Interior Health

I M I T
INFRASTRUCTURE SPECIFICATIONS 1.0

This document is specific to Information Management and Information Technology Infrastructure Standards and Specifications (IMIT) at all of the Health Authorities sites and is to be used in conjunction with Division 26, 27, and 28 of any project with an IMIT Infrastructure impact.
To confirm if you have the latest version please contact the Authorities Facilities Project Coordinator via email at IMITFPC@interiorhealth.ca

Version Control

The contents of this document cannot be modified without prior written consent from the original Contributors

2013-10-07: Distributed to replace the IHA IMIT Cabling Specification with updates of standards and to be used as a holistic document including Audio/Video Standards and Cable Management.
Demolition, Infection Control, Commissioning sections added.
Additional requirements for physical separation in the MC added
Definitions and abbreviations moved to the Appendix.
Section 4 modified to focus on items governed specifically by NTS

Contributors

The following subject matter experts formed the committee for content and change management of this document. Any revisions made to the latest release as indicated above must be approved by the Contributors

All Sections	Interior Health Authority IMIT Facilities Project Coordinator (IMITFPC)
Section 4	Interior Health Authority Networks and Telecommunications (NTS)

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I M I T INFRASTRUCTURE SPECIFICATIONS 1.0

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1 AUTHORITY SPECIFICATION INTRODUCTION

1.1 Purpose

This document and any associated appendices are to be used by all staff, consultants, and Contractors working with any of the Authorities IMIT infrastructure. Although this document will serve as a baseline specification for all current and future Authority facilities, the Authority reserves the right to alter or customize the specification as required. It is the intention of the specification and drawings to call for work to be finished, tested, certified, commissioned and ready for operation.

It is the ***responsibility*** of the Prime Consultant, Design Engineer, Cabling Contractor, or other professional services involved to read this document in its entirety along with the Statement of Work (SOW), Request for Proposal (RFP), and any accompanying drawings and to identify any errors or omissions prior to tendering or submitting a quotation. Any apparatus, appliances, materials, or work not shown on the drawings, but mentioned in the specifications, or vice versa, or any incidental accessories necessary to make the work complete and perfect in all respects and ready for operation, even if not particularly specified, shall be furnished, delivered and installed. There will be no allowances for extras based on interpretation of the specifications or drawings.

1.2 Scope

This document applies to the overall IMIT Infrastructure with a primary focus on data and telecommunications cabling systems at all facilities owned or operated by the Authority, unless otherwise noted.

1.3 Work Included

Work shall be in accordance with the drawings and specifications and their intent. Work shall include all: materials, labour, tools, equipment and services required for the construction, installation and putting into regular operation the complete communication system as shown on the drawings and as described and specified in this and accompanying sections.

1.4 Reference Standards

All materials, workmanship and/or installation practices and activity shall meet or exceed the following reference standards:

- ANSI/TIA/EIA-569 (CSA T530) – Commercial Building Standard for Telecommunications Pathways
- ANSI/TIA/EIA-607 (CSA T527) – Commercial Building Grounding and Bonding Requirements
- ANSI/TIA/EIA-606 (CSA T528) – Administration Standard for the Telecommunications Infrastructure
- ANSI/TIA/EIA-568-C.x – Commercial Building Telecommunications Cabling Standard
- ANSI/TIA/EIA-1179-2010 Healthcare Facility Telecommunications Cabling Standard
- ANSI/TIA/EIA TSB-67 – Transmission Performance Specifications for Field Testing
- TE CONNECTIVITY System Certification
- BICSI Telecommunications Distribution Methods Manual (TDMM)
- BICSI 004-2012 Information Technology Systems Design and Implementation Best Practices for Healthcare Institutions and Facilities
- TIA TSB-162- Telecommunications Cabling Guidelines for Wireless Access Points
- CEC part 1 C22.1
- British Columbia Building Code
- UL Cable Certification Program
- UL Testing Bulletin

This document shall supersede the above if a conflict exists. Municipal, provincial, and federal laws, bylaws, regulations, and codes shall supersede the above and this document in cases of conflict. Any conflicts must be brought to the attention of the Authorities IMIT Facilities Project Coordinator (IMITFPC) for resolution. In the case of conflicts or discrepancies the more stringent Code shall apply. In case of Hospital installations ANSI/TIA/EIA-1179-2010 takes precedence.

The Prime Consultant, Design Engineer, Cabling Contractor, or other professional services is ***responsible*** to determine the most current release of the above documents and adhere to such release of the documents. Any changes or alteration shall be reissued as a new version and supersede the previous. The Authority will endeavor to provide the most current version of this document to all parties upon request. Verification of the latest release can be obtained by contacting the Authorities IMITFPC via email at IMITFPC@interiorhealth.ca

2 DEMOLITION REQUIREMENTS

2.1 Demolition

Proper coordination for the shut-off of utility services and control measures for dust and noise must occur prior to commencement of any demolition work. Considerations must be given to on-going services and activities in adjacent areas. In confined areas of selective demolition, install and maintain dust and noise control barriers to keep dirt, dust, and noise from being transmitted to adjacent areas. Remove these protection measures after demolition operations are completed.

The Contractor must completely remove all equipment noted on the drawings for removal including:

- all associated devices,
- controls,
- conduit, including all exposed conduit,
- wiring and wiring devices back to the panel that they serve,
- fixtures,
- circuitry (conduit and wiring), and
- other materials as identified by the Authority that have become obsolete by the demolition within or around the building.

The Contractor must fill and patch all wall, floor, and ceiling openings resulting from this demolition work with materials and finishes identical to adjacent materials and finished, unless otherwise noted.

The Contractor must relocate all existing piping, circuitry (conduit and wiring), ductwork, and other materials as identified by the Authority, which impedes the installation of new materials and equipment, unless otherwise noted.

All demolition which involves the removal or disturbance of asbestos containing fire proofing, finish material, insulation or other asbestos containing material must be approved by the Authority.

2.2 Disposal

The Contractor shall remove all generated trash, recyclables and debris at their expense. The Contractor may not place this trash and debris in any Authority facility dumpsters. The Authority shall retain the right to direct the disposal of salvageable equipment and materials. No equipment is given to the Contractor unless specifically listed in the job specifications prior to contract award. The Contractor shall deliver any surplus equipment to a site designated by the Authority and return a receipt for the equipment to the Authority

3 INFECTION CONTROL REQUIREMENTS

3.1 General

Construction projects, in particular renovation projects, pose health risks for patients, staff, visitors and construction personnel that may lead to healthcare associated infections. These risks most commonly develop when dust particles contaminated with bacteria and/or fungi are dispersed into adjacent patient care areas.

Assessment of the risks to occupants of the health care facility is necessary before construction or renovations begin. The Planning Department or Plant Services will keep the Infection Control Service informed regarding the location of all areas of renovation and construction as soon as possible, during the planning stages.

CSA Z317-13-07 shall be used to determine population risk group, construction activity type, and preventative measures. The preventative measures will be outlined in the construction documentation prior to project commencement.

It is the responsibility of the Contractor to:

- Ensure critical and strict measures are taken to control dust throughout the construction process.
- Give the Infection Control Practitioner a minimum of 48 hours notice for permit requests before the scope of work can be assessed and a permit issued.

A copy of the construction guidelines from the Infection Prevention and Control Manual will be provided upon request.

3.2 Hoarding

Prior to removal of hoarding, the construction zone must be thoroughly cleaned, including all horizontal surfaces. Remove all hoarding and dust control that was erected, installed for the project, or installed for that phase prior to moving on to the next phase and repair any damage. Removal of hoarding must occur in a fashion that will minimize the spread of dust and bacteria. During the removal, the hoarding and area surrounding should be spray misted with water to minimize dust.

4 TELECOMMUNICATIONS SYSTEM REQUIREMENTS

4.1 Purpose

Section 4 of this document focuses on the supply, installation, testing, validation, and certification requirements of communications cabling systems in any of the Authority's facilities. This section is governed by the Authority's Networks and Telecommunications Department (NTS). Any conflicts in Section 4 must be brought to the attention of NTS for resolution. For construction projects this can be facilitated through the IMITFPC by email: IMITFPC@interiorhealth.ca. For ad-hoc cabling work including MACs (Moves, Adds, and Changes) not related to a construction project the Cabling Contractor should contact NTS directly via the Network Operations Centre (NOC) at NOC@interiorhealth.ca or by calling 1-877-664-6614.

This section must be adhered to unless explicit written consent is received from the manager (or designate) of NTS.

4.2 Basic Communications Requirements

Cabling Contractors that will be installing all low voltage CAT 5E/CAT6 systems at any Authority facility must be registered as TE Connectivity ND&I partners and must use employees holding current TE Connectivity Installer certifications.[1] The Authority specific requirements are that installers are TE Connectivity Level 1 and 2 certified, and that a TE Connectivity Level 3 employee supervise and approve all installations.

Cabling Contractors that will be installing low voltage cabling systems at any existing Authority facility currently wired with an Integrated Building Distribution Network (IBDN) Belden/Nordx infrastructure MUST contact NTS before commencing any work. NTS will advise whether to continue using Belden/Nordx or whether to proceed with TE CONNECTIVITY CAT 6 cabling. Under most cases the contractor will be advised to use TE CONNECTIVITY.

The voice and data CAT 5E/6 distribution system is to share faceplate outlets, conduits, cable trays, raceways and a certified CAT 5E/6 patch panel system.

The "home run" device runs are to consist of three white TE CONNECTIVITY CAT 5E/6 UTP, 4 pair, 24/23 AWG CMR / CMP rated cables based on jurisdictional / municipal codes. Specialized device runs or incidental voice lines requiring alternative design will be specified in accompanying documentation. Each communication outlet will have three permanent links as defined in EIA/TIA 568-C, two designated for Data and one for Voice. When a universal voice/data patch panel system is being used (as is the case in new communication rooms, see Section 4.5.1) all three links shall be considered "multi-purpose" with no differentiation between Voice and Data

Designated VoIP Sites will have two data links per communications outlet. The four port outlets will have two spare ports for future expansion, except in locations specified otherwise. All outlets will use four port face plates unless otherwise specified.

The cabling system must meet or exceed CAT 5E/6 performance defined in EIA/TIA 568-C and provide a 25 year system performance certification from a TE CONNECTIVITY single channel source manufacturer. Multi or mixed vendor solutions will NOT be considered.

4.3 Administration Requirements

The specifications shall be considered as an integral part of the drawings which accompany them, neither of which shall be used alone, and all services, materials or apparatus, omitted from one but which is mentioned, shown or reasonably implied in the other shall be considered as properly and sufficiently specified and shall therefore be supplied and installed.

