

Oakton College

TECHNICAL SPECIFICATIONS

**COMMUNICATION
CERTIFIED STRUCTURED
CABLING SYSTEM
TECHNICAL SPECIFICATIONS**

Network Infrastructure System(NIS) Specification

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1. OVERVIEW / INTENT

1.1 NIS FOR VOICE, DATA & VIDEO

Oakton College is implementing an IP Security Cameras Project at the Skokie Campus at 7701 N. Lincoln Ave. Skokie, Illinois. A component of this project is the extension of our current horizontal low voltage cabling system to accommodate the new cameras.

The project will include a total of 65 level 7 (cat 6) data cable runs, distributed throughout the building (generally in the ceilings) and terminating in seven existing IDF closets.

2. GENERAL

2.1 REFERENCES

Commercial Building Telecommunications Wiring Standards ANSI/TIA 568-B0, General requirements, May 2001

Commercial Building Telecommunications Wiring Standards ANSI/TIA 568-B, Balanced Twisted Pair Cabling Components, May 2001

Commercial Building Telecommunications Wiring Standards ANSI/TIA 568-B, Optical Fiber Cabling Components standards, April 2000

TIA/EIA –569A - Commercial Building Standard for Telecommunications Pathways and Spaces.

TIA/EIA – 606 – Administration Standard for the Telecommunications Infrastructure of Commercial Buildings

International Standards Organization/International Electrotechnical Commission (ISO/IEC) DIS 11801, January 6, 1994.

Underwriters Laboratories (UL®) Cable Certification and Follow Up Program.

National Electrical Manufacturers Association (NEMA).

American Society for Testing Materials (ASTM).

National Electric Code (NEC®).

Institute of Electrical and Electronic Engineers (IEEE).

UL Testing Bulletin.

American National Standards Institute (ANSI) X3T9.5 Requirements for UTP at 100 Mbps.

Systemax Communication SYSTIMAX® Structured Connectivity Solutions, Performance Specifications, Latest Issue.

Systemax Communication SYSTIMAX® Structured Connectivity Solutions, Components Guide, Latest Issue.

Systemax Communication Generic Specifications: Fiber Optic Outside Plant Cable, Latest Issue.

Systemax Inc. Design & Installation Guidelines, latest issue.

Systemax Inc. SYSTIMAX® Structured Connectivity Solutions Performance Specification (Addendum) – Issue 3

2.2 DEFINITION - STRUCTURED CABLING SYSTEM

Structured Cabling Systems (NIS) wiring is defined as all required equipment and cabling including hardware, termination blocks, cross connect wire or cordage, patch panels, telecommunication outlets, UTP and fiber lightguide cable installed and configured to provide certified connectivity from camera to the network switch designated as the service point of the local area network.

Applications standards supported should include, but be not limited to, IEEE 802.3, 10Base5, 10BASE-T,. In addition, these links/channels shall be capable of supporting 100 Base-T. Gigabit cable performance shall be capable of supporting existing and evolving applications including 1000Base-T Gigabit Ethernet.

2.3 DESCRIPTION

The project is fully detailed in the attached drawings, but the structured cabling system will include the following:

- Work Area
- Horizontal
- Backbone (Riser/Campus) - No Cables
- Intermediate Distribution Facility (IDF)
- Administration

A. Work Area

The work area will include a number of different areas including offices, classrooms, lobby and hallway areas. Exterior locations include roof parapets and walls.

B. Horizontal Distribution

There are a total of seven (7) existing IDF's at the Skokie campus, Distribution of the 65 copper cable runs that will connect to the cameras is documented in the drawings and in the attached Horizontal Distribution spreadsheet. All cable terminations shall comply with, and be tested to ANSI/TIA 568-B standards for Category 6 installations. Of the 65 runs, 64 are terminated in the interior of the building. The remaining one cable is for an exterior camera mounted on the canopy by exit 1S.

Note all distances should be within the Cat 6 maximum of 295' but this should be verified by the contractor before running the cables. Oakton is not responsible for differences in actual versus projected measurements.

