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Dalhousie University Design Guidelines provide assistance to consultants during the planning, and design phases of the University's expansion and renovations. The Guidelines do not relieve a consultant from any professional responsibility, duty or due diligence to design elegant, functional, efficient and low maintenance facilities.

Facility owners have preferred materials and requirements that make the task of maintaining facilities less costly. Dalhousie understands this is a balance between capital and operating cost. The Guidelines are not intended to be the only acceptable solution. Dalhousie expects consultants to bring modern and innovative ideas, materials and methods to the University. If these Guidelines do not allow these new ideas then the consultant is to make a request in writing to the Dalhousie Project Manager for an exception to the guidelines. Necessary reasoning and or calculations shall accompany the request. The exception request will be reviewed internally and either rejected or accepted. The consultant will document this rational and/or justification for each exception in the Basis of Design. The University Guidelines may be updated subsequently.

These documents provide design guidelines only, and are not intended for use, in whole or in part, as a specification. Do not copy the guidelines verbatim in specifications or in notes on drawings. Refer questions and comments regarding the content and use of these documents to the Dalhousie University Project Manager. The Guidelines are intended to be read in conjunction with the local codes and regulations, and in no way are to be considered as a code replacement. The codes and regulations represent the minimum acceptable standard. Where the technical design requirements differ from the building codes and other applicable codes and standards, the more stringent of the codes shall be applied.

Maintaining the Standards/Guidelines

The Design Guidelines are created and maintained by Dalhousie's Facilities Management Department. Any enquiries about the Guidelines should be directed to Facilities Management, Director of Projects, Central Services Building. Dalhousie encourages design specialists and other interested parties to provide their input and suggestions based on their experience.



ELECTRICAL CONSULTANT COMPLIANCE CHECKLIST

NC NA

NA

General Requirements

communications			
Communications Services			
Grounding and Bonding for Communications Systems			
Pathways for Communications Systems			
Structured Cabling for Communications Systems			
Entrance Conduits			
Equipment Racks and Cable Management			
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Electrical Consultant Name:

Electrical Consultant Signature:

Date:

C: Compliant

NC: Non-Compliant

NA: Not Applicable

If the guidelines or part of the guidelines cannot be attained of fulfilled (i.e. NC) during the design process, the Consultant shall provide reason(s) why such Guidelines are NOT met. Any modification or alteration to the design guidelines will need to be agreed / accepted by Information Technology Services / Facilities Management prior to inclusion in the design.



General Requirements

1. Warranties

- A. Standard 12 month warranty for a project begins at Substantial Performance. Systems and or equipment that is not considered complete at the time of the project's (or trade's) Substantial Performance shall be noted as such on the Substantial Performance Certificate's Punch List. Warranty for this equipment (or system) shall be one year from the date upon which it is removed from the Punch List.
- B. Extended warranties are available for many pieces of equipment and/or products from the manufacturer. Dalhousie requires suppliers/manufacturers to provide such extended warranties directly to the Owner in the name of Dalhousie University. A list of such warranties will be reviewed with the Owner at time of shop drawing submission.
- C. The designer shall recommend any extended warranties (including labour) and/or service agreements to the Owner. In all cases, these shall be listed as alternative prices to the base project on the bid form.

2. References:

- A. Canadian Electrical Code
- B. Nova Scotia Building Code
- C. National Building Code of Canada
- D. ANSI/EIA/TIA 568-B: Commercial Building Telecommunications Cabling Standard
- E. ANSI/EIA/TIA 569: Commercial Building Standards for Telecommunications Pathways and Spaces
- F. ANSI/EIA/TIA 607: Commercial Building Grounding and Bonding Requirements for Telecommunications
- G. BICSI TDMM Telecommunications Distribution Methods Manual (current edition)



27 05 13 Communication Services:

