ANSI/TIA/EIA-606-A-2002
Approved: May 16, 2002

TIA/EIA-606-A

TIA/EIA STANDARD

Administration Standard for Commercial Telecommunications Infrastructure

TIA/EIA-606-A

(Revision of TIA/EIA-606)

MAY 2002

TELECOMMUNICATIONS INDUSTRY ASSOCIATION

Representing the telecommunications industry in association with the Electronic Industries Alliance

Electronic Industries Alliance

NOTICE

TIA/EIA Engineering Standards and Publications are designed to serve the public interest through eliminating misunderstandings between manufacturers and purchasers, facilitating interchangeability and improvement of products, and assisting the purchaser in selecting and obtaining with minimum delay the proper product for his particular need. Existence of such Standards and Publications shall not in any respect preclude any member or nonmember of TIA/EIA from manufacturing or selling products not conforming to such Standards and Publications, nor shall the existence of such Standards and Publications preclude their voluntary use by those other than TIA/EIA members, whether the standard is to be used either domestically or internationally.

Standards and Publications are adopted by TIA/EIA in accordance with the American National Standards Institute (ANSI) patent policy. By such action, TIA/EIA does not assume any liability to any patent owner, nor does it assume any obligation whatever to parties adopting the Standard or Publication.

This Standard does not purport to address all safety problems associated with its use or all applicable regulatory requirements. It is the responsibility of the user of this Standard to establish appropriate safety and health practices and to determine the applicability of regulatory limitations before its use.

(From Standards Proposal No. 3-4156-RV1-A and 3-4156-RV1-A-1, formulated under the cognizance of the TIA TR-42.6 Subcommittee on Telecommunications Infrastructure Administration.)

Published by

Standards and Technology Department
2500 Wilson Boulevard
Arlington, VA 22201 U.S.A.

PRICE: Please refer to current Catalog of
EIA ELECTRONIC INDUSTRIES ALLIANCE STANDARDS and ENGINEERING PUBLICATIONS or call Global Engineering Documents, USA and Canada
(1-800-854-7179) International (303-397-7956)

PLEASE!

DON'T VIOLATE
THE
LAW!

NOTICE OF DISCLAIMER AND LIMITATION OF LIABILITY

The document to which this Notice is affixed has been prepared by one or more Engineering Committees of the Telecommunications Industry Association ("TIA"). TIA is not the author of the document contents, but publishes and claims copyright to the document pursuant to licenses and permission granted by the authors of the contents.

TIA Engineering Committees are expected to conduct their affairs in accordance with the TIA Engineering Manual ("Manual"), the current and predecessor versions of which are available at http://www.tiaonline.org/standards/sfg/engineering_manual.cfm. TIA's function is to administer the process, but not the content, of document preparation in accordance with the Manual and, when appropriate, the policies and procedures of the American National Standards Institute ("ANSI").

THE USE OR PRACTICE OF CONTENTS OF THIS DOCUMENT MAY INVOLVE THE USE OF INTELLECTUAL PROPERTY RIGHTS ("IPR"), INCLUDING PENDING OR ISSUED PATENTS, OR COPYRIGHTS, OWNED BY ONE OR MORE PARTIES. TIA MAKES NO SEARCH OR INVESTIGATION FOR IPR. WHEN IPR CONSISTING OF PATENTS AND PUBLISHED PATENT APPLICATIONS ARE CLAIMED AND CALLED TO TIA'S ATTENTION, A STATEMENT FROM THE HOLDER THEREOF IS REQUESTED, ALL IN ACCORDANCE WITH THE MANUAL. TIA TAKES NO POSITION WITH REFERENCE TO, AND DISCLAIMS ANY OBLIGATION TO INVESTIGATE OR INQUIRE INTO, THE SCOPE OR VALIDITY OF ANY CLAIMS OF IPR.

ALL WARRANTIES, EXPRESS OR IMPLIED, ARE DISCLAIMED, INCLUDING WITHOUT LIMITATION, ANY AND ALL WARRANTIES CONCERNING THE ACCURACY OF THE CONTENTS, ITS FITNESS OR APPROPRIATENESS FOR A PARTICULAR PURPOSE OR USE, ITS MERCHANTABILITY AND ITS NON-INFRINGEMENT OF ANY THIRD PARTY'S INTELLECTUAL PROPERTY RIGHTS. TIA EXPRESSLY DISCLAIMS ANY AND ALL RESPONSIBILITIES FOR THE ACCURACY OF THE CONTENTS AND MAKES NO REPRESENTATIONS OR WARRANTIES REGARDING THE CONTENT'S COMPLIANCE WITH ANY APPLICABLE STATUTE, RULE OR REGULATION.

TIA SHALL NOT BE LIABLE FOR ANY AND ALL DAMAGES, DIRECT OR INDIRECT, ARISING FROM OR RELATING TO ANY USE OF THE CONTENTS CONTAINED HEREIN, INCLUDING WITHOUT LIMITATION ANY AND ALL INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING DAMAGES FOR LOSS OF BUSINESS, LOSS OF PROFITS, LITIGATION, OR THE LIKE), WHETHER BASED UPON BREACH OF CONTRACT, BREACH OF WARRANTY, TORT (INCLUDING NEGLIGENCE), PRODUCT LIABILITY OR OTHERWISE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. THE FOREGOING NEGATION OF DAMAGES IS A FUNDAMENTAL ELEMENT OF THE USE OF THE CONTENTS HEREOF, AND THESE CONTENTS WOULD NOT BE PUBLISHED BY TIA WITHOUT SUCH LIMITATIONS.

ADMINISTRATION STANDARD FOR COMMERCIAL TELECOMMUNICATIONS INFRASTRUCTURE

Table of Contents

List of Tables

List of Figures

FOREWORD

(This foreword is not part of this Standard)

This Standard was developed by TIA/EIA Subcommittee TR-42.6.

Approval of this Standard

This Standard was approved by TIA/EIA Subcommittee TR-42.6, TIA/EIA Engineering Committee TR-42, and the American National Standards Institute (ANSI).

TIA/EIA reviews standards every 5 years. At that time, standards are reaffirmed, rescinded, or revised according to the submitted updates. Updates to be included in the next revision should be sent to the committee chair or to TIA/EIA.

Contributing organizations

More than 30 organizations within the telecommunications industry contributed their expertise to the development of this Standard (including manufacturers, consultants, end users, distributors, and other organizations).

Documents superseded

This Standard replaces the first edition of ANSI/EIA/TIA-606, originally published August 1993.

Significant technical changes from the previous edition

a) Establishes classes of administration, to address the different needs of small, medium, large, and very large telecommunications infrastructure systems.

b) Accommodates the scalable needs of telecommunications infrastructure systems.

c) Allows modular implementation of different parts of this Standard.

d) Specifies identifier formats to accommodate the exchange of information between design drawings, test instruments, administration software, and other documents or tools which may be used throughout the lifecycle of the cabling infrastructure.

e) Specifies labeling formats.

f) Definition of terms are harmonized across all premises telecommunications infrastructure standards.

Relationship to other standards and documents

This Standard is a member of a family of standards related to the telecommunications infrastructure. Other standards within this family are:

a) *Commercial Building Telecommunications Cabling Standard Part 1: General Requirements* (ANSI/TIA/EIA-568-B.1-2001)

b) *Commercial Building Telecommunications Cabling Standard Part 2: Balanced Twisted-pair Cabling* (ANSI/TIA/EIA-568-B.2-2001)

c) *Optical Fiber Cabling Component Standard* (ANSI/TIA/EIA-568-B.3-2000)

d) *Commercial Building Standard for Telecommunications Pathways and Spaces*

(ANSI/TIA/EIA-569-A-1998)

e) *Residential Telecommunications Cabling Standard* (ANSI/TIA/EIA-570-A-1999)

f) *Commercial Building Grounding and Bonding Requirements for Telecommunications* (ANSI/TIA/EIA-607-1994)

g) *Customer-owned Outside Plant Telecommunications Cabling Standard* (ANSI/TIA/EIA-758-1999)

Useful supplements to this Standard are the Building Industry Consulting Service International (BICSI) *Telecommunications Distribution Methods Manual, Customer-owned Outside Plant Manual,* and *The Telecommunications Cabling Installation Manual*. These manuals provide recommended practices and methods by which many of the requirements of this Standard are implemented.

The National Electrical Code® (ANSI/NFPA 70) contains requirements for telecommunications pathways and cabling within buildings that govern the use of this Standard. The National Electrical Safety Code® (ANSI/IEEE C2) also contains requirements for telecommunications pathways and cabling between buildings that govern the use of this Standard.

Other references are listed in annex E.

The following list may be useful to the reader in acquiring safety and other additional code-related information:

a) American Insurance Association:
National Building Code (NBC)

b) Building Officials and Code Administrators (BOCA):
The BOCA Basic Building Code

c) Institute of Electrical & Electronics Engineers (IEEE):
National Electrical Safety Code®

d) International Conference of Building Officials (ICBO):
Uniform Building Code (UBC)

e) National Fire Protection Association (NFPA):

1) Automatic Fire Detectors
2) Auxiliary Protective Signaling Systems
3) Central Station Signaling Systems
4) Life Safety Code
5) Local Protective Signaling Systems
6) National Electrical Code (NEC)
7) Remote Station Protective Signaling Systems
8) Proprietary Protective Signaling Systems
9) Protection of Electronic Computer/Data Processing Equipment

f) Southern Building Code Congress International, Inc.:
Standard Building Code (SBC)

Annexes

Annexes A through E are informative and are not considered as requirements of this Standard.

1 INTRODUCTION

1.1 General

This Standard provides the user of this document with guidelines and choices of classes of administration for maintaining telecommunications infrastructure. The four classes of administration specified are based on the complexity of the infrastructure being administered. In addition, this Standard is modular and scalable to allow implementation of various portions of the administration system as desired. For example, a contractor placing the pathways may be responsible for recording pathway information. After the pathway has been placed, a different contractor installing the cabling may be responsible for recording cabling information. A third contractor might install firestopping and be responsible for recording information and labeling for that portion of the infrastructure. The system owner should coordinate among the various contractors to maintain a uniform method of administration as specified in this Standard.

1.2 Purpose

This Standard specifies administration for a generic telecommunications cabling system that will support a multi-product, multi-vendor environment. It also provides information that may be used for the design of administration products.

This Standard provides a uniform administration approach that is independent of applications, which may change several times throughout the life of the telecommunications infrastructure. It establishes guidelines for owners, end users, manufacturers, consultants, contractors, designers, installers, and facilities administrators involved in the administration of the telecommunications infrastructure.

Use of this Standard is intended to increase the value of the system owner's investment in the infrastructure by reducing the labor expense of maintaining the system, by extending the useful economic life of the system, and by providing effective service to users.

1.3 Specification of criteria

In accordance with EIA Engineering Publication, EP-7B, two categories of criteria are specified; mandatory and advisory. The mandatory requirements are designated by the word "shall"; advisory requirements are designated by the words "should", "may" or "desirable" which are used interchangeably in this Standard.

Mandatory criteria generally apply to protection, performance, administration and compatibility; they specify the absolute minimum acceptable requirements. Conformance with the additional advisory criteria of this Standard can be expected to enhance the performance and usability of the cabling infrastructure.

A note in the text, table, or figure is used for emphasis or for offering informative suggestions.

1.4 Metric equivalents of US customary units

The metric dimensions in this Standard are soft conversions of US customary units; e.g., 100 millimeters is the soft conversion of 4 inches.

1.5 Life of this Standard

This Standard is a living document. The criteria contained in this Standard are subject to revisions and updating as warranted by advances in building construction techniques and telecommunications technology.

1.6 Elements of an administration system

Figure 1 illustrates a representative model for generic telecommunications infrastructures for which this Standard specifies an administration system. The elements illustrated include:

a) horizontal pathways and cabling;

b) backbone pathways and cabling;

c) telecommunications grounding / bonding;

d) spaces (e.g., entrance facility, telecommunications room, equipment room); and,

e) firestopping.

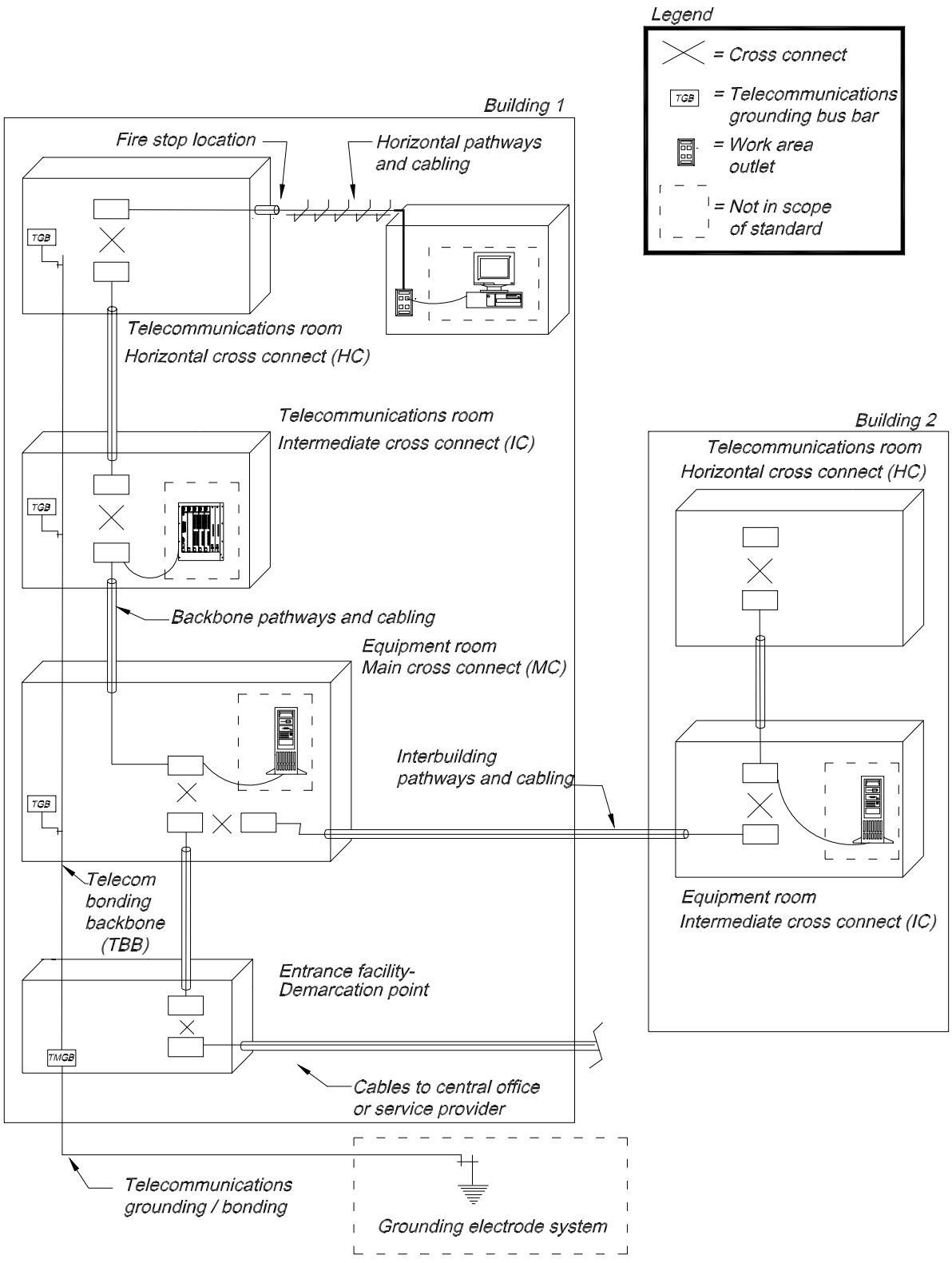


Figure 1: A representative model of typical telecommunications infrastructure elements for administration.

2 SCOPE

2.1 Applicability

This Standard specifies administration systems for commercial telecommunications infrastructure. This infrastructure may range in size from a building requiring a single telecommunications space (TS) and associated elements, to many TSs and associated elements in multiple campus locations. This Standard applies to administration of telecommunications infrastructure in existing, renovated, and new buildings.

This Standard addresses the administration of commercial telecommunications infrastructure by:

a) assigning identifiers to components of the infrastructure
b) specifying elements of information which make up records for each identifier
c) specifying relationships between these records to access the information they contain
d) specifying reports presenting information on groups of records
e) specifying graphical and symbolic requirements

This Standard does not replace any code, either partially or wholly. The reader shall consult the Authority Having Jurisdiction concerning applicable codes that may impact the use of this Standard.

2.2 Normative references

The following standards contain provisions that, through reference in this text, constitute provisions of this Standard. At the time of publication of this Standard, the editions were valid. All standards are subject to revision; parties to agreements based on this Standard are encouraged to investigate the possibility of applying the most recent editions of standards indicated. ANSI and TIA maintain registers of currently valid national standards published by them.

a) ANSI/TIA/EIA-568-B.1-2001, *Commercial Building Telecommunications Cabling Standard Part 1: General Requirements*

b) ANSI/TIA/EIA-568-B.2-2001, *Balanced Twisted-pair Cabling Component Standard*

c) ANSI/TIA/EIA-568-B.3-2000, *Optical Fiber Cabling Component Standard*

d) ANSI/TIA/EIA-569-A-1998, *Commercial Building Standard for Telecommunications Pathways and Spaces*

e) ANSI/TIA/EIA-607-1994, *Commercial Building Grounding and Bonding Requirements for Telecommunications*

f) ANSI/TIA/EIA-758-1999, *Customer-owned Outside Plant Telecommunications Cabling Standard*

3 DEFINITIONS, ACRONYMS AND ABBREVIATIONS, UNITS OF MEASURE

3.1 General

This clause contains definitions of terms, acronyms, abbreviations, units of measure, and symbols that have special meaning or are unique to the technical content of this Standard. Terms that are used in only one clause may be defined at the beginning of that clause.

3.2 Definition of terms

The generic definitions in this clause have been formulated for use by the entire family of telecommunications infrastructure standards. Specific requirements are found in the normative clauses of this Standard. For the purposes of this Standard, the following definitions apply.

access provider: The operator of any facility that is used to convey telecommunications signals to and from a customer premises.

adapter; optical fiber duplex: A mechanical device designed to align and join two duplex optical fiber connectors (plugs) to form an optical duplex connection.

administration: The method for labeling, identification, documentation and usage needed to implement moves, additions and changes of the telecommunications infrastructure.

aerial cable: Telecommunications cable installed on aerial supporting structures such as poles, sides of buildings, and other structures.

backbone: A facility (e.g., pathway, cable or conductors) between any of the following spaces: telecommunications rooms, common telecommunications rooms, floor serving terminals, entrance facilities, equipment rooms, and common equipment rooms.

backbone cable: See **backbone**.

cable: An assembly of one or more insulated conductors or optical fibers, within an enveloping sheath.

cable run: A length of installed media, which may include other components along its path.

cabling: A combination of all cables, jumpers, cords, and connecting hardware.

campus: Buildings and grounds having legal contiguous interconnection.