C. Intermediate Distribution Facilities (IDF)

All IDF's are existing. Oakton College will provide 48 port Cat 6 patch panels as necessary to terminate specified cables. Contractor does not need to provide patch panels. Cables will run to IDF's A108, A246, C255, P107, P137 and P257, as well as to MDF C204.

D. Administration

Oakton College has specific labeling requirements, please see section 4

2.4 CABLING BASIC REQUIREMENTS

A. Cable Pathway

Extension of all data and fiber cables shall be within raceway, conduit, cable tray or other

designated cable delivery system. There is extensive use of cable trays at the Skokie Campus. Raised flooring (Tate) is also used throughout most of the P wing addition.

B. Hardware

Required hardware includes, but is not limited to, termination blocks, fastening devices, data outlets, connectors and all required accessories to comply with this specification.

2.5 PROJECT TIMETABLE

Since the campus is occupied and operating, attention must be taken to plan the work to accommodate class and activity schedules, although this activity is substantially reduced during the summer. ***To facilitate planning, Oakton will provide a schedule of anticipated activities in classroom and other common space areas covering the affected time period.*** Contractor can begin work as soon as the project is awarded and must complete all construction activities by Friday **June 28, 2024**. The college is normally closed Fridays, Saturday's and Sundays in the summer from May 24, 2024 through Saturday, August 3, 2024, although the building can be open for the contractor on Fridays with prior arrangement.

2.6 GROUNDING AND BONDING

A. Bonding and Grounding

Communication bonding and grounding shall be in accordance with the NEC® and NFPA as well as local codes which specify additional grounding and/or bonding requirements. Horizontal cables shall be grounded in compliance with ANSI/NFPA 70 and local requirements and practices. Horizontal equipment includes cross connect frames, patch panels and racks, active telecommunication equipment and test apparatus and equipment. .

2.7 SPECIAL REQUIREMENTS FOR CABLE ROUTING AND INSTALLATION

A. Cabling

All communications cabling used throughout this project shall comply with the requirements as outlined in the National Electric Code (NEC®) Articles 725, 760, 770, and 800 and the appropriate local codes. All copper cabling shall bear CMP (Plenum Rated), CM/CMR (Riser Rated) and/or appropriate markings for the environment in which they are installed.

B. Cable Pathway

1. In suspended ceiling and raised floor areas where duct, cable trays or conduit are not available, the Contractor shall bundle, in bundles of 50 or less, station wiring with cable ties snug, but not deforming the cable geometry. Cable bundles shall be supported via "J" hooks attached to the existing building structure and framework at a maximum of five (5) foot intervals. Plenum rated cable ties will be used in all appropriate areas. The contractor shall adhere to the manufacturers' requirements for bending radius and pulling tension of all data cables.
2. Cables shall not be attached to lift out ceiling grid supports or laid directly on the ceiling grid.
3. Cables shall not be attached to or supported by fire sprinkler heads or delivery systems or any environmental sensor located in the ceiling air space.

C. Fire Stopping

Sealing of openings between floors, through rated fire and smoke walls, existing or created by the contractor for cable pass through shall be the responsibility of the contractor. Sealing material and application of this material shall be accomplished in such a manner which is

acceptable to the local fire and building authorities having jurisdiction over this work. Creation of such openings as are necessary for cable passage between locations as shown on the drawings shall be the responsibility of the contractor's work. Any openings created by or for the contractor and left unused shall also be sealed as part of this work.

D. Contractor Responsibility

The contractor shall be responsible for damage to any surfaces or work disrupted as a result of his work. Repair of surfaces, including painting, shall be included as necessary.

2.8 WORK EXTERNAL TO THE BUILDING

Any work external to the confines of this building as shown on the drawings shall be governed by the provisions of this specification and the applicable drawings.

2.9 PRODUCT WARRANTY AND APPLICATION ASSURANCE

The installation must be covered by the following warranty:

CommScope Network Infrastructure System 25 Year Extended Product Warranty

A. Extended Product Warranty

CommScope warrants, for a period of twenty-five (25) years from the Certification Date (the "Warranty Period"), that Products in the Registered System shall be free from defects in materials or workmanship subject, to the terms and conditions below and the terms, conditions and limitations of CommScope's Limited Product Warranty in effect at the date of sale (available at <http://www.commscope.com/Resources/Warranties/>).