.1 General Specification Guidelines

- 1.1. All new cabling installations and wiring retrofits to existing cable plant at the Dalhousie University campus should follow the current EIA/TIA cabling standards.
- 1.2. Dalhousie Information Technology Services [ITS] bases its requirements on ANSI/EIA/TIA standards including but not limited to the following:
 - 1.2.1.568-B: Commercial Building Telecommunications Cabling Standard
 - 1.2.2.569: Commercial Building Standards for Telecommunications Pathways and Spaces
 - 1.2.3.607: Commercial Building Grounding and Bonding Requirements for Telecommunications
- 1.3. For all projects the termination and testing of the fibre and copper cabling is to be completed by a Belden Certified CSV.
- 1.4. All cable installers must have a valid Nova Scotia Cabling Specialist Certificate.
- 1.5. By default all outlets specified as Data on the design drawings are connected by ITS to the default LAN for the building at 100 Mbps. Specialty devices that require a network connection such as HVAC, Vending, Lighting Controls, Access and Security, cameras, electrical meters must be identified to ITS for proper VLAN and other special network requirements such as POE. Coordinate with the Facilities Management [FM] Project Manager and ITS for further technical details.

.2 Telecommunication Space Requirements

- 2.1. There must be at least one telecommunications equipment room (T-E-R) in a single-story building. For multi-story buildings, one T-E-R on the first floor (or basement) is required and at least one smaller telecommunications room (TR) is required on each floor above. T-E-Rs and TRs must be designed so that they are within 295 "cable feet" (90 meters) of every telecommunications outlet (TO) on that floor. If this is not possible, more than one TR per floor is required. Cable length (295 feet) includes cable lengths through vertical walls, conduits, cable trays and other pathways between the patch panels in the TR and the TO.
- 2.2. The preferred location for T-E-Rs or TRs is the center of the building, equidistant from the furthest TO in opposite directions. The rooms shall be vertically aligned or stacked from the lowest room to the highest room. They must be accessible either from the building exterior, public hallway or other common areas. They shall not be located inside office spaces, classrooms or auditoria.
 - 2.2.1.T-E-Rs and TRs must be dedicated to voice, video, data, security devices and Dalcard equipment. They shall not contain electrical and mechanical equipment; fire alarm panels, slop sinks for janitors, etc. Equipment not related to the T-E-R and TR such as piping, duct work, building column and distribution of building power must not be located in or pass through the T-E-R or TRs.
- 2.3. If there are any other systems or devices requiring space in the TER or TR, these additions must be approved by Dalhousie ITS and Facilities Management. The room size for the TER or TR shall increase based on the additional equipment to be added.

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2.4. Audio-visual (AV) systems, intercoms and similar in-house paging devices shall not be located in any TR/TER

.3 Doors

- 3.1. The doors to the telecommunications rooms must open 180 degrees outward unless restricted by building code. They must be a minimum of 36" wide and 80" high with no door sills. Where doors must open into the room, set the door so that there is a minimum of 9" behind the opened door this space can be utilized for risers and sleeves between rooms. All doors to be lockable (lock set or access control)
- 3.2. Telecommunications rooms shall not have windows.

.4 Floors

- 4.1. Carpet is not permitted in any telecommunications spaces.
- 4.2. Floors and ceilings should be treated/painted and sealed to eliminate dust accumulation.
- 4.3. Floor shall be covered with non-slip paint.

.5 Walls

- 5.1. All walls must be lined with ³/₄" void free A-C grade (or better) plywood. The plywood must be fire retardant or treated with at least two coats of fire retardant paint. Use a light colored (white) paint to aid with lighting in the rooms. No electrical conduits, junction boxes or any other equipment may be mounted on or across any backboard.
- 5.2. Walls behind rack locations shall be complete with blocking to allow for mounting of wall mounted racks. Blocking shall be installed to allow for both installed and future racks as noted in the communication room layouts. Racks should not rely on the plywood lining for support.

.6 Ceiling

6.1. Drop ceiling or suspended ceiling is not permitted in the telecommunications spaces. The minimum acceptable ceiling height is 8'-6". It should be unobstructed to provide space over the equipment racks for suspended cable trays, horizontal ladder racks or wire basket. Where ceilings are required due to building code regulations (fire rating) the structure shall be wrapped with sufficient drywall to provide the desired fire rating. Consider

https://www.hilti.ca/c/CLS_FIRESTOP_PROTECTION_7131/CLS_FIRESTOP_SLEEV ES_PATHWAYS_7131/r3143561 or equivalent.

