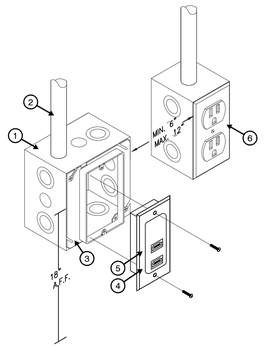


KEYED NOTES:

1. 4-11/16" X 4-11/16" X 2-1/8" RECESSED DOUBLE GANG BOX MOUNTED BEHIND DISPLAY (BY DIV 26).
2. 1-INCH EMT CONDUIT FROM BACK BOX WITH 200 LBS PULL STRING AND NYLON BUSHING STUBBED OUT ABOVE ACCESSIBLE CEILING IN THE SAME ROOM WHERE THE DEVICE IS LOCATED (BY DIV 26).
3. DOUBLE-GANG PLASTER RING - DEVICE OPENING MUST HAVE RIGHT-ANGLE CORNERS TO AVOID PHYSICAL CONFLICTS WITH A/V DEVICE(S) (BY DIV 26).
4. AUDIO VISUAL INPUTS - HDMI INPUT PLATE - MANUFACTURER/MODEL NUMBER AS SPECIFIED.
5. ELECTRICAL RECEPTACLE, GANG BOX AND CONDUIT SHOWN FOR REFERENCE ONLY (REFER TO DIV 26).
6. 1-INCH EMT CONDUIT FROM BACK BOX WITH 200LBS PULL STRING AND NYLON BUSHING STUBBED OUT ABOVE ACCESSIBLE CEILING IN THE SAME ROOM WHERE THE DEVICE IS LOCATED. (BY DIV 26)
7. AUDIOVISUAL INPUT- USB INPUT JACK.
8. DATA JACK PROVIDED AND INSTALLED BY DATA CONTRACTOR.

3 / TA4.01 TYPICAL CLASSROOM INTERACTIVE FLAT PANEL DISPLAY DETAIL

SCALE: N.T.S.



KEYED NOTES:

1. 4-11/16" X 4-11/16" X 2-1/8" RECESSED DOUBLE GANG BOX (BY DIV 26).
2. 1.5-INCH EMT CONDUIT FROM BACK BOX WITH 200 LBS PULL STRING AND NYLON BUSHING STUBBED OUT ABOVE ACCESSIBLE CEILING IN THE SAME ROOM WHERE THE DEVICE IS LOCATED (BY DIV 26).
3. SINGLE-GANG PLASTER RING - DEVICE OPENING MUST HAVE RIGHT-ANGLE CORNERS TO AVOID PHYSICAL CONFLICTS WITH DEVICE(S) (BY DIV 26).
4. HDMI INPUT.
5. USB INPUT.
6. ELECTRICAL RECEPTACLE, GANG BOX AND CONDUIT SHOWN FOR REFERENCE ONLY (REFER TO DIV 26).

4 / TA4.01 TYPICAL TEACHER PRIMARY PRESENTATION LOCATION (HDMI AND USB) DETAIL

SCALE: N.T.S.

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Project: IL TEXAS PEARLAND K-8
SITE TBD, NEW CANEY, TX ZIP TBD

COMBS RFP- 11/11/22

Project No:	21-049
Date:	11/11/22
Checked By:	DG
Drawn By:	JR

Sheet Name:

AUDIOVISUAL TYPICAL DETAILS

Sheet No:

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SECURITY SYMBOLS & LEGEND

ACCESS CONTROL SYMBOLS

AD	INTERFACE TO AUTOMATIC DOOR CONTROL AND MONITORING.
BI	INTERFACE TO RETRACTABLE VEHICLE BOLLARD.
BR	BIOMETRIC READER.
CH	DOOR BELL CHIME.
CR	CARD READER.
CR1	CARD READER MULLION MOUNT.
CR2	ELEVATOR CARD READER.
CR3	CARD READER/INTERCOM UNIT.
CR4	CARD READER/INTERCOM PEDESTRIAN PEDESTAL.
D	DURESS BUTTON MOUNTED IN KNEE SPACE OF DESK, TABLE OR COUNTER PROVIDE ARMORED CABLE FROM DURESS BUTTON TO JUNCTION BOX.
D	WALL MOUNTED DURESS BUTTON.
DB	DOOR BELL.
DC	DOOR CONTACT.
DC1	OVERHEAD DOOR CONTACT. PROVIDE ARMORED CABLE FROM SWITCH TO JUNCTION BOX.
DMA	DOOR MANAGEMENT ANNUNCIATOR.
DR	SINGLE DOOR RELEASE PUSHBUTTON UNDER COUNTER. ARMORED CABLE FROM PUSHBUTTON TO JUNCTION BOX.
EL	INTERFACE TO ELEVATOR CONTROL/MONITORING.
FA	INTERFACE TO FIRE ALARM SYSTEM.
GC	INTERFACE TO PARKING GATE CONTROL/MONITORING.
IC	AUDIO INTERCOM SUBSTATION.
IM	INTERCOM MASTER STATION AS INDICATED BLOCK DIAGRAM AND/OR DETAILS.
KS	KEYSWITCH.
LD	LOCKDOWN BUTTON UNDER COUNTER. ARMORED CABLE FROM LOCKDOWN BUTTON TO JUNCTION BOX.
LD	LOCKDOWN BUTTON.
OD	INTERFACE TO OVERHEAD DOOR CONTROL/MONITORING.
RD	INTERFACE TO MOTORIZED REVOLVING DOOR CONTROL/MONITORING.
REX	REQUEST-TO-EXIT IS INTEGRAL WITH ELECTRIFIED LOCKING HARDWARE. PROVIDED AND INSTALLED BY OTHERS.
RX	REQUEST-TO-EXIT MOTION SENSOR MOUNTED CEILING-MOUNTED.
RX	REQUEST-TO-EXIT MOTION SENSOR DOOR FRAME-MOUNTED.
SD	INTERFACE TO SLIDING DOOR CONTROL/MONITORING.
SR	SECURITY SYSTEM RISER, DATA GATHERING PANEL AND LOW VOLTAGE POWER SUPPLY DISTRIBUTION LOCATION.
VI	VIDEO INTERCOM SUBSTATION.
VM	DESKTOP VIDEO INTERCOM MASTER STATION.
WD	WIRELESS DURESS BUTTON MOUNTED IN KNEE SPACE OF DESK, TABLE, OR COUNTER.

ACCESS CONTROL SYMBOLS

WDRR	WIRELESS DOOR RELEASE RECEIVER DEVICE.
WDRT	WIRELESS DOOR RELEASE TRANSMITTER DEVICE.
WR	WIRELESS DURESS BUTTON RECEIVER DEVICE.
WT	WIRELESS DURESS BUTTON TRANSMITTER DEVICE.
	PRE-WIRE AND BLANK COVER PLATE FOR FUTURE DEVICE.

ELECTRONIC SURVEILLANCE SYMBOLS

	FIXED SURVEILLANCE CAMERA, CAMERA MODEL AND MOUNTING HEIGHT AS SPECIFIED.
	CEILING-MOUNTED FIXED SURVEILLANCE CAMERA, CAMERA MODEL AND MOUNTING HEIGHT AS SPECIFIED.
	180° SURVEILLANCE CAMERA, CAMERA MODEL AND MOUNTING HEIGHT AS SPECIFIED.
	CEILING-MOUNTED 180° SURVEILLANCE CAMERA, CAMERA MODEL AND MOUNTING HEIGHT AS SPECIFIED.
	360° SURVEILLANCE CAMERA, CAMERA MODEL AND MOUNTING HEIGHT AS SPECIFIED.
	CEILING-MOUNTED 360° SURVEILLANCE CAMERA, CAMERA MODEL AND MOUNTING HEIGHT AS SPECIFIED.
	PAN, TILT & ZOOM SURVEILLANCE CAMERA, CAMERA MODEL AND MOUNTING HEIGHT AS SPECIFIED.
CLG	CEILING-MOUNTED PAN, TILT & ZOOM SURVEILLANCE CAMERA, CAMERA MODEL AND MOUNTING HEIGHT AS SPECIFIED.
	CEILING MOUNTED, DUAL SENSOR CAMERA, CAMERA MODEL AND MOUNTING HEIGHT AS SPECIFIED.

GENERAL SYMBOLS

# SHEET — DRAWING TITLE SCALE: SCALE	DRAWING TITLE CALLOUT, # = DETAIL NUMBER.
# SHEET	DETAIL CALLOUT, # = DETAIL NUMBER.
# SHEET	SECTION CALLOUT, # = DETAIL NUMBER.
SHEET #	ELEVATION CALLOUT, # = DETAIL NUMBER.
#	KEYED NOTE.
#	REVISION TRIANGLE, # = REVISION NUMBER (PER SHEET).
TR (IDF XXX)	INDICATES TELECOMMUNICATIONS REGION

INTRUSION DETECTION SYMBOLS

AL	ALARM ANNUNCIATOR LIGHT.
AP	ANNUNCIATOR PANEL AS INDICATED IN BLOCK DIAGRAMS AND/OR DETAILS.
AV	AUDIO VISUAL ANNUNCIATOR.
FA	INTERFACE TO FREEZER/TEMPERATURE ALARM. PROVIDED AND INSTALLED BY OTHERS.
FC	FUTURE CABLE AS SPECIFIED.
GB	CEILING-MOUNTED GLASS BREAK SENSOR.
GB	GLASS BREAK SENSOR.
KP	PERSONAL IDENTIFICATION NUMBER KEYPAD.
M	SOUND DETECTION MICROPHONE.
MS	360° MOTION DETECTOR MOUNTED TO CEILING.
MD	MOTION DETECTOR.
MD LR	LONG RANGE MOTION DETECTOR.
RA	INTERFACE TO REFRIGERATOR/TEMPERATURE ALARM. PROVIDED AND INSTALLED BY OTHERS.
ST	STROBE LIGHT SURFACE MOUNTED TO CEILING.
ST	STROBE LIGHT.
V	VIBRATION DETECTOR.