B. Application Warranty

During the Warranty Period, the Registered System will meet or exceed the specifications set forth in the System Specification and support Applications as documented therein.

C. System Warranty Requirements.

The System Warranty applies only to Products that are: (i) installed by an Authorized Partner, at the location listed on the System Warranty Certificate; (ii) installed in compliance with CommScope's written design, engineering and installation procedures, and the specifications for the Application and the System Specification; (iii) designed, installed, and maintained in compliance with the applicable industry standards as set forth in the System Specification; (iv) not subject to conditions that exceed the individual Product Specification(s); (v) used at the original site of installation; (vi) tested pursuant to industry standards and applicable CommScope testing requirements and satisfactorily pass such tests; and (vii) not otherwise expressly excluded or invalidated under the System Warranty Terms and Conditions. To qualify for a System Warranty, all documents, including the prescribed System test results, must be submitted to CommScope for review within sixty (60) days of installation, and registration for the System Warranty must be applied for with CommScope within ninety (90) days from the date the installation is complete. CommScope, in its sole judgment, shall determine if the System Warranty Requirements have been met. CommScope's approval of a System Warranty shall be evidenced by a numbered registration System Warranty Certificate issued by CommScope. In the event a System Warranty Certificate is issued and CommScope subsequently discovers that any of the System Warranty requirements were not met, then the System Warranty shall be void.

3. PRODUCTS

Below is a list of products that will be required for this project.

3.1 CATEGORY 6 PATCH PANELS USED IN CLOSETS

The following Commscope Patch Panel shall be used. Oakton will provide the necessary quantity of this panel for the project preinstalled for the contractor:

Commscope Part Number	Description
760152579	48-port 360 cat6 patch panel

3.2 CABLE RUNS

Category 6 UTP, 4 Pair (XL7 - High Performance) (Data)

The following Commscope plenum cable shall be used for the IDF to Camera runs:

Commscope Part Number	Description
700208101	Box Cat6 White 1000 ft.

**3.4 CABLE TERMINATION COMPONENTS
6 GIGABIT OUTLETS (DATA)**

CATEGORY

The following Commscope jacks shall be used at the remote end of the cable runs:

Commscope Part Number	Description
700206667 MGS400-BK	M-Series modular jack 110 UTP Cat6 Black

DATA JACK ACCESSORY

The following protective box shall enclose each data jack used at the remote end of the cable runs:

Commscope Part Number	Description
107984007 M101SMB-B-246	Surface Mtg Box

3.3 EQUIVALENT PRODUCTS

Equivalent product(s) will not be considered as substitutes for any of the above items.

3.4 UNSPECIFIED EQUIPMENT AND MATERIAL

Any item of equipment or material not specifically addressed on the drawings or in this document and required to provide a complete and functional NIS installation shall be provided in a level of quality consistent with other specified items.

4. EXECUTION

4.1 WORKMANSHIP

Components of the NIS system shall be installed in a neat, workmanlike manner. Wiring color codes shall be strictly observed and terminations shall be uniform throughout the system. Identification markings and systems shall be uniform. TIA/EIA 568-B wiring codes as shown on the drawings shall standardize all NIS wiring.

4.2 GENERAL DESCRIPTION

The wiring system components of OAKTON COLLEGE will comply with all product specifications contained in Section 3.

4.3 NIS ELEMENTS

The structured cabling system shall consist of the following elements:

Work Area
Horizontal
Backbone (Riser/Campus)
Intermediate Distribution Facility (IDF)
Voice Main Distribution Facility Equipment Room (Voice MDF)
Data Main Distribution Facility Equipment Room (Data MDF)
Administration

4.4 WORK AREA

The connection between the information outlet and the station equipment in the work area is provided by the Work Area. It consists of cords, adapters, and other transmission electronics.