The location of various items indicated on the drawings is approximate except where specifically mentioned. It shall be understood drawings are generally diagrammatic and are only intended to indicate the scope and general arrangement of

[1] A complete list of current contractors can be found at http://www.te.com/en/industries/enterprise-networks-north-america/partners/canada-ndis/british-columbia-ndis.html

work and that the locations shown are subject to relocation within two meters at no additional costs to the Authority to accommodate varying construction conditions. Onsite measurements must be taken to ensure components will fit within specified geographic building dimensions while meeting all codes and regulations.

The entire installation shall comply with current versions of the following codes, standards, and policies:

- All Municipal By-laws,
- Provincial Codes,
- The National Building Code,
- The Canadian Electrical Code,
- Canadian Labour Code, and the
- National Fire Code.

In the case of conflict or discrepancy the more stringent code shall apply.

All necessary permits, licenses, inspections and related fees to the above are the responsibility of the Contractor.

4.4 Contractor's Responsibility

The Contractor's responsibility is to adhere to the standards and specifications contained within and their work shall reflect the following:

- Before finalizing the contract price a site visit is mandatory to report any condition or logistical problem that may prevent the Contractors from performing the work as specified.
- Responsible for the work until the project has achieved substantial completion and to replace anything that may have been damaged, lost or stolen as a result of the work without additional costs to the Authority.
- Arrange work schedules in co-operation with the other subcontractors.
- Protect finished and unfinished work of the building from damage resulting from the carrying out of the work.
- Protect floors and walls, where necessary, and repair all damages to floor surfaces resulting from the execution of this work, without additional charge.
- On completion of work and before acceptance ensure all exposed surfaces of communications equipment are cleaned. See Section 3.
- Promptly advise the Authority of any work functions that appear in conflict with local authorities and work not included in work contract.
- Make no changes to the design intent without written authority. The Contractor shall give the Authority 48 hours notice in advance of any field reviews required.
- Ensure that equipment does not transmit noise and/or vibration to other parts of the building as a result of poor installation practices.
- The Contractor shall keep a qualified foreman or journeyman on the job site during the construction, testing and acceptance period. The above will not be changed from the project unless satisfactory reasons are given in writing to the Authority.
- Contractors are responsible that all communications rooms are secure while performing the work. The above must also be left in a secure state after use and the Contractor will be responsible for all damages and costs as result of improper use of the facility.
- During the course of the project the site must be kept clean and tidy by the Contractor. Additionally the building and site must be cleaned to a condition acceptable to the Authority before final completion.
- All the above shall be considered minimum requirements. The requirements, as designed, shall not be reduced as a result of the above and no extra charges will be accepted.

4.5 Communication Equipment Rooms and Closets

4.5.1 New Communication Rooms

All new communication rooms that do not have existing data cabling require a CAT 6 distribution system. The use of CAT 5/5E will not be permitted in new communication rooms without written approval from NTS. All data and voice runs are to terminate on the same universal patch panel system with no differentiation between voice and data ports. This will permit all ports to be used for either voice or data applications by means of labelled patch cords which connect to the network hardware (data) or voice patch panel (voice). A voice patch panel and tie cable will be used to provide a cross-connect between the universal patch panel system and the BIX telephone infrastructure.

4.5.2 Existing Communication Rooms

Existing communication rooms with CAT 5/5E that require MACs will be installed with CAT 6 cabling for data. Existing communication rooms may or may not currently use a universal voice/data patch panel system. If a universal patch panel system is in place then follow the instructions outlined in Section 4.5.1. If no universal patch panel system is in place then contact NTS to determine if the communications room should be upgraded to the universal architecture or if the existing legacy architecture should remain. If advised to continue using the legacy architecture then voice cable shall terminate on the existing universal BIX punch block system. Voice cables which terminate to legacy BIX systems MUST be Cat5e.

4.5.3 Entrance Facility (EF)

A. The EF consists of the telecommunications service entrance to the building, including the entrance point through the building wall, and continuing to the entrance room or space. The EF of each new building is the location where campus cables inter-building and intra-building services interconnect. The space shall be identified on the drawings. The demarcation point between service providers and the Authority premise cabling is generally located here.
B. All carriers and telecommunications providers involved in providing service to the building shall be contacted to establish their requirements and explore alternatives for delivering service. The location of other utilities, such as electrical, water, gas, and sewer shall be considered in the site selection of the telecommunication entrance facility.
C. A service entrance pathway shall be provided. The basic methods for provisioning are underground, buried, and aerial pathways.
D. EF shall have a minimum of two (2) feed conduits of 101.6mm (4in)
E. In determining the total number of pathways required the planner shall consider the following:
    a) Type and use of building
    b) Growth
    c) Difficulty of adding pathways in the future
    d) Alternate entrance
    e) Type and size of cables likely to be installed
F. The entrance room or space is the component of the EF that provides space for the termination of the entrance backbone cable. In accordance with electrical code the entrance or outside building cable shall be terminated and protected on a listed primary protector within 15m (50ft) of entering the building. Where telecommunications equipment (i.e. PBX) is located in the entrance room or space, the entire room or space shall meet the requirements for an equipment room as specified in Section 8 of TIA/EIA-569-A. If the network interface devices and telecommunication equipment are required in the entrance room, additional space will be needed.
G. The decision whether a room or open area is provided shall be based on security, quantity, type of termination and equipment, size of building and physical location within the building. For buildings exceeding 6096m (20,000SF) usable floor space, an enclosed and secure room must be provided.

H. In buildings (with up to 30,480SqM (100,000SF)) of usable floor space, wall mounted terminating hardware may be suitable. Buildings of larger floor area may require freestanding frames for cable termination. Tables 8.3-1 and 8.3-2 of TIA/EIA-569-C specify the space for all telecommunications equipment and associated cross-connections based on a 2.44m (8ft) wall or on freestanding racks.

I. Listed below are some additional provisions for EFs:
   a) A minimum of two walls shall be covered with rigidly fixed (3/4in trade size) A-C plywood, void free, 2.44m (8ft) high, capable of supporting attached equipment. Plywood shall be either fire rated or covered with two coats of fire retardant paint.
   b) Lighting shall be a minimum of 50 foot candles measured 1m (3ft) above the finished floor.
   c) False ceiling shall not be provided.
   d) The access door shall be a minimum of 1m (36in) wide and 2m (80in) high and shall be fitted with a lock. The brand of said lock shall be provided by the Authority and the lock must be keyed in accordance with supplied instructions. The Authorities preference is to have this door accessible via card lock and secure access.
   e) Floors, walls and ceiling shall be treated to eliminate dust. Finishes shall be light in color to enhance room lighting.
   f) A minimum of two dedicated 30A, 120V AC L530R electrical outlets, each on separate circuits, shall be provided for equipment power as part of the site-specific specifications. Consideration should be given to identifying those outlets dedicated to telecommunications equipment. In addition, convenience duplex outlets on a separate 20A 120V AC circuit shall be placed at 1.83m (6ft) intervals around the perimeter walls, at a height of 15.2cm (6in) AFF. If emergency power is available, consideration shall be given to automatic power backup.
   g) If an emergency power source is available in the building at least one of the duplex outlets must be so supplied and marked as such.
   h) Access shall be made available to the independent telecommunications grounding system specified by ANSI/TIA/EIA 607.
   i) TIA/EIA-569-A contains fire stopping, sprinkler requirements, miscellaneous pathways, and telecommunications recommendations of separation from less than 480V power lines.
   j) HVAC must maintain a continuous and dedicated environmental control with a temperature range of 20C to 25C and a humidity range of 40% to 55% relative humidity.

J. The EF will house communications electronics which shall be installed and activated by the Authority.

4.5.4 Main Cross connect (MC)

Copper and fiber backbone cables extend from the MC to the telecommunication room as shown on the drawings. The MC also serves as a telecommunications room for services to the work areas.

The MC includes termination hardware, equipment racks, patch panels, cable management hardware, and network electronics. The MC shall house the telecommunications main grounding busbar (TMGB). The bonding backbone cables shall extend from the TMGB to each of the telecommunications room as shown on the drawings.

For new large construction projects there may be a requirement to add a physical partition in the MC to securely separate the Authority equipment from other Vendor managed systems. When this is required follow the guidelines outlined in Section 4.5.5. To determine if a physical partition in the MC is required contact the Authorities IMITFPC who will work with NTS and other Authority technical representatives to review the overall design for the new building and determine if this is a requirement.

4.5.5 Physical Partition Guidelines

In any new construction project where an MC will be built the Contractor must take into consideration that a physical partition may be required. The Authority equipment must be located on the restricted side. Vendor managed systems must be located on the accessible side. The Contractor will incorporate the following design in the MC in addition to best practices and standards of design for MCs.

- Provide a physical and secure separation between the restricted side and the accessible side. This separation must be card reader accessible (for auditing and recording who accessed the location and when), minimum 2438.4mm in height, not impede airflow, cooling or overall room lighting. This separated area is the only location in the building where vendor managed systems may reside; they may not reside in any of the other TC, TR, or EF without prior written approval from the IMITFPC.
- The accessible side will be designed to:
    - Be located on the side with the entrance into the MC;
    - Include Contractor provided 4 post server rack(s) with a vertically mounted PDU and a 48 port TE CONNECTIVITY patch panel cross connected to a 48 port TE CONNECTIVITY patch panel on the restricted side;
    - Include horizontal cable management from the 4 post rack to the nearest 2 post relay cabinet on the restricted side with applicable waterfall cable management;
    - Ensure that all equipment will be placed and mounted securely in the 4 post server rack(s) and off the floor;
    - Be used for vendor supplied and serviceable equipment.
- The restricted side will be designed to:
    - Be located on the side of the MCR that is furthest from the entrance or the other side of the physically secure separation;
    - Include horizontal cable management from the nearest 2 post relay rack to the 4 post rack on the accessible side with applicable waterfall cable management;
    - Include Contractor provided 4 post server rack(s) with a vertically mounted PDU and a 48 port TE CONNECTIVITY patch panel cross connected to a 48 port TE CONNECTIVITY patch panel on the accessible side;
    - Ensure that all equipment will be placed and mounted securely in the 4 post server rack(s) and off the floor;
    - Be used for all Authority communications and network equipment.