MISCELLANEOUS SECURITY SYMBOLS

B	ALERTUS BEACON MOUNTED AT 60" A.F.F. UNLESS OTHERWISE NOTED
EP	EMERGENCY PHONE.
LS	FLOOR MOUNTED LIQUID SENSOR. PROVIDE ARMORED CABLE FROM SENSOR TO JUNCTION BOX.
S	INTERCOM SPEAKER FLUSH MOUNTED IN CEILING.
	ALERTUS LED MARQUEE (SINGLE SIDED)
	ALERTUS LED MARQUEE (DOUBLE SIDED)

ABBREVIATIONS

A.F.F.	ABOVE FINISHED FLOOR
A.F.G.	ABOVE FINISHED GRADE
AER	AERIAL
B	BURIED
CAT.3/5	CATEGORY 3/5
CATV	COMMUNITY ANTENNA TELEVISION
CCTV	CLOSED CIRCUIT TELEVISION
CLT	CLOSET
CO	CENTRAL OFFICE
DEMARC	DEMARCATION POINT
DPDT	DOUBLE PULL DOUBLE THROW
EMT	ELECTRIC METALLIC TUBE
F.O.C.	FIBER OPTIC CABLE
GIP	GALVANIZED IRON PIPE
HE	PA/INTERCOM HEAD-END
IRC	INTERMEDIATE RIGID CONDUIT
ISP	INSIDE CABLE PLANT
IDF	INTERMEDIATE DISTRIBUTION FRAME
MDF	MAIN DISTRIBUTION FRAME
MH	MANHOLE
MM	MULTIMODE
OSP	OUTSIDE CABLE PLANT
PB	PULLBOX
PR	PAIR
PBX	PRIVATE BRANCH EXCHANGE
PVC	POLYVINYL CHLORIDE
SM	SINGLE MODE
SP	SERVICE PROVIDER
STP	SHIELDED TWISTED PAIR
TB	TERMINAL BLOCK
UTP	UNSHIELDED TWISTED PAIR

NOTES

1. CONTRACTOR SHALL REVIEW ALL SECURITY DRAWINGS AND SPECIFICATIONS THAT MAKE UP THE CONTRACT DOCUMENTS AND COMPLETE ALL WORK INCLUDED THEREIN (BY DIVISION 28).
2. SCALE OF SECURITY DRAWINGS IS PROVIDED FOR REFERENCE ONLY. CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER CABLE LENGTHS, SIZE OF PATHWAYS, DIMENSIONS, ETC.
3. SECURITY DRAWINGS SHALL BE USED TO COMPLEMENT THE WRITTEN SPECIFICATIONS (BY DIVISION 28).
4. ANY DISCREPANCY OR CONFLICT WITHIN OR BETWEEN THE DRAWINGS AND SPECIFICATIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT/ENGINEER PRIOR TO PLACING A BID. DISCREPANCIES OR CONFLICTS NOT BROUGHT TO THE ATTENTION OF THE ARCHITECT/ENGINEER AND SUBSEQUENTLY CLARIFIED DURING THE BIDDING OF THE PROJECT WILL BE DEEMED TO HAVE BEEN BID OR PROPOSED IN THE MORE COSTLY OR DIFFICULT MANNER, AND THE BETTER QUALITY OR GREATER QUANTITY OF WORK SHALL BE PROVIDED BY THE CONTRACTOR IN ACCORDANCE WITH THE ARCHITECT'S/ENGINEER'S INTERPRETATION (BY DIVISION 28).

INDEX OF DRAWINGS

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SECURITY SYMBOLS & LEGEND

Sheet No:
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1 TS1.01 SECURITY SITE PLAN
SCALE: 1/32" = 1'-0"

GENERAL NOTES

1. ALL CONDUIT PATHWAYS, ROUGH-INS, CONDUIT SLEEVES, ETC. INDICATED ON THE SECURITY DRAWINGS ARE TO BE PROVIDED AND INSTALLED BY DIVISION 26.
2. ALL POWER INDICATED ON THE SECURITY DRAWINGS SHALL BE PROVIDED AND INSTALLED (BY DIVISION 26).
3. CONTRACTOR SHALL RESTORE ALL PENETRATIONS PROVIDED THROUGH FIRE RATED WALLS/STRUCTURES FOR DATA, VOICE, AND SECURITY CABLING BACK TO THE ORIGINAL RATING (BY DIVISION 26).
4. CONTRACTOR SHALL RESTORE ALL PENETRATIONS PROVIDED THROUGH NON-RATED WALLS/STRUCTURES FOR DATA, VOICE, AND SECURITY CABLING FOR SOUND TO REDUCE NOISE TRAVELING THROUGH PENETRATIONS (BY DIVISION 26).
5. CABLING FOR DATA, VOICE, AND SECURITY SHALL BE ROUTED IN SEPARATE PATHWAYS IN J-HOOKS, CONDUITS, CONDUIT SLEEVES, CORES, ETC. THROUGHOUT THE ENTIRE PATHWAY. DIFFERENT MEDIA TYPES (DATA, VOICE, SECURITY, ETC.) SHALL NOT SHARE THE SAME J-HOOK, CONDUIT, CONDUIT SLEEVE, CORE, ETC., (BY DIVISION 26).
6. ALL CONDUITS FOR DATA, VOICE, AND SECURITY DEVICES SHALL ROUTE FROM THE DEVICE LOCATION AND TERMINATE ABOVE AN ACCESSIBLE CEILING IN THE SAME ROOM WHERE THE DEVICE IS LOCATED. IF THE ROOM WHERE THE DEVICE IS LOCATED DOES NOT HAVE AN ACCESSIBLE CEILING, THE CONDUIT SHALL ROUTE TO THE NEAREST ACCESSIBLE CEILING OFF OF A MAIN CORRIDOR. CONDUIT PATHWAY SHALL TAKE THE SHORTEST ROUTE TO THE APPLICABLE DATA ROOM TO MINIMIZE THE CABLE LENGTH (BY DIVISION 26).
7. CONDUIT SEGMENTS SHALL BE NO MORE THAN 100-FEET IN LENGTH WITH NO MORE THAN THE EQUIVALENT OF (2) 90 DEGREE BENDS BETWEEN PULLING POINTS (BY DIVISION 26).
8. CONDUITS SHALL MAINTAIN A BEND RADIUS OF 6 TIMES THE DIAMETER OF THE CONDUIT FOR CONDUITS 2-INCHES OR SMALLER AND 10 TIMES THE DIAMETER OF THE CONDUIT FOR CONDUITS GREATER THAN 2-INCHES (BY DIVISION 26).
9. ALL CONDUITS SHALL HAVE A PULL STRING INSTALLED FOR PULLING OF CABLE. CLEARLY LABEL AS "PULL STRING" INDICATING OPPOSITE END LOCATION (BY DIVISION 26).
10. ALL SPARE CONDUITS OR CONDUITS FILLED WITH LESS THAN THE MAXIMUM ALLOWED FILL RATIO SHALL HAVE A PULL STRING INSTALLED AND LEFT FOR FUTURE PULLING OF CABLE. CLEARLY LABEL AS "PULL STRING" INDICATING OPPOSITE END LOCATION (BY DIVISION 26).
11. EXISTING CONDUIT AND DATA CABLE THAT FEEDS EXISTING SURVEILLANCE CAMERAS. IF REMOVAL IS NECESSARY, COORDINATE WITH THE ARCHITECT/ENGINEER PRIOR TO REMOVAL (BY DIVISIONS 26 AND 27).

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Project:
IL TEXAS PEARLAND K-8
SITE TBD, NEW CANEY, TX ZIP TBD

COMBS RFP- 11/11/22

Project No:	21-049
Date:	11/11/22
Checked By:	DG
Drawn By:	JR

Sheet Name:
SECURITY SITE PLAN

Sheet No:
TS1.01

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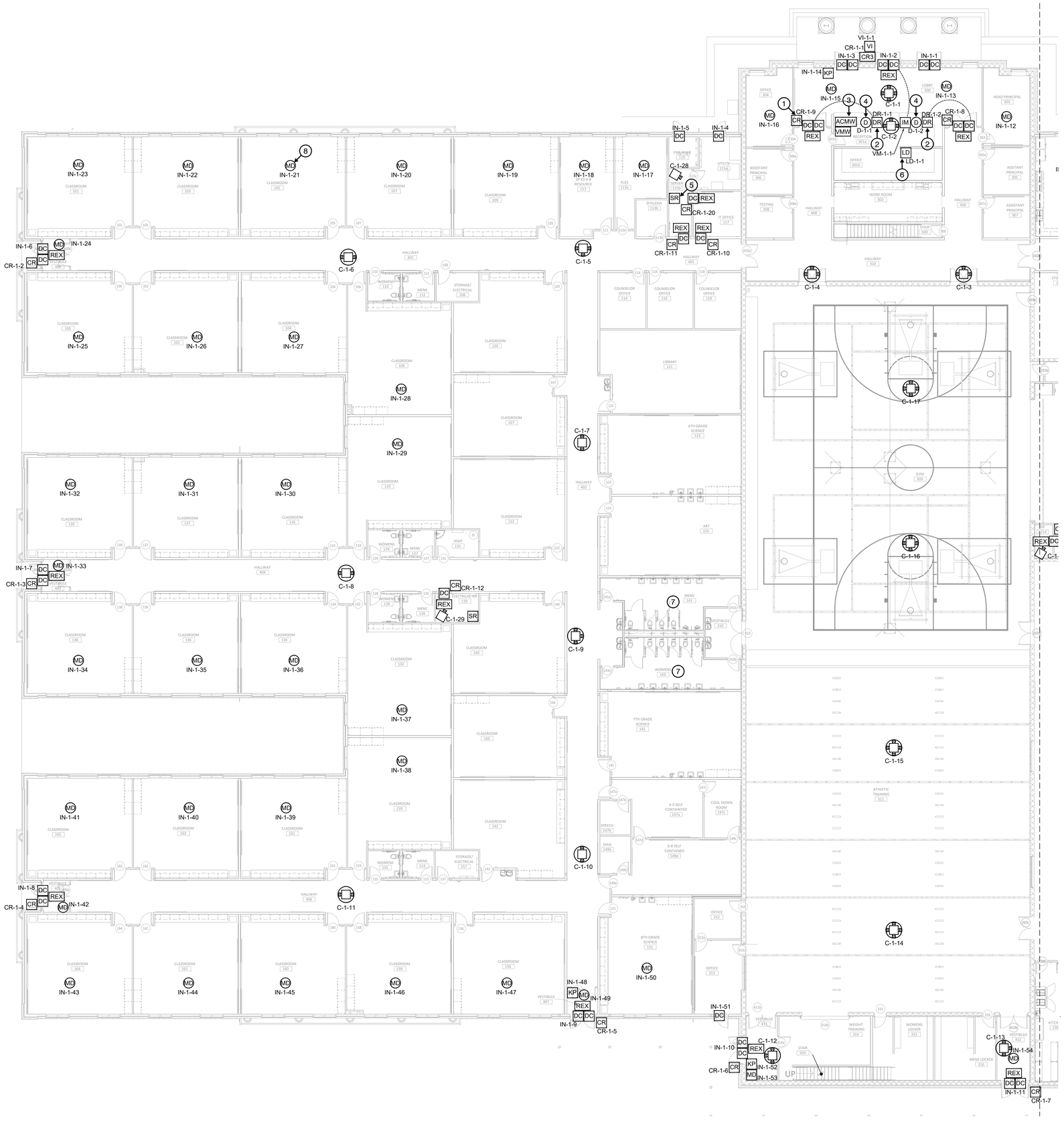