A. Wiring and cords

End user will supply & install cameras and patch cords

4.5 HORIZONTAL

The Horizontal provides connections from the horizontal cross connect to the information outlets (IOs) in the work areas. It consists of the horizontal transmission media, the associated connecting hardware terminating this media and IOs in the work area. Horizontal Cabling

1. Contractor shall supply horizontal cables to connect each information outlet to the backbone subsystem. See Horizontal Distribution Spreadsheet for details on the type and quantities of horizontal cabling and outlets.
2. The 4pair UTP cables shall be run using a star topology format from the IDF's to every individual information outlet. Any changes to cable routing must be approved by OAKTON COLLEGE prior to installation of the cabling.
3. The length of each individual run of horizontal cable from the IDF to the information outlet shall not exceed 295 ft (90 m). All planned cable routes should be compliant with this specification. Contractor must notify OAKTON COLLEGE if a cable run will exceed this distance.
4. Contractor shall observe the bending radius and pulling strength requirements of the 4pair UTP cable during handling and installation.
5. Each run of cable between the termination block and the information outlet shall be continuous without any joints or splices.
6. In suspended ceiling and raised floor areas where walker duct, cable trays or conduit are not available, the Contractor shall bundle station wiring with plastic cable ties at appropriate distances. The cable bundling shall be supported via "J" hooks attached to the existing building structure and framework. Plenum cable will be used in all appropriate areas.

7. If the interior of walls are not obstructed, the Contractor shall conceal horizontal distribution wiring internally within the walls. If such obstructions exist, Contractor shall secure approval by OAKTON COLLEGE prior to the use of an alternate method.
8. All above ceiling work will require removal and replacement of ceiling tiles. In the event of damage to existing ceiling tiles, contractor will be responsible for tile replacement using tiles provided by the college. Contractor shall not break or disturb the ceiling grid.
9. In raised floor areas (Skokie P wing) contractor is responsible for removing existing carpet or rubber floor squares and opening the access floor. After completion of a days work, the floor tiles and carpet or rubber finish tiles must be replaced and returned to original condition. In the event Contractor is required to remove floor tiles, such Work shall not break or disturb grid.
10. The 4 pair UTP cable shall be the specific Commscope part# listed earlier in this document.
11. All cable runs should follow existing paths if possible. Contractor shall consult OAKTON COLLEGE for any proposed deviations from existing paths.
12. Station cables and tie cables installed within ceiling spaces and raised floor spaces shall be routed through these spaces at right angles to electrical power circuits.
13. Cable tray, and wall mounted single gang boxes for horizontal cabling may exist for some locations. Where gang boxes do not exist, contractor is responsible for cutting an appropriately sized opening in the wall or ceiling tile at the specified location and providing an appropriate single gang Low Voltage Mounting Bracket.
14. Many IDF's support multiple floors Contractor is responsible for ensuring adequate space is available in existing riser sleeves. Bid should include costs for drilling/coring of additional sleeves as contractor deems necessary. Contractor must get approval for any new corings.

4.6 BACKBONE (RISER/CAMPUS)

A. Riser Backbone

The main cable route within a building is called the Riser Backbone. It links the main cross connect (MC) in the Data MDF to horizontal cross connects in the IDFs. It consists of the backbone transmission media between these locations and the associated connecting hardware terminating this media.

The riser backbone shall include vertical runs (riser) of inbuilding fiber cables between floors. No riser cable is included in this project.

4.7 INTERMEDIATE DISTRIBUTION FACILITY (IDF) ROOMS

All cabling will be installed in existing IDFs. The locations for the horizontal termination should be field verified with OAKTON COLLEGE prior to installation. The College requires each vendor to ensure proper cable management in the telecommunication closet. No loose hanging cable will be allowed. All cables should be bundled with cable ties and/or attached to appropriate cable management hardware.

The installer will simply terminate the distribution system. There will be no connection to electronic equipment. All cross connects for voice and data will be the responsibility of OAKTON COLLEGE.