6.2. Sprinkler heads must be provided with cages to prevent accidental operations.

.7 Electrical Power

7.1. A minimum of four dedicated non-switched 20A, 120 volt AC quad outlets are required for equipment power, each on a separate branch circuit. Branch circuits for equipment power shall be protected and wired for 20A capacity using a CSA 5-20R receptacles. Two of the four outlets are dedicated to voice and data and must be located on the

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same wall as the data field. Additional dedicated circuits are required for CCTV racks, door access control system, and intrusion alarm system. Refer to Appendix "A" for typical room layouts and circuit requirements.

- 7.2. When available these circuits should be connected to an emergency power system.
- 7.3. Top of power outlets should be mounted at 6" above finished floor to allow for access under installed racks and wire management.

.8 Lighting

- 8.1. Lighting must have uniform intensity of 50 foot candles when measured 3 feet from the finished floor. Lighting fixtures must be on separate electrical circuits from the circuit(s) that the feed(s) the electrical outlets in the room (this includes the power to the communication equipment). Fixtures shall be fitted with wire guards or a shatter proof lens.
- 8.2. Emergency lighting shall be installed in the TER and TRs.

.9 Environmental Control

- 9.1. At full equipment capacity, as provided by ITS, the temperature inside telecommunications rooms shall be maintained at 72°F +/- 3°.
- 9.2. At full equipment capacity, as provided by ITS, the relative humidity inside telecommunications rooms shall be maintained between 5% and 90%.
- 9.3. The TER and TRs are to be maintained at a positive pressure with mechanical supply and exhaust.

.10 Telecommunications Equipment Room (TER)

- 10.1. Typical TER dimensions are 12' x 14' (minimum) for a building serving fewer than 200 work areas. A typical work area (WA) is defined as 10'x10' or 100 sq. ft..
- 10.2. Sizing of the TER shall be coordinated on a building by building basis and must include space for Access Control and Security equipment, DalCard System equipment and CATV equipment (where required).
- 10.3. Entrance conduits entering the TER shall be located as close to a corner of the TER as possible to minimize wasted wall space.
- 10.4. Refer to Appendix "A" for typical Telecommunication Equipment Room layout.

.11 Telecommunications Rooms (TRs)

- 11.1. Minimum size of a TR is 10'x8'. The room must be free of columns or obstructions.
- 11.2. Sizing of these rooms is dependent on various factors and shall be decided on a building by building basis and must include space for Access Control and Security equipment, DalCard System equipment and CATV equipment (where required).
- 11.3. A minimum of three 4-inch vertical riser conduits or sleeves are required from the TR to the TER and between TRs. These conduits or sleeves shall be located as close to a corner of the TR as possible to minimize wasted wall space.
- 11.4. Refer to Appendix "A" for typical Telecommunication Room layout.

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27 05 26 Grounding and Bonding for Communications Systems:

.1 Bonding & Grounding

- 1.1. The telecommunications grounding and bonding infrastructure shall be designed and routed through each telecommunications space as per the latest edition of the CEC and ANSI/EIA/TIA- 607 requirements.
- 1.2. The TER shall be equipped with a Main Telecommunications Grounding Busbar (TMGB) tied directly to the building electrical ground. The TMGB shall be pre-drilled for two-hole compression lugs, minimum 24" in length, 4" in width and 1/4" thick. Standard of acceptance: Panduit GB40624TPI-1 series. Refer to Dalhousie's electrical guideline document for additional information on interconnection with the main electrical room ground.
- 1.3. Each telecommunication room shall be equipped with a Telecommunications Grounding Busbar (TGB) bonded directly to the Telecommunications Bonding Backbone (TBB). The TGB shall be pre-drilled for two hole compression lugs, minimum 24" in length, 2" in width and 1/4" thick. Standard of acceptance: Panduit GB2B0314TPI-1 series.
- 1.4. The TGB and TMGB shall be the central point of attachment for all bonding and grounding connections inside the telecommunication spaces. This includes, but not limited to: surge protectors, cable/basket trays, equipment racks, metallic entrance conduits, branch circuit panelboards, battery racks, etc. Where building steel is accessible and in the same room as the TMGB/TGB, the TMGB/TGB shall be bonded to building steel using a minimum 6AWG conductor and exothermic weld or listed irreversible high compression-type connection.
- 1.5. Unnecessary connections or splices in bonding conductors are to be avoided. Use only approved connections where necessary.
- 1.6. All conductors shall be copper.
- 1.7. Installers should always follow the Canadian Electrical Code (CEC), applicable provincial and local codes, manufacturer's instructions, and contract documents when installing telecommunications cabling. A qualified electrician shall make connections within the AC electrical system.
- 1.8. Bonding conductors exposed to physical damage shall be protected.
- 1.9. Bonding conductors shall be:
 - 1.9.1.No longer than required to achieve their purpose, and maintain a minimum bending radius of 200mm (8in) with angles of bends not less than 90 degrees.
 - 1.9.2.installed in a professional and workmanlike manner
 - 1.9.3. Secured at no greater than 0.9m (3ft) intervals.
 - 1.9.4. Installed in such a way that permits associated equipment to be easily serviced.
 - 1.9.5.Installed and routed so that personnel safety is not compromised and that all equipment is serviceable.
 - 1.9.6.Attached to surfaces in such a way that they do not become damaged or disconnected.
 - 1.9.7.Each Bonding conductor connected to the TGB or TMGB shall be permanently tagged at or near the bonding bar to clearly identify the equipment that it is

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connected to. Labels shall include the information "IF THIS CONNECTOR OR CABLE IS LOOSE OR MUST BE REMOVED, PLEASE CALL THE DALHOUSIE I.T.S. MANAGER".

27 05 28 Pathways for Communications Systems:

.1 Horizontal Pathways

- 1.1. The Horizontal Pathway System is the route through which cables are pulled from the TER or TR to the outlets on the respective floor. Outlets must be connected to a TR on the same floor.
- 1.2. Cable Management
 - 1.2.1.Tie wraps shall not be used as cable support or management. Velcro wraps are the required method of bundling cables.

.2 Surface Mount Raceway System

2.1. In a surface mount raceway, power and telecommunications cables must be in separate compartments and must comply with applicable electric codes. When metallic barrier is provided, it must be bonded to ground. The barrier must run continuously throughout the length of the raceway.

.3 Cable Trays

- 3.1. Wire basket or ventilated solid type cable trays are acceptable. Metallic cable trays, in communications rooms or data centers, shall not produce any zinc whiskers or any zinc flakes. Ladder trays are not acceptable inside the TRs or TERs.
- 3.2. There must be at least 4 inches of vertical space between the suspended ceiling tile and the bottom of the cable tray or wire basket. All other clearances around cable trays or wire baskets shall meet or exceed the CEC.
- 3.3. Access ceiling panels must be provided at a distance of 12 feet wherever a cable tray passes through a hard-lid ceiling. The panels should be within 12" of the cable tray and shall not be mounted directly underneath the cable tray. Access doors shall be flush mounted 24" x 24" for body entry. Doors shall open 180 degrees, have rounded safety corners, concealed hinges, screwdriver latches and anchor straps. Access doors shall be minimum 14 gauge steel.
- 3.4. Cable trays or wire basket shall be used for installations over 25 cables. The cable trays or wire basket shall include appropriate accessories to ensure installed cables maintain their minimum bending radius, including bend radius adapters and cable drop outs.
- 3.5. Cable trays and wire baskets shall be sized as per the CEC for maximum fill and shall include for 25% spare cable capacity. Where door access control or security systems share the same cable tray or wire basket, the systems shall be bundled separately using velcro straps.



.4 Curved cable supports (J – Hooks)

- 4.1. Curved cable supports are only an acceptable installation method for projects involving legacy wiring in retrofit applications where accessibility is an issue.
- 4.2. An appropriately sized curved cable supports may be used for up to 25 UTP cables.
- 4.3. The maximum distance between curved cable supports shall be 35.5".
- 4.4. Type of J-hook used to be compliant with the cables requirements which they are supporting (e.g. Cat6A).