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

common equipment room (telecommunications): An enclosed space used for equipment and backbone interconnections for more than one tenant in a building.

common telecommunications room: An enclosed space used for backbone interconnections for more than one tenant in a building, which may also house equipment.

conduit: (1) A raceway of circular cross-section. (2) A structure containing one or more ducts.

Editorial note - For the purposes of these Standards the term conduit includes electrical metallic tubing (EMT) or electrical non-metallic tubing (ENT)

conduit system: Any combination of ducts, conduits, maintenance holes, handholes and vaults joined to form an integrated whole.

connecting hardware: A device providing mechanical cable terminations.

connector (plug), duplex; optical fiber: A remateable device that terminates two fibers and mates with a duplex receptacle.

consolidation point: A location for interconnection between horizontal cables extending from building pathways and horizontal cables extending into furniture pathways.

cross-connect: A facility enabling the termination of cable elements and their interconnection or cross-connection.

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), grounds and appurtenances (belongings) under the control of the customer.

demarcation point: A point where the operational control or ownership changes.

direct-buried cable: A telecommunications cable designed to be installed under the surface of the earth, in direct contact with the soil.

duct: (1) A single enclosed raceway for conductors or cables. See also **conduit, raceway**. (2) A single enclosed raceway for wires or cables usually used in soil or concrete. (3) An enclosure in which air is moved. Generally part of the HVAC system of a building.

end user: The owner or user of the premises cabling system.

entrance facility (telecommunications): An entrance to a building for both public and private network service cables (including wireless) including the entrance point of the building and continuing to the entrance room or space.

equipment cable; cord: A cable or cable assembly used to connect telecommunications equipment to horizontal or backbone cabling.

equipment room (telecommunications): An environmentally controlled centralized space for telecommunications equipment that usually houses a main or intermediate cross-connect.

firestop: A fire-rated material, device, or assembly of parts installed in a cable pathway at a fire-rated wall or floor to prevent passage of flame, smoke or gases through the rated barrier, (e.g., between cubicles or separated rooms or spaces).

firestopping: The process of installing listed, fire-rated materials into penetrations in fire-rated barriers to reestablish the fire-resistance rating of the barrier.

grounding electrode: A conductor, usually a rod, pipe or plate (or group of conductors) in direct contact with the earth for the purpose of providing a low-impedance connection to the earth.

grounding electrode conductor: The conductor used to connect the grounding electrode to the equipment grounding conductor, or to the grounded conductor of the circuit at the service equipment, or at the source of a separately derived system.

handhole: A structure similar to a small maintenance hole in which it is expected that a person cannot enter to perform work.

horizontal cabling: 1)The cabling between and including the telecommunications outlet/connector and the horizontal cross-connect. 2) The cabling between and including the building automation system outlet or the first mechanical termination of the horizontal connection point and the horizontal cross-connect.

horizontal cross-connect: A cross-connect of horizontal cabling to other cabling, e.g., horizontal, backbone, equipment.

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

identifier: An item of information that links a specific element of the telecommunications infrastructure with its corresponding record.

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

interconnection: A connection scheme that employs connecting hardware for the direct connection of a cable to another cable without a patch cord or jumper.

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

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

linkage: A connection between a record and an identifier or between records.

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

maintenance hole (telecommunications): A vault located in the ground or earth as part of an underground duct system and used to facilitate placing, connectorization, and maintenance of cables as well as the placing of associated equipment, in which it is expected that a person will enter to perform work.

media (telecommunications): Wire, cable, or conductors used for telecommunications.

modular jack: A female telecommunications connector that may be keyed or unkeyed and may have 6 or 8 contact positions, but not all the positions need be equipped with jack contacts.

multi-user telecommunications outlet assembly: A grouping in one location of several telecommunications outlet/connectors.

optical fiber: Any filament made of dielectric materials that guides light.

optical fiber cable: An assembly consisting of one or more optical fibers.

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

outlet box: A metallic or nonmetallic box used to hold telecommunications outlets/connectors or transition devices.

outlet/connector (telecommunications): A connecting device in the work area on which horizontal cable or outlet cable terminates.

outside plant: Telecommunications infrastructure designed for installation exterior to buildings.

patch cord: A length of cable with a plug on one or both ends.

patch panel: A connecting hardware system that facilitates cable termination and cabling administration using patch cords.

pathway: A facility for the placement of telecommunications cable.

penetration: An opening in a fire-rated barrier.

private branch exchange: A private telecommunications switching system.

raceway: Any enclosed channel designed for holding wires or cables.

record: A collection of detailed information related to a specific element of the telecommunications infrastructure.

report: A presentation of a collection of information from the various records.

room, telecommunications: An enclosed space for housing telecommunications equipment, cable terminations, and cross-connect cabling, that is the recognized location of the horizontal cross-connect.

service provider: The operator of any service that furnishes telecommunications content (transmissions) delivered over access provider facilities.

space (telecommunications): An area used for housing the installation and termination of telecommunications equipment and cable, e.g., common equipment rooms, equipment rooms, common telecommunications rooms, telecommunications rooms, work areas, and maintenance holes/handholes.

splice: A joining of conductors in a splice closure, meant to be permanent.

splice box: A box, located in a pathway run, intended to house a cable splice.

splice closure: A device used to protect a splice.

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

telecommunications infrastructure: See **infrastructure (telecommunications)**.

telecommunications media: See **media (telecommunications)**.

telecommunications space: See **space (telecommunications)**.

termination position: A discrete element of termination hardware where telecommunications conductors are terminated.

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

work area (work station): A building space where the occupants interact with telecommunications terminal equipment.

3.3 Acronyms and abbreviations

The following acronyms and abbreviations are used in this Standard:

ANSI	American National Standards Institute
AWG	American Wire Gauge
CER	common equipment room
CTR	common telecommunications room
EIA	Electronic Industries Alliance
EF	entrance facility
ER	equipment room
IDC	insulation displacement contact
LAN	Local Area Network
NEC	National Electrical Code
PBX	private branch exchange
TGB	telecommunications grounding busbar
TIA	Telecommunications Industry Association
TMGB	telecommunications main grounding busbar
TR	telecommunications room
TS	telecommunications space
UL	Underwriters Laboratories
UTP	unshielded twisted pair

3.4 Units of measure

The following units of measure are used in this Standard:

ft	foot
in	inch
μm	micrometer or micron
mm	millimeter
nm	nanometer

4 CLASSES OF ADMINISTRATION

4.1 General

Four classes of administration are specified in this Standard to accommodate diverse degrees of complexity present in telecommunications infrastructure. The specifications for each class include requirements for identifiers, records, and labeling. An administration system shall provide a method to find the record associated with any specific identifier.

An administration system may be managed using a paper-based system, general purpose spreadsheet software, or special-purpose cable management software. In a general purpose spreadsheet implementation, each required identifier with its associated record makes up a row and each column contains a particular item of information from the record. Administration for complex cabling systems may require special-purpose software. Special-purpose cable management software shall provide reports comprising information from groups of records. Examples of report formats are provided in annex A.

Drawings should be available showing all identified elements of infrastructure. Refer to annex C for examples and further information.

4.2 Determination of class

The most relevant factors in determining the minimum class of administration are the size and complexity of the infrastructure. The number of telecommunications spaces (TS), such as equipment room (ER), common equipment room (CER), telecommunications room (TR), common telecommunications room (CTR), and entrance facility (EF) spaces, is one indicator of complexity.

Classes are scalable and allow expansion without requiring changes to existing identifiers or labels. For mission critical systems, buildings over 7000 m^2 (75 000 ft^2), or multi-tenant buildings, administration of pathways and spaces and outside plant elements is strongly recommended. See annex B.

4.2.1 Class 1

Class 1 addresses the administration needs of a premises that is served by a single ER. This ER is the only TS administered whereas there are no TRs and no backbone cabling or outside plant cabling systems to administer. Simple cable pathways will generally be intuitively understood and need not be administered. In order to administer cable pathways or firestopping locations, class 2 or higher administration system should be used. Class 1 will typically be managed using a paper-based system or with general purpose spreadsheet software. Examples of these are provided in annex A. Class 1 administration is specified in clause 5.

4.2.2 Class 2

Class 2 administration provides for the telecommunications infrastructure administration needs of a single building or of a tenant that is served by a single or multiple TSs (e.g., an ER with one or more TRs) within a single building. Class 2 administration includes all elements of class 1 administration, plus identifiers for backbone cabling, multiple-element grounding and bonding systems, and firestopping. Cable pathways may be intuitively understood so administration of these elements is optional. Class 2 may be managed using a paper-based system, general purpose spreadsheet software, or special-purpose cable management software. Class 2 administration is specified in clause 6.

4.2.3 Class 3

Class 3 administration addresses the needs of a campus, including its buildings and outside plant elements. Class 3 administration includes all elements of class 2 administration, plus identifiers for buildings and campus cabling. Administration of building pathways and spaces, and outside plant elements is recommended. Class 3 may be managed with a paper-based system, general purpose spreadsheet software or special-purpose cable management software. Class 3 administration is specified in clause 7.

4.2.4 Class 4

Class 4 administration addresses the needs of a multi-site system. Class 4 administration includes all elements of class 3 administration, plus an identifier for each site, and optional identifiers for inter-campus elements, such as wide area network connections. For mission critical systems, large buildings, or multi-tenant buildings, administration of pathways and spaces and outside plant elements is strongly recommended. See annex B. Class 4 may be managed with general purpose spreadsheet software or special-purpose cable management software. Class 4 administration is specified in clause 8.

4.3 Classes and associated identifiers

An identifier is associated with each element of a telecommunications infrastructure to be administered. A unique identifier, or a combination of identifiers constructed so as to uniquely refer to a particular element, serves as the key to finding the record of information related to that element. Table 1 illustrates identifiers for elements of telecommunications infrastructure grouped by class.

Table 1: Identifiers grouped by class

Identifier	Text Clauses	Description of Identifier	Class of administration			
			1	2	3	4
fs	5.1.1	telecommunications space (TS)	R	R	R	R
fs-an	5.1.2	horizontal link	R	R	R	R
fs-TMGB	5.1.3	telecommunications main grounding busbar	R	R	R	R
fs-TGB	5.1.4	telecommunications grounding busbar	R	R	R	R
fs_1/fs_2-*n*	6.1.1	building backbone cable		R	R	R
fs_1/fs_2-*n.d*	6.1.2	building backbone pair or optical fiber		R	R	R
f-FSL*n(h)*	6.1.3	firestop location		R	R	R
$[b_1\text{-}fs_1]/[b_2\text{-}fs_2]$-*n*	7.1.2	campus backbone cable			R	R
$[b_1\text{-}fs_1]/[b_2\text{-}fs_2]$-*n.d*	7.1.3	campus backbone pair or optical fiber			R	R
b	7.1.1	building			R	R
c	8.1.1	campus or site				R
fs-UUU.n.d(q)	annex B	intra-space pathway		O	O	O
fs_1/fs_2-*UUU.n.d(q)*	annex B	building pathway		O	O	O
c-UUU.n.d(q)	annex B	outside plant pathway			O	O
$[b_1\text{-}fs_1]/[b_2\text{-}fs_2]$-*UUU.n.d(q)*	annex B	campus pathway			O	O
$[c_1\text{-}b_1\text{-}fs_1]/[c_2\text{-}b_2\text{-}fs_2]$-*UUU.n.d(q)*	annex B	inter-campus element				O

Notes:
a) R = required identifier for class, when corresponding element is present
   O = optional identifier for class
b) Optional identifiers are explained in informative annex B.
c) Refer to annex D for listing of all text references of these identifiers.

5 CLASS 1 ADMINISTRATION

Class 1 addresses the administration needs of a premises that is served by a single equipment room (ER). This ER is the only telecommunications space (TS) administered whereas there are no TRs and no backbone cabling or outside plant cabling systems to administer.

5.1 Infrastructure identifiers

The following infrastructure identifiers shall be required in class 1 administration, when the corresponding elements are present:

a) TS identifier
b) horizontal link identifier
c) TMGB identifier
d) TGB identifier

In the case of a tenant with single-ER infrastructure, in a multi-tenant building, the TMGB will commonly be elsewhere in the building, and the single grounding busbar in the tenant's ER will be a TGB.

Additional information may be enclosed by parentheses after the end of the required format of an identifier. See annex A for examples.

5.1.1 TS identifier

A TS identifier, unique within the building, shall be assigned to the TS, and it shall have the format *fs,* where:

f = numeric character(s) identifying the floor of the building occupied by the TS
s = alpha character(s) uniquely identifying the TS on floor *f*, or the building area in which the space is located

For buildings with non-numeric floors, alpha-numeric characters may be used in the "*f*" format and shall be consistent with the floor naming convention used within the building.

All TS identifiers in a single infrastructure should have the same format where possible.

The TS shall be labeled with the TS identifier inside the room so as to be visible to someone working in that room.

5.1.2 Horizontal link identifier

A horizontal link identifier, unique within the building, shall be assigned to each horizontal link and to its elements.

A horizontal link identifier shall have a format of *fs-an,* where,

fs = the TS identifier
a = one or two alpha characters uniquely identifying a single patch panel, a group of patch panels with sequentially numbered ports, an IDC connector (punch-down block), or a group of IDC connectors, serving as part of the horizontal cross-connect
n = two to four numeric characters designating the port on a patch panel, or the section of an IDC connector on which a four-pair horizontal cable is terminated in the TS

All horizontal link identifiers in a single infrastructure should have the same format where possible. The recommended format, to accommodate the majority of systems, is *fs-annn*. See annex A for examples.

For a copper horizontal link, the elements include:

a) the connecting hardware, e.g., patch panel port or the section of an IDC connector (punch-down block) terminating a four-pair horizontal cable
b) a four-pair horizontal cable
c) a telecommunications outlet/connector terminating a four-pair horizontal cable in the work area
d) if a consolidation point (CP) is present:
    i. the segment of four-pair horizontal cable extending from the TS to the CP connecting hardware
    ii. the CP connecting hardware or section of an IDC connector terminating a four-pair horizontal cable
    iii. the segment of four-pair horizontal cable extending from the CP connecting hardware to the outlet/connector, if present
e) if a MUTOA is present, a telecommunications outlet/connector in the MUTOA

For an optical fiber horizontal link, the elements include:

a) a pair of optical fiber terminations on a patch panel in the TS
b) a pair of optical fibers in a cable
c) a pair of optical fiber terminations in the work area
d) a telecommunications outlet/connector terminating a pair of optical fibers in the work area
e) if a consolidation point (CP) is present:
    i. the segment of optical fiber cable extending from the TS to the CP connecting hardware
    ii. the CP connecting hardware or section terminating a pair of optical fibers
    iii. the segment of optical fiber cable extending from the CP connecting hardware to the outlet/connector, if present
f) if a MUTOA is present, a telecommunications outlet/connector in the MUTOA

The pair of optical fiber terminations may be two simplex connectors or one duplex connector, and includes adapters, if present.

When consolidation points are used, some elements of the horizontal link may not be installed initially. All elements shall be labeled at the time they are installed.

In class 1 systems only, the *fs* portion of the horizontal link identifier may be omitted from labels. The full horizontal link identifier is the recommended format.

In the TS, each patch panel port or section of IDC connector shall be labeled with the *an* portion of the identifier. This requirement may be met by labeling a patch panel with the *a* portion of the identifier, and each port with the *n* portion. The port numbers marked on a patch panel by its manufacturer may be used as the *n* portion. Similarly, an IDC connector or group of IDC connectors may be labeled with the *a* portion of the identifier, and the section of an IDC connector terminating a four-pair horizontal cable labeled with the *n* portion.

Each end of a horizontal cable shall be labeled within 300 mm (12 in) of the end of the cable jacket with the horizontal link identifier, which shall be visible on the exposed part of the cable jacket. This shall include each cable end in the TS, at the work area, and at a CP, if present.

In the work area, each individual telecommunications outlet/connector shall be labeled with the horizontal link identifier. The labeling shall appear on the connector, faceplate, or MUTOA, in a way that clearly identifies the individual connector associated with the particular identifier.

A horizontal cable containing more than one horizontal link, such as a hybrid cable containing multiple four-pair sub-units or an optical fiber cable with four or more optical fibers, shall be identified with the lowest alpha-numeric horizontal link identifier of the four-pair sub-units or pairs of optical fiber in the cable. See annex A.1 for examples.

Information on the requirements for commercial building telecommunications cabling may be found in ANSI/TIA/EIA-568-B.1, ANSI/TIA/EIA-568-B.2, and ANSI/TIA/EIA-568-B.3.

5.1.3 TMGB identifier

The TMGB identifier is used to identify the single TMGB present in a building.

The format for the TMGB identifier shall be *fs*-TMGB, where:

fs = TS identifier for the space containing the TMGB
TMGB = portion of an identifier designating a telecommunications main grounding busbar

The telecommunications main grounding busbar shall be labeled with the TMGB identifier.

Information on requirements for the grounding and bonding system may be found in ANSI/TIA/EIA-607.

5.1.4 TGB identifier

The TGB identifier is used to identify TGBs in the grounding and bonding system.

A unique TGB identifier shall be assigned to each TGB and the format for the TGB identifier shall be *fs*-TGB, where:

fs = TS identifier for the space containing the TGB
TGB = portion of an identifier designating a telecommunications grounding busbar

All the TGB identifiers in a single infrastructure should have the same format where possible.

Each TGB shall be labeled with the TGB identifier.

5.2 Required records

In class 1 administration the following records shall be required:

a) one horizontal link record for each horizontal link

5.2.1 Horizontal link records

Horizontal link records shall contain the following information:

a) horizontal link identifier (primary indexing identifier, e.g., 1A-A47)
b) cable type (e.g., 4-pair, UTP, category 5e, plenum)
c) location of telecommunications outlet/connector (room, office, or grid location)
d) outlet connector type (e.g., 8-position modular, T568A, category 5e)
e) cable length (e.g., 51m/166ft)
f) cross-connect hardware type (e.g., 48-port modular patch panel, T568A, category 5e)

g) service record of link (e.g., passed category 5e at installation 1/12/01, re-terminated and re-tested at cross-connect 4/22/01 due to broken wire)

Additional items of information desired by the system owner or operator may be added at the end of the record, such as, the location of test results, the location of the outlet within the room or office, or other telecommunications outlet/connectors at same location (generally, the other outlet connectors in the same faceplate, e.g., 1A-A02, 1A-A03, 1A-A04; or 2B-B01, 2B-C01, 2B-D01).

Refer to annex A for examples of horizontal link records.

6 CLASS 2 ADMINISTRATION

Class 2 administration addresses infrastructure with one or more telecommunications spaces (TSs) in a single building.

6.1 Infrastructure identifiers

The following infrastructure identifiers shall be required in class 2 administration, when the corresponding elements are present:

a) identifiers required in class 1 administration (see clause 5.1 for requirements for TS, horizontal link, TMGB, and TGB identifiers)
b) building backbone cable identifier
c) building backbone pair or optical fiber identifier
d) firestopping location identifier

Class 2 administration may additionally include pathway identifiers. See annex B for examples of additional optional identifiers.