4.8 ADMINISTRATION

The Administration Subsystem links all of the subsystems together. It consists of labeling hardware for providing circuit identification. The administration subsystem shall consist of wiring blocks for termination of the copper cables. All wallfield and rack layouts to be approved by OAKTON COLLEGE prior to installation.

4.9 INSTALLATION

All installation shall be done in conformance with TIA 568-B (standards and Commscope SYSTIMAX COMMUNICATION Design and Installation guidelines. The Contractor shall ensure that the maximum pulling tensions of the specified distribution cables are not exceeded and cable bends maintain the proper radius during the placement of the facilities. Failure to follow the appropriate guidelines will require the Contractor to provide in a timely fashion the additional material and labor necessary to properly rectify the situation. This shall also apply to any and all damages sustained to the cables by the Contractor during the implementation.

A. Power Separation

The Contractor shall not place any distribution cabling alongside power lines, or share the same conduit, channel or sleeve with electrical apparatus.

B. Miscellaneous Equipment

The Contractor shall provide any necessary screws, anchors, clamps, tie wraps, distribution rings, wire molding (MC & IDF locations), miscellaneous grounding and support hardware, etc., necessary to facilitate the installation of the System.

C. Special Equipment and Tools

It shall be the responsibility of the Contractor to furnish any special installation equipment or tools necessary to properly complete the System. This may include, but is not limited to, tools for terminating cables, testing equipment for copper/fiber cables, communication devices, jack stands for cable reels, or cable wenchers.

D. Labeling

Tag all Cat 6 cables at both Communications Equipment Room and the information outlets using the following alphanumeric labeling system:

1. Each cable run should have 4 labels. Two wrap around labels on the cable itself, a label on the patch panel and a label on the wall plate.

2. The cable labels should be printed on a flexible wrap around white label with black text, using the format (single line, spaces around the slash):

IDF-Rack#-PatchPanel#-Patch Panel Port# / Room-port

Example:

0509-1-1-23 / 1530-01

3. The wall port labels should be printed on a white label with black text, using the format (Two lines, no slash):

IDF-Rack#-PatchPanel#-Port#
Room-port

Example:

0509-1-1-23
1530-01

4. The Patch panel labels should be printed on a white label with black text and should include just the Room-port (i.e. 1530-01)
5. For all the label types, The IDF is the Communications Equipment Room, the Rack# and Patch Panel# are sequential numbers beginning with the next sequential number based on the marked existing patch panels and racks. The patch panel port # is the position within the patch panel (1-48). For the Room-Port, the Room is the room number. For hallways, it is the room number of the closest adjacent room followed by an H (i.e. 1542H). The port number starts at one with each additional outlet in each room numbered sequentially. If a port is located in the ceiling. (Security camera's, Wireless AP's, projector, etc,) the port should be preceded by a C (for example 1530-C13). All ports, both wall, ceiling and floor should be in the same sequence, i.e. 1530-01, 1530-C02, 1530-03, ...)
6. For wall ports, the label should be placed directly on the faceplate and not on the removable paper card under the window.
7. All proposed labels must be reviewed by the owner prior to installation.

E. Cable Storage

The Contractor shall not roll or store cable reels without an appropriate underlay and the prior approval of OAKTON COLLEGE.

F. Cable Records

The Contractor shall maintain conductor polarity (tip and ring) identification at the main equipment room (switch room), risers, and station connecting blocks in accordance with industry practices.

4.10 ENGINEERING

A. Prebid meeting

A mandatory prebid meeting is scheduled for Thursday April 21, 2024 . At this meeting, OAKTON COLLEGE will review the bid specifications, present the interested contractors with electronic versions of the drawings and answer any initial questions. Any unresolved issues will be addressed by a bid addendum.

B. Planning meetings and schedule

After the bid is awarded, an initial planning meeting will be held with the successful bidder to clarify all requirements (systems, services, distribution methods, etc.), identify responsibilities, and schedule the events that will transpire during the implementation of the project. OAKTON COLLEGE shall provide the Contractor with one (1) clearly readable, uptodate copy of all drawings. In reviewing such drawings Contractor shall be obligated to make an on-site inspection with OAKTON COLLEGE for on-site verification of access routes for cabling and other matters. The contractor shall then provide a written report and project schedule to clearly document the events and responsibilities associated with the project and to clarify any planned changes.