1 TS2.11a SECURITY LEVEL 1 - AREA A FLOOR PLAN

SCALE: 3/32" = 1'-0"

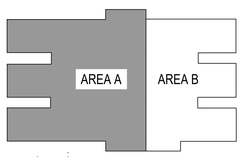
GENERAL NOTES

1. ALL CONDUIT PATHWAYS, ROUGH-INS, CONDUIT SLEEVES, ETC. INDICATED ON THE SECURITY DRAWINGS ARE TO BE PROVIDED AND INSTALLED BY DIVISION 26.
2. ALL POWER INDICATED ON THE SECURITY DRAWINGS SHALL BE PROVIDED AND INSTALLED (BY DIVISION 26).
3. CONTRACTOR SHALL RESTORE ALL PENETRATIONS PROVIDED THROUGH FIRE RATED WALLS/STRUCTURES FOR DATA, VOICE, AND SECURITY CABLING BACK TO THE ORIGINAL RATING (BY DIVISION 26).
4. CONTRACTOR SHALL RESTORE ALL PENETRATIONS PROVIDED THROUGH NON-RATED WALLS/STRUCTURES FOR DATA, VOICE, AND SECURITY CABLING FOR SOUND TO REDUCE NOISE TRAVELING THROUGH PENETRATIONS (BY DIVISION 26).
5. CABLING FOR DATA, VOICE, AND SECURITY SHALL BE ROUTED IN SEPARATE PATHWAYS IN J-HOOKS, CONDUITS, CONDUIT SLEEVES, CORES, ETC. THROUGHOUT THE ENTIRE PATHWAY. DIFFERENT MEDIA TYPES (DATA, VOICE, SECURITY, ETC.) SHALL NOT SHARE THE SAME J-HOOK, CONDUIT, CONDUIT SLEEVE, CORE, ETC., (BY DIVISION 26).
6. ALL CONDUITS FOR DATA, VOICE, AND SECURITY DEVICES SHALL ROUTE FROM THE DEVICE LOCATION AND TERMINATE ABOVE AN ACCESSIBLE CEILING IN THE SAME ROOM WHERE THE DEVICE IS LOCATED. IF THE ROOM WHERE THE DEVICE IS LOCATED DOES NOT HAVE AN ACCESSIBLE CEILING, THE CONDUIT SHALL ROUTE TO THE NEAREST ACCESSIBLE CEILING OFF OF A MAIN CORRIDOR. CONDUIT PATHWAY SHALL TAKE THE SHORTEST ROUTE TO THE APPLICABLE DATA ROOM TO MINIMIZE THE CABLE LENGTH (BY DIVISION 26).
7. CONDUIT SEGMENTS SHALL BE NO MORE THAN 100-FEET IN LENGTH WITH NO MORE THAN THE EQUIVALENT OF (2) 90 DEGREE BENDS BETWEEN PULLING POINTS (BY DIVISION 26).
8. CONDUITS SHALL MAINTAIN A BEND RADIUS OF 6 TIMES THE DIAMETER OF THE CONDUIT FOR CONDUITS 2-INCHES OR SMALLER AND 10 TIMES THE DIAMETER OF THE CONDUIT FOR CONDUITS GREATER THAN 2-INCHES (BY DIVISION 26).
9. ALL CONDUITS SHALL HAVE A PULL STRING INSTALLED FOR PULLING OF CABLE. CLEARLY LABEL AS "PULL STRING" INDICATING OPPOSITE END LOCATION (BY DIVISION 26).
10. ALL SPARE CONDUITS OR CONDUITS FILLED WITH LESS THAN THE MAXIMUM ALLOWED FILL RATIO SHALL HAVE A PULL STRING INSTALLED AND LEFT FOR FUTURE PULLING OF CABLE. CLEARLY LABEL AS "PULL STRING" INDICATING OPPOSITE END LOCATION (BY DIVISION 26).
11. EXISTING CONDUIT AND DATA CABLE THAT FEEDS EXISTING SURVEILLANCE CAMERAS. IF REMOVAL IS NECESSARY, COORDINATE WITH THE ARCHITECT/ENGINEER PRIOR TO REMOVAL (BY DIVISIONS 26 AND 27).

KEYED NOTES

1. CARD READER DOOR LOCATION. CONFIRM IF BACKBOX AND CONDUIT REQUIRED FOR CARD READER BASED ON DOOR HARDWARE SCHEDULE.
2. DOOR RELEASE BUTTON SHALL BE AN INPUT TO THE GENETEC SYSTEM.
3. APPROXIMATE LOCATION OF OWNER FURNISHED / OWNER INSTALLED ACCESS CONTROL / ALARM MANAGEMENT AND VIDEO SURVEILLANCE WORKSTATION.
4. DURESS BUTTON LOCATION, COORDINATE NOTIFICATION METHODS AND INTEGRATIONS WITH OWNER. TYPICAL.
5. INTRUSION ALARM/CONTROL PANEL SHALL BE INTEGRATED WITH ACCESS CONTROL SYSTEM. COORDINATE WITH OWNER FOR SCHEDULES OF ARM/DISARM AND NOTIFICATION METHODS.
6. WALL MOUNTED EMERGENCY PUSH BUTTON (LOCKDOWN) WITH COVER.
7. PROVIDE AND INSTALL VAPE SENSOR INTEGRATED INTO GENETEC SYSTEM.
8. EXTERIOR DOOR CONTACTS AND MOTION DETECTORS SHALL BE CABLED TO INTRUSION SYSTEM AND GENETEC SYSTEM.

KEYPLAN



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Project: IL TEXAS PEARLAND K-8
SITE TBD, NEW CANEY, TX ZIP TBD

COMBS RFP- 11/11/22

Project No:	21-049
Date:	11/11/22
Checked By:	DG
Drawn By:	JR

Sheet Name:

SECURITY LEVEL 1
AREA A FLOOR PLAN

Sheet No:

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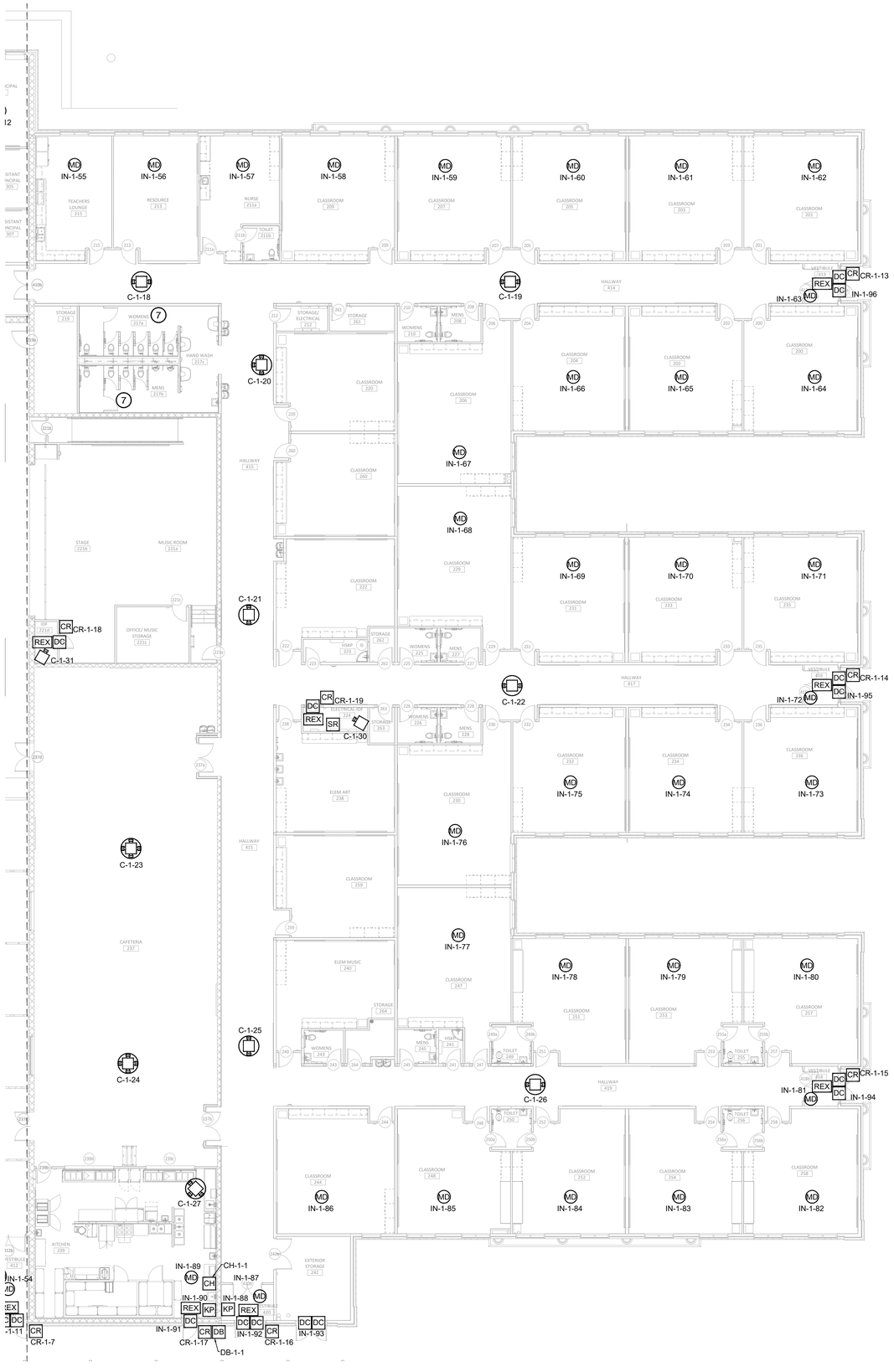
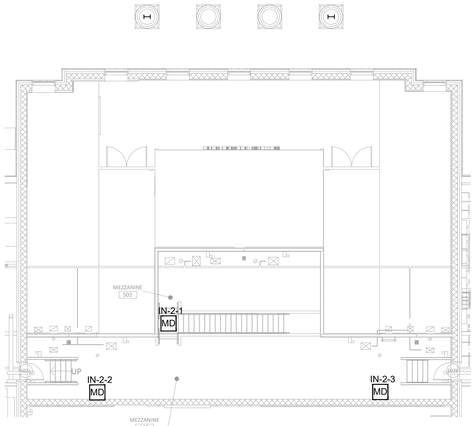