.5 Conduit

- 5.1. Where the use of cable tray, wire basket or curved cable support is not permitted, telecommunications outlets (TOs) should be connected to the TR with a minimum 1" EMT. No more than two 90 degree bends between pull boxes are allowed. The use of "condulets" or "LB" type fittings is not allowed unless they are designed to provide proper bend radius for cable being installed.
- 5.2. Where wire basket and curved cable supports are utilized, TOs shall have a 1" EMT from the backbox, run vertically within the wall space and stubbed into the accessible ceiling space. Where walls exist and TOs are required EMT may be omitted.
- 5.3. The use of flexible conduit is not acceptable.
- 5.4. EMT ends shall be reamed and fit with an insulated bushing to prevent cable damage.

.6 Service Loops

- 6.1. The cable installer contractor will leave a 36" minimum of extra cable on the room end, coiled in the accessible ceiling space above the drop location.
- 6.2. The cable installer contractor will create a minimum 72" service loop at the TR site.

27 10 05 Structured Cabling for Communications Systems:

.1 Cabling Specifications

- 1.1. Copper Cable Supported as per EIA/TIA and CSA standards, Category 6a, CMR or CMP rated as per the NBCC and CEC, Belden 10GXW
- 1.2. Cabling color identifications shall be as follows:
 - 1.2.1.Blue for Data (Includes cabling for IP Based CCTV Cameras and Building Automation data outlets).
 - 1.2.2.White for Voice.
 - 1.2.3.Grey for Access Control (Heartland and Genetec) Not Category 6a. Refer to access control guidelines for more information on cable structure.
 - 1.2.4.Green for Building Systems cabling that utilize UTP for sub networks (Lighting, VRF, ...).
 - 1.2.5. Orange for Dalhousie Private Networks.
 - 1.2.6.Black for AV point to point (Extron XTP DTP 24).
- 1.3. A minimum of two Cat 6a cables (one voice and one data) cables shall be provided at each TO except at computer labs; data only to be provided at workstations.

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- 1.4. Dalhousie uses fiber optic cabling to connect all new buildings back to the network core and as riser cables from the TER to the TRs. Fiber cables are supplied and installed by the electrical contractor and terminated by ITS. Fibre cables shall loop once around the perimeter of the TER and TRs for future flexibility. Provide 20 feet slack at identified termination location for termination by owner.
- 1.5. Entrance cable:
 - 1.5.1.Single mode 72 fiber with FT4 rated indoor / outdoor black jacket, dielectric, Corning Part Number 072EUF-T4101D20.
- 1.6. Building risers:
 - 1.6.1.Single mode 24 fiber FT4 jacket, Corning Part Number 024E81-33131-241.6.2.Multimode laser optimized 24 fiber, FT4 jacket, Corning Part Number 024T81-33180-24
- 1.7. Labeling requirements shall be carried out as per ANSI/EIA/TIA 606 standards with the following exceptions:
 - 1.7.1.TO's and corresponding patch panel location shall be labeled with the room number plus an identifying number. (example 4106-1) Identifying number shall be in order starting at 1 and increasing by one as you move from left to right around the room.
 - 1.7.2.TO's with multiple jacks shall be labeled at the patch panel using the room number, identifying number and a TO location letter (example 4106-1A) The letter is in alphabetical order starting at the top, left to right, then bottom left to right.

27 11 13 Entrance Conduits:

.1 Entrance Conduits

1.1. New buildings must have a cabling pathway that enables cables to be installed and tied in to one of the Network Head -ends. Coordinate with Dalhousie ITS on a per project basis.

1.1.1.The data center located in the basement of the Killam Library room B504, 1.1.2.The data center located in the basement of Sexton A-building room A03, or 1.1.3.West Cox room 100c.