4.5.6 Telecommunications Rooms (TR)

Telecommunications Rooms (TR) and Telecommunications Closets (TC) provide many different functions for the cabling systems and are often treated as a distinct sub-system within the hierarchical cabling system. The TR is the location for cross-connecting the backbone cable and horizontal station cable .Horizontal cables of all recognized hardware. Similarly, recognized types of backbone cable are also terminated in the TR on compatible connecting hardware.

The cross-connection of horizontal and backbone cable using jumper or patch cords allows flexible connectivity when extending various services to telecommunications outlet/connectors. Connecting hardware, jumpers, and patch cords used for this purpose are collectively referred to as “horizontal cross-connect”. Patch cords used for horizontal cross-connect must be of the same type (i.e. CAT 5E or CAT 6) as the horizontal cabling to which they will be connected. The TR may also contain the IC or the MC connections for different portions of the backbone cabling system.

Sometimes backbone to backbone cross-connections in the TR are used to tie different TR’s together in a ring, bus, or tree configuration. Equipment cables that consolidate several ports on a single connector shall be terminated on dedicated connecting hardware. Equipment cables that extend a single port appearance may either be permanently connected or interconnected directly to horizontal or backbone termination. Direct interconnections reduce the number of connections required to configure a link but may reduce flexibility.

The TR houses a telecommunications grounding busbar (TGB). The TR includes equipment racks, cable management hardware, termination hardware and labelling.

TR shall have a minimum fed conduit of 101.6mm (4in). The TR shall be dedicated for IMIT services and can NOT be co-located with any other service (i.e. plumbing, electrical, storage). The TR includes equipment racks, cable management hardware, termination hardware and labelling. The TR shall be equipped with electrical power, plywood backboard, lighting, floor covering, paint, and HVAC by other Contractors.

TR requirements shall be as follows. Size requirements are based on distributing telecommunications service to one individual work area per 100ft² (10m²) of usable floor space.

SERVING AREA	RECOMMENDED ROOM SIZE
100SqM	Wall, self-contained, or enclosed cabinets.
> 100SqM and < 500SqM	Shallow room at least .6m depth x 2.6m width
500SqM	3.0m depth x 2.5m width
> 500SqM and < 800SqM	3.0m depth. x 2.8m width.
> 800SqM and < 1000SqM	3.0m depth x 3.4m width.

The additional provisions for the Authority EF (Section 4.5.3, I., a-f) also apply to TR and TCs. Further provisions to be considered are as follows:

- The TR/TC should not be used as a passageway to other equipment rooms, nor should they share space with fire reporting equipment, alarm systems, electrical panel boards, power transformers, plumbing, storage, custodial equipment or any other function which would require access for reasons other than telecommunications maintenance.
- TC should be centrally located (both vertically and horizontally) within the building area served. The TR/TC should be stacked horizontally on multi-floor buildings where possible. Although BICSI standards recommend a separate wiring closet for each floor level, every attempt should be made to maximize the area served from the primary wiring closet in order to minimize the cost of telecommunications wiring infrastructure equipment and space.
- TR/TC should be accessible from a common hallway.
- TR/TC should be located in a low traffic area.
- TR/TC should not be located near office locations.
- TR/TC must not be located in a sterile core
- The maximum wiring run from the TR/TC to the most distant data outlet served from the room/closet can not exceed 90m (295ft) The TR/TC will be the origination point for wiring to all communications outlets within the area served.
- Where TR/TC serve areas on more than one floor, the design process should recognize the need to incorporate appropriate paths of travel for the raceway systems which will be required to carry the telecommunications wiring between the floors.

4.6 Backbone and Riser Cabling Requirements

4.6.1 General Backbone Cabling Requirements

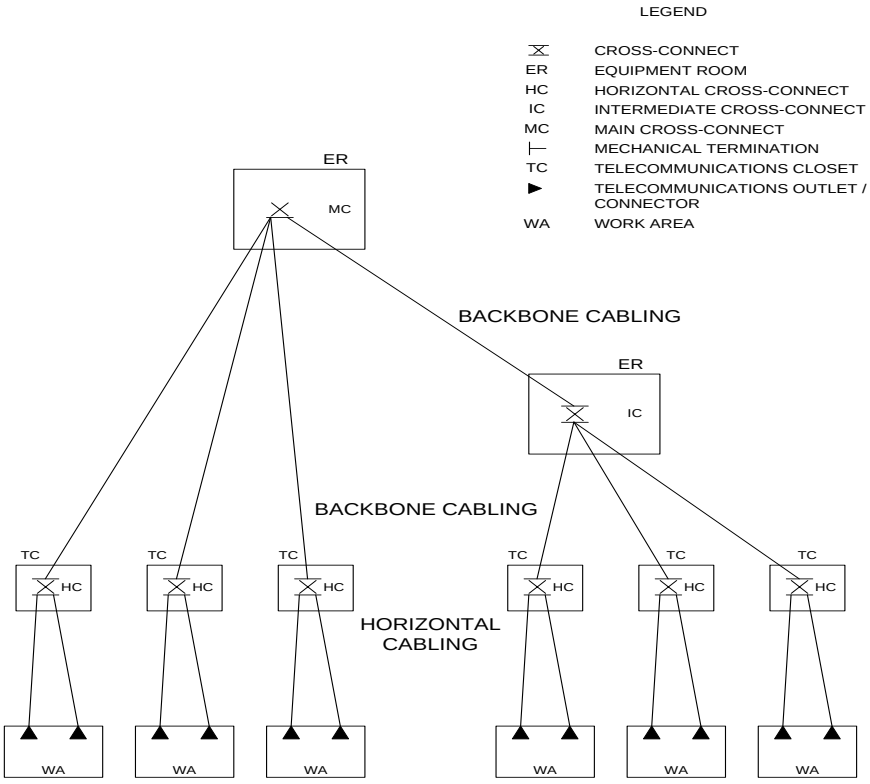
The function of the backbone cabling is to provide interconnections between telecommunications rooms, equipment rooms, and entrance facilities. In accordance with TIA/EIA-568-C the backbone cabling consists of the backbone cables, intermediate and main cross-connects, mechanical termination, and patch cords or jumpers used for backbone to backbone cross-connection.

- Backbone cables shall be installed separately from horizontal distribution cables.

- Where cables are housed in EMT conduits, the backbone and horizontal cables shall be installed in separate EMT conduits or in separate HDPEI within EMT conduits.
- Where cables are installed in an air return plenum as required by code, the cable shall be installed in EMT conduit, or plenum cable shall be installed in a corrugated plenum rated HDPEI to provide protection to the cable.
- Where backbone cables and distribution cables are installed in a cable tray or wire way, backbone cables shall be installed first and bundled separately from the horizontal distribution cables. If the backbone cable is fiber, the fiber must be installed inside corrugated HDPEI, and the HDPEI is to be attached to the outer or under side of the cable tray.
- In accordance with TIA/EIA-568-C the backbone cabling consists of the backbone cables, intermediate and main cross-connects, mechanical termination, and patch cords or jumpers used for backbone to backbone cross-connection.
- Backbone cabling also includes cabling between buildings. During each planning period, growth and changes in service requirements should be accommodated without installation of additional cabling.
- When a cable enters or exits a junction or pull box or other such enclosure the appropriate connector, grommet, or bushing needs to be used.
- ANSI/TIA/EIA-569-A specifies separation of the backbone cabling pathways from sources of EMI. Grounding of all metallic shields shall also be made to the main telecommunication ground.
- Consult TIA/EIA-569-C for pathway and floor penetration and conduit stub heights for all topologies.
- The backbone distribution system shall follow the conventional hierarchical extended star topology
- There shall be no more than two hierarchical levels of cross-connects in the backbone cabling. From the horizontal cross-connect, no more than one cross-connect shall be passed through to reach the main cross-connect. Therefore, interconnections between any two horizontal cross-connects shall pass through three or fewer cross-connects. Only a single cross-connect shall be passed through to reach the main cross-connect. (See IHA Backbone Hierarchical Star Topology Diagram at the end of this section on pg. 12)
- If cable needs to go through a wall, be it drywall, concrete, wood or other, and an existing pathway does not exist, the created pathway must use electrical conduit as a sleeve with EMT connectors with nylon throats at each end of the conduit. Poking a hole in the wall and running the cable through is not acceptable. All penetrations through fire rated building structures (walls and floors) shall be sealed with an appropriate firestop system. See Section 6.
- Backbone Distances in accordance with TIA/EIA 568-C are as follows:

Maximum backbone distribution distances			
Media Type	HC to MC	HC to IC	MC to IC
UTP	800m	500m	300m
	2624ft	1640ft	984ft
50/125 MM FO	2000m	300m	1700m
	6560ft	984ft	5576ft
SM FO	3000m	300m	2700m
	9840ft	984ft	8856ft

When the Horizontal Cross-Connect (HC) to Intermediate Cross-Connect (IC) is less than the maximum, the IC to Main Cross-Connect (MC) distance for optical fiber can be increased accordingly. But, the total distance from HC to IC shall not exceed the maximum 2000m (6560ft) for multi-mode fiber or 3000m (9840ft) for single mode. When the HC to IC distance is less than the maximum, the IC to MC distance for UTP cabling can be increased accordingly but the total distance from the HC to the MC shall not exceed the maximum of 800m (2624ft)



IHA Backbone Hierarchical Extended Star Topology

4.6.2 Voice Backbone Requirements

A. Voice backbone cabling shall be TE CONNECTIVITY 24 AWG, 100-pair UTP, CMR or FT4 rated, with a gray PVC jacket. Cable shall be third party verified to comply with TIA CAT 3 requirements. 50-pair or 25-pair UTP may be used if approved. A coupled bonding conductor will be installed within the riser bundle and bonded and grounded at each end.

B. Voice backbone cables shall be terminated in BIX mount panels in a Cross-connect Wall Mount Layout using the 25-pair color code method. The color refers to the insulation covering each conductor. The first group (tip) of colors is, in order: white, red, black, yellow, violet. The second group (ring) of colors is, in order: blue, orange, green, brown, slate. Cable assemblies consisting of more than 25 pairs shall have binder groups consisting of 25 pairs with a colour coded wrapping.

   For the general layout rules the following parameters should be observed:

   - A minimum of 20cm from ceiling
   - A minimum of 20cm from wall or equipment
   - A minimum of 15.25cm between Frames

C. The quantity of UTP cable requirements. As a guide, three (3) pairs of CAT 3 UTP should be provided between the main cross-connect and each telecommunications closet for each work area planned to be served by the closet. For example, if one work area is planned per 10SqM. of floor space and the closet serves 500SqM., 150 pairs (50 work areas x 3 pairs per work area) should be provided.