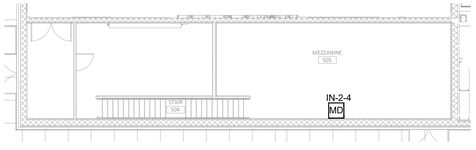
1 TS2.11b SECURITY LEVEL 1 - AREA B FLOOR PLAN

SCALE: 3/32" = 1'-0"



2 TA2.11b SECURITY MEZZANINE 502 FLOOR PLAN

SCALE: 3/32" = 1'-0"



3 TA2.11b SECURITY MEZZANINE 504 FLOOR PLAN

SCALE: 3/32" = 1'-0"

GENERAL NOTES

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2. ALL POWER INDICATED ON THE SECURITY DRAWINGS SHALL BE PROVIDED AND INSTALLED (BY DIVISION 26).
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KEYED NOTES

1. CARD READER DOOR LOCATION. CONFIRM IF BACKBOX AND CONDUIT REQUIRED FOR CARD READER BASED ON DOOR HARDWARE SCHEDULE.
2. DOOR RELEASE BUTTON SHALL BE AN INPUT TO THE GENETEC SYSTEM.
3. APPROXIMATE LOCATION OF OWNER FURNISHED / OWNER INSTALLED ACCESS CONTROL / ALARM MANAGEMENT AND VIDEO SURVEILLANCE WORKSTATION.
4. DURESS BUTTON LOCATION, COORDINATE NOTIFICATION METHODS AND INTEGRATIONS WITH OWNER. TYPICAL.
5. INTRUSION ALARM/CONTROL PANEL SHALL BE INTEGRATED WITH ACCESS CONTROL SYSTEM. COORDINATE WITH OWNER FOR SCHEDULES OF ARM/DISARM AND NOTIFICATION METHODS.
6. WALL MOUNTED EMERGENCY PUSH BUTTON (LOCKDOWN) WITH COVER.
7. PROVIDE AND INSTALL VAPE SENSOR INTEGRATED INTO GENETEC SYSTEM.
8. EXTERIOR DOOR CONTACTS AND MOTION DETECTORS SHALL BE CABLED TO INTRUSION SYSTEM AND GENETEC SYSTEM.

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Project:
IL TEXAS PEARLAND K-8
SITE TBD, NEW CANEY, TX ZIP TBD

COMBS RFP- 11/11/22

Project No:	21-049
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Checked By:	DG
Drawn By:	JR

Sheet Name:

SECURITY LEVEL 1
AREA B FLOOR PLAN

KEYPLAN

Sheet No:

TS2.11b

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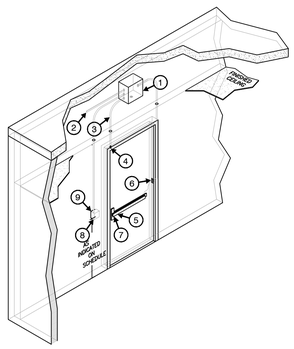


KEYED NOTES:

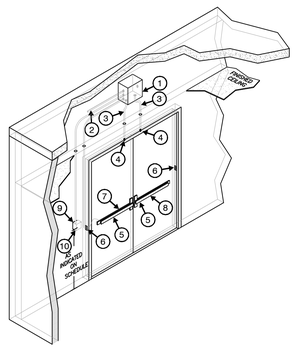
1. (1) 12-INCH WIDE X 12-INCH HIGH X 8-INCH DEEP JUNCTION BOX MOUNTED ABOVE ACCESSIBLE CEILING ON SECURE SIDE OF DOOR (BY DIV. 26).
2. (1) 1-INCH CONDUIT FROM 12-INCH WIDE X 12-INCH HIGH X 8-INCH DEEP JUNCTION BOX TO ABOVE ACCESSIBLE CEILING ON SECURE SIDE OF DOOR FOR ACCESS CONTROL CABLE (BY DIV. 26).
3. (1) 1/2-INCH CONDUIT FROM 12-INCH WIDE X 12-INCH HIGH X 8-INCH DEEP JUNCTION BOX TO HEAD OF DOOR FRAME FOR CONCEALED DOOR POSITION SWITCH. STUB CONDUIT INTO HEAD OF DOOR FRAME 6-INCHES FROM THE STRIKE SIDE OF THE DOOR. PROVIDE A 3-INCH BLOCKOUT FOR GROUTED DOORS (BY DIV. 26).

   CONCEALED DOOR POSITION SWITCH (BY DIV. 28).
4. (1) REQUEST TO EXIT INTEGRAL TO EXIT DEVICE (BY DIV. 28).
5. (1) 3/4-INCH CONDUIT FROM 12-INCH WIDE X 12-INCH HIGH X 8-INCH DEEP JUNCTION BOX DOWN DOOR FRAME FOR POWER TRANSFER HINGE (BY DIV. 26).
6. (1) ELECTRIFIED EXIT DEVICE ON SECURE SIDE OF DOOR (BY DIV. 28).
7. (1) 3/4-INCH CONDUIT FROM 12-INCH WIDE X 12-INCH HIGH X 8-INCH DEEP JUNCTION BOX TO A RECESSED
8. DOUBLE GANG BOX WITH A SINGLE GANG PLASTER RING FOR CARD READER ON UNSECURE SIDE OF DOOR (BY DIV. 26).

   (1) CARD READER ON UNSECURE SIDE OF DOOR (BY DIV. 28).
9.

TYPICAL WALL MOUNTED CARD READER WITH ELECTRIFIED EXIT DEVICE AND REQUEST TO EXIT INTEGRAL SWITCH

1 / TS4.00 SCALE: N.T.S.



KEYED NOTES:

1. (1) 12-INCH WIDE X 12-INCH HIGH X 8-INCH DEEP JUNCTION BOX MOUNTED ABOVE ACCESSIBLE CEILING ON SECURE SIDE OF DOOR (BY DIV. 26).
2. (1) 1-INCH CONDUIT FROM 12-INCH WIDE X 12-INCH HIGH X 8-INCH DEEP JUNCTION BOX TO ABOVE ACCESSIBLE CEILING ON SECURE SIDE OF DOOR FOR ACCESS CONTROL CABLE (BY DIV. 26).
3. (1) 1/2-INCH CONDUIT FROM 12-INCH WIDE X 12-INCH HIGH X 8-INCH DEEP JUNCTION BOX TO HEAD OF DOOR FRAME FOR CONCEALED DOOR POSITION SWITCH. STUB CONDUIT INTO HEAD OF DOOR FRAME 6-INCHES FROM THE STRIKE SIDE OF THE DOOR. PROVIDE A 3-INCH BLOCKOUT FOR GROUTED DOORS (BY DIV. 26).

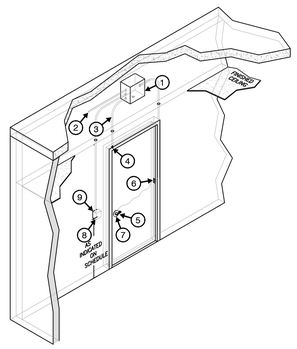
   CONCEALED DOOR POSITION SWITCH (BY DIV. 28).
4. (1) REQUEST TO EXIT (BY DIV. 28).
5. (1) 3/4-INCH EMT CONDUIT FROM 12-INCH WIDE X 12-INCH HIGH X 8-INCH DEEP JUNCTION BOX DOWN
6. DOOR FRAME FOR POWER TRANSFER HINGE (BY DIV. 26).

   (1) ELECTRIFIED EXIT DEVICE ON SECURE SIDE OF DOOR (BY DIV. 28).
7. (1) MECHANICAL EXIT DEVICE ON SECURE SIDE OF DOOR (BY DIV. 8).
8. (1) 3/4-INCH CONDUIT FROM 12-INCH WIDE X 12-INCH HIGH X 8-INCH DEEP JUNCTION BOX TO A RECESSED
9. DOUBLE GANG BOX WITH A SINGLE GANG PLASTER RING FOR CARD READER ON UNSECURE SIDE OF DOOR (BY DIV. 26).

   (1) CARD READER ON UNSECURE SIDE OF DOOR (BY DIV. 28).
10.

TYPICAL WALL MOUNTED CARD READER WITH SINGLE ELECTRIFIED EXIT DEVICE AND REQUEST TO EXIT INTEGRAL SWITCH

2 / TS4.00 SCALE: N.T.S.



KEYED NOTES:

1. (1) 12-INCH WIDE X 12-INCH HIGH X 8-INCH DEEP JUNCTION BOX MOUNTED ABOVE ACCESSIBLE CEILING ON SECURE SIDE OF DOOR (BY DIV. 26).
2. (1) 1-INCH CONDUIT FROM 12-INCH WIDE X 12-INCH HIGH X 8-INCH DEEP JUNCTION BOX TO ABOVE ACCESSIBLE CEILING ON SECURE SIDE OF DOOR FOR ACCESS CONTROL CABLE (BY DIV. 26).
3. (1) 1/2-INCH CONDUIT FROM 12-INCH WIDE X 12-INCH HIGH X 8-INCH DEEP JUNCTION BOX TO HEAD OF DOOR FRAME FOR CONCEALED DOOR POSITION SWITCH. STUB CONDUIT INTO HEAD OF DOOR FRAME 6-INCHES FROM THE STRIKE SIDE OF THE DOOR. PROVIDE A 3-INCH BLOCKOUT FOR GROUTED DOORS (BY DIV. 26).