Additional information may be enclosed by parentheses after the end of the required format of an identifier. See annex A for examples.

6.1.1 Building backbone cable identifier

A unique building backbone cable identifier shall be assigned to each backbone cable between two TSs in one building and it shall have a format of fs_1/fs_2-*n,* where*:*

fs_1= TS identifier for the space containing the termination of one end of the backbone cable
fs_2= TS identifier for the space containing the termination of the other end of the backbone cable
n = one or two alpha-numeric characters identifying a single cable with one end terminated in the TS designated fs_1 and the other end terminated in the TS designated fs_2

In this format, the TS with the lesser alpha-numeric identifier shall be listed first. If the entire cable is within one TS, the format may be fs_1/fs_1-*n.*

All building backbone cable identifiers in a single infrastructure should have the same format where possible.

The backbone cable identifier shall be marked on each end of the backbone cable within 300 mm (12 in) of the end of the cable jacket.

6.1.2 Building backbone pair or optical fiber identifier

A unique building backbone pair or optical fiber identifier shall be used to identify each single copper pair or each single optical fiber in a backbone cable between two TSs in one building, and shall have a format fs_1/fs_2-*n.d,* where:

fs_1/fs_2-*n* = a building backbone cable identifier
d = two to four numeric characters identifying a single copper pair or a single optical fiber

All backbone pair or optical fiber identifiers in a single infrastructure should have the same format where possible.

The backbone pair or optical fiber identifier shall be marked on the front of the patch panel, the IDC connector (punch-down block) labeling strip, or the optical fiber patch panel, in a way which clearly

identifies the associated pair or optical fiber. This requirement may be met by marking the *fs*$_1$/*fs*$_2$-*n* portion of the identifier on each patch panel, IDC connector, or group of IDC connectors, and the *d* portion of the identifier by each port or section of an IDC connector terminating the pair or optical fiber.

6.1.3 Firestopping location identifier

A firestopping location identifier shall identify each installation of firestopping material.

The format for the firestopping location identifier shall be *f*-FSL*n(h)*, where:

f = numeric character(s) identifying the floor of the building occupied by the TS
FSL = an identifier referring to a firestopping location
n = two to four numeric characters identifying one firestopping location
h = one numeric character specifying the hour rating of the firestopping system

All firestopping location identifiers in a single infrastructure should have the same format where possible.

Each firestopping location shall be labeled at each location where firestopping is installed, on each side of the penetrated fire barrier, within 300 mm (12 in) of the firestopping material.

6.2 Required records

The following records shall be required in class 2 administration:

a) horizontal link records as specified in clause 5.2.1
b) one TS record for each TS
c) one backbone cable record for each backbone cable
d) one TMGB record for each TMGB
e) one TGB record for each TGB
f) one firestopping location record for each firestopping location

6.2.1 TS records

The TS records shall contain the following information:

a) TS identifier (primary indexing identifier, e.g., 2A)
b) type of TS (e.g., TR, CTR, ER, CER, or EF)
c) building room number
d) key or access card identification
e) contact person
f) hours of access

Additional items of information desired by the system owner or operator may be added to each record, such as, environmental information (e.g., electrical service, HVAC present) or non-telecommunications systems present. See annex B for implementation of additional identifiers.

6.2.2 Building Backbone cable records

The building backbone cable records shall contain the following information:

a) building backbone cable identifier (primary indexing identifier, e.g., 2A/3A-1)
b) type of cable (e.g., 600-pair 24 AWG shielded riser cable)
c) type of connecting hardware, first TS (e.g., 36 568SC duplex adapter panel)
d) type of connecting hardware, second TS (e.g., 36 568SC duplex adapter panel)
e) cross-connect table relating each backbone cable pair or optical fiber to other backbone cable pairs or optical fibers or to a horizontal link

Additional items of information desired by the system owner or operator may be added to each record. See annex B.

6.2.3 TMGB record

The TMGB record shall contain the following information:

a) telecommunications main grounding busbar identifier (primary indexing identifier, e.g., 1A-TMGB)
b) location of the TMGB (building room number)
c) location of attachment of TMGB to electrical system ground or building structural steel
d) location of test results for any tests performed on the TMGB, such as resistance to ground

Additional items of information desired by the system owner or operator, such as the dimensions of the TMGB or the number of grounding positions available, may be added to each record. See annex B.

6.2.4 TGB records

The TGB records shall contain the following information:

a) telecommunications grounding busbar identifier (primary indexing identifier, e.g., 3A-TGB)
b) location of TGB (building room number)
c) location of test results for any tests performed on the TGB, such as resistance to ground

Additional items of information desired by the system owner or operator, such as the dimensions of the TGB or the number of grounding positions available, may be added to each record. See annex B.

6.2.5 Firestopping records

The firestopping records shall contain the following information:

a) firestopping location identifier (primary indexing identifier, e.g., 3-FSL02(3))
b) location of the firestopping installation (eg.: room number and location within room)
c) type and manufacturer of firestopping installed
d) date of firestopping installation
e) name of installer of firestopping material
f) service record of firestopping location (e.g., 4/22/99 firestopping removed and replaced with same type by ABC Cabling to add cabling runs)

Additional items of information desired by the system owner or operator may be added to each record. See annex B.

7 CLASS 3 ADMINISTRATION

Class 3 administration addresses infrastructure with multiple buildings at a single site.

7.1 Infrastructure identifiers

The following infrastructure identifiers shall be required in class 3 administration:

a) identifiers required in class 2 administration (see clause 6.1)
b) building identifier
c) campus backbone cable identifier
d) campus backbone pair or optical fiber identifier

The following infrastructure identifiers are optional in class 3 administration:

a) identifiers optional in class 2 administration (see clause 6.1)
b) outside plant pathway element identifier
c) campus pathway or element identifier

Additional identifiers may be added if desired. See annex B for examples of additional optional identifiers.

Additional information may be enclosed in parentheses after the end of the required format of an identifier. See annex A for examples.

7.1.1 Building identifier

A unique building identifier shall be assigned to each building, and it shall have the format *b*, where:

b = one or more alpha-numeric characters identifying a single building

There are no labeling requirements for the building identifier.

7.1.2 Campus backbone cable identifier

A unique campus backbone cable identifier shall be assigned to each backbone cable connecting telecommunications spaces (TS) in different buildings, and it shall have the format $[b_1\text{-}fs_1]/[b_2\text{-}fs_2]\text{-}n$, where:

b_1fs_1 = building identifier and TS identifier for the TS in which one end of the backbone cable is terminated
b_2fs_2 = building identifier and TS identifier for the TS in which the other end of the backbone cable is terminated
n = one or two alpha-numeric characters identifying a single cable with one end terminated in the TS designated b_1fs_1 and the other end terminated in the TS designated b_2fs_2

In this format, the building with the lesser alpha-numeric identifier shall be listed first.

All campus backbone cable identifiers in a single infrastructure should have the same format where possible.

The campus backbone cable identifier shall be marked on each end of the backbone cable within 300 mm (12 in) of the end of the cable jacket.

Cables not terminating in a TS at both ends (e.g., with one or both ends terminating in a splice or pedestal) are outside the scope of this Standard. See annex B for recommendations on administering these elements.

7.1.3 Campus backbone pair or optical fiber identifier

A unique campus backbone pair or optical fiber identifier shall be assigned to each pair or optical fiber in a backbone cable connecting TSs in different buildings, and it shall have the format *[b_1-fs_1]/[b_2-fs_2]-n.d,* where:

[b_1-fs_1]/[b_2-fs_2]-n = campus backbone cable identifier
d = two to four numeric characters identifying a single copper pair or a single optical fiber

All campus backbone pair or optical fiber identifiers in a single infrastructure should have the same format where possible.

The campus backbone pair or optical fiber identifier shall be marked on the front of the patch panel, the IDC connector (punch-down block) labeling strip, or the optical fiber patch panel, in a way to clearly identify the intended pair or optical fiber. This requirement may be met by marking the *[b_1-fs_1]/[b_2-fs_2]-n* portion of the identifier on each patch panel, IDC connector, or group of IDC connectors, and the *d* portion of the identifier by each port or section of IDC connector terminating the pair or optical fiber.

Information on requirements for pathways and spaces occupied by telecommunications infrastructure may be found in ANSI/TIA/EIA-569-A. Information on requirements for customer-owned outside plant cabling may be found in ANSI/TIA/EIA-758.

7.2 Required records

In class 3 administration the following records shall be required:

a) records required in class 2 administration (see clause 6.2)
b) one building record for each building
c) one campus backbone cable record for each campus backbone cable

7.2.1 Building records

The building records shall contain the following information:

a) building name
b) building location (e.g., street address)
c) a list of all TSs
d) contact information for access
e) access hours

Additional items of information desired by the system owner or operator may be added to each record.

7.2.2 Campus backbone cable records

The campus backbone cable records shall contain the following information:

a) campus backbone cable identifier (the primary indexing identifier, e.g., [ADM-3A]/[ENG-2A]-4)
b) type of cable (e.g., 36 optical fiber, 50/125μm, gel filled, copper armor)
c) type of connecting hardware, first TS (e.g., 36 568SC duplex adapter panel)
d) type of connecting hardware, second TS (e.g., 36 568SC duplex adapter panel)

e) table relating backbone terminations to other backbone terminations or horizontal links, to which they are cross-connected

Additional items of information desired by the system owner or operator may be added to each record.

8 CLASS 4 ADMINISTRATION

Class 4 administration addresses infrastructure with multiple sites or campuses.

8.1 Infrastructure identifiers

The following infrastructure identifiers shall be required in class 4 administration:

a) identifiers required in class 3 administration (see clause 7.1)
b) campus or site identifier

The following infrastructure identifiers are optional in class 4 administration:

a) identifiers optional in class 3 administration (see clause 7.1)
b) inter-campus element identifier

Additional identifiers may be added if desired. See annex B for examples of additional optional identifiers.

Additional information may be enclosed in parentheses after the end of the required format of an identifier. See annex A for examples.

8.1.1 Campus or site identifier

A unique campus or site identifier shall be assigned to each campus or site, and it shall have the format *c*, where:

c = one or more alpha-numeric characters identifying a campus or site

There are no labeling requirements for the campus or site identifier.

8.2 Required records

The following records shall be required in class 4 administration:

a) records required in class 3 administration (see clause 7.2)
b) one campus or site record for each campus or site

8.2.1 Campus or site records

The campus or site records shall contain the following information:

a) campus or site name
b) campus or site location (e.g., street address)
c) contact information for local administrator of infrastructure
d) list of all buildings at the site or campus
e) location of main cross-connect, if applicable
f) access hours

Additional items of information desired by the system owner or operator may be added to each record.

9 COLOR-CODING IDENTIFICATION

9.1 General

This clause describes color-coding requirements for termination fields and for horizontal cabling.

9.2 Color-coding of termination fields

9.2.1 General

Color-coding of termination fields can simplify infrastructure administration and maintenance by making the structure of the cabling more intuitive.

The color-coding of termination fields specified in this Standard is based on the topology of backbone and horizontal cabling specified in ANSI/TIA/EIA-568-B.1 which allows one level of cross-connection in horizontal cabling and two levels of cross-connection in backbone cabling.

9.2.2 Color-coding of specific termination fields

If termination fields are color-coded, the coding shown in table 2 shall be used.

Cross-connections generally connect termination fields of different colors.

A summary and illustration of these requirements are shown below in table 2 and figure 2.

Table 2: Summary of termination color-coding

Termination Type	Color	Pantone #	Typical Application
demarcation point	orange	150C	central office connection
network connection	green	353C	user side of central office connection
common equipment	purple	264C	connections to PBX, mainframe computer, LAN, multiplexer
key system	red	184C	connections to key telephone systems
first level backbone	white		terminations of building backbone cable connecting MC to ICs
second level backbone	gray	422C	termination of building backbone cable connecting ICs to HCs
campus backbone	brown	465C	termination of backbone cable between buildings
horizontal	blue	291C	terminations of horizontal cable in TSs
miscellaneous	yellow	101C	alarms, security, or energy management

Notes:
a) Industry practice in Canada is to use white/silver (Pantone 877C) for common equipment terminations and purple for first level backbone terminations.
b) Industry practice in some areas reserves red for life safety alarm systems.

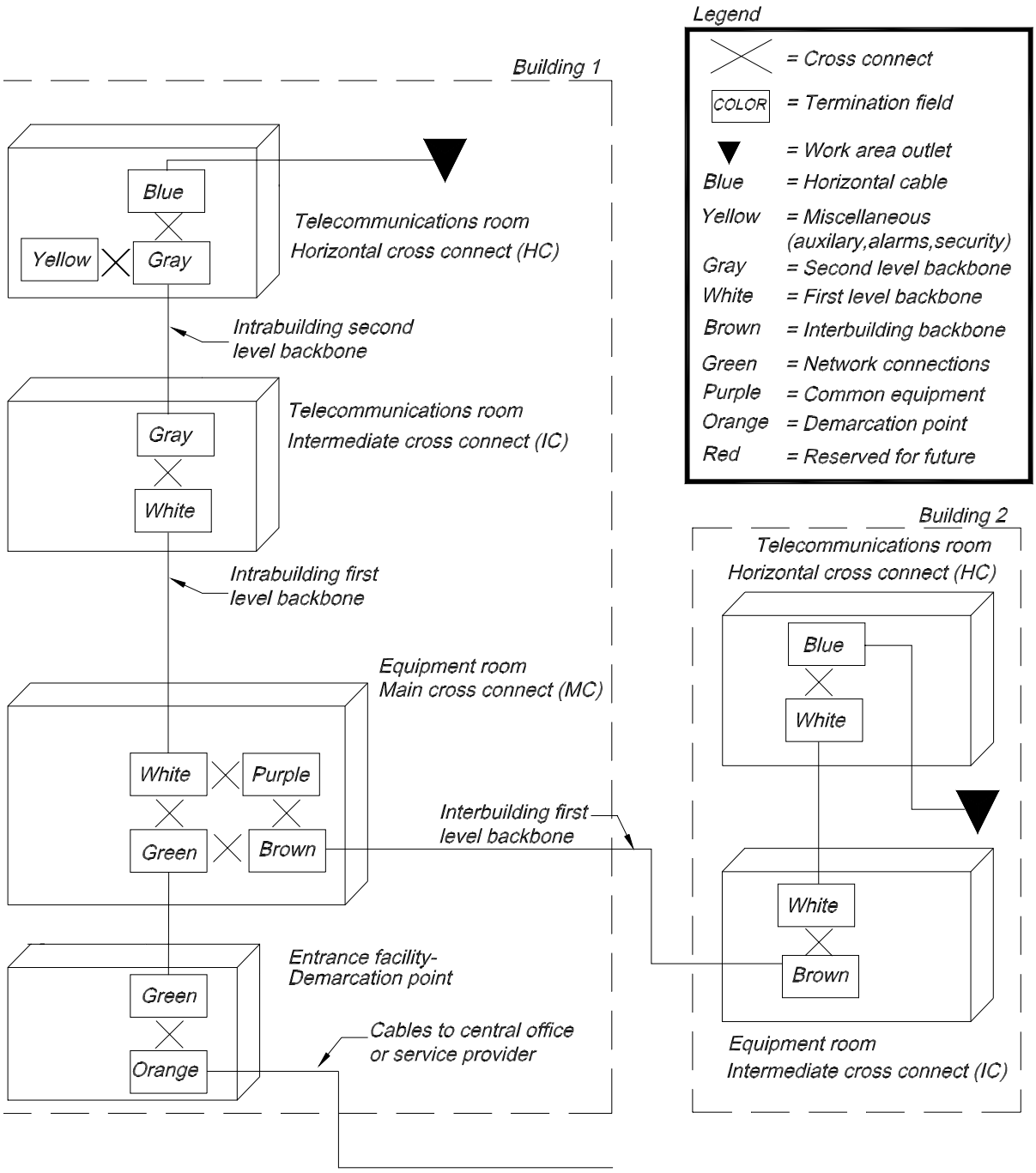


Figure 2: Illustration of color-coding of termination fields

9.3 Color-coding in horizontal cabling

9.3.1 Horizontal cabling components

Color-coding may be used to differentiate horizontal cable runs, to identify services connected by patch cords, or to identify various services available in a work area outlet. To be of most value, such color-coding should be consistent throughout the system.

9.3.2 Optical fiber cabling components

9.3.2.1 Optical fiber patch cords

Most telecommunications circuits using optical fiber as a transmission medium require two optical fibers. Patch cords, equipment cords, and work area cords with simplex connectors should use different color connectors or strain relief boots to assist in maintaining proper polarity. Refer to ANSI/TIA/EIA-568-B.1 for recommendations on maintaining polarity.

9.3.2.2 Optical fiber types and connector types

Cabling systems may contain optical fiber with different core sizes, or different bandwidth specifications within the same core size. System operators should identify terminations by color to assist in maintaining compatibility when making connections.

Angled PC, or APC, optical fiber connectors are not compatible with other types, and system operators should identify these terminations by color to assist in maintaining compatible connections.

Refer to ANSI/TIA/EIA-568-B.1 for requirements for color-coding multimode and singlemode connectors.

10 LABELING PROCEDURES

10.1 Visibility and durability

The size, color, and contrast of all labels should be selected to ensure that the identifiers are easily read. Labels should be visible during the installation of and normal maintenance of the infrastructure.

Labels should be resistant to the environmental conditions at the point of installation (such as moisture, heat, or ultraviolet light), and should have a design life equal to or greater than that of the labeled component.

See annex A.7 for examples of labeling.

10.2 Mechanical generation

All labels shall be printed or generated by a mechanical device.

11 LINKAGES AND REPORTS

11.1 Required linkages

Linkages support the retrieval of information about the telecommunications infrastructure from administration records. Each required record type defines a primary indexing identifier to facilitate linkage between infrastructure identifiers and records. Optional or user-defined record types should also define a primary indexing identifier.

When administration is performed with special-purpose cable management software, linkages shall be provided between each appearance of an infrastructure identifier in a record and any record for which that identifier is the primary indexing identifier. Linkages to additional records in which the identifier appears are also desirable.

When administration is performed using spreadsheets or paper-based systems, records should be designed and organized to facilitate information retrieval based on primary indexing identifiers. This provides functionality similar to software linkages. Indexes relating record locations to primary identifiers may also prove beneficial. See annex A.6.2 for an example.

11.2 Required reports

Reports are the means by which information about a telecommunications infrastructure is communicated. A report may consist of an individual record, a group of records, or selected portions of one or more records.

Administration systems using special purpose cable management software shall make available to the telecommunications infrastructure operator reports listing all records containing a selected identifier and all information in those records, any desired subset of those records and the recorded information, or any desired union of such information. Paper-based or spreadsheet-based administration systems may require additional record-keeping beyond that described in clauses 5 through 8 to provide adequate reporting capabilities. For example, a drawing or graphical representation of the infrastructure would allow the operator to easily locate all telecommunications outlets in a given work area, even if they are connected to links originating from multiple telecommunications spaces.

ANNEX A (INFORMATIVE) NOTES ON IMPLEMENTATION OF THIS STANDARD

This annex is informative only and is not part of this Standard.