C. As Built Documentation

Upon completion of the project, Contractor is to prepare "As Built" documentation showing actual site conditions and installation as constructed, and provide copies of such documentation as appropriate

3.5.1.1 Work Area Floor Plans - Includes:

- 3.5.1.1.1 detailed cable routes if they vary from original plans
- 3.5.1.1.2 documentation of labeling for all work areas.

3.5.1.2 Documentation should be in the following format:

- 3.5.1.2.1 A copy in paper consisting of marked up CAD drawings or Electronic form – (Word / Excel /AutoCad)

D. Additional Records

In addition to the engineering diagrams, the following items shall be provided by the contractor:

1. Cable Records and Assignments
2. Test results (as documented in section 4.14)

4.11 DAMAGES

The Contractor will be held responsible for any and all damages to portions of the building caused by it, its employees or subcontractors; including but not limited to:

- Damage to any portion of the building caused by the movement of tools, materials or equipment.
- Damage to any component of the construction of spaces "turned over" to the Contractor.
- Damage to the electrical distribution system and/or other space "turned over" to the Contractor.
- Damage to the electrical, mechanical and/or life safety or other systems caused by inappropriate operation or connections made by the Contractor or other actions of Contractor.
- Other damage to the materials, tools and/or equipment of OAKTON COLLEGE, its consultants, other contractors, agents and leasees.

4.12 PENETRATIONS OF WALLS FLOORS AND CEILINGS

A. Prior consent

The Contractor shall make no penetration of floors, walls or ceiling without the prior consent of OAKTON COLLEGE.

B. Sealing penetrations

Where penetrations through acoustical walls or other walls for cableways have been provided for the Contractor, such penetrations shall be sealed by the Contractor in compliance with applicable code requirements and as directed by OAKTON COLLEGE.

Where penetrations through fire-rated walls for cableways have been provided for the Contractor, such penetrations shall be sealed by the Contractor as required by code and as directed by OAKTON COLLEGE. Contractor shall, prior to the commencement of on-site activities, submit to OAKTON COLLEGE for review details of any special systems to be used.

4.13 PROJECT DIRECTION

A. Single Point of Contact

Contractor will provide a single point of contact, i.e., Project Manager, to speak for the Contractor and to provide the following functions:

1. Initiate and coordinate tasks with OAKTON COLLEGE.
2. Provide day-to-day direction and on-site supervision of Contractor personnel:

3. Ensure conformance with all Contract provisions.

4.14 TESTING/WARRANTY

A. Copper Cable testing

Testing of all copper wiring shall be performed prior to system cutover. 100 percent of the horizontal and riser wiring pairs shall be tested for opens, shorts, polarity reversals, transposition and presence of AC voltage. Voice and data horizontal wiring pairs shall be tested from the information outlet to the IDF. The Category 5E cable runs shall be tested for conformance to the specifications of TIA 568-B Category 6.

Category 6 horizontal cables shall be tested according to testset manufacturers instructions utilizing the latest firmware and software. Testing shall include all of the electrical parameters as specified in the Products Section of this document. Any pairs not meeting the requirements of the standard shall be brought into compliance by the contractor, at no charge to OAKTON COLLEGE. Complete, end to end test results must be submitted to OAKTON COLLEGE. All testing will be performed using Fluke OMNI-Scanner.

1. Preinstallation cable testing

The Contractor shall assume all liability for the replacement of the cable should it be found defective at a later date.

2. Any link not meeting the requirements of the standard shall be brought into compliance by the contractor, at no charge to OAKTON COLLEGE.
3. Documentation shall be provided in both hard copy and computer readable media to the point of contact.

B. Manufacturer Warranty

Contractor shall provide a Twenty five (25) year Commscope Systimax® Network Infrastructure System Extended Product Warranty and Application Assurance.

C. Additional Warranty

Contractor shall state any additional Contractor supplied warranty.