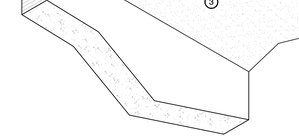
   CONCEALED DOOR POSITION SWITCH (BY DIV. 28).
4. (1) REQUEST TO EXIT INTEGRAL TO LEVERSET (BY DIV. 28).
5. (1) 3/4-INCH CONDUIT FROM 12-INCH WIDE X 12-INCH HIGH X 8-INCH DEEP JUNCTION BOX DOWN DOOR FRAME
6. FOR POWER TRANSFER HINGE (BY DIV. 26).

   (1) ELECTRIFIED LEVERSET ON SECURE SIDE OF DOOR (BY DIV. 28).
7. (1) 3/4-INCH CONDUIT FROM 12-INCH WIDE X 12-INCH HIGH X 8-INCH DEEP JUNCTION BOX TO A RECESSED
8. DOUBLE GANG BOX WITH A SINGLE GANG PLASTER RING FOR CARD READER ON UNSECURE SIDE OF DOOR (BY DIV. 26).

   (1) CARD READER ON UNSECURE SIDE OF DOOR (BY DIV. 28).
9.

TYPICAL WALL MOUNTED CARD READER WITH ELECTRIFIED LEVERSET AND REQUEST TO EXIT INTEGRAL SWITCH

3 / TS4.00 SCALE: N.T.S.



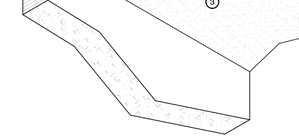
KEYED NOTES:

1. CEILING DECK AS SCHEDULED.
2. LAY-IN CEILING AS SCHEDULED.
3. CEILING MOUNTED GLASS BREAK DETECTOR (REFERENCE DIV 28 SPECIFICATIONS FOR EXACT MODEL).
4. 20 FOOT SERVICE LOOP ABOVE ACCESSIBLE CEILING NEATLY COILED AND SECURED TO J-HOOK (BY DIV 28).

   J-HOOK ABOVE ACCESSIBLE CEILING (BY DIV 28).
5. SECURITY CABLE ABOVE ACCESSIBLE CEILING (BY DIV 28).
6.

TYPICAL INTERIOR CEILING MOUNTED GLASS BREAK DETECTOR

4 / TS4.00 SCALE: N.T.S.



KEYED NOTES:

1. CEILING DECK AS SCHEDULED.
2. LAY-IN CEILING AS SCHEDULED.
3. CEILING MOUNTED MOTION DETECTOR (REFERENCE DIV 28 SPECIFICATIONS FOR EXACT MODEL).
4. 20 FOOT SERVICE LOOP ABOVE ACCESSIBLE CEILING NEATLY COILED AND SECURED TO J-HOOK (BY DIV 28).

   J-HOOK ABOVE ACCESSIBLE CEILING (BY DIV 28).
5. SECURITY CABLE ABOVE ACCESSIBLE CEILING (BY DIV 28).
6.

TYPICAL INTERIOR CEILING MOUNTED MOTION DETECTOR

5 / TS4.00 SCALE: N.T.S.

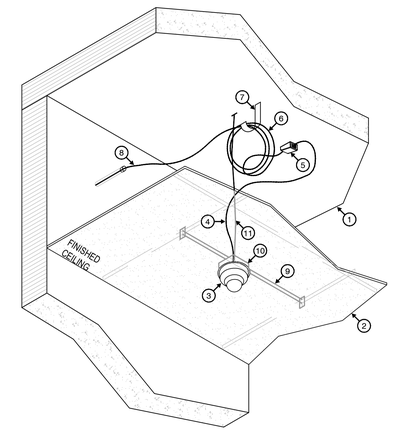
KEYED NOTES:

1. DOUBLE GANG BOX (BY DIV 26). RECESS WHEN POSSIBLE.
2. 1-INCH CONDUIT FROM DOUBLE GANG BOX WITH 200 LBS PULL STRING AND NYLON BUSHING STUBBED TO CABLE TRAY (BY DIV 26).

   DOUBLE GANG PLASTER RING (BY DIV 26).
3. SCHEDULED ARM/DISARM KEYPAD (REFERENCE SPECIFICATION).
4.

TYPICAL ARM/DISARM KEYPAD DETAIL

6 / TS4.00 SCALE: N.T.S.

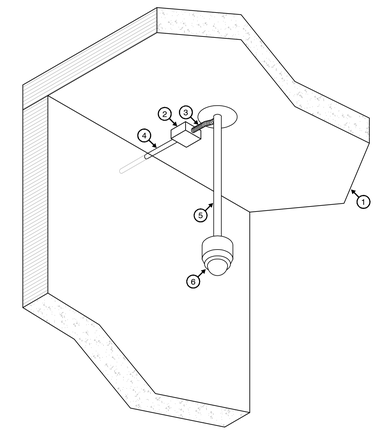


KEYED NOTES:

1. CEILING DECK AS SCHEDULED.
2. LAY-IN CEILING AS SCHEDULED.
3. CEILING MOUNTED INTERIOR IP VIDEO SURVEILLANCE DOME CAMERA (REFERENCE DIV 28 SPECIFICATIONS FOR EXACT MODEL).
4. PATCH CORD (BY DIV 27).
5. SURFACE MOUNT DATA OUTLET ABOVE ACCESSIBLE CEILING (BY DIV 27).
6. 20 FOOT SERVICE LOOP ABOVE ACCESIBLE CEILING NEATLY COILED AND SECURED TO J-HOOK (BY DIV 27).
7. J-HOOK ABOVE ACCESSIBLE CEILING (BY DIV 27).
8. DATA CABLE ABOVE ACCESSIBLE CEILING (BY DIV 27).
9. HEAVY DUTY T-GRID, SURVEILLANCE CAMERA SUPPORT ATTACHED TO CEILING GRID (BY DIV 26).
10. DOUBLE GANG BACKBOX WITH DUAL-GANG MUD RING (BY DIV 26).
11. GUIDEWIRE FROM DOUBLE GANG BACKBOX WITH DUAL-GANG MUD RING TO STRUCTURE (BY DIV 26).

TYPICAL INTERIOR CEILING MOUNTED SURVEILLANCE CAMERA

7 / TS4.00 SCALE: N.T.S.



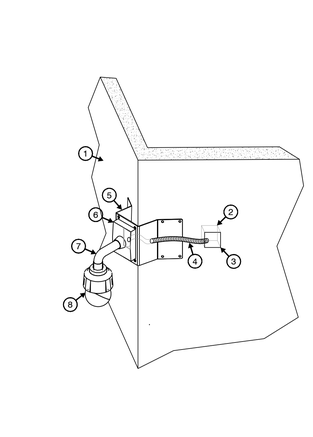
KEYED NOTES:

1. CEILING DECK AS SCHEDULED.
2. DOUBLE GANG WEATHERPROOF BACK BOX WITH A BLANK COVER PLATE SURFACE MOUNTED TO THE CEILING (BY DIV. 26).
3. 6 FEET OF 3/4-INCH LIQUID TIGHT FLEXIBLE STEEL CONDUIT CONNECTED TO THE 4 11/16-INCH X 4 11/16-INCH X 2 1/8-INCH DEEP WEATHERPROOF BACK BOX (BY DIV. 26).
4. (1) 1-INCH CONDUIT WITH 200 LBS. PULL STRING AND NYLON BUSHING FROM THE WEATHERPROOF BACK BOX TO THE IDF ROOM OR NEAREST ACCESSIBLE CEILING (BY DIV. 26).
5. PENDANT MOUNT FOR FIXED SURVEILLANCE CAMERA SURFACE MOUNTED TO THE CEILING AND EXTENDING EVEN WITH BEAMS ENSURING VIEW OF CAMERA MOUNTED ON PENDANT IS NOT OBSTRUCTED BY BEAMS. COMPLETE ALL CONNECTIONS OF FLEXIBLE CONDUIT AND CABLING TO CAMERA (BY DIV. 28).

   FIXED SURVEILLANCE CAMERA IN DOME ENCLOSURE MOUNTED TO PENDANT. CAMERA SHALL BE MOUNTED AS CLOSE TO BEAMS AS POSSIBLE WITHOUT OBSTRUCTING VIEW OF CAMERA.
6.

TYPICAL INTERIOR PENDANT MOUNTED SURVEILLANCE CAMERA

8 / TS4.00 SCALE: N.T.S.



KEYED NOTES:

1. SCHEDULED EXTERIOR WALL.
2. 4 11/16" X 4 11/16" X 2 1/8" DOUBLE GANG WATER PROOF BACKBOX INSTALLED FLUSH WITH THE BUILDING CONTRACTOR SHALL INSTALL BACKBOX NO FURTHER THAN 18-INCHES FROM THE CORNER OF THE BUILDING.

   ADJUSTABLE SEAL TIGHT BACKBOX WATER PROOF COVER PLATE.
3. 3/4-INCH SEAL TIGHT FROM 4 11/16" X 4 11/16" X 2 1/8" DOUBLE GANG WATER PROOF
4. BACKBOX COVER PLATE TO WALL MOUNTED CORNER BRACKET.

   CORNER MOUNT BRACKET.
5. WALL MOUNT BRACKET.
6. PENDANT KIT.
7. PTZ SURVEILLANCE CAMERA.
8.

TYPICAL EXTERIOR PTZ CORNER MOUNTED SURVEILLANCE CAMERA

9 / TS4.00 SCALE: N.T.S.