4.6.3 Data Backbone Requirements

Twelve strand fiber optic cables shall be utilized to provide backbone connectivity between the Data MC and each TR. (Six strand can be used if approved by NTS). The optical fiber cable shall be TE CONNECTIVITY XG OM3 Multimode 50/125µm, all-dielectric, and shall consist of one unit that contains twelve tight-buffered 850nm laser-optimized 50/125µm fibers surrounded by aramid strength members and a PVC jacket.

The cable shall have a UL rating of OFNR (Riser) or will meet the requirements of FT4 as per CEC rule 2-126. The outside diameter of each unit shall be 6.2mm making the overall cable dimensions 7.2mm x 13.4mm. The cable shall provide a maximum attenuation of 3.5 dB/km @ 850 nm and 1.5 dB/km @ 1300nm. The bandwidth of the cable shall be 1500 MHz/km @ 850nm and 500 MHz/km @ 1300nm. Both ends of the cable will be terminated to LC-LC connectors. Each fiber optic cable shall be terminated in the Data MC and TR's in black 24 port rack mount enclosures providing protection to the terminated fibers. All strands shall be terminated.

All exposed fiber in telecommunications pathways shall be protected with riser rated corrugated High Density Polyethylene Innerduct (HDPEI).

- HDPEI must
- Meet testing requirements for CSA C22.2 No.262
- Meet or exceed the requirements for FT-4 in accordance with the National Building Code of Canada

All other exposed fiber shall be protected between the point where the EMT conduit enters the communications room, and the fiber enters the terminating enclosure, including a service loop, using HDPEI. The HDPEI must be securely fastened to the wall or vertical cable management system in order to ensure it is not hanging down in the middle of the closet.

4.7 Horizontal Cabling Requirements

4.7.1 Telecommunications Outlets

Each outlet location will be three CAT 5E/6 cables unless otherwise specified. The cables shall be terminated on 8-position, 8-conductor CAT 5E/6 Universal jack for data and voice to the T568A wiring code. The outlet plates, unless otherwise noted, shall be 4 outlet, mounted to single gang boxes, mounting bracket (Arlington Industries LV1 or similar), surface mount boxes, and/or floor monuments (3rd party) as required.

4.7.2 Wire Product Specifications

CAT 5E/6 Cabling – Non-plenum

Horizontal cabling shall be TE CONNECTIVITY , CAT 5E/6, 24/23 AWG, 4-pair UTP, UL/NEC/CSA CMR rated, with a white PVC jacket. Cable jacketing shall be lead-free. Cable shall meet the performance requirements outlined in EIA/TIA 568-C in addition to all other standard CAT 5E/6 performance requirements.

CAT 5E/6 Cabling –plenum

Horizontal cabling shall be TE CONNECTIVITY , CAT 5E/6, 24/23 AWG, 4-pair UTP, UL/NEC/CSA CMP or CSA equal rated, with a white plenum-rated PVC jacket. Individual conductors shall be 100% FEP insulated. Cable jacketing shall be lead-free. Cable shall meet the performance requirements as outlined in EIA/TIA 568-C in addition to all other standard CAT 5E/6 performance requirements.

4.7.3 Modular Jacks and Face Plates

All modular jacks shall be wired to the T568A wiring pattern. Modular jacks shall be terminated using IDC connections colour coded for both T568A and T568B wiring. Modular jacks shall be UL Listed under file number E81956 or CSA equivalent.

CAT 5E/6 modular (data) jacks shall be un-keyed 4-pair and shall meet the performance requirements outlined in EIA/TIA 568-C in addition to all other standard CAT 5E/6 performance requirements.

All office and room outlets shall use white TE CONNECTIVITY, 4-port, single gang, flush faceplates constructed of ABS moulding compound and be 4.53in X 2.77in X .60in in size. Each faceplate shall contain three CAT 5E/6 jacks as noted in Section 4.2 (unless the site is a designated VoIP site then only two cables will be run and terminated in each outlet, with black jacks). Each port shall be individually labelled above the port with white machine printed label tape, applied horizontally, to indicate its function, as indicated in Section 4.13.4. The faceplates shall be mounted to in-wall single gang boxes. The faceplate specified is TE CONNECTIVITY part number 1479446-3 or TE CONNECTIVITY's latest replacement product.

Where new cable is added to an existing telecommunications outlet, the faceplate and all existing jacks shall be replaced to bring the entire outlet up to the current TE CONNECTIVITY SL series specifications. If the existing jacks are in use then consult NTS or IMITFPC before proceeding as some connections may be critical to the operations at the facility.

The following shall be maintained during Telecommunications Outlet Installation:

- Cables shall be coiled in the in-wall or surface-mount boxes if adequate space is present to house the cable coil without exceeding the manufacturer's bend radius.
- In hollow wall installations where box-eliminators are used, excess wire can be stored in the wall.
- No more than 12in of slack shall be stored in an in-wall box, modular furniture raceway, or insulated walls. Excess slack may be neatly stored in the ceiling above each drop location in a figure-eight coil when there is not enough space present in the outlet box to store slack cable. Coiled slack in the ceiling space should not exceed 2m of cable.
- Cables shall be dressed and terminated in accordance with the recommendations made in the TIA/EIA-568-C document, manufacturer's recommendations and/or best industry practices.
- Pair untwist at the termination shall not exceed one-quarter inch for CAT 5E/6 connecting hardware.
- Bend radius of the UTP cable in the termination area shall not be less than 4 times the outside diameter of the cable as per the TIA/EIA 568-C standard.
- The cable jacket shall be maintained as close as possible to the termination point. Where cables are terminated on TE CONNECTIVITY SL series jacks, the cable jacket must be fully inserted into the strain relief.
- Black data/voice jacks shall occupy the top position(s) on the faceplate. Data jacks in horizontally oriented faceplates shall occupy the left-most position(s).
- The Authority colour coding for jacks to identify system usage is as follows:

CABLE LABEL	JACK COLOUR	USAGE	TERMINATION POINT
D	Black	Data/Voice Applications	PP
W	Green	Wireless Connection Outlet (POE)	PP
N	Yellow	Nurse Call (Yellow Sheathed Cable)	NC BRC
P	Red	Patient Monitoring	PP
V	White	Voice (Legacy MAC work only)	BIX
CC	Violet	IP Security/CCTV - Green Cable	Sep. PP

Horizontal distribution cable for data circuits shall be CAT 5E/6, 4-pair unshielded twisted pair, CMP or CMR rated cable as required. Horizontal distribution cable for voice circuits shall be as defined above. Quantities of cables to each outlet type shall be in accordance with the definitions provided in Section 4.2.

In addition the following practices should be maintained in installation:

- Cable shall be installed in accordance with manufacturer's recommendations and best industry practices.
- Horizontal pathways, raceways and trays, shall not be filled to greater than 40% of fill capacity during initial installation.
- Conduit shall not be filled to greater that 40% of fill capacity during initial installation.
- Cable trays shall be galvanized steel, ladder type, with barriers and house only data, wireless, patient monitoring, video, and nurse call cabling with soft 90 degree bends as per TIA/EIA cabling standards. All nurse call cabling that leaves the cable tray must be protected in conduit stubbed up from the cable tray to the outlet box.
- Cables shall be installed in continuous lengths from origin to destination (no splices) unless specifically addressed in this document.
- Consolidation points are not permitted except by written authority.
- The cable's minimum bend radius and maximum pulling tension shall not be exceeded.
- When a cable enters or exits a junction or pull box or other such enclosure the appropriate connector, grommet, square cornered mud ring or bushing shall be used.
- If a J-hook or trapeze system is used to support cable bundles all horizontal cables shall be supported at a maximum of four-foot intervals. At no point shall cable(s) rest on acoustic ceiling grids or panels.
- Horizontal distribution cables shall be bundled in groups of no greater than 40 cables. Cable bundle quantities in excess of 40 cables may cause deformation of the bottom cables within the bundle, and increase the chances of alien crosstalk.
- Cable shall be installed above fire-sprinkler and systems and shall not be attached to the system or any ancillary equipment or hardware.
- The cabling system and support hardware shall be installed so that it does not obscure any valves, fire alarm conduit, boxes, or other control devices.
- Cables shall not be attached to ceiling grid or lighting support wires. Where light supports for drop cable legs are required, the Contractor shall install clips to support the cabling.
- Any cable damaged or exceeding recommended installation parameters during installation shall be replaced by the Contractor prior to final acceptance at no cost to the Owner.
- Cables shall be identified by a self-adhesive label in accordance with Section 4.13.
- 4-pair UTP cable shall be installed so that there are no bends less than four times the cables outside diameter (4 X cable O.D.) at any point in the run as outlined in EIA/TIA 568-C.
- Pulling tension on 4-pair UTP cables shall not exceed 25-pounds for a single cable or cable bundle as outlined in EIA/TIA 568-C
- Cables run through conduit will not pass through more than two 90 degree corners (or equivalent) without the use of an intermediate pull box as outlined in EIA/TIA 568-C.
- If cable needs to go through a wall, be it drywall, concrete, wood or other, and an existing pathway does not exist, the created pathway must use electrical conduit as a sleeve with EMT connectors with nylon throats at each end of the conduit. Poking a hole in the wall and running the cable through is not acceptable. All penetrations through fire rated building structures (walls and floors) shall be sealed with an appropriate firestop system as per Section 6.
- If cable is to be terminated in an open office location with modular furniture and termination within a wall is not a viable option, then the cables are to terminate within PAC poles, not the modular furniture.

4.8 Nurse Call

- All Nurse Call installations will be installed using yellow sheathed TE CONNECTIVITY CAT 5E UTP Cable, 4 pair, 24 AWG CMR rated based on jurisdictional / municipal codes.
- VoIP terminals that are connected directly to the Authority data switch shall use the predominant cabling standard in the closet that the terminal is terminating to whether it is CAT5E or CAT6.
- All cables will be routed in a cable tray and stubbed up conduit from the cable tray to the device location.
- Cables must not be buried amongst new or existing data/voice cables in pathways.
- Marquees are to be seismically restrained and mounted on appropriate T-Bar hangers.
- As of July 2009, the current Nurse Call standard is Rauland Responder 5 and Rauland Responder 4000, depending on the facility.