- 1.2. Provide at least three 4" conduits, one equipped with a 3 cell Maxcell innerduct installed to any new building. A 3/8" nylon pull rope (not pull string) with 200 lbs minimum tensile strength must be provided in each conduit. No more than two 90-degree bends are allowed between pull boxes. A mandrel inspection shall be performed on the conduits after conduit installation with a mandrel one trade size less than the conduit to ensure that there are no blockages.
 - 1.2.1.One with the Maxcell for fibre to be labelled at both ends for each conduit.
 - 1.2.2.One for copper labelled at building entrance.
 - 1.2.3.One for cabling technology expansion labelled at building entrance.
- 1.3. Pull boxes shall be located in accessible locations and identified on record drawings.
- 1.4. J-Hooks are not acceptable for entrance pathways.

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27 11 16 Equipment Racks and Cable Management:

.1 Equipment racks and cable management

- 1.1. Fixed equipment racks shall be heavy duty, fixed style racks, Belden Cat. No. XDR-8419-310, black c/w all required hardware for wall mounting.
- 1.2. 6" vertical cable managers shall be Belden Cat. No. BHVHH06
- 1.3. 12" vertical cable managers shall be Belden Cat. No. BHVHH12
- 1.4. Horizontal cable managers shall be Belden Cat. No. BHH192UR
- 1.5. Refer to Appendix "B" for typical rack and cable management layouts.

27 11 19 Patch Panels:

.1 Patch Panels

- 1.1. All telephone, voice, and data patch panels shall be EIA/TIA-568B Category 6a c/w RJ45 jacks, mounting brackets, and all associated hardware.
- 1.2. All patch panels shall be fully populated with jacks, regardless of quantity terminated.
- 1.3. Telephone backbone patch panels shall be 48-port, 2U, black AX103261
- 1.4. Voice patch panels shall be 48-port, 2U, black, flex patch panel, Belden Cat. No. AX101458 c/w 48 MDVO modular jacks (blue) Cat. Co.AX102277.
- 1.5. Data patch panels shall be 48-port, 2U, black, flex patch panel, Belden Cat No. AX101458 c/w 48 MDVO modular jacks (gray) Cat. No. AX102269.
- 1.6. CATV patch panels shall be 48-port, 2U, black, flex patch panel, Belden Cat No. AX101458 c/w 48 MDVO modular jacks (white) Cat. No. A0407001

27 11 20 Terminals and Connectors for Communications

Conductors:

.1 Telecommunications Outlets (TO)

- 1.1. Wall Outlets
 - 1.1.1.Belden telecommunications outlets (TO) shall be used for voice, data and video communications where required. The outlet requires a double gang box, 4 11/16" x 4 11/16" x 2 1/8" deep, equipped with a single gang plaster ring. It shall be mounted flush in the wall at same height as the adjacent electrical outlet. There shall be no more than 4 cables per double gang box.
- 1.2. Floor-mounted or Desk mounted outlets
 - 1.2.1.Enclosures for floor and desk mounted TOs must have 1" knock-outs to accept the station conduits. These devices must accommodate Belden standard or keystone TO outlets. They must include space for cable slack.
- 1.3. Pack Poles

1.3.1.The pack pole must have grommets on entry and exit points and must be capable of accepting Belden standard or keystone TOs.

- 1.4. Devices:
 - 1.4.1.RJ45 jacks for communication outlets and modular patch panels shall be Belden/Nordx MDVO Cat.6+ series as listed below:

1.4.1.1. Data: Grey, Belden Cat. No. AX102269

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- 1.4.1.2. Voice: Blue, Belden Cat. No. AX102277
- 1.4.1.3. CATV Coax Video-F, Belden Cat. No. A0407001
- 1.4.1.4. Telephone Riser: Green, Belden Cat. No. AX101070
- 1.4.1.5. AV Cable point to point Black Belden Cat No. AX102272
- 1.5. Faceplates (provide and install blank module covers where required): 1.5.1.Two Port MDVO faceplate, Belden Cat. No. AX101433
 - 1.5.2. Four port, MDVO faceplate, Belden Cat. No. AX101437

27 15 54 Testing:

.1 Testing:

- 1.1. Test horizontal UTP cables as specified below and correct deficiencies, and provide an electronic record of results via email.
 - 1.1.1.Perform tests for Permanent Link on installed cables, including spares:
 - 1.1.1.1. Category 6a using a Fluke DTX certified level III tester to: TIA/EIA-568-B.2-10.Need to update level of tester required and remove DTX, still Fluke
 - 1.1.1.2. Provide test results as Fluke Linkware files (.FLW)
- 1.2. Test backbone UTP cables as specified below and correct deficiencies, and provide an electronic record of results via email.
 - 1.2.1.Perform tests for Permanent Link on 4-pair cables:
 - 1.2.1.1. Category 6a using certified level III tester to: TIA/EIA-568-B.2.
 - 1.2.1.2. Perform Wire Map tests on multi-pair UTP cables to: TIA/EIA-568-B.1.
- 1.3. Colour code and identify all work in accordance with CAN/CSA-T568A. Provide complete administrative records in accordance with the recommended practice for this Standard.
- 1.4. ITS reserves the right to check and verify all installations performed by non-ITS personnel. In case of failure to meet certification standards, reinstallation of any non-compliant cabling shall be done at installer's expense.
- 1.5. ITS requires proof of warranty registration with Belden from the CSV

27 21 33 Wireless Equipment (Wi-Fi):

.1 Wireless Equipment (Wi-Fi)

- 1.1. Dalhousie provides the Wireless service.
- 1.2. The location of the Access Points (APs) are determined by ITS.
- 1.3. A CAD drawing for each floor is required showing room layouts, wall construction materials and any large metal objects. A separate drawing of each floor showing the reflected ceiling plan is also required.
- 1.4. The APs are connected to the network with Cat6a cable which supplies power for the AP using Power over Ethernet (POE). Each AP location requires 2 Cat6A cables.
- 1.5. In areas of accessible ceiling (T-bar), provide and install a two-port side entry MDVO surface adapter, Belden Cat. No. AO645273 complete with two grey Belden jacks

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AC102269. The adapter shall be mounted in the ceiling space above the AP location, supported to a curved cable support.

- 1.6. In areas of drywall ceiling provide and install a 4" square backbox complete with single gang tile ring, flush mounted in the ceiling. Terminate the MDVO jack directly to the cable without the use of a faceplate. Provide 10' slack cable coiled at the last accessible location for on-site adjustment. Provide 6" slack cable within the 4" backbox.
- 1.7. In exposed areas without a ceiling provide and install a 4" square backbox complete with flat single gang tile ring, flush wall mounted 8'-0" a.f.f.. Terminate the MDVO jack directly to the cable without the use of a faceplate. Provide 10' slack cable coiled at the last accessible location for on-site adjustment. Provide 6" slack cable within the 4" backbox.
- 1.8. Leave a 10' cable slack loop at the Access point end coiled on a curved cable support for on-site adjustment.

27 31 00 Voice Communications Switching and Routing Equipment: Intentionally left blank

27 32 13 Payphones:

.1 Payphones, if required.

- 1.1. Payphones are ordered by ITS who also arranges for their installation. A conduit with pull rope shall be provided to the required location. All payphone spaces must comply with the regulations set out in the Canadians with Disabilities Act.
- 1.2. All payphone locations shall be provided with two Cat6a cables (one voice and one data).

27 32 23 Elevator Phones:

.1 Elevator Phones

1.1. There must be at least one TO in the elevator equipment room that is cabled to the elevator controllers to allow for the actual connection of the phone in the elevator cab. There must be an adequate number of jacks in the equipment room to accommodate all elevators in the building.

27 51 16 Public Address and Mass Notification Systems:

- .1 Generally, public address and mass notification systems shall be part of the fire alarm system. **Refer to Div. 26 Electrical Guideline.**
- .2 Public address and mass notification systems, used by operational of groups within the facility, shall have a UPS power supply to provide back-up power and a stable clean power supply. The normal power for the UPS shall be from an emergency or essential service if available.

