Solicitation Information

Date: 12/8/11

RFP # 7449277

TITLE: INTERNAL SECURITY SYSTEM – DAVIES HS

Submission Deadline: 1/12/12 @ 2:00 PM (Eastern Time)

Mandatory Pre Bid Conference: YES
Location: Davies High School
50 Jenckes Hill Rd.
Lincoln, RI 02865

Questions concerning this solicitation may be e-mailed to the Division of Purchases at gary.mosca@purchasing.ri.gov no later than **12/28/11 @ 12:00 NOON** (Eastern Time). Please reference the RFQ # on all correspondence and send questions in a *Microsoft Word format*. Questions received, if any, will be answered and posted on the Internet as an addendum to this solicitation. It is the responsibility of all interested parties to download this information.

SURETY REQUIRED: YES
BOND REQUIRED: YES

Gary P. Mosca
Buyer

Vendors must register on-line at the State Purchasing Website at www.purchasing.ri.gov

NOTE TO VENDORS:
Offers received without the entire completed three-page RIVIP Generated Bidder Certification Form attached may result in disqualification.

THIS PAGE IS NOT A BIDDER CERTIFICATION FORM

"EFFECTIVE CONSULTING – EXCELLENT RESULTS"

United Security Solutions

Security Division of CCRS

P.O. Box 802 Coventry, RI - Office: 401-623-8965 - Fax: 401-250-5565 - Email: info@unitedsecuritysolutions.net

CREATIVE ENVIRONMENT CORP · CONSULTING ENGINEERS ·

HVAC • ELECTRICAL • PLUMBING
• FIRE PROTECTION •

50 OFFICE PARKWAY
EAST PROVIDENCE, RI 02914
P: 401.438.7733
F: 401.438.7620
WWW.CEC-ENGINEERING.COM

DAVIES TECHNICAL HIGH SCHOOL SECURITY IMPROVEMENTS CCTV – SURVEILENCE SYSTEM UPGRADE AND INSTALLATION AUGUST 4, 2011

WILLIAM M. DAVIES JR.
TECHNICAL HIGH SCHOOL
50 JENKES HILL RD.
LINCOLN, RI 02865

Section 00100 – Invitation To Bid:

BID#: **_7449277_____**

OWNER:

State of Rhode Island and Providence Plantations
William M. Davies Jr. Technical High School

ISSUED BY:

The Department of Administration- Office of Purchases
One Capitol Hill
Providence, RI 02908

DESIGNER OF RECORD:

CCRS - United Security Solutions
P.O. Box 802
Coventry, Rhode Island 02816

Bidders are invited to bid on a general project for:

CCTV - Surveillance System upgrade and installation. This includes, cutting patching, general renovation, drywall construction, and related electrical work. The work is described within the contract documents.

All bids shall be irrevocable, after they are received and opened, and not subject to withdrawal for any cause whatsoever for a period of ninety (90) days after receipt of bids. Acceptance shall be by mail in the form of a letter and/ or property signed purchase order and is effective upon mailing such notice.

All bids shall be signed by the proper and authorized representative of the bidding party or company and shall contain no alterations or erasures.

The Owners representative shall be:

Mr. William Okerholm
William M. Davies Jr. Technical High School
50 Jenkes Hill Road
Lincoln, Rhode lsland 02865

Bids will be received until:

DATE: 1/12/11 _____

TIME: _____2:00 PM (EST)_____

Bid shall include a breakdown of the work to be done with associated cost of each phase.

The bid shall clearly and conspicuously state any assumption or modification from the contract documents, that the bidder feels necessary, and include any explanation thereof.

Should the bidder discover discrepancies, omissions, or ambiguities in the contract documents or supporting documents, he should notify CCRS – United Security Solutions at once; and it will send written instructions and/ or corrections to all bidders. All bidders should carefully examine complete documents and supporting documents, before submitting any bid, so far as to fully and completely inform themselves as to all existing conditions, limitations and requirements.

A MANDATORY pre-bid conference will be held at: William M. Davies Jr. Technical High School
50 Jenkes Hill Road Lincoln, Rhode Island 02865

Date: ___12/22/11_____

Time: __10:00 AM_(EST)____

All bids must contain the number of calendar days required for the performance of the work or the delivery of on which his bid or proposal is based.

PROJECT COMPLETION: 90 Calendar Days from the issuance of a purchase order.

Bid documents may be examined at the Rhode Island State Building Commission, One Capitol Hill, Providence, RI 02908-5855 Bid documents, in the form of a CD, may be obtained from the office of the Building Code Commission. Bid documents will be available for pickup in person from , 2011 to , 2011 between hours of 8:30AM to 4:00PM. Bid documents will be available for pickup only up to 96 hours before the bid date and will not be available after that time.