4.9 Security and Closed Circuit TV (CCTV)

- All security and CCTV cabling must follow the same low-voltage cabling specifications outlined in this document for network cabling. i.e. J-hooks, fire-stopping, etc.
- Security cabling sharing pathways with network cabling must not compromise the integrity of existing network cabling. It is not acceptable to bundle security cabling to network cabling using tie wraps.
- Cabling for IP-CCTV and IP-Security systems shall be designed according to the standards and best practices outlined in this document. Copper cables should run to a closet on the same floor as the work area. Closets shall be laid out so that no copper cable will exceed 95m, and fiber optic cable will be used to connect all closets to a central or core closet.
- All interconnections must be made with certified patch cables. Under no circumstances shall any cables be manually terminated with modular plugs.
- As with all network cabling, as-built drawings and certification results must be provided by the cabling vendor.
- All new IP-Security/CCTV installations shall be installed using green sheathed TE CONNECTIVITY CAT 5E/ 6 UTP Cable, 4 pair, 24 AWG CMR rated based on jurisdictional / municipal codes. (If TE CONNECTIVITY is not available, Belden, Superior Essex, or another suitably rated green sheathed cable will suffice)
- Terminate at the head end to violet TE CONNECTIVITY SL series 8P8C modular jacks mounted in 48 port unloaded patch panels in the nearest data closet.
- Terminate at the field end to violet TE CONNECTIVITY SL series 8P8C modular jacks mounted in a 4 port faceplate as per Section 4.7.3. Blanks must be used for spare ports in each outlet. For jacks terminated in the ceiling space, such as those for CCTV cameras, surface mount jacks may be used.
- In situations where IP-Security/CCTV cabling will share a common infrastructure or share rack space with the Authority cabling or network equipment, the NTS department must be consulted during the planning phase.

4.10 Wireless

For Wireless Connection Outlet locations:

- Provide one (1) CAT 5E/6 cable, terminated per Section 4.7.3 using green jacks.
- Provide 5m slack for each cable, at the field end, coiled neatly, suspended in the ceiling space with proper support and cable management. Coil radius must be within acceptable bend radius for the cable as per EIA/TIA 568-C.
- Support cables with Velcro wraps or equivalent. Tie-wraps are NOT to be used.
- As of July 2010, the current wireless access point vendor is Cisco.

4.11 Patch and Interconnection Cabling Requirements

4.11.1 Horizontal Data Cross-Connect

The horizontal cross-connect for data circuits shall consist of patch cords from the horizontal CAT 5E/6 termination panels to the network equipment within the same or adjacent racks. The horizontal data cross-connect shall be contained in suitably sized 19in racks. All equipment racks shall be augmented with horizontal and vertical management hardware, to properly dress horizontal cables and patch cords.

- Horizontal cable managers must be installed above and below every 48 port patch panel. Panduit part no. NM2
- Vertical cable managers must be installed on both sides of rack. Panduit part no. WMPVHC45E. Vertical managers installed between two adjoining racks should be Panduit WMPVHC45E. Consult NTS prior to ordering as some specific situations and the availability of space can vary.
- Horizontal and vertical cable managers must be double sided with covers on each side and must be of sufficient width to support all required cables. Substitutions may be used only if approved by NTS, and may be necessary due to limited space on the rack, or to accommodate larger bundles of cable.

Patch panels shall be 3.5in high (2U) and provide 48 unloaded ports for TE CONNECTIVITY SL style CAT5E/6 jacks as required. Jacks shall be terminated to T568A, and the colour of the jack at the patch panel must match the colour of the jack at the work area and the purpose of that specific cable. The front of each group of 6 ports shall be capable of accepting 9mm to 12mm labels. Patch panels shall comply with the performance characteristics outlined in EIA/TIA 568-C in addition to all other standard CAT 5E/6 requirements. Patch panels must be UL Listed under file number E81956 or CSA equivalent. Patch panels shall be TE CONNECTIVITY part numbers 1375015-2, 1479155-2 or approved substitute. Patch panels other than those listed above are not permitted to be used, even in situations where existing patch panels are of different manufacture. (Belden, Panduit, etc.)

All new cables must be terminated on the TE CONNECTIVITY patch panel as described above, even in situations where free ports are available on existing BIX or 110 termination style patch panels. Exceptions may be made where there are space limitations but only if approved by NTS.

4.11.2 Voice/Data BIX Cross-connect

New installations of horizontal cabling for voice shall be run and terminated in the same manner as data. (Black TE CONNECTIVITY SL series jacks in a patch panel) MAC work may require voice cabling to be terminated at existing BIX frames with connecting blocks designated for horizontal voice cabling. Always consult NTS prior to ordering supplies or commencing work to ensure the most appropriate voice cabling method is being followed.

To allow cross-connecting between horizontal and backbone voice cabling in new installations, 25 pair “Amphenol tails” will be run from patch panels in the data rack and terminated on BIX 1A connecting blocks. The patch panels will be TE CONNECTIVITY part # 555482-1 or Ortronics part # or-808004388. The interconnecting cables will be 25 pair, CAT 3 cables with one Amphenol end for connection to the patch panel. The number of pairs available between the patch panels and BIX frames shall be at least twice the number of work areas requiring telephone devices. The use of data patch panels for the voice cross-connect is not acceptable. If the voice patch panels listed above are not available or back-ordered then contact NTS for the best course of action. The Authority typically maintains a stock of appropriate voice patch panels.

Where new BIX installations are required, wall fields shall consist of field-terminated BIX XC kits which include frame, blocks, bottom trough, horizontal wire troughs, connecting blocks, and designation strips. Wire management frames shall be mounted between adjacent vertical frames to provide wire management of cross-connect wire. Frames and bottom troughs shall be constructed of carbon steel, light almond in colour. Wiring blocks, connecting blocks and horizontal troughs shall be constructed of polycarbonate moulding compound.

Connecting block terminals shall be constructed of phosphor bronze, plated with a minimum of 150 micro inches of tin-lead over a 50 micro-inch minimum nickel under plate. Combinations of 300 and/or 900 pair frames shall be used as required by the horizontal and backbone pair counts to be terminated in a given closet. Backbone frames shall employ BIX1A connecting blocks with 5-pair markings, and horizontal frames shall employ BIX1A4 connecting blocks with 4-pair markings on each 25-pair row. Where multiple frames are required:

- Frames shall be oriented so that backbone frames are located on the left and horizontal frames are located on the right of the wall field when facing the frame assembly.
- Frames on the left must allow for cross-connect wire to enter and exit the left side of the frame and connecting blocks must be able to swing out to the left, allowing for servicing while fully terminated and cross connected.
- Frames on the right must allow for cross-connect wire to enter and exit the right side of the frame and connecting blocks must be able to swing out to the right, allowing for servicing while fully terminated and cross connected.

Copper termination and management hardware shall be installed in the following manner:

- Cables shall be dressed and terminated in accordance with the recommendations made in the TIA/EIA-568-C document, manufacturer's recommendations and/or best industry practices.
- Cables must be secured to BIX connecting blocks using four inch nylon tie wraps.
- Pair untwist at the termination shall not exceed one-half an inch for CAT 5E/6 connecting hardware.
- Maximum bend radius of the cable in the termination area shall not exceed 4 times the outside diameter of the cable.
- Cables shall be neatly bundled and dressed to their respective panels or blocks. Each panel or block shall be fed by an individual bundle separated and dressed back to the point of cable entrance into the rack or frame.
- Cable bundles shall not cross the path (or plane) used for cross-connect wire.
- For data terminations the cable jacket shall be maintained as close as possible to the termination point.
- For voice terminations on BIX, the cable jacket shall extend to the point directly behind the designation strip, between the pair of BIX connecting blocks where termination is to take place. No unjacketed wire shall be visible when designation strips and connecting blocks are in place, and no jacketed cable shall be secured to the connecting block.
- BIX connecting blocks shall be terminated with enough slack as to allow access to the rear of the block by swinging it out towards the direction where cross connect wire enters and exits the frame.
- Each cable shall be clearly labelled on the cable jacket behind the patch panel at a location that can be viewed without removing the bundle support ties. Cables labelled within the bundle, where the label is obscured from view shall not be acceptable.

4.12 Fiber Termination

Fiber optic termination hardware shall be installed in the following manner:

- Fiber slack and service loops shall be neatly coiled within the fiber termination panel. The sheath of the cable must remain on the loop. No slack loops shall be allowed external to the fiber panel(s).
- Each cable shall be individually attached to the respective termination panel by mechanical means. The cables strength member(s) shall be securely attached the cable strain relief bracket in the panel.
- Each fiber cable shall be stripped upon entering the termination panel and the individual fibers routed in the termination panel.
- Each end of the fiber will be terminated with LC-LC connectors.
- Each cable shall be clearly labelled at the entrance to the termination panel. Cables labelled within the bundle shall not be acceptable.
- Dust caps shall be installed on the LC-LC connectors and couplings at all times unless physically connected.
- Exposed fiber must be protected with riser rated corrugated High Density Polyethylene Innerduct (HDPEI)
    - HDPEI must
        - Meet testing requirements for CSA C22.2 No.262
        - Meet or exceed the requirements for FT-4 in accordance with the National Building Code of Canada
- The optical budget for all fiber channels shall be 7.5dB and all channels must support 1000Base-SX or 1000Base-FX for MM and SM channels respectively.

KEY PROPERTIES FOR FIBER-GUARD/RIPER UL 2024 AND ASTM D-4216

Description	Test Method	Requirement	Value
Maximum Flame Propagation	UL 2024, 11.1.2a	12.00 Feet	Passed
Max Temp. at 12 Ft	UL 2024, 11.1.2b	850 ºF	Passed
Tensile Strength	ASTM D 638	> 6500 psi	> 6500 psi
Tensile Modulus	ASTM D 638	> 377,000 psi	380,000 psi
Notched Izod Impact	ASTM D 256	> 5 ft-lbs/in	15 ft-lbs/in

4.13 Labelling

4.13.1 General

All documentation and labelling must follow the TIA/EIA 606A Standard. Specifically, all labels must be machine-printed. They must be smudge-resistant and water-resistant. Laser printed labels are acceptable. Ink-jet printed labels may be used provided some mechanical protection is used (such as cellophane tape or a plastic strip). For labels on faceplates, patch panels, walls, BIX, or equipment, a device such as the Brother P-Touch labeller is acceptable.

For labels identifying cable, the labels must be wrapped around the cable within 30cm of the cable termination and must be protected with a plastic coating. Laser-printed labels may be printed on sheets such as Panduit PLL-12-Y3 self-laminating sheets or equivalent. Also, a device such as the Panduit LS3E can be used to print self-laminating labels as needed.