A.1 Administering horizontal cables containing multiple horizontal links

Hybrid cables with more than one four-pair sub-unit or optical fiber cables with four or more optical fibers will contain more than one horizontal link. Sub-clause 5.1.2 of this Standard specifies that such a cable be identified with the lowest alpha-numeric horizontal link identifier of its components.

Example 1: Hybrid cable with six four-pair sub-units.
If the six four-pair sub-units are assigned horizontal link identifiers

1A-B19
1A-B20
1A-B21
1A-B22
1A-B23
1A-B24

then each of those individual four-pair sub-units would be labeled with these identifiers, as would their associated cross-connect terminations and outlet connectors, just as any individual four-pair cable would. The overall cable would be identified 1A-B19, the lowest alpha-numeric horizontal link identifier of the components of the hybrid cable, and the overall jacket would be labeled with that identifier within 300 mm (12 in) of each end of that jacket.

Example 2: Optical fiber building distribution cable with twelve color-coded optical fibers.
If the six pairs of optical fiber are assigned horizontal link identifiers

2B-C43	blue and orange optical fibers
2B-C44	green and brown optical fibers
2B-C45	slate and white optical fibers
2B-C46	red and black optical fibers
2B-C47	yellow and violet optical fibers
2B-C48	rose and aqua optical fibers

then the cross-connect terminations and outlet connectors associated with each of those pairs of optical fibers would be labeled with these identifiers, just as if each pair of optical fibers was in an individual cable. The overall cable would be identified 2B-C43, the lowest alpha-numeric horizontal link identifier of the components of the cable, and the overall jacket would be labeled with that identifier within 300 mm (12 in) of each end of that jacket.

Example 3: Optical fiber breakout cable with six two-optical fiber individually jacketed sub-units.
If the six two-optical fiber sub-units are assigned horizontal link identifiers

3C-D07
3C-D08
3C-D09
3C-D10
3C-D11
3C-D12

then each of those individual two-optical fiber sub-units would be labeled with these identifiers, as would their associated cross-connect terminations and outlet connectors, just as any individual two-

optical fiber horizontal cable would. The overall cable would be identified 3C-D07, the lowest alpha-numeric horizontal link identifier of the sub-units of the cable, and the overall jacket would be labeled with that identifier within 300 mm (12 in) of each end of that jacket.

A.2 Adaptability to special requirements

Some system owners have special needs in administration, as in other aspects of system performance. By their nature as special, these needs do not fall within the primary specification of this Standard, but this Standard is intended to be flexible enough to accommodate such needs. This annex and annex B provide guidance on expanding the standard in a manner consistent with its basic design.

This Standard specifies formats of identifiers for each of the four classes of administration, and these formats may not be changed, other than the expansion provided in the standard. The design of the standard is that all additional information related to the identifiers should be contained in the records to which the identifiers lead.

If system owners want to add additional information to the identifiers themselves, the standard allows this information to be added only after the end of the standard format, enclosed in parentheses.

For example, in a class 1 system, if a system administrator desires to include the building room number location of each work area outlet in the horizontal link identifier, the format might appear as:

fs-ann(rrr)

where *fs-ann* is the standard format for the horizontal link identifier and *rrr* would be whatever alpha-numeric characters are used in the building to identify room numbers.

Before making a change in the formats provided by this Standard, the system administrator should compare the value received by making the change and the extra effort required to administer the added information. In the example above, including the room number in the horizontal link identifier may initially provide useful information but room numbers often change between construction and move-in, from one tenant to the next, or as walls are added or removed to reconfigure workspaces. If room numbers were included in identifiers, any such changes would require relabeling in both the work area and the telecommunications space (TS).

The implementation recommended in the standard captures room number information in records, rather than in identifiers, and the location of an outlet could be found in the horizontal link record, by turning to a page in a three-ring binder, scrolling to a line in a spreadsheet, or scanning a drawing posted on the wall in the TS. Updating these records—whether they are paper-based or implemented in software—is much easier than relabeling.

A.3 Formats of administration

Smaller cabling systems may be successfully maintained on paper-based administration systems, and this Standard provides examples of formats for such systems in this annex. The physical format of a class 1 administration system might be as simple as a three-ring binder with one page for each horizontal link record. For example, a system serving one hundred users, each with a duplex work area outlet, would contain two hundred pages of horizontal link records arranged alpha-numerically by the link identifier. An example of a paper record is shown below in figure 9.

Alternatively, a cabling infrastructure could be administered from a blueprint or drawing posted on the wall of the TS. Annexes B and C provide examples of drawings and symbols suitable for this purpose.

The volume of information involved in larger cabling systems makes them difficult to administer without the assistance of software-based administration systems. These may be general-purpose

spreadsheet software programs, or special-purpose programs designed specifically to administer cabling systems. In a spreadsheet based system, each individual record could be a row and each column would contain one particular type of information from that record. The sorting abilities of spreadsheet programs make it possible to find any desired information. An example of a spreadsheet that could be used to administer a system is shown below in figure 10.

This Standard specifies basic minimum identification and information requirements for software-based systems and leaves the detail structure to software designers. The Standard intends to leave maximum flexibility for innovation by these designers, recognizing that the design cycle for software programs is shorter than is possible for standards development, and that this flexibility will provide the best end product for the system owner/administrator. The examples in figures 9 and 10 are intended as examples of possible implementations compliant to this Standard. They are not intended to be controlling as to format or exhaustive of the information a system owner or operator may desire to include in records.

A.4 Installation issues

A primary issue for technicians installing cabling per this Standard is the labeling of components. A key requirement of this Standard is that all labels must be mechanically printed, and not written by hand. This requirement is intended to improve legibility and to upgrade the professional appearance of installations. To meet this requirement, it may be convenient to provide a technician with label sheets preprinted before the job with several duplicate labels for each horizontal link.

System administrators are encouraged to take into account practical issues, for example, the confusion between the numeral ‘1’ and the letter ‘l’ and between the numeral ‘0’ and the letter ‘O’. A possible solution would be to skip ‘I’ and ‘O’ in the alpha character list.

System administrators may find that simple conventions can make a system more intuitive and thus easier to maintain. For example, if a system has some horizontal cables terminated on patch panels commonly, those used for data, and some horizontal cables terminated on IDC connectors (punch-down blocks), commonly, those used for voice, then the patch panels might be identified A, B, C, and so on, and the IDC connectors might be identified as a group as W (intuitively indicating ‘wall-mounted’).

A.5 Consistency in identifier formats

In specifying identifier formats, this Standard recommends that each identifier have a consistent format throughout the infrastructure where possible. In most instances this will be possible by using leading zeros to maintain the same number of numeric characters in the identifier.

For example, in the horizontal link identifier with the format *fs-ann,* the *f* represents the floor level in the building. For buildings up to nine floors, the numbers 1 through 9 could represent the floors. In a twenty-story building, the *f* would expand to two characters and the identifiers would number 01, 02, 03, and so on, up to 20. In a one hundred story building, the floors could start with 001, 002, 003, etc.

The *nn* in the format will often represent port numbers on patch panel *a*. Since most patch panels have ninety-six or fewer ports, two numeric characters will be sufficient, and the ports would be numbered 01, 02, 03, and so forth. If, instead, the *a* represents a group of wall-mounted IDC connectors which can terminate three hundred horizontal cables, then the termination positions for each cable would be numbered 001, 002, 003, on up to 300.

An instance in which a consistent format would not be possible is a building with non-numeric floor level names with different numbers of characters. For example, a building with a Mezzanine, two underground shopping levels (A and B), and two basements might have levels and *f* identifier portions as follows:

Building name	*f* identifier

for level	portion
11	11
10	10
9	09
8	08
7	07
6	06
5	05
4	04
3	03
2	02
Mezzanine	M
1	01
A	A
B	B
Sub-basement 1	SB1
Sub-basement 2	SB2

The number of floors requires two numeric characters, but the non-numeric names used by the building operator, such as M for Mezzanine, do not fit a numeric format. There is no "zero" space-holder in the alpha character set to make A or B or into two character identifiers. The sub-basement levels mix alpha and numeric characters, and expand the format to a third character.

This Standard allows the flexibility to accommodate these naming conventions since the names for these levels are often established before telecommunications infrastructure administration identifiers are assigned.

A.6 Notes on individual classes of administration

A.6.1 Class 1

The class 1 system has been designed to be as simple and as easy to administer as possible. A primary goal of the committee drafting this revision is to establish as standard practice identifying each horizontal link and labeling each outlet connector with its unique identifier. Even the short identifier format *fs-ann* has enough capacity for virtually any installation with a single equipment room (ER) and no additional telecommunications rooms (TRs). With up to twenty six patch panels (or groups of IDC connectors) labeled A-Z, and up to 96 ports on each patch panel (or enough IDC connector capacity to terminate 99 horizontal cables in each group of IDC connectors), the format *ann* could identify approximately 2500 four pair horizontal cables. Few ERs will terminate more than this number of horizontal cables.

In practice, for example, the horizontal link identifier 1A-A23 could represent patch panel A, and port number 23 on that patch panel. The port could be labeled 'A23' or the letter 'A' could be marked on the panel, and the manufacturer's marking of the number '23' by the port could complete the required labeling.

Alternatively, a group of patch panels may be identified together with one letter, and the ports numbered consecutively up to 99 ports. For example, two 48-port panels could be identified and labeled together as A, and the ports labeled 01 through 96.

If IDC connectors are used for a horizontal cross-connect, each IDC connector could be labeled with a letter, or a group of IDC connectors may be identified together with a letter. For example, a group of four 100 pair IDC connectors could be identified as W, and each group of eight terminations attached to a four pair horizontal cable could be assigned a number from 01 to 99 to complete the horizontal link identifier. Each group of terminations may be marked with that complete horizontal link identifier. The first group on the first IDC connector could be labeled W01, the second group on the first IDC

connector would be labeled W02, the first group on the next IDC connector would be labeled W26, and so forth (or identifiers could be numbered W00 to W99 in order to identify all 100 of the four pair groups, instead of just 99). Alternatively, the group of IDC connectors could be labeled together with a 'W', and each group of terminations terminating a four pair horizontal cable could be labeled with just the two digit number.

If a patch panel is used to extend to a cross-connect from a piece of active equipment, such as a LAN hub or switch, then the ports on that patch panel should be labeled with the same user-defined identifiers used for the ports on the active equipment. This will help trace a circuit all the way through the channel from the hub or switch to the PC on a user's desk.

For small cabling systems in which addition of TRs beyond the single ER is not expected, the *fs* portion of the horizontal link identifier may be omitted from labels.

A.6.2 Class 2

Class 2 administration applies to a wide range of infrastructures, from small single-ER installations where the operator wishes to administer pathways and firestopping (for which there are no provisions in class 1) to multi-story, single-building networks serving thousands of users. Operators should select identifier formats and administration methods (paper-based, spreadsheet, or special-purpose software) based on the complexity of their immediate needs and anticipated future expansion.

A.6.2.1 Identifer formats

To accommodate this variety of applications, the horizontal link identifier format can be as small as *fs-ann* and can be expanded to formats such as *fffs-aannnn*. The recommended format to accommodate most installations is *fs-annn*. A single digit *f* will identify up to nine floors, adding a second digit will identify up to ninety-nine floors, and a third digit will accommodate over 100 floors. A single alpha character *s* will identify up to 26 TSs on each floor of a building. If a floor of a building has more than 26 TSs, it is suggested that the building be divided into two parts, and each identified as a building in a class 3 administration system (a building with so many TSs on a floor will generally consist of different wings or structures which could be divided in an intuitive easily understood way).

The horizontal link identifier, *fs-ann* could identify up to 2500 horizontal cables terminated in a single TS. A second *a* may be added for unusual systems with more than 26 panels in one TS, or with a large number of IDC connectors that are identified and labeled individually. A third and fourth digit for the individual horizontal links may be added for very large numbers of cables terminated in a single telecommunications room.

A.6.2.2 Administration methods

When systems are administered without dedicated cable management software, special consideration should be given to the requirements of clause 11 regarding retrieval of information based on primary indexing identifiers. The reporting requirements of the system administrator will dictate both the organization of required records and the inclusion of optional records, indices, graphics, and drawings.

For example, a paper-based administration system for a class 2 infrastructure with three telecommunications rooms on a single floor could be organized as a notebook with four chapters. One chapter would contain the TS records and firestopping location records, sorted alphanumerically by primary indexing identifier. The remaining three chapters, one for each TS, would contain the horizontal link records, backbone cable records, TMGB record, and TGB records. These remaining records would be assigned to a chapter based on the first TS identifier which appears in the primary indexing identifier. Within the chapters, records would be sorted alphanumerically based on the portion of the indexing identifier following "TS".

As the number of records in such a system grows, it becomes more difficult to find a desired record. The inclusion of separate indices for horizontal links and backbone cables makes records easier to find but requires additional record-keeping. For larger infrastructures the maintenance of such a

paper-based system becomes impractical, and a spreadsheet or dedicated software solution is preferred. In spreadsheet-based administration of the same infrastructure, the operator might rely on the sorting capabilities of the spreadsheet to provide indexing capabilities. For either spreadsheet or paper-based system, the inclusion of graphical reports or drawings is a valuable adjunct.

A.6.3 Class 3

Class 3 administration is built around a class 2 system, with identifiers added for buildings and outside plant elements. Like class 2, this is a diverse class—it could apply to two small connected buildings or a 50-building campus. All cabling elements within an individual building are identified and administered just as they would be in a class 2 system. A benefit of this fully hierarchical approach is that the expansion of a class 2 network to a second building requires no relabeling or re-identification in the original building. The additional identifiers introduced to describe cabling and pathways between buildings include the same flexibility with respect to formatting described for building cabling identifiers in A.6.2.1. Many class 3 networks will be too complex for paper-based administration systems, but this method is allowed for small infrastructures with multiple buildings when the operator finds it suitable. The guidelines of A.6.2.2 apply within each building, and additional drawings, reports, and indices are recommended to facilitate retrieval of information regarding campus backbone cabling, outside plant pathways, and campus pathways.

A.6.4 Class 4

Class 4 administration is a class 3 system with identifiers added for multiple sites and for communications links between the sites. This is the top level of the 606A hierarchy. The expansion of the administration system to cover multiple, geographically distinct sites involves only a few additional identifiers and records, and no changes to existing identifiers or records within a site or within a building are required. It is assumed, however, that any system spanning multiple sites should be administered electronically—spreadsheet-based administration is allowed but dedicated cable-management software should be considered for all class 4 systems.

A.7 Examples of labeling

In the following figures 3 through 8 are examples of labeling compliant to this Standard. These are illustrative only, and are not intended to be exhaustive of all possible labeling configurations.

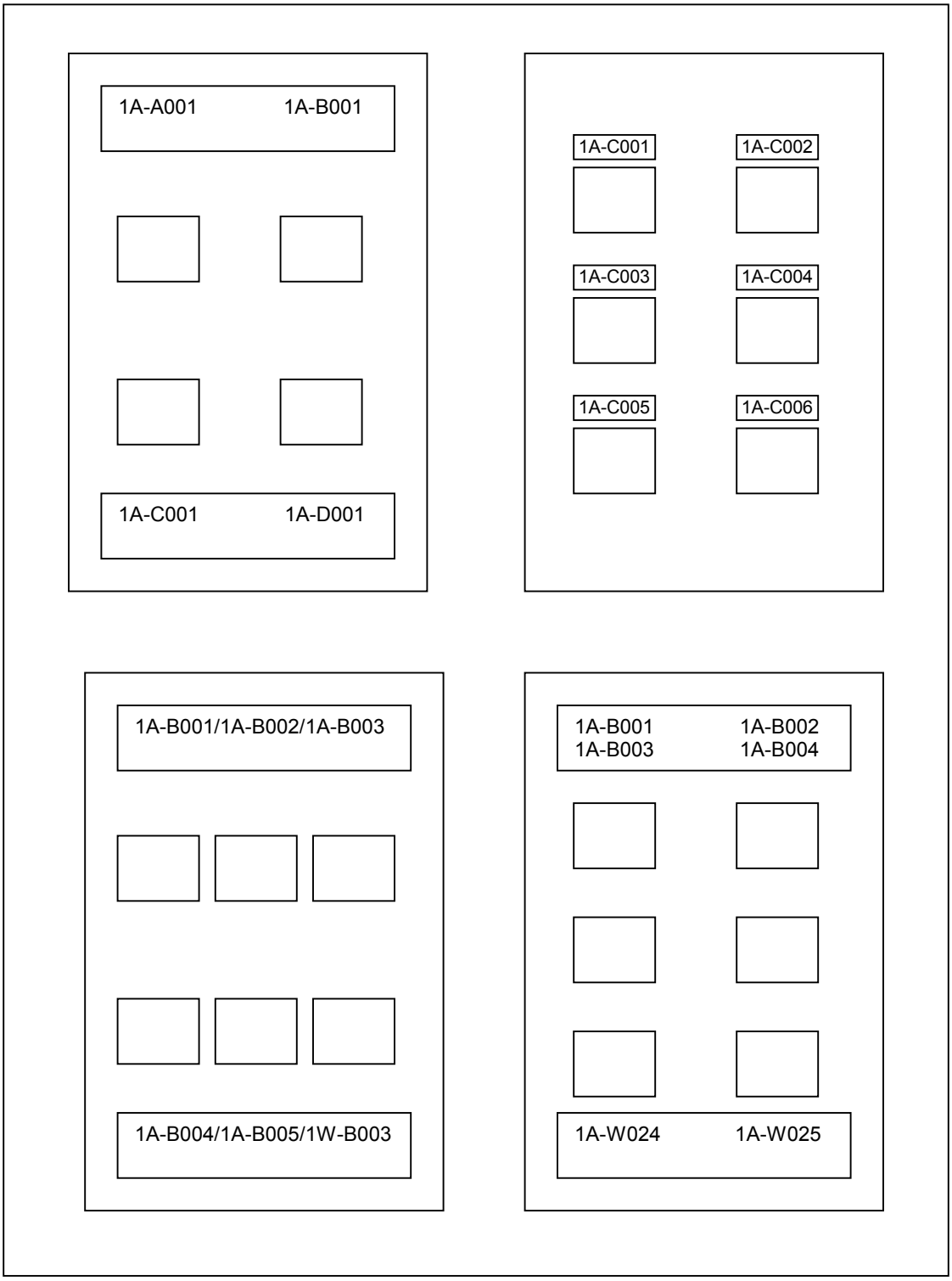
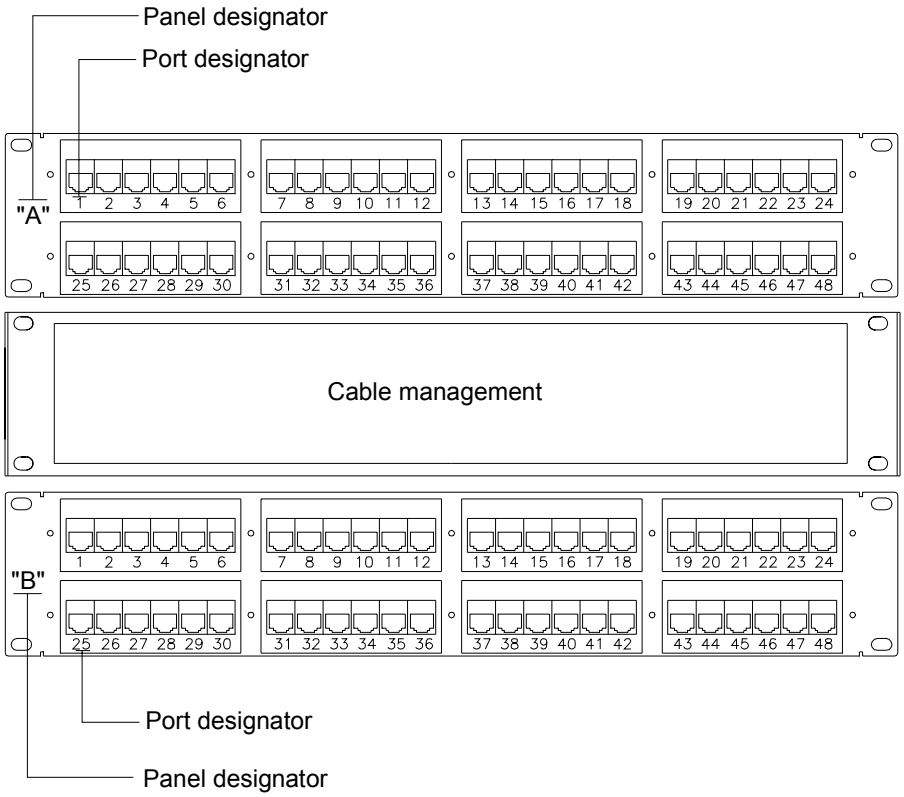