Bidder is required to provide Bid Security in the form of a Bid Bond, or a certified check payable to the State of Rhode Island, in the amount of a sum not less than five percent (5%) of the Bid Price.

Refer to other Bidding requirements described in Instructions to Bidders of the bid documents

Bidders' attention is referred to State requirements pertaining to conditions of employment to the observed, including the requirement that ten percent (10%) of the dollar value of the work be per- formed by Minority Business Enterprises, and wage rates to be paid under the Contract for this project, as on file in the Rhode Island Department of Labor, Office of the Director. Bidders are subject to terms, conditions and provisions of Chapters 2, 12, 13 and 14 1 of Title 37, General Laws of the State of Rhode Island 1956, as amended.

The State reserves the right to accept or reject any and all bids or bidders, for whatever reason it deems appropriate.

The hearing impaired persons may obtain interpreter assistance by calling (401)277-2317, a minimum of 48

hours prim to the bid date

END OF SECTION 00100

TO: **State of Rhode Island Department of Administration**
Division of Purchases
One Capitol Hill
Providence, Rhode Island 02908-5859

PROJECT: **CCTV - Surveillance System upgrade and installation**
William M. Davies Jr. Technical High School
50 Jenkes Hill Road
Lincoln, Rhode Island 02865

Date: _____

Submitted By: _____

Address: _____

_____

Telephone Number: _____

Bid:

Having examined the Place of the Work and all matters referred to in the Instructions to Bidders and in the Contract Documents prepared by CCRS - United Security Solutions, for the above- mentioned project, we, the undersigned, hereby propose to enter into a Contract to perform the Work for the sum of:

$ _____

Written Amount:

_____

_____

Authorized Signature: _____

TABLE OF CONTENTS

SECTION 260500

COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Sleeves for raceways and cables.

2. Sleeve seals.

3. Grout.

4. Common electrical installation requirements.

1.2 SUBMITTALS

A. Product Data: For sleeve seals.

PART 2 - PRODUCTS

2.1 SLEEVES FOR RACEWAYS AND CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

C. Sleeves for Rectangular Openings: Galvanized sheet steel.

1. Minimum Metal Thickness:

a. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and no side more than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).

b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches (1270 mm) and 1 or more sides equal to, or more than, 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

2.2 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

A. Comply with NECA 1.

B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

E. Right of Way: Give to piping systems installed at a required slope.

3.2 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

E. Cut sleeves to length for mounting flush with both surfaces of walls.

F. Seal space outside of sleeves with grout for penetrations of concrete and masonry

1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

G. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants.".

H. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping."

I. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.

J. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

K. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between raceway or cable and sleeve for installing mechanical sleeve seals.

3.3 SLEEVE-SEAL INSTALLATION

A. Install to seal exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve

seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.4 FIRESTOPPING

A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."

END OF SECTION 260500

SECTION 260529

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Hangers and supports for electrical equipment and systems.

2. Construction requirements for concrete bases.

1.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.3 SUBMITTALS

A. Product Data: For steel slotted support systems.

B. Shop Drawings: Show fabrication and installation details and include calculations for the following:

1. Trapeze hangers. Include Product Data for components.

2. Steel slotted channel systems. Include Product Data for components.

3. Equipment supports.

C. Welding certificates.

1.4 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Allied Tube & Conduit.

b. Cooper B-Line, Inc.; a division of Cooper Industries.

c. ERICO International Corporation.

d. GS Metals Corp.

e. Thomas & Betts Corporation.

f. Unistrut; Tyco International, Ltd.

g. Wesanco, Inc.

3. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.

4. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.

5. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.

6. Channel Dimensions: Selected for applicable load criteria.

B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1) Hilti Inc.

2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.

3) MKT Fastening, LLC.

4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.

2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.

a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1) Cooper B-Line, Inc.; a division of Cooper Industries.

2) Empire Tool and Manufacturing Co., Inc.

3) Hilti Inc.

4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.

5) MKT Fastening, LLC.

3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.

4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.

5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.

6. Toggle Bolts: All-steel springhead type.

7. Hanger Rods: Threaded steel.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

B. Materials: Comply with requirements in Division 05 Section "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as scheduled in NECA 1, where its Table 1 lists maximum spacings less than stated in NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with two-bolt conduit clamps.