4.13.2 Panel Labelling

Fiber patch panels will be labelled “Panel 1”, continuing in a top-to-bottom, left-to-right approach. This label must be followed by a description of the fiber strand count and fiber type (6 Strand MM or 12 Strand SM) and where the other end of the fiber is located. For example “Panel 1 – 6 Strand MM to TR A1A".

Copper patch panels will be labeled “Panel A” for the first panel, “Panel B” for the next panel and continuing top-to-bottom, left-to-right. The label is to be placed on the left side of the front face of each 48-port patch panel. There should be no other labeling added to the patch panel. Each port on each patch panel comes pre-labeled with numbers 1 – 48 and therefore ports are identified at the wall-plate using a combination of the patch panel letter and port number. For example port 45 on patch panel B would be identified as B45.

4.13.3 Horizontal Cables Labelling and Termination

Horizontal cables are labelled sequentially from each communications room or closet. Patch panels will be labelled in a left-to-right, top-to-bottom fashion. With all new builds the cables must be terminated in a logical fashion so that all data drops from a room or area in the building are sequentially located on the patch panel(s). BIX positions will be labelled left-to-right, top-to-bottom within a BIX column; numbering will continue at the top of the next (to the right) column.

In order to identify the installer the Authority requests that the label on the cable also include the company’s initials.

Self-laminating labels must be wrapped around the ends of horizontal cable runs 10 cm from the end of the sheath, marked with, communications room or closet, patch panel location, room, installer and usage. For example, a cable used for Patient Monitoring coming from patch panel B, location 17, in TR A1A terminating to Room 2745 on faceplate A would have this label at both the head and field end A1A.B17.2745.A.XX.PM (XX being the company’s initial)

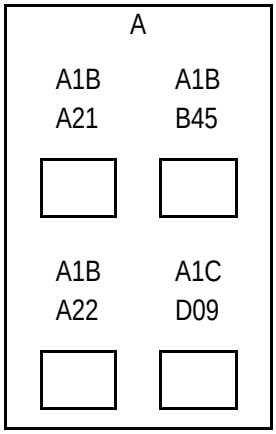
The last few letters after the installers’ initials indicate what the cable is used for. Refer to the table in Section 4.7.3 for the naming convention to use.

All cabling must be bundled in a logical order, based on cable usage, at the head end. Separate patch panels and BIX mounts/rails are not required; however consideration must be taken into consideration for the different systems that are being cabled. For new installs such as PACS or PM cabling should be terminated using the highest numbered patch panel location, and working backwards from there. This same rule will apply for MACs where possible. For example if there are 58 data cables, 10 PACS, 12 PM, and 8 WAP, and there are 2- 48 port patch panels available at the head end for termination, the cables must be terminated as follows:

- Patch Panel A, 1-48, and Patch Panel B, 1-10 will be for data.
- Patch Panel B, 38-48 for PACS
- Patch Panel B, 25-36 for PM
- Patch Panel B, 17-24 for WAP

4.13.4 Face Plate Labelling

At the faceplate, each jack of the faceplate will show the associated communications room or closet (such as A1B or A1C) followed by the patch panel letter and port number (such as A21 or B45) for data related applications, or BIX location for voice related applications



The above faceplate indicates that there are 3 cables coming from the A1B location, and 1 cable coming from A1C. The colour of the jack will indicate whether it is a data or voice connection. All of the faceplates must also be labelled with their position in the room to match the label on the cable, be that A, B, C, D etc. The locations start from the primary entry, then clockwise around the room. Refer to the table in Section 4.7.3 for jack colour coding requirements.

4.13.5 Backbone Cable Labelling

Backbone cables will be labelled showing the communications rooms or closets at each end and where within those rooms or closets the fiber is terminated, along with the installers initials. For example, a fiber bundle connecting rooms S5A (in fiber panel 2) and R1A (in fiber panel 1) would be labelled “S5A-2 R1A-1.XX”. (XX being the installers initials) The specific labelling to be applied will be specified for the job. Both the port where the cable is terminated and the cable itself must be labelled. The cable must be labelled with self-laminating labels wrapped around the sheath of the cable.

4.13.6 Patch Cable Labelling

Patch cables used at the workstation or within a communications room or closet do not need to be labelled.

4.14 Low Voltage Certification Testing

Certification testing shall be performed on all data cabling. This should exclude only voice cabling terminated on BIX connecting blocks. Validation and/or qualification testing is not sufficient for either horizontal or backbone data cabling. Test documentation shall be provided electronically in PDF format to the IMIT Networks and Telecoms Operator within three weeks after the completion of the project. The test document should not exceed 8-1/2in x 11in. There shall be only one cable test result per page, and the document must include the cable designation that matches the machine printed label that can be found within 10cm of each cable end. Test documentation must include site code.

The test equipment by name, manufacturer, model number and last calibration date will also be provided at the end of the document. Unless a more frequent calibration cycle is specified by the manufacturer, an annual calibration cycle is anticipated on all test equipment used for this installation. Calibration shall be completed by a manufacturer approved facility – “self” calibration is not sufficient. The test document shall detail the test method used and the specific settings of the equipment during the test.

When repairs and re-tests are performed, the problem found and corrective action taken shall be noted, and both the failed and passed test data shall be provided electronically in PDF format to NTS or IMITFPC as applicable.

4.15 Telecommunications Infrastructure Acceptance

4.15.1 Inspections

The Authorities Technical Representative from NTS or a designate will make periodic inspections of the cabling in progress. One inspection will be performed at the conclusion of cable pulling, prior to closing of the false ceiling, to inspect the method of cable routing and support, and the fire stopping of penetrations. Refer to Section 6. A second inspection will be performed at completion of cable termination to validate that cables were dressed and terminated in accordance with TIA/EIA 568-C specifications for jacket removal and pair untwist, compliance with manufacturer's minimum bend radius, and that cable ends are dressed neatly and orderly. Note that these inspections are at a minimum. The Authority may choose to inspect work more frequently at its discretion.

4.15.2 Final Inspection

Upon completion of the project, the Authorities Technical Representative from NTS or a designate will perform a final inspection of the installed cabling system with the Contractor's Project Foreman. The final inspection will be performed to validate that all horizontal and backbone cables were installed as defined in the drawing package, and that the installation meets the aesthetic expectations of the Authority.

4.15.3 Test Verification

Upon receipt of the test documentation, (Section 4.14) the Authority reserves the right to perform spot testing of a representative sample of the cabling system to validate test results provided in the test document. Authority testing will use the same method employed by the Contractor, and minor variations will be allowed to account for differences in test equipment. If any significant discrepancies are found, the Contractor will be notified for immediate resolution.

4.15.4 System Performance

During the three week period between final inspection and delivery of the test and as-built documentation, the Authority will activate the cabling system. The Authority will validate operation of the cabling system during this period.

4.15.5 Final Acceptance

Completion of the following will constitute acceptance of the system:

- the installation;
- in-progress and final inspections;
- receipt of the test and as-built documentation;
- receipt of the installation permit number with an accompanying summary of the work performed within three weeks of completion;
- successful performance of the system for a two week period;

4.16 Warranty and Services

4.16.1 General

The Contractor shall provide a system warranty covering the installed cabling system against defects in workmanship, components, and performance, and follow-on support after project completion.

4.16.2 Installation Warranty

The Contractor shall warrant the cabling system against defects in workmanship for a period of one year from the date of system acceptance. The warranty shall cover all labour and materials necessary to correct a failed portion of the system and to demonstrate performance within the original installation specifications after repairs are accomplished. This warranty shall be provided at no additional cost to the Authority

5 ELECTRICAL SPECIFICATIONS

5.1 Grounding and Bonding

The facility shall be equipped with a Telecommunications Bonding Backbone (TBB). This backbone shall be used to ground all telecommunications cable shields, equipment, racks, cabinets, raceways, and other associated hardware that has the potential for acting as a current carrying conductor. The TBB shall be installed independent of the buildings electrical and building ground and shall be designed in accordance with the recommendations contained in the TIA/EIA-607 Telecommunications Bonding and Grounding Standard.

The main entrance facility/equipment room in each building shall be equipped with a telecommunications main grounding bus bar (TMGB). Each telecommunications closet shall be provided with a telecommunications ground bus bar (TGB). The TMGB shall be connected to the building electrical entrance grounding facility. The intent of this system is to provide a grounding system that is equal in potential to the building electrical ground system. Therefore, ground loop current potential is minimized between telecommunications equipment and the electrical system to which it is attached.

5.2 Product Specifications

All racks, metallic backboards, cable sheaths, metallic strength members, splice cases, cable trays, etc. entering or residing in the TC or ER shall be grounded to the respective TGB or TMGB using a minimum #6 AWG stranded copper bonding conductor and compression connectors. Where metallic panels attached to the rack do not have sufficient metal to metal contact to provide an adequate path to ground, they shall be bonded to the rack using a minimum #14 AWG copper conductor. The copper conductor size shall be upgraded based on the largest power conductor feeding any rack mount equipment. The conductor shall be continuous; attaching all isolated components in a daisy chain fashion from top to bottom and bonded to the rack using an appropriate compression connector.

All wires used for telecommunications grounding purposes shall be identified with a green insulation. Non-insulated wires shall be identified at each termination point with a wrap of green tape. All cables and bus bars shall be identified and labelled in accordance with Section 4.13.

5.3 Ground System Installation

The TBB shall adhere to the recommendations of the TIA/EIA-607 standard, and shall be installed in accordance with best industry practices. Installation and termination of the main bonding conductor to the building service entrance ground, at a minimum, shall be performed by a licensed electrical contractor.

6 FIRESTOP SPECIFICATIONS

6.1 General

A firestop system is comprised of: the item or items penetrating the fire rated structure; the opening in the structure and the materials and assembly of the materials used to seal the penetrated structure. Firestop systems comprise an effective block for fire, heat, vapour and pressurized water stream.

All penetrations through fire rated building structures (walls and floors) shall be sealed with an appropriate firestop system. This requirement applies to through penetrations (complete penetration) and membrane penetrations (through one side of a hollow fire rated structure). Any penetrating items such as riser slots and sleeves, cables, conduit, cable tray, and raceways shall be properly fire stopped.

6.2 Product Specifications

Firestop systems shall be CSA/ULC Classified and shall be approved by a qualified Professional Engineer (P.E.), licensed in B.C. A drawing showing the proposed fire stopped system, stamped by the P.E. shall be provided to the Authorities Technical Representative prior to installing the firestop system(s). The Authority recommends the use of HILTE Fire stop sleeve CP 653 4in for both wall and riser penetrations.