Figure 3: Examples of outlet faceplate labeling



Patch panels consecutively numbered 1-96

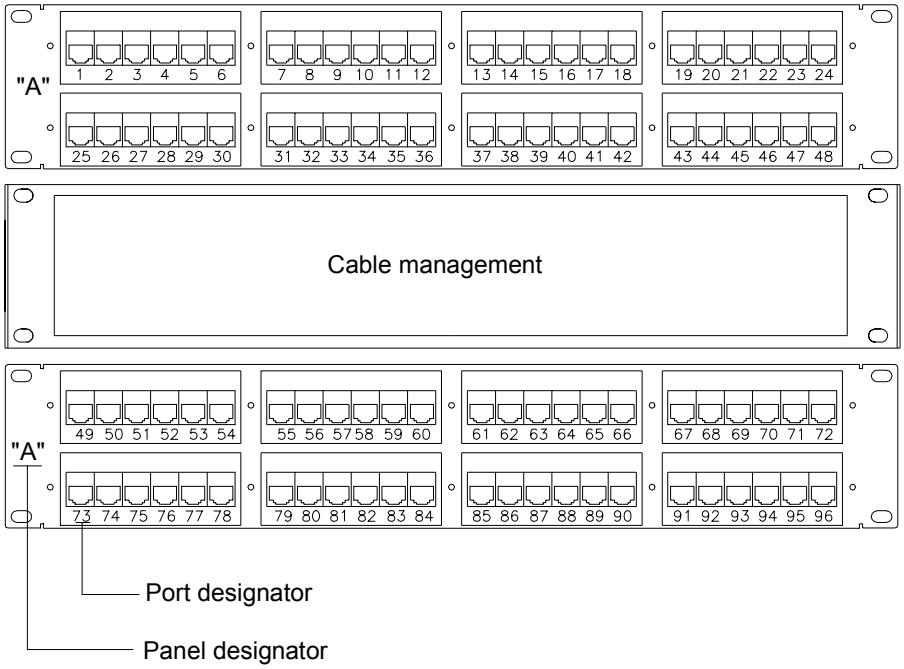


Figure 4: Examples of patch panel labeling

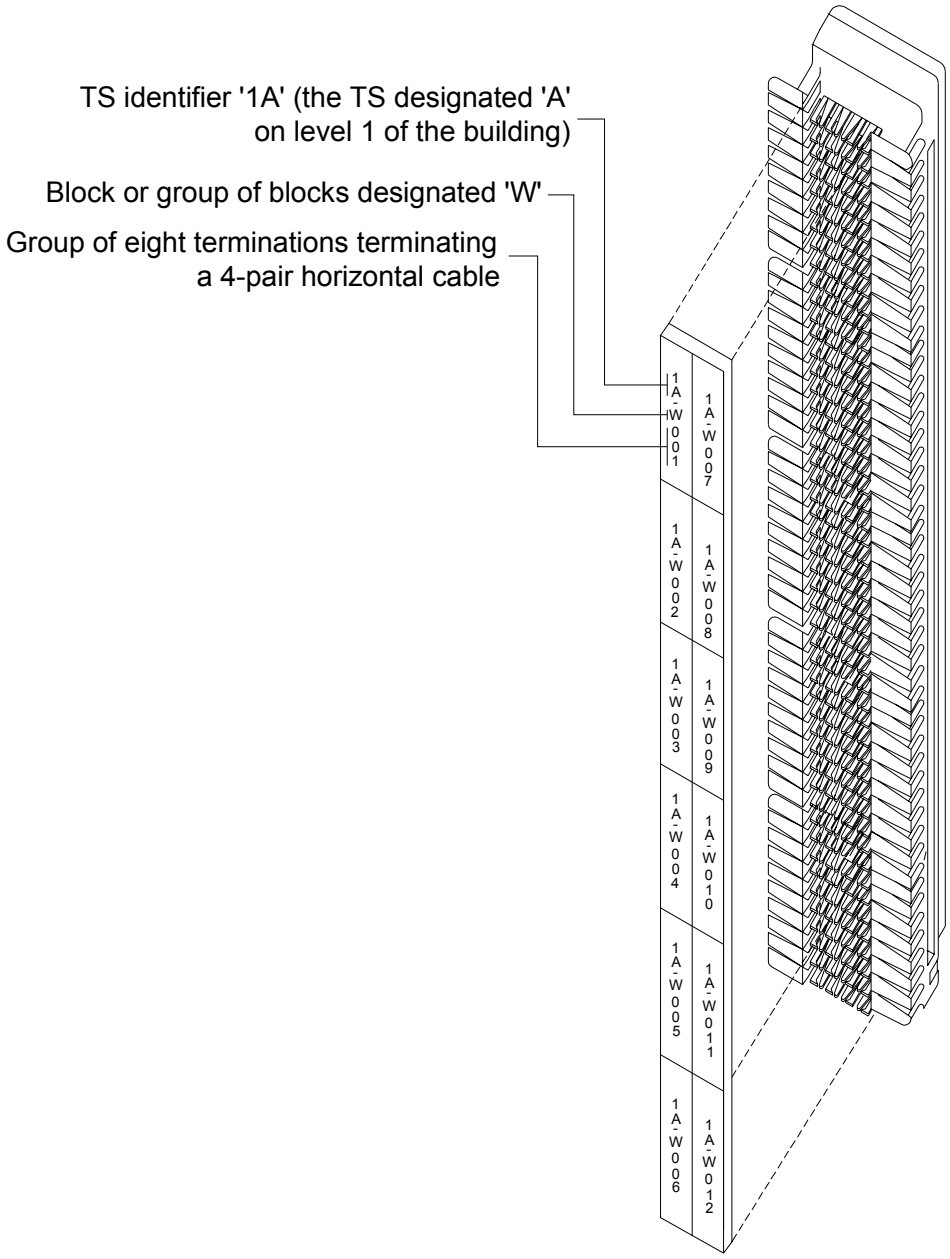


Figure 5: Example of IDC connecting hardware (punch-down block) labeling

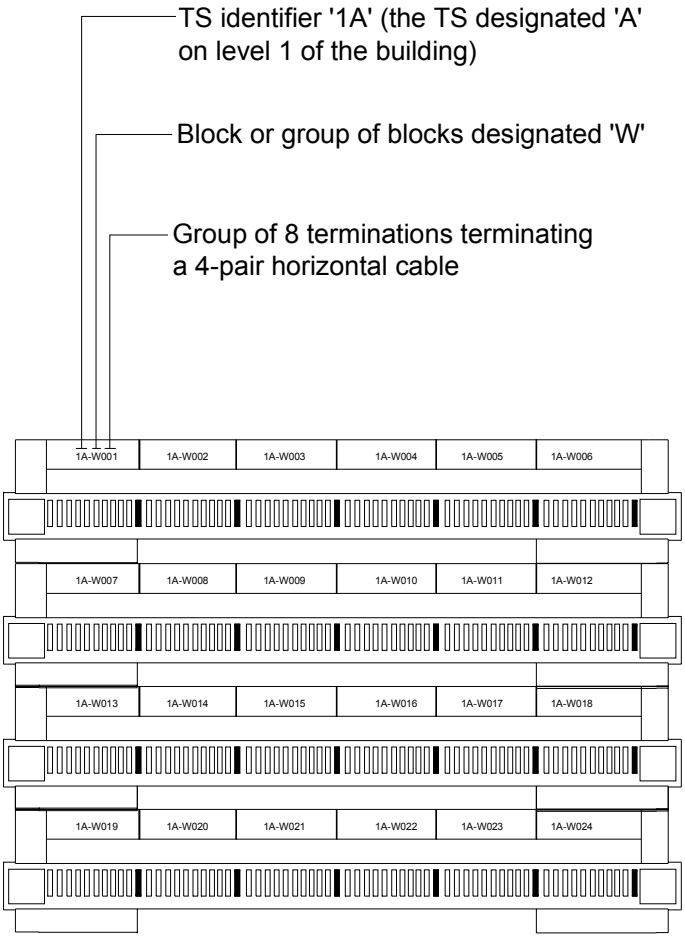
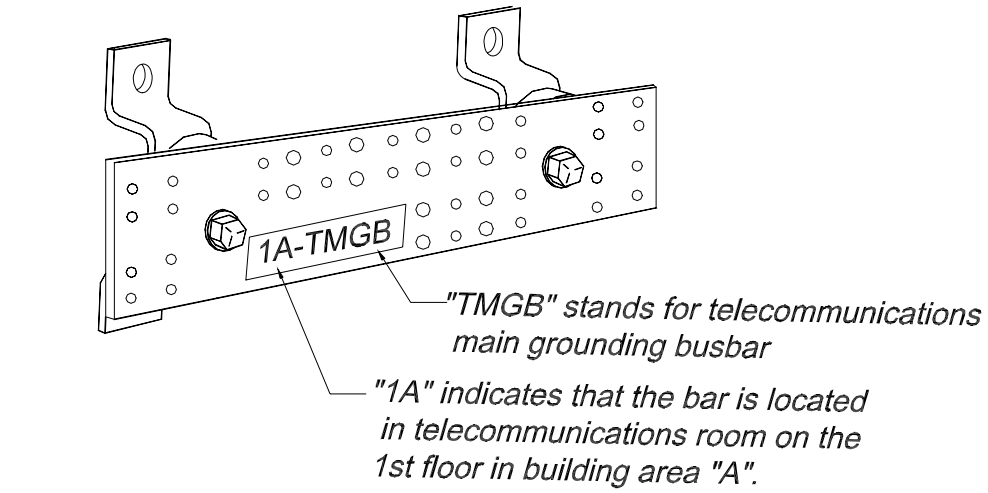


Figure 6: Example of IDC connecting hardware (punch-down block) labeling

Figure 7: Example of firestop location labeling



Note: For multitenant buildings there may be multiple "TMGB"

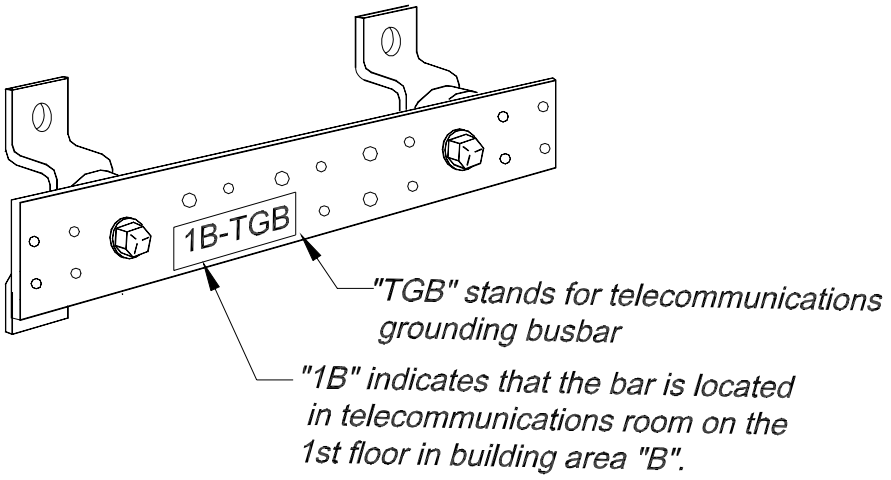


Figure 8: Example of bonding and grounding labeling

Figure 9: Example of Horizontal Link Record

Horizontal Link Record	**1A-B47**
Cable type	4-pair, UTP, Cat 5e, plenum, (mfr.) pn: W-123456
Location of work area outlet	Room 125
Outlet connector type	8-position modular, T568A, (mfr.) pn: Z-123456
Cable length	51m, 154ft
Cross-connect hardware type	48-port modular patch panel, T568A, Cat 5e, (mfr.) pn: X-123456
Service record of link	Installed and tested by ABC Cabling, 1/12/01; re-terminated at cross-connect 4/22/01 due to broken wire and retested, by technician Billy Sykes

Optional information	
Location of test results	Site file: universalexport.mdb
Location of outlet within room or office	center of north wall
Color code on work area outlet	blue icon
Other work area outlet connectors in the same faceplate	B48, W08
Faceplate configuration	single gang, four port, one port with blank, telco ivory, (mfr.) pn: Y-123456
Position of outlet connector on faceplate	top
Pathway to outlet	fishable wall
Presence of MUTOA	No
Presence of CP	No
Equipment circuit using this link	PBX extension #123
Current user name	Max Headroom

Figure 10: Example of spread-sheet implementation of horizontal link records sorted by building room number

Horizontal Link Identifier	Cable type	Building Location of Outlet	Outlet Connector Type	Color Code of Outlet Connector	Other Outlet Connectors at this Location	Wiring Scheme	Horiz. Cable Length	Cross Conn. Hdwr. Type	Service Record	MUTOA	CP	Trans. Point
1A-W01	Cat 5e plenum	R 111	8 pos mod	beige	1A-A01 1A-B01	568A	129ft	block	tested 4/22/01	no	no	no
1A-A01	Cat 5e plenum	R 111	8 pos mod	orange	1A-W01 1A-B01	568A	127ft	patch panel	tested 4/22/01	no	no	no
1A-B01	62.5/125, two strand, plenum	R 111	SC duplex	blue	1A-W01 1A-A01	na	128ft	SC duplex	tested 5/23/01	no	no	no
1A-W02	Cat 5e plenum	R 112	8 pos mod	beige	1A-A02 1A-B02	568A	112ft	block	tested 4/22/01	no	no	no
1A-A02	Cat 5e plenum	R 112	8 pos mod	orange	1A-W02 1A-B02	568A	112ft	patch panel	tested 4/22/01	no	no	no
1A-B02	62.5/125, two strand, plenum	R 112	SC duplex	blue	1A-W02 1A-A02	na	113ft	SC duplex	tested 5/23/01	no	no	no
1A-W03	Cat 5e plenum	R 113	8 pos mod	beige	1A-A03 1A-B03	568A	98ft	block	tested 4/22/01	no	no	no
1A-A03	Cat 5e plenum	R 113	8 pos mod	orange	1A-W03 1A-B03	568A	99ft	patch panel	tested 4/22/01	no	no	no
1A-B03	62.5/125, two strand, plenum	R 113	SC duplex	blue	1A-A03 1A-W03	na	98ft	SC duplex	tested 5/23/01	no	no	no
1A-W04	Cat 5e plenum	R 114	8 pos mod	beige	1A-A04 1A-B04	568A	98ft	block	tested 4/22/01	no	no	no
1A-A04	Cat 5e plenum	R 114	8 pos mod	orange	1A-W04 1A-B04	568A	99ft	patch panel	tested 4/22/01 reterm 4/1/02	no	no	no
1A-B04	62.5/125, two strand, plenum	R 114	SC duplex	blue	1A-W04 1A-A04	na	98ft	SC duplex	tested 5/23/01	no	no	no

ANNEX B (INFORMATIVE) RECOMMENDATIONS FOR IMPLEMENTATION OF OPTIONAL IDENTIFIERS

This annex is informative only and is not part of this Standard.

B.1 General

This annex includes suggested formats of optional identifiers for copper, fiber, coax, wireless and device elements as well as for areas, spaces, pathways, and locations. Many of the elements listed in this annex are found in larger installation environments and often require labels and identifiers to allow the elements to be effectively managed. Objects such as cables or conduits, which span multiple telecommunications spaces, should be labeled with the same identifier in each space where they are accessible.

B.2 Absolute and partial identifiers

The intent of this annex is to establish guidelines and serve as a foundation for consistent identification of these elements. The identifiers constructed in this annex are “absolute” or complete identifiers. Since much of the information expressed in this absolute format may be inferred from the element itself and its location, a shortened form of the identifier may be used in certain situations. A shortened (“partial” or “local”) identifier will normally be preferred on labels.

B.3 Identifier formats

The value of the "absolute" identifier can be better understood when one is attempting to administer an infrastructure with a database. In database format, the inferred information is not always available and therefore the "absolute" identifier must contain the otherwise inferred information. The format for these identifiers should be *fs-UUU.n.d(q)*, and when the element connects or begins and ends in different spaces the identifier should be fs_1/fs_2*-UUU.n.d(q)* where:

fs = Identifier for a space which is derived by combining the level and the building area in which the space is located. When the element or space is outside of a building this identifier would be derived from the site ID and/or area of the campus as required. (i.e. a maintenance hole)
fs_1= Identifier for the space containing the termination of one end of the horizontal pathway, typically the most central or lowest alpha-numeric identifier
fs_2= Identifier for the space containing the termination of the other end of the horizontal pathway, typically the least central or highest alpha-numeric identifier
UUU = a user defined identifier referring to the type of element (descriptor)
n = two to four numeric characters identifying the pathway element (major ID)
d = detail information such as port, sub-duct, optical fiber and pair (minor ID)
q = qualifying information

B.4 Space identifiers

To present an "absolute" identifier for a space it may become necessary to include additional information such as the campus/site and building identifiers along with the space identifier. When this occurs, brackets [ ] are used to contain the identifiers associated with a space.

[c-b-fs]-*UUU.n.d(q) (i.e. The 1A TS in building 113 on the north campus: [NC-113-1A])*

The following pathway elements can also be defined as a space, if the identifier is expressed in brackets along with a site/campus and/or building identifier). See the detail in site drawing T0-PP in annex D for an example of this use.

MH-Maintenance Hole, **HH**-Handhole, **BR**-Bridge, **TN**-Tunnel, **TP**-Telephone Pole, **DB**-Direct Buried location, **SM**-Submerged location, **EN**-Entrance, **VL**-Vault, **PE**-Pedestal, **RT**-Roof Top.