FACILITIES MANAGEMENT



27 51 23 Intercommunications and Program Systems: Intentionally left blank

27 52 24 Nurse Call Systems: Intentionally left blank

27 53 13 Clock Systems: Intentionally left blank



APPENDIX "A": TYPICAL ROOM LAYOUTS





4

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XDR8419-310

- 84" H 45RU 2 POST RACK
- 19" RACK MOUNT
- BOLT TOGETHER CONSTRUCTION
- POSTS 11 GA STEEL
 - TAPPED #10-32
 - RACK UNIT NUMBER MARKED ON FRONT OF POSTS **1RU STARTING @ BOTTOM**
 - (40) #10-32 x 1/2 SCREWS INCLUDED
- (2) TOP ANGLES 11 GA STEEL
- PÓWDER COATED BLACK

BHVHH06

- 84" H x 6" W DOUBLE SIDED HIGH DENSITY
- VERTICAL MANAGER w/ DOORS
- .090 AL FRAME AND DOORS
- MOLDED FINGER STRIPS (BLACK)
- REMOVABLE UPPER AND LOWER HINGED DOORS
- INCLUDES MOUNTING HARDWARE
- FINISH BLACK POWDER COAT

BHVHH12

- 84" H x 12" W DOUBLE SIDED HIGH DENSITY
- VERTICAL MANAGER w/ DOORS
- .090 AL FRAME AND DOORS
- MOLDED FINGER STRIPS (BLACK)
- REMOVABLE UPPER AND LOWER HINGED DOORS - INCLUDES MOUNTING HARDWARE

4

- FINISH - BLACK POWDER COAT

BHH192UR

- 19" HORIZONTAL FINGER MANGER w/ DOOR
- 2 RACK UNIT HIEGHT
- COLOR: BLACK

	CUSTOMER APPROVED BY DATE BELDEN APPROVED BY DATE					
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	XDR8419-310 & BHVHH06 & BHVHH12 6" & 12" W DBL SIDED HD VERT MNGR w/ DOORS					
	DRAWN BY: RCG DRAWN DATE: 6-15-17					
	UNITS: INCH SH 1 of 1 D SCALE: 3:32 DATE: 6/6/2017 SUBMITTAL					
2	1					











4

XDR8419-310

84" H 37RU 2 POST RACK

19" RACK MOUNT

BOLT TOGETHER CONSTRUCTION

POSTS 11 GA STEEL

- TAPPED #10-32 - RACK UNIT NUMBER MARKED ON FRONT OF POSTS 1RU STARTING @ BOTTOM
- (40) #10-32 x 1/2 SCREWS INCLUDED

(2) TOP ANGLES 11 GA STEEL

POWDER COATED BLACK

BHVHH06

84" H x 6" W DOUBLE SIDED HIGH DENSITY VERTICAL MANAGER w/ DOORS

.090 AL FRAME AND DOORS

MOLDED FINGER STRIPS (BLACK)

REMOVABLE UPPER AND LOWER HINGED DOORS

4

INCLUDES MOUNTING HARDWARE

FINISH - BLACK POWDER COAT

BHVHH12

84" H x 12" W DOUBLE SIDED HIGH DENSITY VERTICAL MANAGER w/ DOORS

.090 AL FRAME AND DOORS

MOLDED FINGER STRIPS (BLACK)

REMOVABLE UPPER AND LOWER HINGED DOORS

INCLUDES MOUNTING HARDWARE

FINISH - BLACK POWDER COAT

BHH192UR

19" HORIZONTAL FINGER MANGER w/ DOOR 2 RACK UNIT HIEGHT COLOR: BLACK

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·	XDR8419-310 w/ BHVHH06 & BHVHH12 ACCESSORIES 6 & 12" W x 84 H DBL SIDED HD VERT MNGR w/ DOORS					
	DRAWN BY: DRAWN DATE:	RCG 10/30/17				
	UNITS : INCH SCALE: 3:32	SH 1 c DATE:	of 1 10/30/20	D 17	SUBMITTAL	
2					1	





APPENDIX "B": TYPICAL RACK LAYOUTS

FACILITIES MANAGEMENT Central Services Building | 1236 Henry Street | PO Box 15000 | Halifax NS, B3H 4R2 Canada DAL.CA









APPENDIX "C": TYPICAL RISER