6.3 Firestop System Installation

All firestop systems shall be installed in accordance with the manufacturer's recommendations and shall be completely installed and available for inspection by the local inspection authorities prior to cabling system acceptance.

7 COMMISSIONING AND SYSTEMS INTEGRATION

7.1 Acceptance

The contractor is responsible for commissioning any systems installed. Commissioning includes the stand-alone system and any other system that is integrated to provide the Authority will a fully integrated infrastructure. A system must be certified, commissioned and demonstrated as a stand-alone system prior to being integrated with any other system.

For example if the scope of work includes the installation of a Nurse Call system that will be integrated with the Staff Communications system, each system must be commissioned independently prior to being commissioned as an integrated system.

End to end commissioning of the fully integrated system must be demonstrated to and accepted by the Authority's IMIT authorized technical representative prior to final acceptance being granted.

8 A/V MEETING AND CONFERENCE ROOM STANDARDS

8.1 Telehealth Rooms

- The following requirements must support a monitor that will be wheeled in to the room on a cart
    - Indirect lighting
    - Three data outlets designated for Telehealth
    - Final room layout, height and location of outlets and equipment will be determined in consultation with the Authority's Video Conference Analyst.

8.2 Small Room

- Provide two data drops and one coaxial output in one face plate and two duplex electrical outlets in a quad face plate at opposite ends of the room.
- Final room layout, height and location of outlets and equipment will be determined in consultation with the Authority's Video Conference Analyst.

8.3 Medium Room

- Provide two data drops and two electrical duplex outlets on each of the 4 walls at a height of 350mm above finished floor (AFF).
- Provide two data and one coaxial output and two electrical duplex outlets at a height of 1375mm AFF in recessed wall plates on a wall that will be determined by the Authority. This will be considered the main wall.
- On the main wall provide an 'in-wall' 75mm conduit vertical pathway that begins at 60mm to the left of the data and electrical outlets that are placed at a height of 1375mm AFF ending at 350mm AFF with appropriate flush mounted access. This pathway will be used for video/audio cables that will run from the wall mounted television location down to a wall plate.
- In between studs, provide a 1200mm x 1200mm sheet of ¾in plywood in the center of the main wall to be used as backing. The lowest edge of this backing is to be no lower than 1200mm AFF.
- In the center of the room, or other designated area once furniture and room layout has been determined, provide four data drops and two electrical duplex outlets flush floor mounted. These outlets are to be covered by a 250mm or 300mm round plate.
- Provide fluorescent indirect lighting on two separate switches designed so that lights within 1200mm of the main wall can be switched off while other lighting that lights the table and the remainder of the medium sized room can remain lit. Pot lights are not acceptable in this room.
- All windows must have total black out curtains or blinds.
- Wall paint to be flat finished in a blue or green medium tone.
- Final room layout, height and location of outlets and equipment will be determined in consultation with the Authority's Video Conference Analyst.

8.4 Large Room

- Main wall will be chosen by the Authorities Video Conference Analyst where 'center of screen' will be determined.
- Provide two data drops and two electrical duplex outlets on each of the walls, other than the main wall, at a height of 350mm AFF at approximately 3650mm intervals.
- On the main wall 1270mm from center of screen (either left or right) provide two data drops and one electrical duplex outlet at a height of 350mm AFF and at a height of 1650mm AFF in recessed wall plates.
- On the main wall provide an in wall 75mm conduit vertical pathway that begins at 60mm further to the left or right of the data and electrical outlets that were placed in bullet #3 at a height of 350mm AFF and proceeds vertically to a point 1650mm AFF with appropriate flush mounted access. This pathway will be used for audio visual cabling and other related equipment.
- In the center of the room, or other designated area once furniture and room layout has been determined, provide four data drops and two electrical duplex outlets flush floor mounted. These outlets are to be covered by a 250mm or 300mm round plate.
- In the plenum directly above where the drop ceiling will be, provide one data outlet and one coaxial output and one electrical duplex outlet for a ceiling mounted projector 3050mm from the main wall and centrally located from each of the side walls and within 1200mm of the center line of the room.
- Provide paired lighting in the room so that there is no single bank of lights. This room will be designed to accommodate a centrally located ceiling mounted projector thus all lighting must be located on either side of the center of the room.
- All lighting must be on multiple switches designed so that lights within 2400mm of the main wall can be switched off while other lighting that lights the table and the remainder of the large room can remain lit.
- All windows must have total black out curtains or blinds.
- Wall paint to be flat finished in a blue or green medium tone.
- Final room layout, height and location of outlets and equipment will be determined in consultation with the Authority's Video Conference Analyst.

9 CABLE MANAGEMENT AND DESKTOP PLACEMENT GUIDELINES

9.1 Communication Room Guidelines

- Patch cables must be installed in bundles using hook and loop fasteners and available cable management. At the switch ports, cables should be bundled in groups of 6 or 12.
- Patch cables must be installed in such a way that they do not block access to switch modules or other equipment.
- CAT 6 patch cables shall be the minimum standard, and patch cable colours for cables being added shall be consistent with existing patch cable colours.
- Patch cables should be of a uniform length, with extra slack neatly tucked into the vertical cable management. Slack should not be stored in horizontal cable managers.
- Where possible, cables from the right side of a patch panel should be routed through vertical cable managers to the right side of the network switch. In cases where a cable must be routed from one side of a rack to the opposite side, the cable should run through horizontal cable management (at the top or bottom of the rack) to reach the other side of the equipment.
    - In essence, a cable plugged into the left half of a switch or patch panel must approach from the left side. A cable plugged into the right half of a switch or patch panel must approach from the right side.
- Do not fasten copper patch cables to fiber patch cables, and do not cause physical stress to fiber patch cables.
- Where bundles of patch cables are already in place and new cables are added, fasteners should be removed and cables should be re-bundled into appropriately size bundles.

9.2 Desktop Guidelines

- Ensure cables are tidily bundled together in a manner that does not interfere with users ability to use the workspace
- Secure cables in a manner that raises them off the floor and does not interfere with users ability to use the workspace (NO CABLES ON THE FLOOR)
- Ultra-slim desktop (USDT) PCs can be placed under the monitor or beside/behind monitor; use stand if feasible. PC should be no farther than 5ft from monitor, keyboard, and mouse.
- Small form factor (SFF) PCs can be placed under the monitor or beside the monitor use desktop stand if feasible. PC should be no farther than 5ft from monitor, keyboard, and mouse.
- Tower PCs should be placed beside or behind the monitor if a mounting solution is not used. If mounting is required, then optimal mounting positions are within 5ft of monitor, keyboard, and mouse while being out of the way of user's ability to use the workspace.

10 FINAL ACCEPTANCE

10.1 System As-Built Drawings

The installation contractor will be provided with two sets of drawings at the start of the project. One set will be designated as the central location to document all as-built information as it occurs throughout the project. The central set will be maintained by the Contractor's Foreman on a daily basis, and will be available to the Authority's Technical Representative upon request during the course of the project. Anticipated variations from the build-to drawings may be for such things as cable routing and actual outlet placement. No variations will be allowed to the planned termination positions of horizontal and backbone cables, and grounding conductors unless approved in writing by the Authority.

The Contractor shall provide the central drawing set to the Authority at the conclusion of the project. The marked up drawing set will accurately depict the as-built status of the system including termination locations, cable routing, and all administration labelling for the cabling system. In addition, a narrative will be provided that describes any areas of difficulty encountered during the installation that could potentially cause problems to the communications system.

10.2 Sign off

The Authority's IMITFPC will not provide sign-off on the work unless all sections of this document, as applicable, have been achieved to the satisfaction of the IMITFPC.

11 PREFERRED VENDORS

For a complete list of current Authority IMIT pre-approved vendors, or vendors that currently have a service level agreement with the authority please refer to Appendix 3 or contact the Authority's IMITFPC via email at IMITFPC@interiorhealth.ca.

APPENDIX 1 – ACRONYMS & ABBREVIATIONS

ACR	Attenuation to Cross-talk Ratio
AFF	Above Finished Floor
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
ATM	Asynchronous Transfer Mode
AUI	Attachment Unit Interface
AWG	American Wire Gauge
BICSI	Building Industry Consulting Service International
BIX	Building Industry Cross-connect
CEC	Canadian Electrical Code
CSA	Canadian Standards Association
CSMA/CD	Carrier Sense Multiple Access/Collision Detection
dB	decibel
EF	entrance facility
EIA	Electronic Industries Association
EMI	electro-magnetic interference
EMT	electrical metallic tubing
EP	entrance point
ER	equipment room
Ethernet	Precursor to, and almost identical with, the IEEE802.3 standard
ft	foot
FTE	field test equipment
HC	horizontal cross-connect
HDPEI	High Density Polyethylene Innerduct
HVAC	heating, ventilation, and air conditioning
Hz	hertz
IBDN	Integrated Building Distribution Network
IC	intermediate cross-connect
IDC	insulation displacement contact
IEC	International Electro-technical Commission
IEEE	Institute of Electrical and Electronics Engineers
IMIT	Information Management Information Technology
IMITFPC	Information Management Information Technology Facilities Project Coordinator
in	inches
IPCCTV	Internet Based Close Circuit Television System
ISO	International Organization for Standardization
ITU	International Telecommunications Union - Telecommunications Standardization Section
kHz	kilohertz
km	kilometre

LAN	local area network
LED	light emitting diode
m	metre
MAC	Moves, Adds, Changes with respect to telecommunications
MBS	megabits per second
MC	main cross-connect
MDF	main distribution frame
MHz	megahertz
MMFO	Multi-Mode Fiber Optic
mm	Millimetre
NBC	National Building Code
NEC	National Electrical Code (US)
NOC	Network Operations Centre
NEMA	National Electrical Manufacturers Association
NeXT	Near End Crosstalk
NI	Network Interface
NIR	Near End Crosstalk-to-Insertion Loss Ratio
NIST	National Institute of Standards and Technology
nm	Nanometre
NRZ	Non Return to Zero
NTS	The Authorities Networks and Telecommunications Department
PBX	Private Branch Exchange
P.E.	Professional Engineer
PVC	Polyvinyl Chloride
RFI	Radio Frequency Interference
SF	Square Feet
SMFO	Single-Mode Fiber Optic
STP	Shielded Twisted Pair
SqM	Square Metres
TC	Telecommunications Closet
TIA	Telecommunications Industry Association
TO	Telecommunications Outlet
TR	Telecommunications Room
TSB	Telecommunications System Bulletin
UTP	Unshielded Twisted Pair
UL	Underwriters Laboratories, Inc.
VoIP	Voice Over Internet Protocol
WAN	Wide Area Network
X	Cross-connect

APPENDIX 2 – DEFINITIONS

In this document, the words "will", "shall" and "must" denote absolute requirements. Also, the following definitions apply:

adapter: a device that enables any or all of the following:

a) different sizes or types of plugs to mate with one another or to fit into a telecommunications outlet/connector;
b) the rearrangement of leads;
c) large cables with numerous wires fanning out to smaller groups of wires;
d) Interconnection between cables.

administration: The method for labelling, identification, documentation and usage needed to implement moves, additions, and changes of the telecommunications and low voltage cabling infrastructure

authority: The Health Authority, Interior Health, the owner, IHA.

backbone: a facility (i.e. pathway, cable, or conductors) between telecommunications closets, or floor distribution terminals, the entrance facilities, and the equipment rooms within or between buildings.