B.5 Examples of elements and identifiers

The following is a list of elements and associated identifiers that can be used in the UUU position of the above identifier: Combine the type letter (i.e. C - for Copper and F -for Fiber) with the 2 or 3 character element identifier (PL - Panel) to derive the *UUU* code. A copper patch panel would be CPL, a fiber panel would be FPL and a conduit would be PCN.

The examples provided in table 3 are not intended to be an exhaustive list of identifiers. When additional identifiers are used, they should be carefully chosen so as not to conflict with standard industry usage.

Following are three examples of identifying elements of telecommunications infrastructure using the formats described in clauses B.3 and B.4.

Example 1:

A sub-duct within a maintenance hole which is in a pathway between the Entrance Facilities of two buildings on the same campus would be identified using this format:

$[b_1\text{-}fs_1]/[b_2\text{-}fs_2]$-UUU.n.d(q)

If the first building is the Steele Building, identified as STE, and the pathway ends in the Entrance Facility on the first floor, identified as 1A, the first segment of the identifier would be [STE-1A].

If the second building is the Teach Building, identified as TEA, and the pathway ends in the Entrance Facility, identified as 2B, the second segment of the identifier is [TEA-2B].

The maintenance hole descriptor from Table 3 is PMH, and if the maintenance hole is identified as number 01 in that pathway, the next segment of the identifier would be PMH.01.

If the detail information on the subduct is its identification as A3, and if the qualifying information is the size of the subduct, for example 2", then the last segment of the identifier would be A3(2).

The complete identifier would then be:

[STE-1A]/[TEA-2B]-PMH.01.A3(2)

Example 2:

An equipment rack in a Telecommunications Room in a class 2 system which has a single building would be identified using this format:

fs-UUU.n

If the Telecommunications Room is identified as 1A, and the descriptor for a rack from Table 3 is PRK, and the rack is identified as number 23, then the full identifier would be:

1A-PRK.23

Note that since there was no further detail or qualifying information about the rack, the d(q) portion of the identifier format was not used.

Example 3:

A 24-optical fiber cable owned by Hillsborough County School Board which connects John Harold High School to the school board's Wean Administration Complex would be identified using this format:

[c1-b1-fs1]/[c2-b2-fs2]-UUU.n.d(q)

If the John Harold High School campus is identified as JHS and the Entrance Facility in Building 101 where the cable is terminated is identified as 101-1A, then the first segment of the identifier would be [JHS-101-1A].

Likewise, if the Wean Administration Complex is identified as WAC, and the Entrance Facility in Building 102 is identified as 102-2B, then the second segment of the identifier would be [WAC-102-2B].

The descriptor for an optical fiber cable from Table 3 is FCA. If this cable is identified as cable 02, the detail information refers to the 24th optical fiber, and the qualifying information is that the fiber is singlemode, then the complete identifier for the cable would be:

[JHS-101-1A]/[WAC-102-2B]-FCA.02.24(sm)

Alternatively, if the School Board network manager needed only to identify the cable, the information in the last two fields (the reference to the 24th optical fiber and that it is singlemode) could be contained in the corresponding record.

Table 3: Optional identifiers associated with pathway, device, and space elements

Copper	Fiber	Wireless	Coax
C – Copper	F – Fiber	W - Wireless	X – Coax
BF Block Field CA Cable CS Case CC Cross Connect FP Feed Pair HP House Pair MS Mechanical Splice PL Panel PT Port SP STP SH Sheath SN Section TM Termination UP UTP	CA Cable CS Case MM Multi-Mode FS Fusion Splice PL Panel PT Port SH Sheath SM Single-Mode SN Section TM Termination	BW Bandwidth CH Channel WT Wireless Tap	TP Tap (coax) SN Section TM Termination LG Leg

Pathway	Devices	Spaces
P – Pathway	A - Active Device	S - Space
BR Branch Splice BS Bridge Splice CB Cabinet CN Conduit CT Cable Tray FR Frame GB Ground Bar NT Node PB Pull Box PN Penetration RK Rack RR Ring Rung SL Sleeve SS Straight Splice ST Slot TY Tray The following pathway elements can also be defined as spaces if the identifier is expressed in brackets along with a site/campus and/or building identifier. MH Maintenance Hole HH Handhole BR Bridge TN Tunnel TP Telephone Pole DB Direct Buried locale SM Submerged locale EN Entrance VL Vault PE Pedestal RT Roof Top	CMR Camera CS Chassis CI Carrier ID AMP Amplifier ANL Analog DIG Digital DLR Dialer FAX Fax GBR Glass Break HNS Handset MDM Modem MIC Microphone MNT Monitor PAY Payphone PC1 PC RDR Reader RS Remote Shelf SF Shelf SNS Sensor SPK Speaker STK Strike STR Strobe TEL Telephone TTY Tele Type TV1 Television WLP Wall Phone	AP Access Point APS Access Provider Space CER Common Equipment Room CTR Common Telecommunications Room CO Central Office DM Demarcation (NI) ER Equipment Room NOC Network Operations Center SPS Service Provider Space SR Switch Room STAR Logical Center of the data network TER Telecommunications Entrance Room TR Telecommunications Room WTRS Wireless Transmission and Reception Space WS Workstation Location SZ Serving Zone RO Repeater Office

Building Area

In larger class 2 environments, or class 3 and class 4 environments, it may be advantageous to define an area of a building in order to more easily locate objects and spaces.

To establish a building area boundary line, first begin with a desirable location for a TS. From the TS, expand the served area until a performance, physical, or functional barrier is reached. A typical performance barrier is distance. A physical boundary could be the exterior of the building or a pathway restriction such as a wall or ceiling or lack of a ceiling. An example of a functional barrier would be a building that is half office and half manufacturing space.

A second method that can be used to determine building area is to begin by assessing a facility for obvious physical or functional barriers and divide the building up into zones or areas based on these barriers. Once the building areas are defined, suitable TS location(s) must then be found to service the building area.

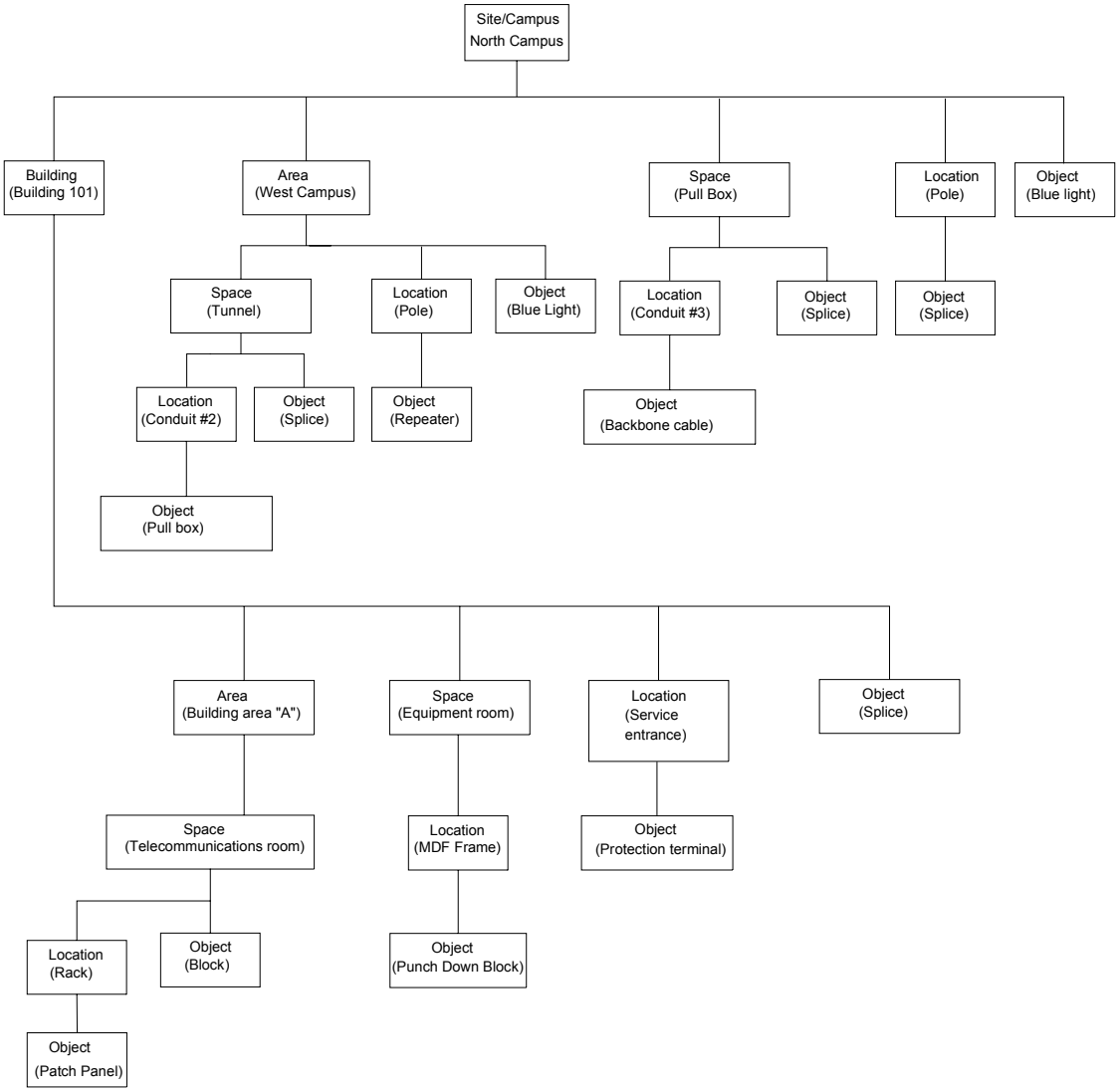


Figure 11: Example showing relationship of sites, buildings, areas, spaces, locations, and objects. This diagram illustrates the mapping of infrastructure elements.

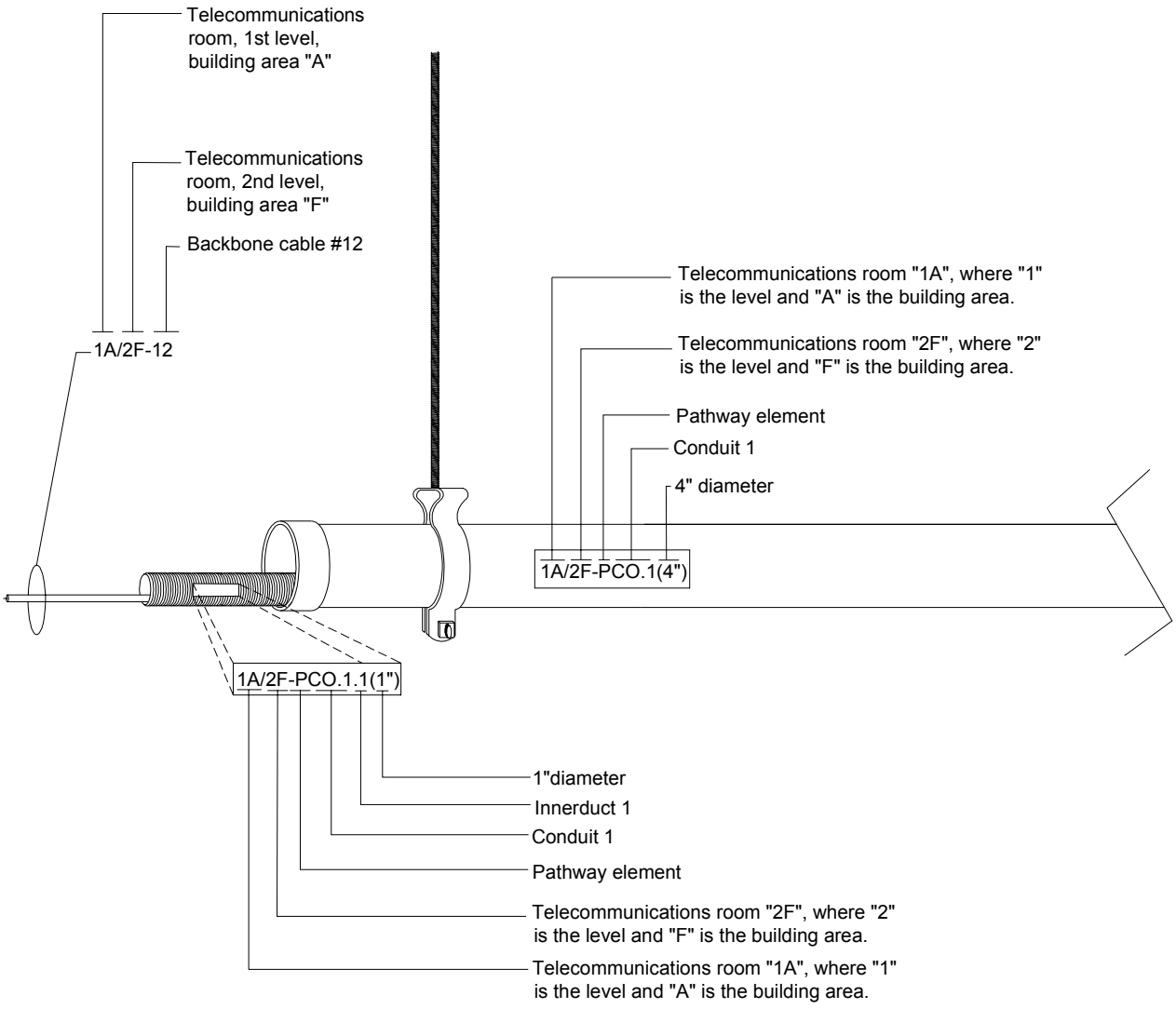


Figure 12: Example of optional pathway identifiers and labeling

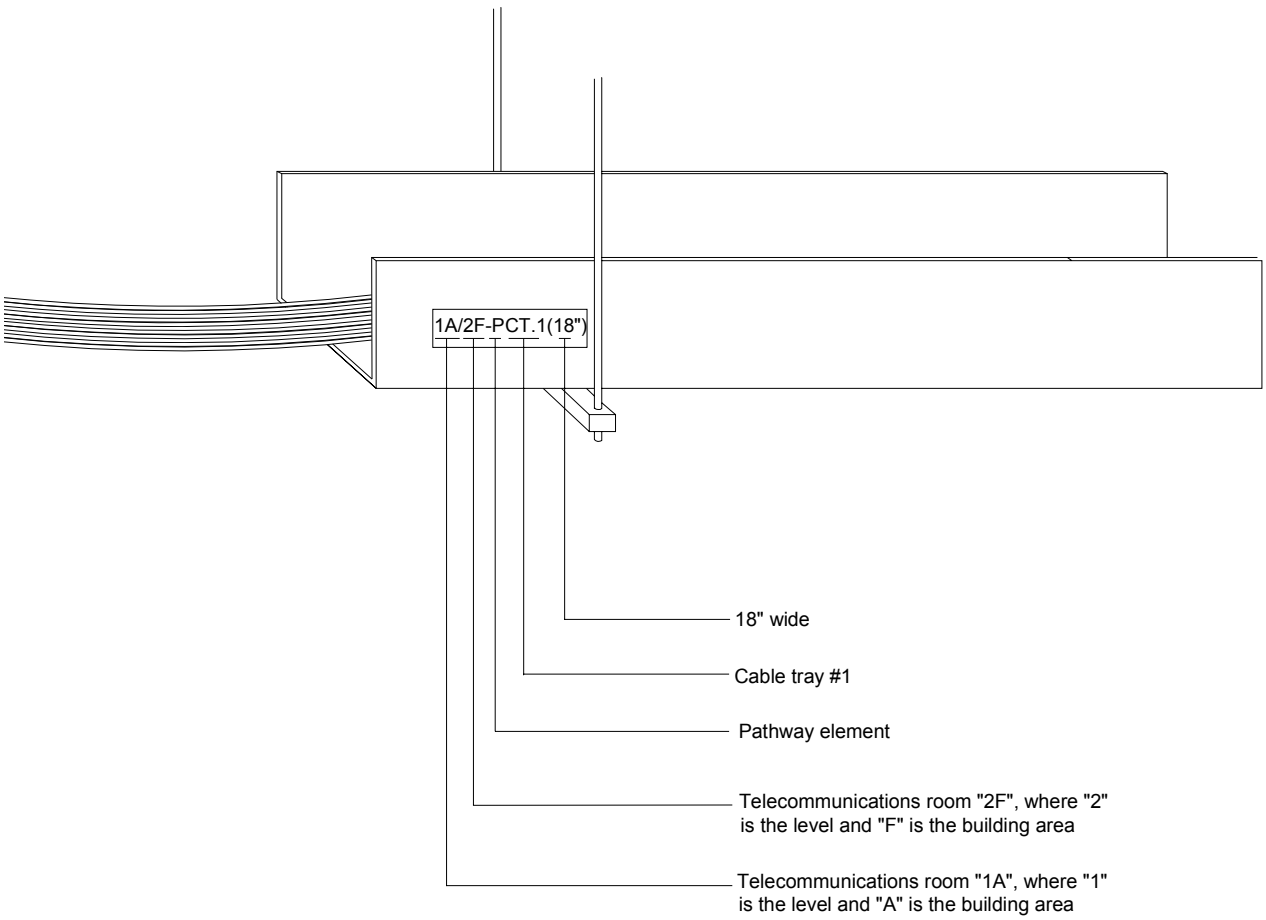
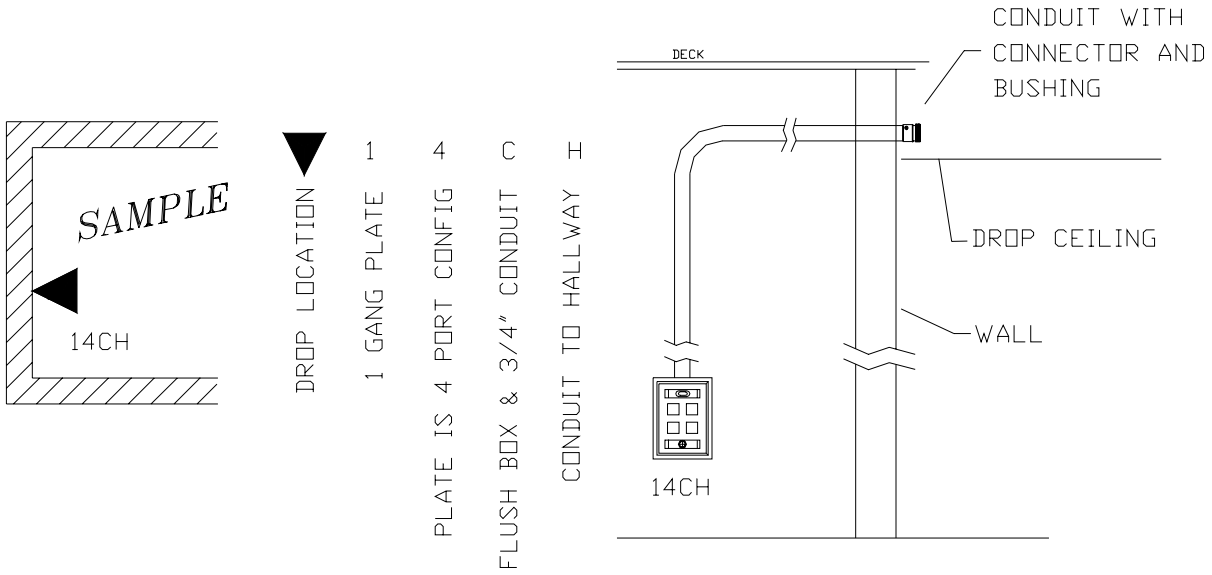


Figure 13: Example of optional pathway identifier and labeling



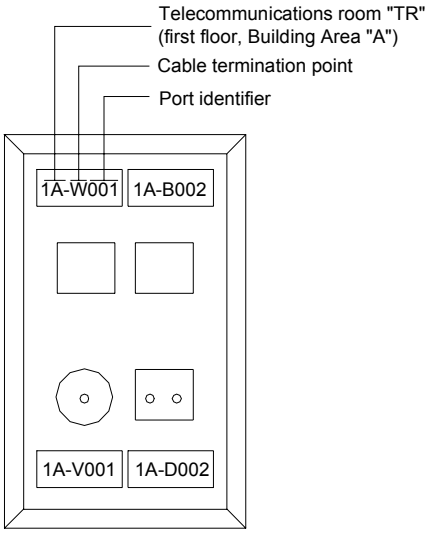


Figure 14: Example of pathway detail and required faceplate labeling

ANNEX C (INFORMATIVE) GRAPHICAL, SYMBOLOGY, AND DRAWING ELEMENTS OF ADMINISTRATION

T - Series Drawings

T-series drawings are a set of drawings used in the construction industry to depict technology and telecommunications components and requirements. As telecommunications infrastructure becomes more integrated with other components of modern building design, the use of standardized T-series drawings becomes more important to the processes of designing, constructing, and renovating the buildings. The following symbols, line styles, layers and drawing organization are provided to assist the design professional with the presentation of the telecommunications requirements on scaled CAD drawings.