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Drawn By:	JR

Sheet Name:

SECURITY TYPICAL DETAILS

Sheet No:

TS4.00

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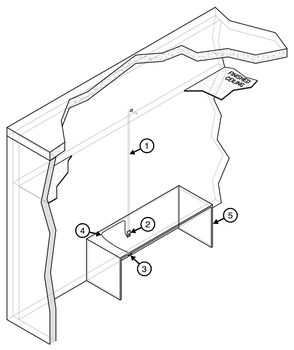
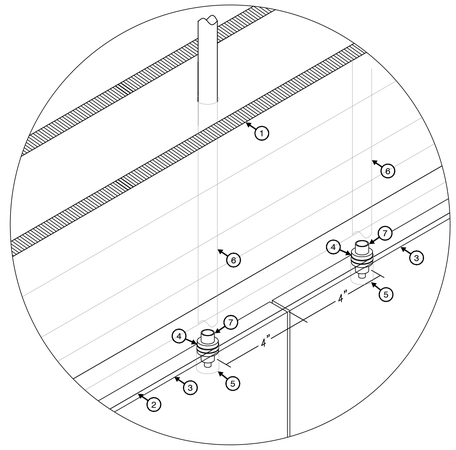


KEYED NOTES

1. 1-INCH CONDUIT FROM DOUBLE GANG BOX WITH 200 LBS PULL STRING AND NYLON BUSHING STUBBED ACCESSIBLE CEILING (BY DIV. 26).
2. RECESSED DOUBLE GANG JUNCTION BOX WITH COVER PLATE MOUNTED AT 1'-6" A.F.F. (BY DIV. 26).
3. DURESS BUTTON MOUNTED WITH KNEE SPACE OF DESK (BY DIV. 28).
4. ARMORED CABLE FROM DOUBLE GANG JUNCTION BOX TO DURESS BUTTON ATTACHED TO WALL AND UNDER SIDE OF DESK.
5. DESK/COUNTER AS SCHEDULED.

1 / TS4.01 TYPICAL PANIC BUTTON - KNEE SPACE MOUNT

SCALE: N.T.S.



KEYED NOTES:

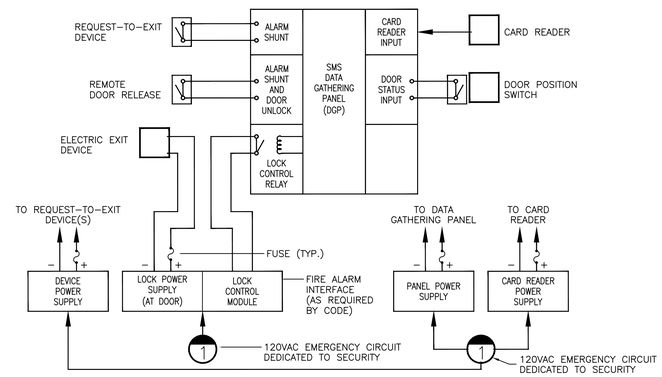
1. SCHEDULED PARTITION.
2. HEAD OF DOOR FRAME. PROVIDE TAB AT DOOR FRAME TO SECURE CONDUIT DIRECTLY ABOVE DOOR POSITION SWITCH.
3. SCHEDULED DOOR.
4. 3/4" DIAMETER HOLE IN THE HEAD OF FRAME FOR CONCEALED DOOR CONTACT.
5. 3/4" DIAMETER X 1 5/8" DEEP HOLE IN TOP OF DOOR FOR CONCEALED DOOR CONTACT MAGNET.
6. 1/2" CONDUIT FROM 6" X 6" X 4" JUNCTION BOX ABOVE DOOR (BY DIV 26).
7. DOOR CONTACT (REFERENCE SPECIFICATION).

2 / TS4.01 TYPICAL DOOR CONTACT - DOUBLE DOOR RECESSED

SCALE: SCALE

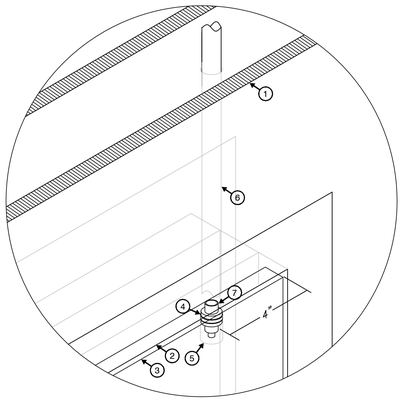
NOTES:

1. BLOCK DIAGRAM REPRESENTS TYPICAL CONTROLLED DOOR WITH ELECTRIC EXIT DEVICE SEE THE PLANS FOR THE EXACT DEVICES ASSOCIATED WITH EACH DOOR.
2. ALL POWER SUPPLIES AND RELAYS SHALL BE U.L. LISTED. PROVIDE INDIVIDUALLY FUSED OUTPUTS TO EACH LOCK/DEVICE. PROVIDE 4 HOUR BATTERY BACK-UP FOR EACH POWER SUPPLY.
3. BLOCK DIAGRAM REPRESENTS FAIL-SECURE LOCK CONDITION FOR FAIL-SAFE WIRE LOCK POWER THROUGH NORMALLY OPEN (CLOSES WHEN PANEL IS ENERGIZED) LOCK CONTROL RELAY CONTACTS, ADD INTERFACE WITH FIRE ALARM SYSTEM (AS REQUIRED BY APPLICABLE CODES), CONNECT POWER SUPPLY TO NON-EMERGENCY BUILDING POWER, AND OMIT BATTERY BACKUP FOR THE LOCK POWER SUPPLY.



3 / TS4.01 TYPICAL CARD READER - ELECTRIC EXIT DEVICE BLOCK DIAGRAM

SCALE: N.T.S.

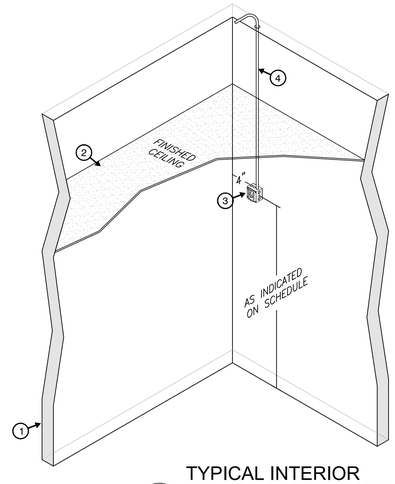


KEYED NOTES:

1. SCHEDULED PARTITION.
2. HEAD OF DOOR FRAME. PROVIDE TAB AT DOOR FRAME TO SECURE CONDUIT DIRECTLY ABOVE DOOR POSITION SWITCH.
3. SCHEDULED DOOR.
4. 3/4" DIAMETER HOLE IN THE HEAD OF FRAME FOR CONCEALED DOOR CONTACT.
5. 3/4" DIAMETER X 1 5/8" DEEP HOLE IN TOP OF DOOR FOR CONCEALED DOOR CONTACT MAGNET.
6. 1/2" CONDUIT FROM 6" X 6" X 4" JUNCTION BOX ABOVE DOOR (BY DIV 26).
7. DOOR CONTACT (REFERENCE SPECIFICATION).

4 / TS4.01 TYPICAL DOOR CONTACT - SINGLE DOOR RECESSED

SCALE: SCALE

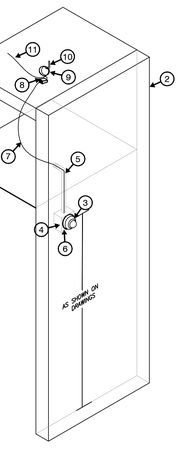


KEYED NOTES:

1. SCHEDULED WALL.
2. SCHEDULED CEILING.
3. 4 11/16-INCH x 4 11/16-INCH x 2 1/8-INCH RECESSED DOUBLE GANG BOX WITH SINGLE GANG PLASTER RING (BY DIV 16).
4. 1-INCH CONDUIT FROM DOUBLE GANG BOX WITH 200 LBS PULL STRING AND NYLON BUSHING STUBBED OUT ABOVE ACCESSIBLE CEILING IN THE SAME ROOM WHERE THE DEVICE IS LOCATED. IF THE ROOM WHERE THE DEVICE IS LOCATED DOES NOT HAVE AN ACCESSIBLE CEILING, THE CONDUIT SHALL ROUTE TO THE NEAREST ACCESSIBLE CEILING OFF OF A MAIN CORRIDOR. CONDUIT PATHWAY SHALL TAKE THE SHORTEST ROUTE TO THE APPLICABLE MDF/IDF ROOM TO MINIMIZE THE CABLE LENGTH (BY DIV 16).

5 / TS4.01 TYPICAL INTERIOR WALL-MOUNTED MOTION DETECTOR

SCALE: N.T.S.

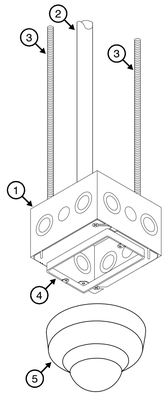


KEYED NOTES:

1. CEILING DECK AS SCHEDULED.
2. INTERIOR WALL AS SCHEDULED.
3. INTERIOR WALL MOUNTED IP VIDEO SURVEILLANCE DOME CAMERA (REFERENCE SPECIFICATION).
4. 4 11/16" x 4 11/16" x 2 1/8" RECESSED DOUBLE GANG BOX (BY DIV 26).
5. 3/4-INCH CONDUIT FROM DOUBLE GANG BOX WITH 200 LBS PULL STRING AND NYLON BUSHING STUBBED OUT ABOVE ACCESSIBLE CEILING (BY DIV 26).
6. DOUBLE GANG PLASTER RING (BY DIV 26).
7. PATCH CORD AS SPECIFIED.
8. SURFACE MOUNT BOX ABOVE ACCESSIBLE CEILING (BY DIV 27).
9. 20 FOOT SERVICE LOOP ABOVE ACCESSIBLE CEILING NEATLY COILED AND SECURED TO J-HOOK (BY DIV 27).
10. J-HOOK ABOVE ACCESSIBLE CEILING (BY DIV 27).
11. DATA CABLE ABOVE ACCESSIBLE CEILING (BY DIV 27).

6 / TS4.01 TYPICAL INTERIOR WALL MOUNTED SURVEILLANCE CAMERA

SCALE: N.T.S.