BIX block: a type of punch block used to connect sets of CAT 3, 5e, or 6 wires in a structured cabling system for telephony

bonding: a low impedance path obtained by permanently joining all non-current-carrying metal parts to assure electrical continuity and having the capacity to conduct safely any current likely to be imposed on it.

bridged tap: the multiple appearances of the same cable pair at several distribution points.

building code: the most current issue of the British Columbia building code, local by-laws and amendments issued by other authorities having jurisdiction.

cable: an assembly of one or more conductors or optical fibers with an enveloping sheath, constructed so as to permit use of the conductors singly or in groups.

cable sheath: a covering over the conductor assembly that may include one or more metallic members, strength members, or jackets.

cable tray: a type of raceway

cabling: a combination of all cables, wire, cords, and connecting hardware.

campus: the building and grounds of a complex; i.e., a university, college, industrial park, government establishment, or military establishment.

channel: the end-to-end transmission path between two points at which application-specific equipment is connected.

coax: electrical cable with an inner conductor surrounded by a tubular insulating layer typically of a flexible material covered with a thin insulating layer on the outside.

commercial building: a building, or part thereof, that is intended for office use.

conduit: a raceway of circular cross-section of the type permitted under the electrical code and this Profile. Includes EMT (electrical-metallic tubing) conduit.

connecting hardware: a device providing mechanical cable terminations.

consolidation point: a location for interconnection between horizontal cables that extend from building pathways, and horizontal cables that extends into work area pathways.

cord, telecommunications: a cable using stranded conductors for flexibility, as in distribution cords or line cords.

cross-connect: a facility enabling the termination of cable elements and their interconnection, and/or cross-connection, primarily by means of a patch cord or jumper.

cross-connection: a connection scheme between cabling runs, subsystems, and equipment using patch cords or jumpers that attach to connecting hardware on each end.

customer premises: building(s) with grounds and belongings under the control of the customer.

Data Communications Cabling System: the cable used to connect data network devices together (copper and fiber), as well as termination hardware, cable support systems, and communications rooms.

demarcation point: a point where the operational control, or ownership changes.

device (as related to a workstation): an item such as a telephone, computer, graphic or video terminal.

distribution frame: a structure with terminations for connecting the permanent cabling of a facility in such a manner that inter-connection or cross-connections may readily be made.

duct:

a) a single enclosed raceway for wires or cables. See also conduit, raceway;
b) a single enclosed raceway for wires or cables usually buried in soil or concrete;
c) an enclosure in which air is moved. Generally part of the HVAC system of a building.

Electrical code: the most current edition of the Canadian Electrical Code, BC amendments, Safety Standards, local by-laws and amendments issued by other authorities having jurisdiction.

entrance facility, telecommunications: an entrance to a building for both public and private network service cables (including antennae) including the entrance point at the building wall and continuing to the entrance room or space.

entrance point, telecommunications: the point of emergence of telecommunications conductors through an exterior wall, a concrete floor slab, or from a rigid metal conduit or intermediate metal conduit.

entrance room or space, telecommunications: a space in which the joining of inter- or intra-building telecommunications backbone facilities takes place. An entrance room may also serve as an equipment room.

equipment cable (cord): a cable or cable assembly used to connect telecommunications equipment to horizontal or backbone cabling.

equipment room, telecommunications: a centralized space for telecommunications equipment that serves the occupants of the building. An equipment room is considered distinct from a telecommunications closet because of the nature or complexity of the equipment.

furniture cluster: a contiguous group of work areas, typically including space division, work surfaces, storage, and seating.

ground: a connection to earth obtained by a grounding electrode.

HDPEI: a corrugated, flexible duct, typically of 1 to 3" diameter, made of High Density Polyethylene used to protect fibre optic cabling.

horizontal cabling: the cabling between, and including, the telecommunications outlet/connector and the horizontal cross-connect.

horizontal cross-connect: a cross-connect of horizontal cabling to other cabling, i.e., horizontal, backbone, or equipment.

hybrid cable: an assembly of two or more cables (of the same, or different types or categories) covered by one overall sheath.

install: synonymous with provide

Interior Health, IHA, IH and owner: refer to the Authority.

infrastructure, telecommunications: a collection of those telecommunications components, excluding equipment, that together provides the basic support for distribution of all information within a building or campus.

interconnection: a connection scheme that provides for the direct connection of a cable to another cable or to an equipment cable without a patch cord or jumper.

intermediate cross-connect: a cross-connect between first level and second level backbone cabling.

jumper: an assembly of twisted wires without connectors, used to join telecommunications circuits/links at the cross-connect.

keying: the mechanical feature of a connector system that guarantees correct orientation of a connection, or prevents the connection to a jack, or to an optical fiber adapter of the same type intended for another purpose.

link: a transmission path between two points, not including terminal equipment, work area cables, and equipment cables.

main cross-connect: a cross-connect for first level backbone cables, entrance cables, and equipment cables.

media, telecommunications: wire, cable, or conductors use for telecommunications

modular jack: a telecommunications female connector. A modular jack may be keyed or unkeyed, and may have six or eight contact positions, but not all positions need to be equipped with jack contacts.

modular plug: a telecommunications male connector for wire or cords. A modular plug may be keyed or unkeyed, and may have six or eight contact positions, but not all the positions need be equipped with contacts.

multimode optical fiber: an optical fiber that will allow many bound modes to propagate. The fiber may be graded-index or step-index fiber. See, also, optical fiber cable.

multi-media telecommunications outlet assembly: a grouping in one location of several telecommunications outlets/connectors.

NTS: Interior Health Authority's Networks and Telecommunications department

open office: a floor space division provided by furniture, movable partitions, or other means, instead of building walls.

optical fiber cable: an assembly of one or more optical fibers.

optical fiber duplex adapter: a mechanical media termination device designed to align and join two duplex connectors.

optical fiber duplex connection: a mated assembly of two duplex connectors and a duplex adapter.

optical fiber duplex connector: a mechanical media termination device designed to transfer optical power between two pairs of optical fibers.

outlet box, telecommunications: a metallic or non-metallic deep box mounted within a wall, floor, or ceiling, used to hold telecommunications outlet/connectors, or transition devices.
outlet/connector, telecommunications: a connecting device in the work area, on which the horizontal cable terminates.

patch cord: a length of cable with connectors on one or both ends used to join telecommunications circuits/links at the cross-connect.

patch panel: a cross-connect system of mateable connectors that facilitates administration.

pathway: a facility for the placement of telecommunications cable.

premise: the facilities, leased or owned by the Authority, where Work is to be performed.

Prime Consultant, Contractor, and Bidder: the individual, sole proprietorship, partnership or corporation responsible for delivery of the project or Work and/or written authority to do Work.

provide: to supply and install.

pull strength: see pull tension.

pull tension: the pulling force that can be applied to a cable without affecting specified characteristics of the cable.

raceway: any channel designed for holding wires, cables, or busbars, and, unless otherwise qualified in the rules of the CE Code, the term includes conduit (rigid and flexible, metallic and non-metallic), electrical metallic and non-metallic tubing, under floor raceways, cellular floors, surface raceways, wireways, cable trays, busways, and auxiliary gutters.

riser: the pathway to link multiple communication rooms, closets, satellites, and/or floors.

single-mode optical fiber: an optical fiber that will allow only one mode to propagate; such fiber is typically a step-index fiber.

site: synonymous with Premise.

small buildings: typically having no more than two telecommunications closets or less than 100 work stations

space, telecommunications: an area used to house the installation and termination of telecommunications equipment and cable, i.e., telecommunications closets, work areas, and access holes/handholes.

splice: a joining of conductors, meant to be permanent, generally from different sheaths.

splice closure: a device used to protect a cable or wire splice.

star topology: a topology in which each telecommunications outlet/connector is directly cabled to the distribution device.

supply: means supply only; no other material or labour cost is involved.

TE Connectivity: Formerly Tyco Electronics, AMP

telecommunications: any transmission, emission, or reception of signs, signals, writings, images, and sounds, that is information of any nature by cable, radio, optical, or other electromagnetic systems.

telecommunications closet: an enclosed space for housing telecommunications equipment, cable terminations, and cross-connect cabling. The closet is the recognized location of the cross-connect between the backbone and horizontal facilities.

telecommunications grounding busbar: a common point of connection for the telecommunications system and bonding to ground; located in the telecommunications closet or equipment room.

terminal:

a) a point at which information may enter or leave a communications network; or
b) the input-output associated equipment; or
c) a device by means of which wires may be connected to each other.

topology: the physical or logical arrangement of a telecommunications system.

work means the furnishings of all labour, material and equipment to perform the services described in this document.

work area (work station): a building space where the occupants interact with a workstation device(s).

work area cable (cord): a cable assembly connecting the telecommunications outlet/connector with the terminal equipment.

Zoned Cabling: multiple cables of the same length terminating at a central transfer point for distribution to individual workstation locations.

APPENDIX 3 – CURRENT TECHNOLOGIES

Technology	Manufacturer	Vendor
Cable Infrastructure	TE CONNECTIVITY	Any TE Connectivity Certified Retailer
Security	Lenel	Chubb
Real Time Locating System (RTLS)	Ekahau	Ekahau
Clock System	Simplex	Simplex
Phone System	Avaya/Cisco	Telus
Network Switches	Hewlett-Packard	Various
Wireless	Cisco	Telus
Staff to Staff Communication	Vocera	Vocera
Nurse Call	Rauland	Terracom
Patient Entertainment		HTV Systems
Patient Monitoring	Space Labs	Space Labs
Health Care Information System	Meditech	Connex
PACS	McKesson	McKesson Horizon
Desktop Computers/Laptops	Lenovo	IBM