As this trend continues, more information will be shown on drawings for the purpose of constructing the telecommunications infrastructure and in turn these drawings will be used as key components in the administration of that telecommunications infrastructure. Therefore, the intent of this annex is to establish guidelines and recommendations that can serve as a foundation for consistent identification of telecommunications elements in a graphical or drawing format.

Building areas are shown from a plan view perspective (top down view) typically on a T1 drawing. The area in which the ER or building demarcation is located should be designated as building area A. Starting with "A" proceed around the building and assign the building area the next available designator, until all building areas are identified.

There are 6 types of drawings. They are:

T0 – Campus or Site Plans - Exterior Pathways and Campus Backbones

Shows physical and logical connections from the perspective of an entire campus, such as actual building locations, exterior pathways and campus backbone cabling on plan view drawings, major system nodes, and related connections on the logical system drawings. An example of a T0 drawing level is shown in figure 19 below.

T1 – Layout of complete building per floor - Building Area/Serving Zone Boundaries, Backbone Systems, and Horizontal Pathways

Layout of complete building per floor. The drawing indicates location of building areas, serving zones, telecommunications rooms, access points, pathways and other systems that need to be viewed from the complete building perspective. An example of a T1 drawing level is shown in figure 20. Examples of T1 line styles are shown in figure 15. T1 pathway drawing notes are shown in figure 16.

T2 – Serving Zones/Building Area Drawings - Drop Locations and Cable ID’s

Shows a building area or serving zone. These drawings show drop locations, telecommunications rooms, access points and detail call outs for common equipment rooms and other congested areas. An example of a T2 drawing level is shown in figure 21. Examples of T2 symbols are shown in figure 18. T2 general pathway conditions are listed in figure 16.

T3 – Telecommunications Rooms - Plan Views - Tech and AMEP /Elevations - Racks and Walls Elevations

Detailed look at telecommunications room. Drawing indicates technology layout (racks, ladder-racks, etc.), mechanical/electrical layout, rack elevation and backboard elevation. May also be an enlargement of a congested area of T1 or T2. An example of a T3 drawing level is shown in figure 22. Examples of T3 symbols are shown in figure 17.

T4 – Typical Detail Drawings - Faceplate Labeling, Firestopping, ADA, Safety, DOT, etc.

Detailed drawings of symbols and typicals such as faceplate labeling, faceplate types, installation procedures, detail racking, and raceways.

T5 – Schedules

Schedules (spreadsheets) to show information for cut-overs and cable plant management.

Table 4: Layers, element descriptions, colors, and line types

LAYER	DESCRIPTION	COLOR	LINETYPE
0		7	Continuous
*A-asbt-info	asbestos info	7	Continuous
*A-grid	planning grid	5	Center
A-anno-ttlb	border and title block	7	Continuous
A-clng	ceiling info	7 (hatch)	Continuous
A-door	doors	165	Continuous
A-eqpm-fixt	lab mill work	3	Continuous
A-flor-evtr	elevators	54	Continuous
A-flor-fixt	plumbing fixtures	230	continuous
A-flor-iden	room numbers	1	continuous
A-flor-strs	stairs	54	continuous
A-furn	furniture	200	continuous
A-glaz	windows	1	continuous
A-roof	roof info	120	continuous
A-wall	walls	7	continuous
E-lite	lighting	114	continuous
E-powr	power	114	continuous
E-powr-eqpm	power equipment	114	continuous
M-hvac	HVAC system	1	continuous
T-aerl-copp	aerial copper	30	hidden
T-aerl-fibr	aerial fiber	6	hidden
T-anno-keyn	details, reference, key notes	1	continuous
T-anno-note	general/drawing notes	7	continuous
T-anno-text	plan info	7	continuous
T-anno-ttlb	T series border	1	continuous
T-bkbd-comp	backboard and components	92	continuous
T-bkbn-coax-text	backbone coax	7	coax backbone
T-bkbn-cond-text	backbone conduit	6	continuous
T-bkbn-cppr-text	backbone copper	4	copper backbone
T-bkbn-fibr-cond	backbone fiber conduit	5	continuous
T-bkbn-fibr-text	backbone fiber	94	fiber backbone
T-bkbn-thck	backbone thicknet	4	thicknet
T-cabl	cabletray	30	cable tray
T-cabl-supp	cable support	30	continuous
T-card	card access	7	continuous
T-clip	clip boundary	7	continuous
T-clok	clock system	94	continuous
T-comp	workstations	150	continuous
T-drop-blnk	drop-blank	14	continuous
T-drop-exst	drop-existing	30	continuous
T-drop-mac	drop-mac	241	continuous
T-drop-prjA	drop-project A	241	continuous
T-drop-prjB	drop-project B	34	continuous
T-drop-prjC	drop-project C	220	continuous
T-drop-prjD	drop-project D	162	continuous
T-drop-reno	drop-renovation	45	continuous
T-intr-cond-fibr	interior conduits fiber	94	fiber backbone
T-lgcy-bond	legacy boundary lines	1	legacy boundary
T-lgcy-thck	legacy thicknet	4	legacy thicknet
T-modm	modem	24	continuous
T-path-extr	exterior pathways	7	continuous
T-pbx1	PBX	165	continuous
T-prnt	printer	24	continuous

T-race-surf	surface raceways	20	continuous
T-rack-comp	racks and components	30	continuous
T-rack-lddr	ladder rack	30	ladderrack
T-reno	renovation hatching	7 (hatch-ansi 31-1/8" plot)	continuous
T-serv-bond	serving zone boundary lines	5	servzone boundary
T-slev-int	interior sleeve	210	continuous
T-soun	sound/PA system	7	continuous
T-util	utility pole	1	continuous
T-vdeo	video	170	continuous
T-view	viewport	7	continuous

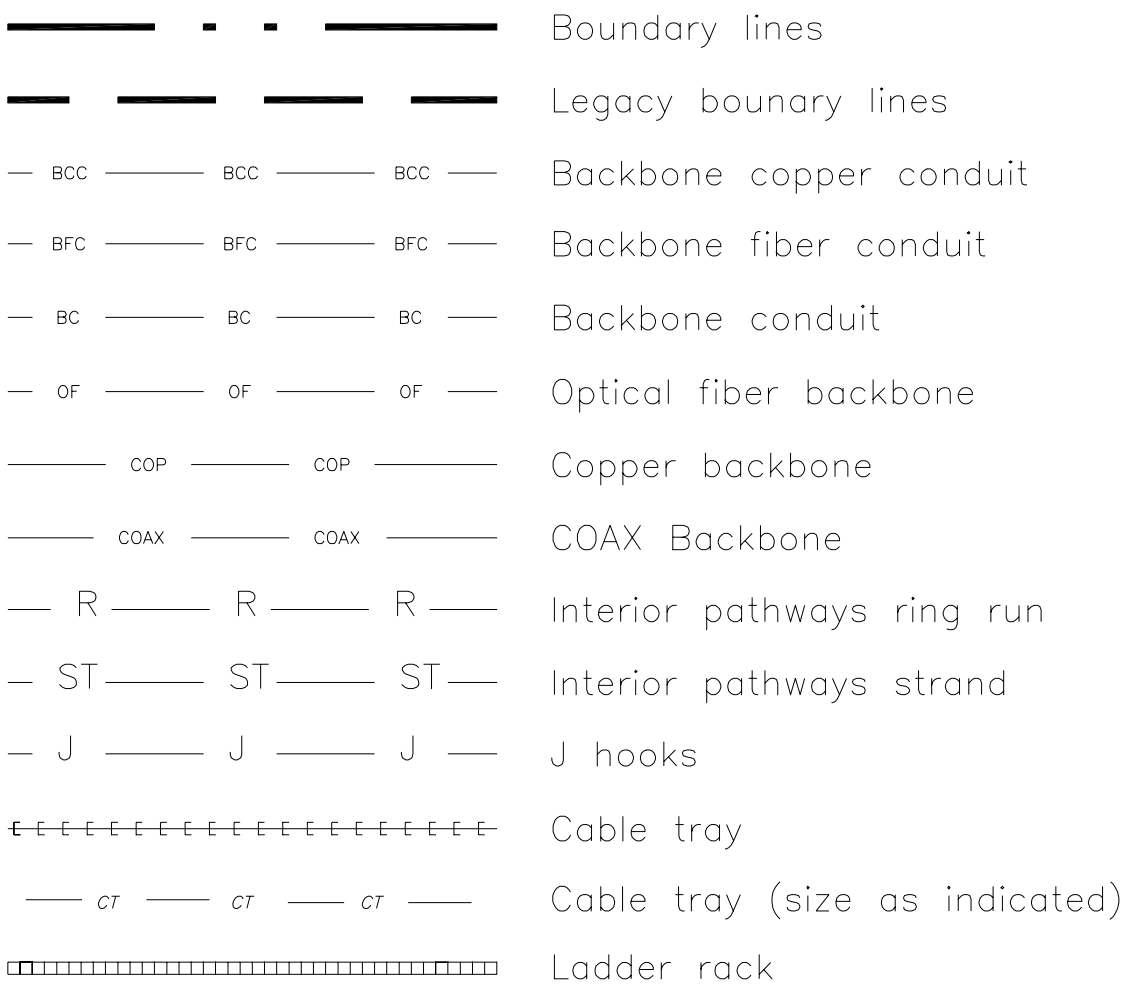


Figure 15: T1 line styles

T2-GENERAL PATHWAY CONDITIONS

FW	FISHABLE WALL
SC	SURFACE BOX TO CEILING
SH	SURFACE BOX TO HALL
SF	SURFACE BOX TO FLOOR
CC	CONDUIT TO CEILING
CR	CONDUIT TO TELECOMMUNICATIONS ROOM
CH	CONDUIT TO HALL
CF	CONDUIT TO FLOOR
CT	CONDUIT TO TRAY
GC	4000/6000 RACEWAY TO CEILING
GH	4000/6000 RACEWAY TO HALLWAY
ST	SURFACE TO CABLETRAY

T1-PATHWAY DRAWING NOTES

(60)	700 METAL RACEWAY
(61)	LD3
(62)	LD5
(63)	LD10
(64)	3/4" CONDUIT
(65)	1" CONDUIT
(66)	1-1/4" CONDUIT
(67)	4000 RACEWAY
(68)	6000 RACEWAY
(69)	1 GANG MUD RING WITH INSIDE SQUARE CORNERS
(70)	2 GANG MUD RING WITH INSIDE SQUARE CORNERS
(71)	MP1 PLATE
(72)	MP2 PLATE