4.15 COMPLETION OF WORK

At the completion of the System, the Contractor shall restore to its former condition, all aspects of the project site and on a daily basis, shall remove all waste and excess materials, rubbish debris, tools and equipment resulting from or used in the services provided under this Contract. All clean up, restoration, and removal noted above will be by the Contractor and at no cost to OAKTON COLLEGE. If the Contractor fails in its duties under this paragraph, OAKTON COLLEGE may upon notice to the Contractor perform the necessary clean up and deduct the costs thereof from any amounts due or to become due to the Contractor. OAKTON COLLEGE will provide a dumpster for the use of the Contractor. It shall be the Contractor's responsibility to remove trash from the areas it is working in and bring trash and debris to the dumpster.

4.16 PROJECT SPECIAL NOTES:

A. Ceiling Mounted Cameras

Most of the cables to be installed will be for ceiling mounted security cameras. The location for these cameras will be identified in the rooms by a blue tape/sticker. Each security camera will require a single cable run to the location terminated in a jack and a single port surface mount box. When at all possible, ceiling mounted jacks should be only in suspended ceiling areas. In areas without suspended acoustical tile ceilings, a back box should be provided along

with necessary blocking to support mounting the camera. All ceiling cables should be provided with a 20' service loop allowing the device to be relocated. Loop should be coiled in the ceiling.

B. Wall mounted Cameras on drywall

Some of the security cameras to be installed will be wall mounted on drywall. The location for these cameras will be identified in the rooms and hallways by a blue tape/sticker. Contractor should provide a single gang low voltage mounting bracket. The cable should be terminated in a jack and a single port surface mount box.

C. Wall mounted Cameras on Concrete

Some of the security cameras to be installed will be wall mounted on concrete columns, walls or ceilings. The location for these cameras will be identified in the rooms by a blue tape/sticker. Contractor is responsible for mounting a 4"x4" junction box with conduit stub or wire mold up to the ceiling area with appropriate anchors. The cable should be terminated in a jack and a single port surface mount box inside the junction box.

D. Stairway Cameras

Two of the security cameras will be installed in stairwells with a metal panel system. The network cables for these will be terminated in the adjacent hallway in a concealed area near the ceiling. The cable should be terminated in a jack and a single port surface mount box mounted on the drywall surface hidden from view.

E. Exterior Cameras

Most exterior cameras will have cables run to the ceiling inside the building. One exterior camera labeled PSE-102 / Room port B113E-01 will have a cable run using the existing exterior conduit on the entrance canopy. The existing coaxial cable will need to be removed and can be used for pulling.

F. Cabling / Consumables

The successful vendor must install all designated cables in the Horizontal Distribution spreadsheet and the drawings. The exact quantities of cable required should be determined by the contractor based on the plans and the walk through. The college is not responsible for any additional cable required if the contractor mis-estimates the required quantity.

4.17 INSPECTION

On-going inspections shall be performed during construction by the Contractors Project Manager and OAKTON COLLEGE's designated representative. All work shall be performed in a high quality manner and the overall appearance shall be clean, neat and orderly. The following points will be examined and must be satisfactorily complied with:

- Is the design documentation complete? Are all cables properly labeled, from end-to-end?
- Have all terminated cables been properly tested in accordance with the specifications for the specific category as well as tested for opens, shorts, polarity reversals, transposition and presence of AC and/or DC voltage?
- Is the cable type suitable for its pathway? Are the cables bundled in parallel?
- Have the pathway manufacturer's guidelines been followed? Are all cable penetrations installed properly and fire stopped according to code?

- Have the Contractors avoided excessive cable bending?
- Have potential EMI and RFI sources been considered?
- Is Cable Fill Correct?
- Are hanging supports within 1.5 meters (5 feet)?
- Does hanging cable exhibit some sag?
- Are telecommunications closet terminations compatible with applications equipment?
- Have Patch Panel instructions been followed?
 - jacket removal point
 - termination positions
 - all pair terminations tight with minimal pair distortions
 - twists maintained up to Index Strip
- Are the correct outlet connectors used (T568B)?
- Are identification markings uniform, permanent and readable?