KEYED NOTES:

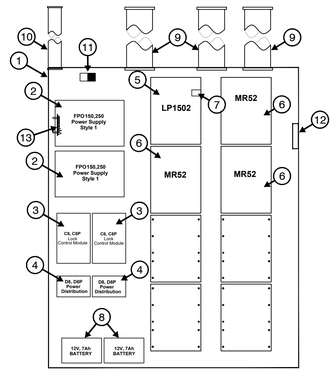
1. 4 11/16-INCH x 4 11/16-INCH x 2 1/8-INCH RECESSED DOUBLE GANG BOX (BY DIV 26).
2. 1-INCH CONDUIT FROM DOUBLE GANG BOX WITH 200 LBS PULL STRING AND NYLON BUSHING STUBBED OUT AT BUILDING STRUCTURE (BY DIV 26).
3. ALL THREAD TO BUILDING STRUCTURE.
4. SINGLE GANG PLASTER RING (BY DIV 26).
5. DOME CAMERA (BY DIV 28).

7 / TS4.01 TYPICAL STRUCTURE MOUNTED CAMERA

SCALE: N.T.S.

GENERAL NOTE:

1. THIS DETAIL IS FOR REFERENCE ONLY. IT SHALL BE THE RESPONSIBILITY OF THE SECURITY CONTRACTOR TO SIZE EACH ACCESS CONTROL PANEL WITH 20% ADDITIONAL OVERALL AMPERAGE. THE SECURITY CONTRACTOR SHALL REFERENCE THE DIVISION 8 FINISH HARDWARE SCHEDULE FOR ALL LOCK POWER REQUIREMENTS IN ORDER TO PROVIDE A FULLY FUNCTION ACCESS CONTROL SYSTEM. SECURITY CONTRACTOR SHALL VERIFY POWER SUPPLY COMPATIBILITY WITH DIVISION 8 CONTACTOR HARDWARE PRIOR TO INSTALLATION.



KEYED NOTES:

1. LIFESAFTEY ENCLOSURE (BY DIV. 28)
2. 12/24VDC POWER SUPPLY AS REQUIRED. IT IS THE RESPONSIBILITY OF THE DIV. 28 CONTRACTOR TO SIZE EACH POWER SUPPLY WITH 20% ADDITIONAL POWER FOR FUTURE GROWTH (BY DIV. 28)
3. DUAL VOLTAGE RELAY BASED LOCK CONTROL MODULE AS REQUIRED. EACH ELECTRIFIED LOCK SHALL BE PROTECTED BY A DEDICATED FUSED OUTPUT (BY DIV. 28)
4. DUAL VOLTAGE POWER DISTRIBUTION MODULE AS REQUIRED. EACH REQUEST TO EXIT MOTION SENSORS SHALL BE PROTECTED BY A DEDICATED FUSED OUTPUT (BY DIV. 28)
5. INTELLIGENT 2 DOOR CONTROLLER AS REQUIRED (BY DIV. 28)
6. 2 DOOR SUB CONTROLLER(S) AS REQUIRED (BY DIV. 28)
7. INTELLIGENT CONTROLLER NETWORK INTERFACE. (1) DATA CABLE SHALL BE PATCHED TO OWNER'S EXISTING NETWORK (BY DIV. 27)
8. BATTERY BACKUP AS SPECIFIED. BATTERIES SHALL BE MACHINE LABELED WITH THE DATE OF INSTALLATION. BATTERIES SHALL BE PLACED ON DIELECTRIC MATERIAL (BY DIV. 28)
9. PROVIDE 2-INCH CONDUIT STUBBED UP AS REQUIRED WITH THREADED NYLON BUSHING TO ENCLOSURE FOR LOW VOLTAGE SECURITY DEVICE CABLING. REFERENCE DEVICE SCHEDULES FOR QUANTITY NEEDED TO HOLD ALL CABLING AS REQUIRED (BY DIV. 26)
10. (1) 3/4-INCH CONDUIT WITH THREADED NYLON BUSHING NEAR POWER SUPPLY TERMINATION LOCATION. (BY DIV. 26)
11. MANUFACTURER PROVIDED CIRCUIT BREAKER ROCKER SWITCH CONNECTED TO 120VAC POWER SUPPLY CIRCUIT (BY DIV. 26)
12. SECURITY ENCLOSURE DOOR TAMPER SWITCH AS SPECIFIED (BY DIV. 28)
13. NETWORKED POWER SUPPLY STATUS MONITORING MODULE AS SPECIFIED (BY DIV. 28)

8 / TS4.01 TYPICAL ENCLOSED ACCESS CONTROL PANEL

SCALE: N.T.S.

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SECURITY TYPICAL DETAILS

Sheet No:

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VIDEO SURVEILLANCE SYSTEM DEVICE SCHEDULE

DEVICE NUMBER	DEVICE TYPE	INTERIOR / EXTERIOR	MOUNT	DEVICE HEIGHT (TO CENTER)	CAMERA MODEL
C-E-1	MULTI-SENSOR LENS	EXTERIOR	CORNER	11-FEET A.F.G.	PNM-9085RQZ
C-E-2	MULTI-SENSOR LENS	EXTERIOR	CORNER	11-FEET A.F.G.	PNM-9085RQZ
C-E-3	MULTI-SENSOR LENS	EXTERIOR	CORNER	11-FEET A.F.G.	PNM-9085RQZ
C-E-4	MULTI-SENSOR LENS	EXTERIOR	CORNER	11-FEET A.F.G.	PNM-9085RQZ
C-E-5	MULTI-SENSOR LENS	EXTERIOR	CANOPY	11-FEET A.F.G.	PNM-9085RQZ
C-E-6	MULTI-SENSOR LENS	EXTERIOR	CANOPY	11-FEET A.F.G.	PNM-9085RQZ
C-E-7	MULTI-SENSOR LENS	EXTERIOR	CORNER	11-FEET A.F.G.	PNM-9085RQZ
C-E-8	MULTI-SENSOR LENS	EXTERIOR	CORNER	11-FEET A.F.G.	PNM-9085RQZ
C-E-9	MULTI-SENSOR LENS	EXTERIOR	CORNER	11-FEET A.F.G.	PNM-9085RQZ
C-E-10	MULTI-SENSOR LENS	EXTERIOR	CORNER	11-FEET A.F.G.	PNM-9085RQZ
C-E-11	MULTI-SENSOR LENS	EXTERIOR	CORNER	11-FEET A.F.G.	PNM-9085RQZ
C-E-12	MULTI-SENSOR LENS	EXTERIOR	CORNER	11-FEET A.F.G.	PNM-9085RQZ
C-1-1	MULTI-SENSOR LENS	INTERIOR	CEILING	N/A	PNM-9084RQZ
C-1-2	PANORAMIC LENS	INTERIOR	CEILING	N/A	PNM-8082VT
C-1-3	PANORAMIC LENS	INTERIOR	CEILING	N/A	PNM-8082VT
C-1-4	PANORAMIC LENS	INTERIOR	CEILING	N/A	PNM-8082VT
C-1-5	PANORAMIC LENS	INTERIOR	CEILING	N/A	PNM-8082VT
C-1-6	DUAL SENSOR DOME	INTERIOR	CEILING	N/A	PNM-9000VD
C-1-7	DUAL SENSOR DOME	INTERIOR	CEILING	N/A	PNM-9000VD
C-1-8	DUAL SENSOR DOME	INTERIOR	CEILING	N/A	PNM-9000VD
C-1-9	PANORAMIC LENS	INTERIOR	CEILING	N/A	PNM-8082VT
C-1-10	DUAL SENSOR DOME	INTERIOR	CEILING	N/A	PNM-9000VD
C-1-11	DUAL SENSOR DOME	INTERIOR	CEILING	N/A	PNM-9000VD
C-1-12	PANORAMIC LENS	INTERIOR	CEILING	N/A	PNM-8082VT
C-1-13	PANORAMIC LENS	INTERIOR	CEILING	N/A	PNM-8082VT
C-1-14	MULTI-SENSOR LENS	INTERIOR	PENDANT	COORDINATE - WITH OWNER	PNM-9085RQZ
C-1-15	MULTI-SENSOR LENS	INTERIOR	PENDANT	COORDINATE - WITH OWNER	PNM-9085RQZ
C-1-16	MULTI-SENSOR LENS	INTERIOR	PENDANT	COORDINATE - WITH OWNER	PNM-9085RQZ
C-1-17	MULTI-SENSOR LENS	INTERIOR	PENDANT	COORDINATE - WITH OWNER	PNM-9085RQZ
C-1-18	DUAL SENSOR DOME	INTERIOR	CEILING	N/A	PNM-9000VD
C-1-19	DUAL SENSOR DOME	INTERIOR	CEILING	N/A	PNM-9000VD
C-1-20	PANORAMIC LENS	INTERIOR	CEILING	N/A	PNM-8082VT
C-1-21	DUAL SENSOR DOME	INTERIOR	CEILING	N/A	PNM-9000VD
C-1-22	DUAL SENSOR DOME	INTERIOR	CEILING	N/A	PNM-9000VD
C-1-23	MULTI-SENSOR LENS	INTERIOR	CEILING	N/A	PNM-9085RQZ
C-1-24	MULTI-SENSOR LENS	INTERIOR	CEILING	N/A	PNM-9085RQZ
C-1-25	DUAL SENSOR DOME	INTERIOR	CEILING	N/A	PNM-9000VD
C-1-26	DUAL SENSOR DOME	INTERIOR	CEILING	N/A	PNM-9000VD
C-1-27	PANORAMIC LENS	INTERIOR	WALL	9-FEET A.F.G	PNM-8082VT
C-1-28	SINGLE LENS DOME	INTERIOR	CEILING	N/A	PND-A9081RV
C-1-29	SINGLE LENS DOME	INTERIOR	WALL	9-FEET A.F.G	PND-A9081RV
C-1-30	SINGLE LENS DOME	INTERIOR	WALL	9-FEET A.F.G	PND-A9081RV
C-1-31	SINGLE LENS DOME	INTERIOR	WALL	9-FEET A.F.G	PND-A9081RV