Figure 16: Pathway conditions and drawing notes

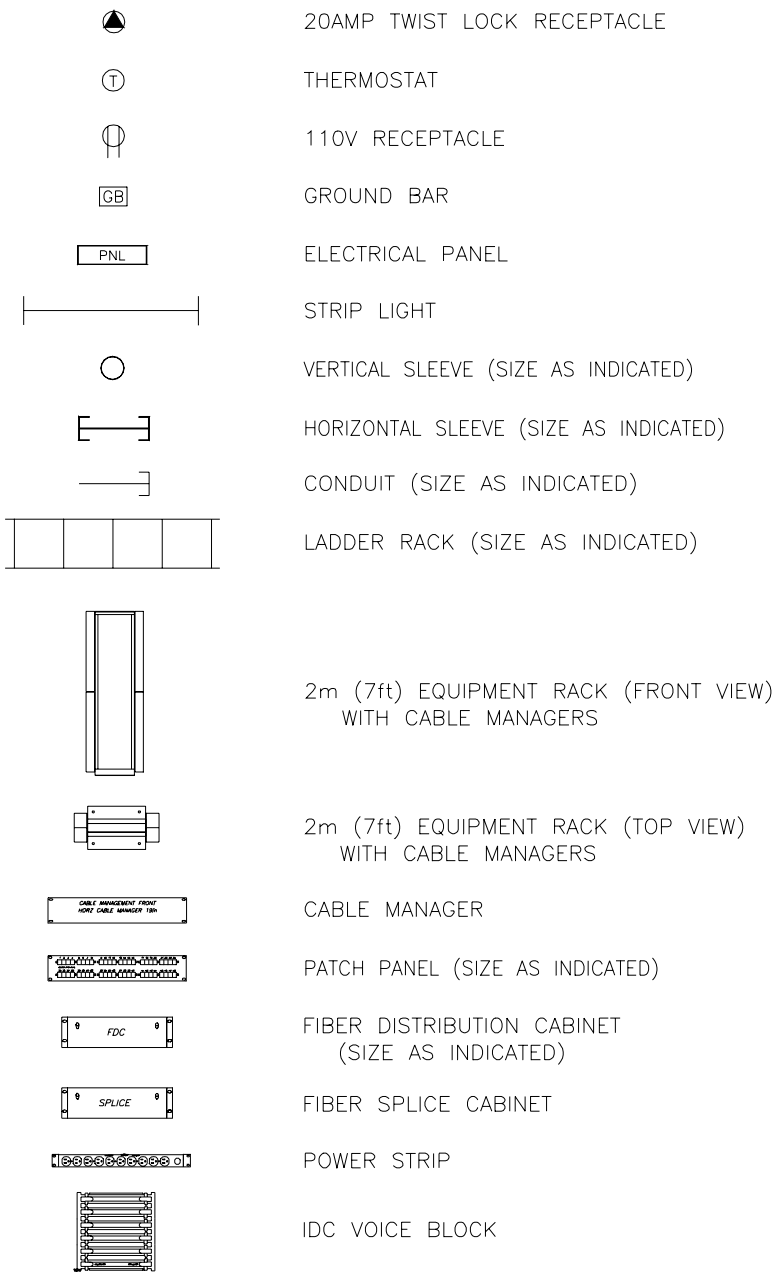


Figure 17: T3 symbols

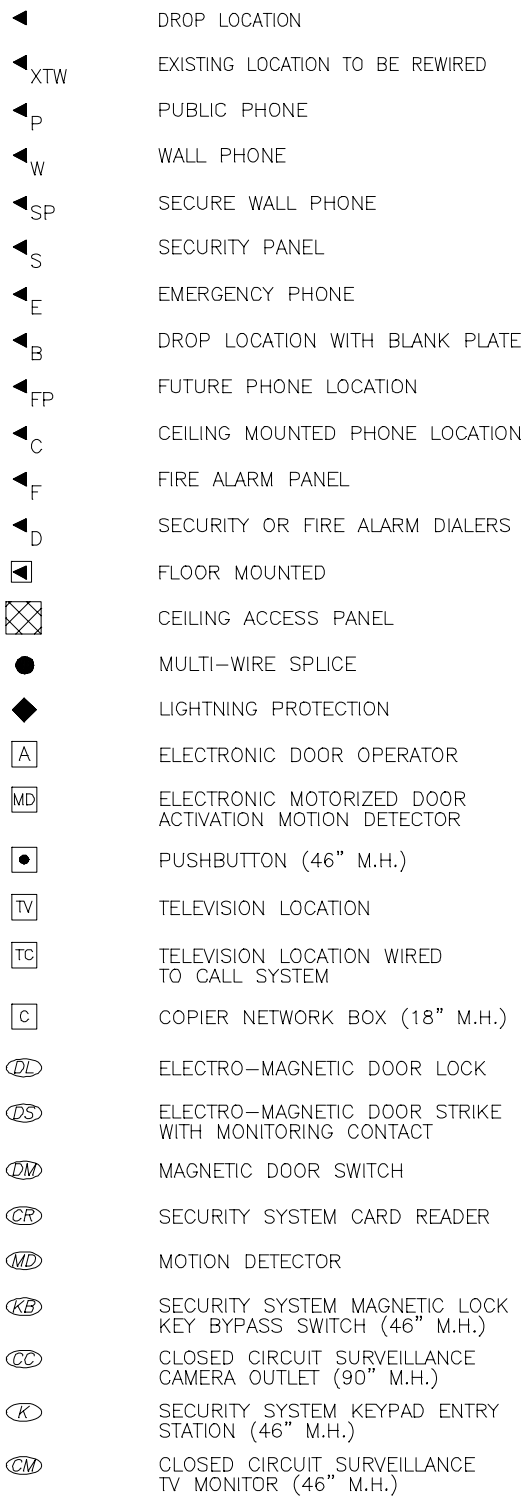


Figure 18: T2 symbols

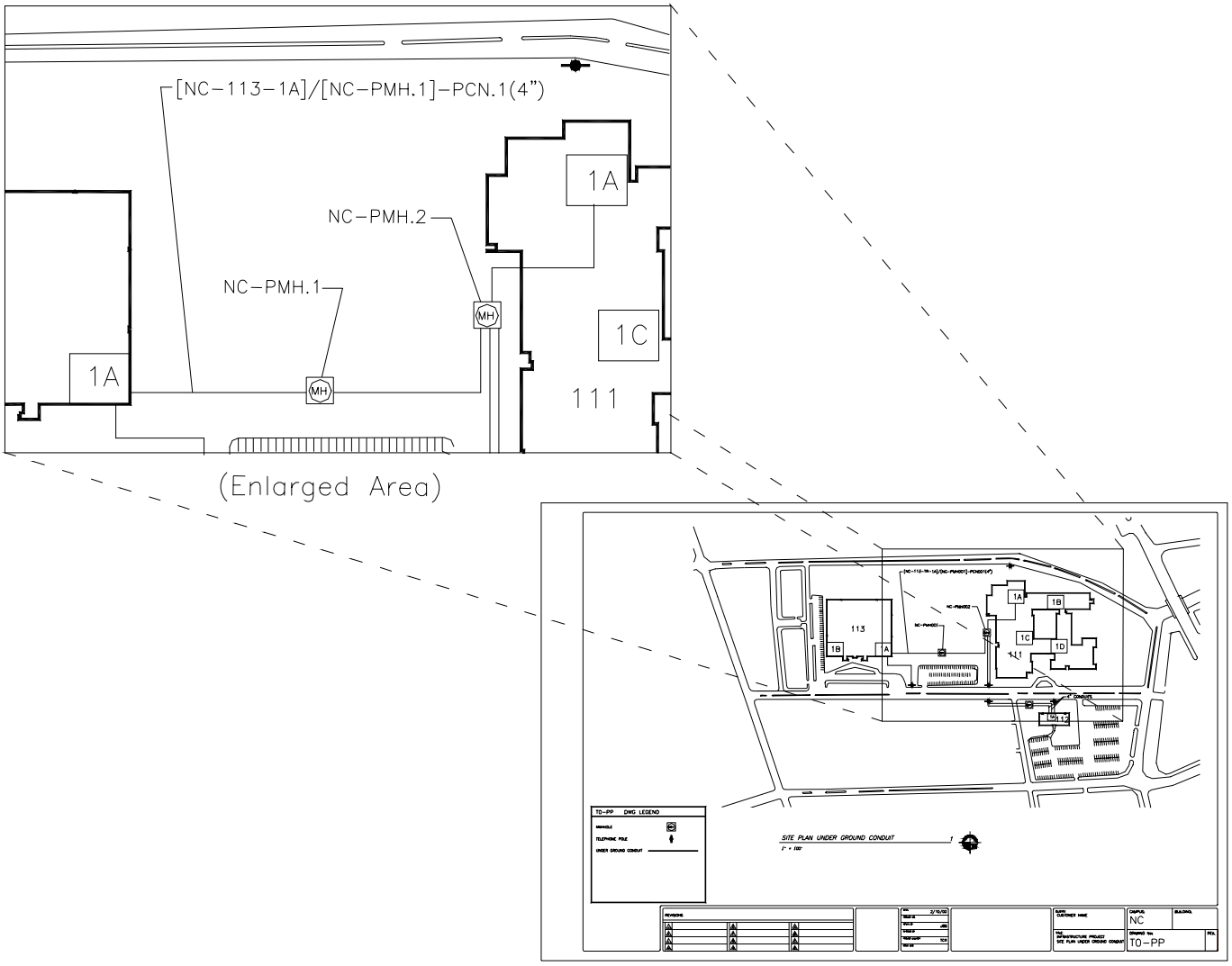


Figure 19: Example of T0 drawing level

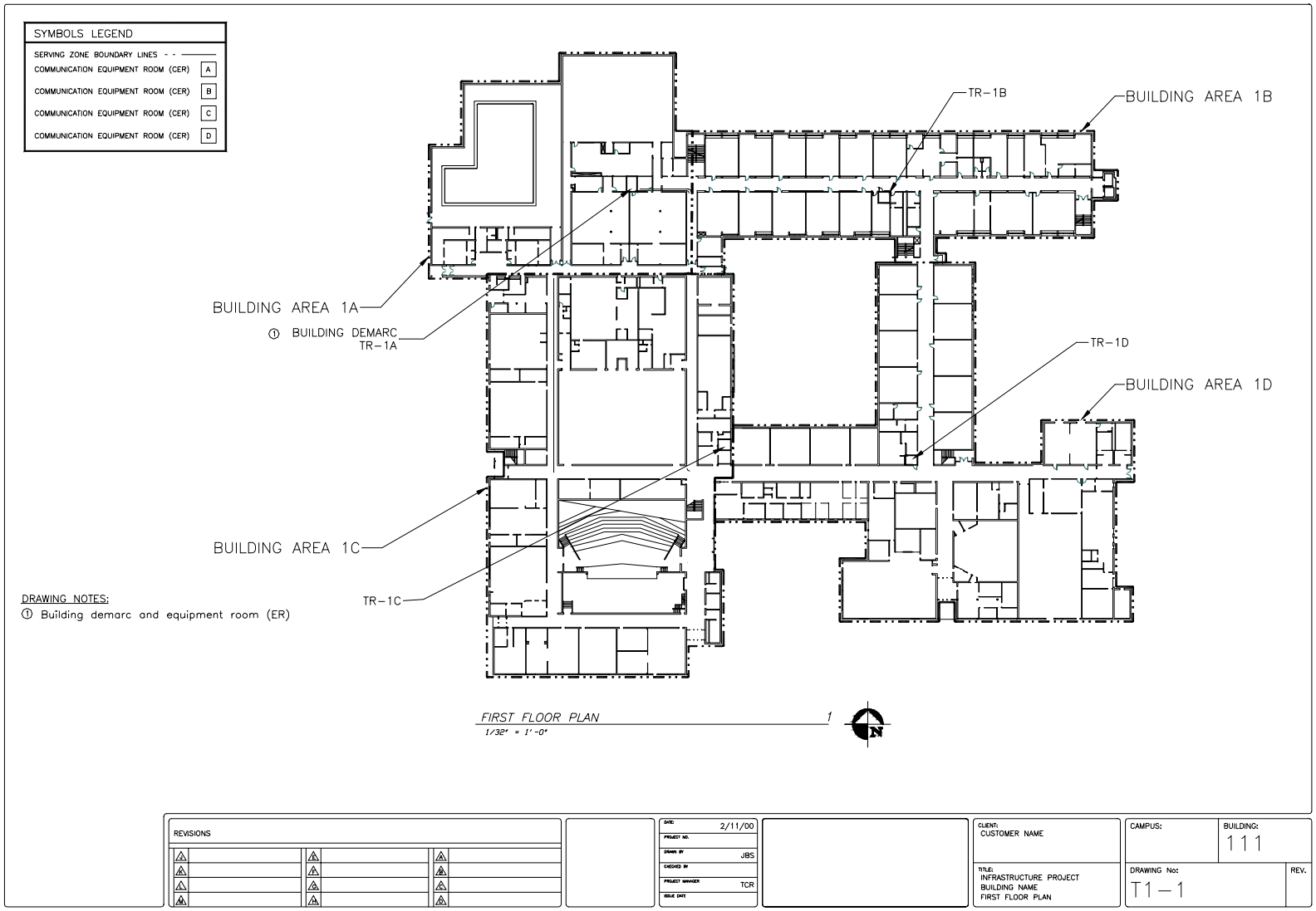


Figure 20: Example of T1 drawing level

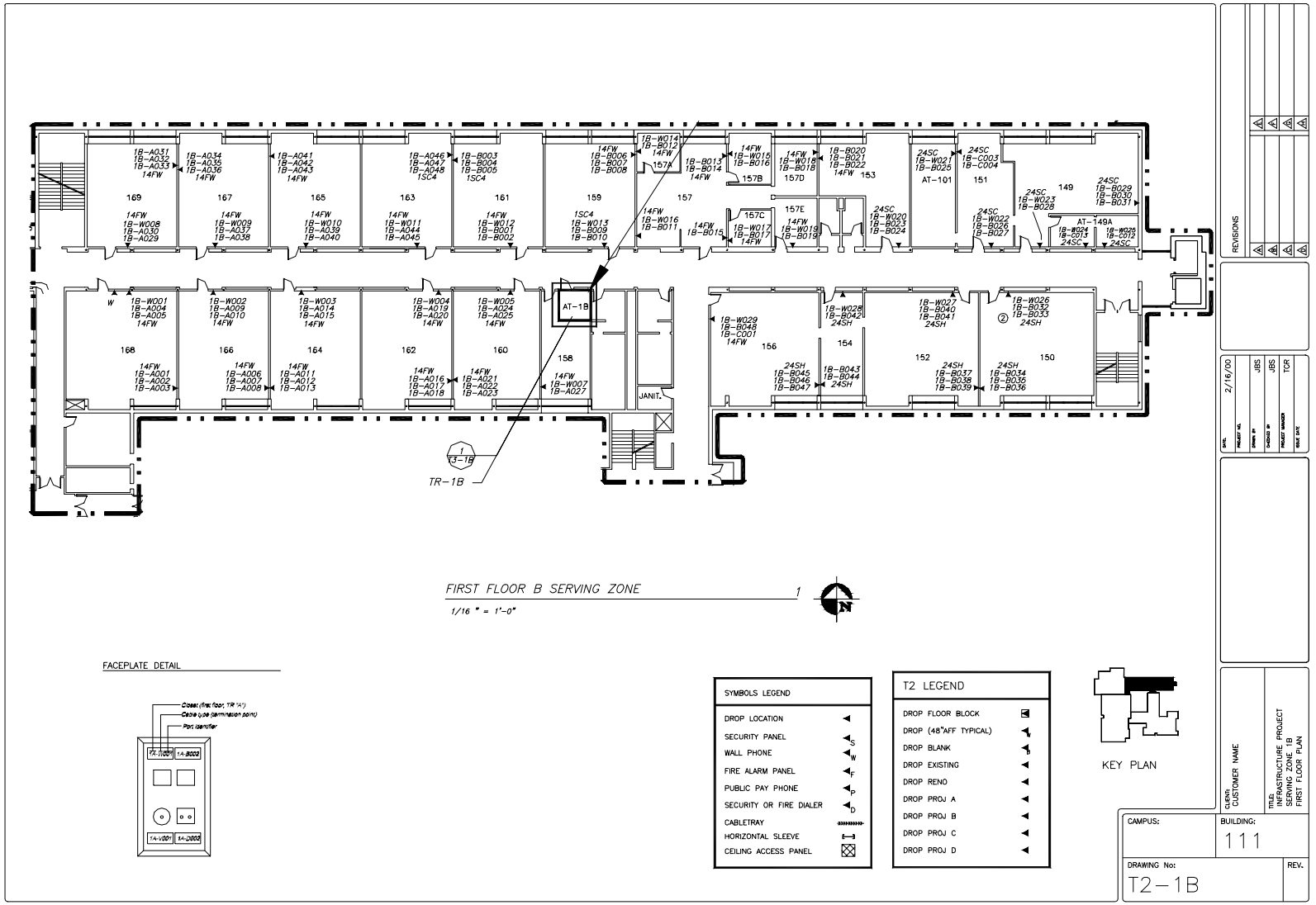


Figure 21: Example of T2 drawing level

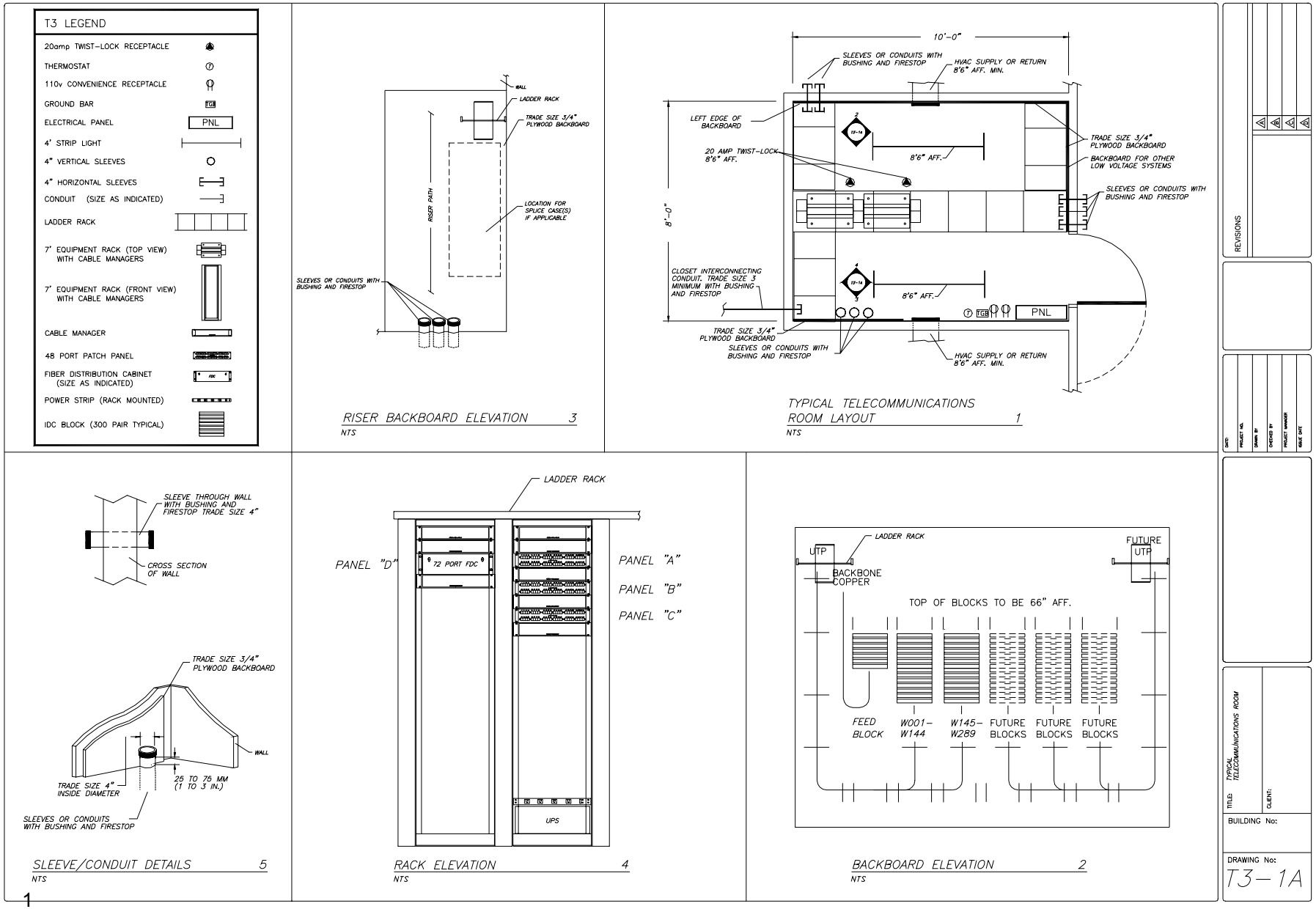


Figure 22: Example of T3 drawing level

ANNEX D (INFORMATIVE) INDEX OF TEXT REFERENCES TO IDENTIFIERS

This annex is informative only and is not part of this Standard.

ANNEX E (INFORMATIVE) BIBLIOGRAPHY AND REFERENCES

This annex is informative only and is not part of this Standard.

This annex contains information on the documents that are related to or have been referenced in this document. Many of the documents are in print and are distributed and maintained by national or international standards organizations. These documents can be obtained through contact with the associated standards body or designated representatives. The applicable electrical code in the United States is the National Electrical Code.

- ANSI/ICEA S-80-576-1994, Communications Wire and Cable for Wiring Premises
- ANSI/IEEE C2-1997, National Electrical Safety Code
- ANSI/NFPA 70-1999, National Electrical Code
- ANSI/TIA/EIA-568-B-2001, Commercial Building Telecommunications Cabling Standard
- ANSI/TIA/EIA-569-A-1998, Commercial Building Standard for Telecommunications Pathways and Spaces
- ANSI/TIA/EIA-598-A-1995, Optical Fiber Cable Color-coding
- ANSI/TIA/EIA-607-1994, Commercial Building Grounding and Bonding Requirements for Telecommunications
- ANSI/TIA/EIA-758-1999, Customer-owned Outside Plant Telecommunications Cabling Standard
- BICSI Telecommunications Distribution Methods Manual
- BICSI Cabling Installation Manual
- BICSI Customer-owned Outside Plant Methods Manual

The organizations listed below can be contacted to obtain reference information.

ANSI
American National Standards Institute (ANSI)
11 W 42 St.
New York, NY 10032
USA
(212) 642-4900
www.ansi.org

ASTM
American Society for Testing and Materials (ASTM)
100 Barr Harbor Drive
West Conshohocken, PA 19428-2959
USA
(610) 832-9500
www.astm.org

BICSI
Building Industry Consulting Service International
8610 Hidden River Parkway
Tampa, FL 33637-1000
USA
(800) 242-7405
www.bicsi.org

CSA
Canadian Standards Association (CSA)
178 Rexdale Blvd.
Etobicoke, (Toronto), Ontario
Canada M9W 1R3
(416) 747-4363
www.csa-international.org

EIA
Electronic Industries Alliance (EIA)
2500 Wilson Blvd., Suite 400
Arlington, VA 22201-3836
USA
(703) 907-7500
www.eia.org

FCC
Federal Communications Commission (FCC)
Washington, DC 20554
USA
(301) 725-1585
www.fcc.org

Federal and Military Specifications
National Communications System (NCS)
Technology and Standards Division
701 South Court House Road
Arlington.VA 22204-2198
USA
(703) 607-6200

www.ncs.gov

ICEA
Insulated Cable Engineers Association, Inc. (ICEA)
PO Box 440
South Yarmouth, MA 02664
USA
(508) 394-4424
www.icea.net

IEC
International Electrotechnical Commission (IEC)
Sales Department
PO Box 131
3 rue de Varembe
1211 Geneva 20
Switzerland
+41 22 34 01 50
www.iec.ch

IEEE
The Institute of Electrical and Electronic Engineers, Inc (IEEE)
IEEE Service Center
445 Hoes Ln., PO Box 1331
Piscataway, NJ 08855-1331
USA
(732) 981-0060
www.ieee.org

IPC
The Institute for Interconnecting and Packaging Electronic Circuits
2215 Sanders Rd.
Northbrook, IL 60062-6135
USA
(847) 509-9700
www.ipc.org

ISO
International Organization for Standardization (ISO)
1, Rue de Varembe
Case Postale 56
CH-1211 Geneva 20
Switzerland
+41 22 34 12 40
www.iso.ch

NEMA
National Electrical Manufacturers Association (NEMA)
1300 N. 17th Street, Suite 1847
Rosslyn, VA 22209
USA
(703) 841-3200
www.nema.org

NFPA
National Fire Protection Association

Batterymarch Park
Quincy, MA 02269
USA
(617) 770-3000
www.nfpa.org

SCTE
Society of Cable Telecommunications Engineers
140 Philips Rd.
Exton, PA 19341-1318
USA
(800) 542-5040
www.scte.org

Telcordia Technologies (formerly Bellcore)
Telcordia Technologies Customer Service
8 Corporate Place Room 3C-183
Piscataway, NJ 08854-4156
USA
(800) 521-2673
www.telcordia.com

TIA
Telecommunications Industry Association (TIA)
2500 Wilson Blvd., Suite 300
Arlington, VA 22201-3836
USA
(703) 907-7700
www.tiaonline.org

UL
Underwriters Laboratories, Inc. (UL)
333 Pfingsten Road
Northbrook, IL 60062
USA
(312) 272-8800
www.ul.com