ACCESS CONTROL SYSTEM DEVICE SCHEDULE

DEVICE NUMBER	DEVICE TYPE	MOUNT	DOOR TYPE	DEVICE HEIGHT (TO CENTER)	TERMINATION POINT	NOTES
CR-1-1	CARD READER	WALL	DOUBLE	48-INCHES A.F.F.	115B	DPDT DOOR CONTACT
CR-1-2	CARD READER	WALL	DOUBLE	48-INCHES A.F.F.	115B	DPDT DOOR CONTACT
CR-1-3	CARD READER	WALL	DOUBLE	48-INCHES A.F.F.	130	DPDT DOOR CONTACT
CR-1-4	CARD READER	WALL	DOUBLE	48-INCHES A.F.F.	130	DPDT DOOR CONTACT
CR-1-5	CARD READER	WALL	DOUBLE	48-INCHES A.F.F.	130	DPDT DOOR CONTACT
CR-1-6	CARD READER	WALL	DOUBLE	48-INCHES A.F.F.	130	DPDT DOOR CONTACT
CR-1-7	CARD READER	WALL	DOUBLE	48-INCHES A.F.F.	130	DPDT DOOR CONTACT
CR-1-8	CARD READER	WALL	DOUBLE	48-INCHES A.F.F.	115B	
CR-1-9	CARD READER	WALL	DOUBLE	48-INCHES A.F.F.	115B	
CR-1-10	CARD READER	WALL	SINGLE	48-INCHES A.F.F.	115B	
CR-1-11	CARD READER	WALL	SINGLE	48-INCHES A.F.F.	115B	
CR-1-12	CARD READER	WALL	SINGLE	48-INCHES A.F.F.	130	
CR-1-13	CARD READER	WALL	DOUBLE	48-INCHES A.F.F.	224	DPDT DOOR CONTACT
CR-1-14	CARD READER	WALL	DOUBLE	48-INCHES A.F.F.	224	DPDT DOOR CONTACT
CR-1-15	CARD READER	WALL	DOUBLE	48-INCHES A.F.F.	224	DPDT DOOR CONTACT
CR-1-16	CARD READER	WALL	DOUBLE	48-INCHES A.F.F.	224	DPDT DOOR CONTACT
CR-1-17	CARD READER	WALL	SINGLE	48-INCHES A.F.F.	224	DPDT DOOR CONTACT
CR-1-18	CARD READER	WALL	SINGLE	48-INCHES A.F.F.	224	DPDT DOOR CONTACT
CR-1-19	CARD READER	WALL	SINGLE	48-INCHES A.F.F.	224	
CR-1-20	CARD READER	WALL	SINGLE	48-INCHES A.F.F.	115B	
DR-1-1	DOOR RELEASE BUTTON	UNDER DESK	N/A	SEE TYPICAL DETAIL	115B	RELEASE 300B
DR-1-2	DOOR RELEASE BUTTON	UNDER DESK	N/A	SEE TYPICAL DETAIL	115B	RELEASE 300D
D-1-1	DURESS BUTTON	UNDER DESK	N/A	SEE TYPICAL DETAIL	115B	
D-1-2	DURESS BUTTON	UNDER DESK	N/A	SEE TYPICAL DETAIL	115B	
LD-1-1	LOCK DOWN BUTTON	WALL	N/A	48-INCHES A.F.F.	115B	
VI-1-1	VIDEO INTERCOM	WALL	N/A	48-INCHES A.F.F.	115B	
VM-1-1	PRIMARY INTERCOM	DESK TOP	N/A	N/A	115B	
DB-1-1	DOOR BELL	WALL	N/A	48-INCHES A.F.F.	N/A	
CH-1-1	CHIME	WALL	N/A	96-INCHES A.F.F.	N/A	

INTRUSION DETECTION SYSTEM DEVICE SCHEDULE

DEVICE NUMBER	DEVICE TYPE	MOUNT	DEVICE HEIGHT (TO CENTER)	TERMINATION POINT	NOTES
IN-1-1	DOOR CONTACT	RECESSED	N/A	115B	
IN-1-2	DOOR CONTACT	RECESSED	N/A	115B	
IN-1-3	DOOR CONTACT	RECESSED	N/A	115B	DPDT
IN-1-4	DOOR CONTACT	RECESSED	N/A	115B	
IN-1-5	DOOR CONTACT	RECESSED	N/A	115B	
IN-1-6	DOOR CONTACT	RECESSED	N/A	115B	DPDT
IN-1-7	DOOR CONTACT	RECESSED	N/A	130	DPDT
IN-1-8	DOOR CONTACT	RECESSED	N/A	130	DPDT
IN-1-9	DOOR CONTACT	RECESSED	N/A	130	DPDT
IN-1-10	DOOR CONTACT	RECESSED	N/A	130	DPDT
IN-1-11	DOOR CONTACT	RECESSED	N/A	130	DPDT
IN-1-12	MOTION	CEILING	N/A	115B	
IN-1-13	MOTION	CEILING	N/A	115B	
IN-1-14	KEYPAD	WALL	48-INCHES A.F.F.	115B	
IN-1-15	MOTION	CEILING	N/A	115B	
IN-1-16	MOTION	CEILING	N/A	115B	
IN-1-17	MOTION	CEILING	N/A	115B	
IN-1-18	MOTION	CEILING	N/A	115B	
IN-1-19	MOTION	CEILING	N/A	115B	
IN-1-20	MOTION	CEILING	N/A	115B	
IN-1-21	MOTION	CEILING	N/A	115B	
IN-1-22	MOTION	CEILING	N/A	115B	
IN-1-23	MOTION	CEILING	N/A	115B	
IN-1-24	MOTION	CEILING	N/A	115B	
IN-1-25	MOTION	CEILING	N/A	115B	
IN-1-26	MOTION	CEILING	N/A	115B	
IN-1-27	MOTION	CEILING	N/A	115B	
IN-1-28	MOTION	CEILING	N/A	115B	
IN-1-29	MOTION	CEILING	N/A	130	
IN-1-30	MOTION	CEILING	N/A	130	
IN-1-31	MOTION	CEILING	N/A	130	
IN-1-32	MOTION	CEILING	N/A	130	
IN-1-33	MOTION	CEILING	N/A	130	
IN-1-34	MOTION	CEILING	N/A	130	
IN-1-35	MOTION	CEILING	N/A	130	
IN-1-36	MOTION	CEILING	N/A	130	
IN-1-37	MOTION	CEILING	N/A	130	
IN-1-38	MOTION	CEILING	N/A	130	
IN-1-39	MOTION	CEILING	N/A	130	
IN-1-40	MOTION	CEILING	N/A	130	
IN-1-41	MOTION	CEILING	N/A	130	
IN-1-42	MOTION	CEILING	N/A	130	
IN-1-43	MOTION	CEILING	N/A	130	
IN-1-44	MOTION	CEILING	N/A	130	
IN-1-45	MOTION	CEILING	N/A	130	
IN-1-46	MOTION	CEILING	N/A	130	
IN-1-47	MOTION	CEILING	N/A	130	
IN-1-48	KEYPAD	WALL	48-INCHES A.F.F.	130	
IN-1-49	MOTION	CEILING	N/A	130	
IN-1-50	MOTION	CEILING	N/A	130	
IN-1-51	DOOR CONTACT	RECESSED	N/A	130	
IN-1-52	KEYPAD	WALL	48-INCHES A.F.F.	130	
IN-1-53	MOTION	WALL ON GIMBAL	96-INCHES A.F.F.	130	
IN-1-54	MOTION	CEILING	N/A	130	
IN-1-55	MOTION	CEILING	N/A	224	
IN-1-56	MOTION	CEILING	N/A	224	
IN-1-57	MOTION	CEILING	N/A	224	
IN-1-58	MOTION	CEILING	N/A	224	
IN-1-59	MOTION	CEILING	N/A	224	
IN-1-60	MOTION	CEILING	N/A	224	
IN-1-61	MOTION	CEILING	N/A	224	
IN-1-62	MOTION	CEILING	N/A	224	
IN-1-63	MOTION	CEILING	N/A	224	
IN-1-64	MOTION	CEILING	N/A	224	
IN-1-65	MOTION	CEILING	N/A	224	
IN-1-66	MOTION	CEILING	N/A	224	
IN-1-67	MOTION	CEILING	N/A	224	
IN-1-68	MOTION	CEILING	N/A	224	
IN-1-69	MOTION	CEILING	N/A	224	
IN-1-70	MOTION	CEILING	N/A	224	
IN-1-71	MOTION	CEILING	N/A	224	
IN-1-72	MOTION	CEILING	N/A	224	
IN-1-73	MOTION	CEILING	N/A	224	
IN-1-74	MOTION	CEILING	N/A	224	
IN-1-75	MOTION	CEILING	N/A	224	
IN-1-76	MOTION	CEILING	N/A	224	
IN-1-77	MOTION	CEILING	N/A	224	
IN-1-78	MOTION	CEILING	N/A	224	
IN-1-79	MOTION	CEILING	N/A	224	
IN-1-80	MOTION	CEILING	N/A	224	
IN-1-81	MOTION	CEILING	N/A	224	
IN-1-82	MOTION	CEILING	N/A	224	
IN-1-83	MOTION	CEILING	N/A	224	
IN-1-84	MOTION	CEILING	N/A	224	
IN-1-85	MOTION	CEILING	N/A	224	
IN-1-86	MOTION	CEILING	N/A	224	
IN-1-87	MOTION	CEILING	N/A	224	
IN-1-88	KEYPAD	WALL	48-INCHES A.F.F.	224	
IN-1-89	MOTION	CEILING	N/A	224	
IN-1-90	KEYPAD	WALL	48-INCHES A.F.F.	224	
IN-1-91	DOOR CONTACT	RECESSED	N/A	224	DPDT
IN-1-92	DOOR CONTACT	RECESSED	N/A	224	DPDT
IN-1-93	DOOR CONTACT	RECESSED	N/A	224	
IN-1-94	DOOR CONTACT	RECESSED	N/A	224	DPDT
IN-1-95	DOOR CONTACT	RECESSED	N/A	224	DPDT
IN-1-95	DOOR CONTACT	RECESSED	N/A	224	DPDT
IN-2-1	MOTION	WALL ON GIMBAL	96-INCHES A.F.F.	115B	
IN-2-2	MOTION	WALL ON GIMBAL	96-INCHES A.F.F.	115B	
IN-2-3	MOTION	WALL ON GIMBAL	96-INCHES A.F.F.	115B	
IN-2-4	MOTION	WALL ON GIMBAL	96-INCHES A.F.F.	130	

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