D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch (38-mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Raceway Support Methods: In addition to methods described in NECA 1, EMT may be supported by openings through structure members, as permitted in NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.

2. To New Concrete: Bolt to concrete inserts.

3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.

4. To Existing Concrete: Expansion anchor fasteners.

5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches (100 mm) thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches (100 mm) thick.

6. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69.

7. To Light Steel: Sheet metal screws.

8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Comply with installation requirements in Division 05 Section "Metal Fabrications" for site-fabricated metal supports.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 CONCRETE BASES

A. Construct concrete bases of dimensions indicated but not less than 4 inches (100 mm) larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.

B. Use 3000-psi (20.7-MPa), 28-day compressive-strength concrete. Anchor equipment to concrete base.

1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

2. Install anchor bolts to elevations required for proper attachment to supported equipment.

3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

END OF SECTION 260529

SECTION 260533

RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

1.2 SUBMITTALS

A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

B. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, details, and attachments to other work.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

A. Rigid Steel Conduit: ANSI C80.1.

B. IMC: ANSI C80.6.

C. EMT: ANSI C80.3.

D. FMC: Zinc-coated steel.

E. LFMC: Flexible steel conduit with PVC jacket.

F. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.

1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886.

2. Fittings for EMT: Steel, set-screw type.

2.2 METAL WIREWAYS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Cooper B-Line, Inc.

2. Hoffman.

3. Square D; Schneider Electric.

B. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 1, unless otherwise indicated.

C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

D. Wireway Covers: Screw-cover type.

E. Finish: Manufacturer's standard enamel finish.

2.3 NONMETALLIC WIREWAYS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Hoffman.

2. Lamson & Sessions

3. Carlon Electrical Products.

B. Description: PVC plastic, extruded and fabricated to size and shape indicated, with snap-on cover and mechanically coupled connections with plastic fasteners.

C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

2.4 SURFACE RACEWAYS

A. Surface Metal Raceways: Galvanized steel with snap-on covers. Manufacturer's standard enamel finish in color selected by Architect.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Thomas & Betts Corporation.

b. Walker Systems, Inc.; Wiremold Company (The).

c. Wiremold Company (The); Electrical Sales Division.

B. Surface Nonmetallic Raceways: Two-piece construction, manufactured of rigid PVC with texture and color selected by Owner from manufacturer's standard colors.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Butler Manufacturing Company; Walker Division.

b. Enduro Systems, Inc.; Composite Products Division.

c. Hubbell Incorporated; Wiring Device-Kellems Division.

d. Lamson & Sessions; Carlon Electrical Products.

e. Panduit Corp.

f. Walker Systems, Inc.; Wiremold Company (The).

g. Wiremold Company (The); Electrical Sales Division.

2.5 BOXES, ENCLOSURES, AND CABINETS

A. Sheet Metal Outlet and Device Boxes: NEMA OS 1.

B. Cast-Metal Outlet and Device Boxes: NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.

C. Nonmetallic Outlet and Device Boxes: NEMA OS 2.

D. Metal Floor Boxes: Sheet metal, fully adjustable, rectangular.

E. Nonmetallic Floor Boxes: Nonadjustable, round.

F. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

G. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, cast iron with gasketed cover.

H. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.

1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.

2. Nonmetallic Enclosures: Plastic.

I. Cabinets:

1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.

2. Hinged door in front cover with flush latch and concealed hinge.

3. Key latch to match panelboards.

4. Metal barriers to separate wiring of different systems and voltage.

5. Accessory feet where required for freestanding equipment.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Comply with the following indoor applications, unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: EMT.

2. Exposed, Not Subject to Severe Physical Damage: EMT.

3. Exposed and Subject to Severe Physical Damage: Rigid steel conduit. Includes raceways in the following locations:

   a. Loading dock.

   b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.

   c. Mechanical rooms.

4. Concealed in accessible ceilings: Conduit not required. Support cables with 'J' hooks located a maximum of 3 feet apart.

5. Concealed in Interior Walls and Partitions: EMT.

6. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.

7. Damp or Wet Locations: Rigid steel conduit.

8. Raceways for Optical Fiber or Communications Cable: EMT.

9. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, nonmetallic in damp or wet locations.

B. Minimum Raceway Size: 1/2-inch (16-mm) trade size.

C. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.

2. EMT: Use insulated throat, steel, set screw fittings. Pot metal is not allowed. Compression fittings are not allowed.

3. Use plastic bushings at all metal openings.

3.2 INSTALLATION

A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.

B. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

C. Complete raceway installation before starting conductor installation.

D. Support raceways as specified in Division 26 Section "Hangers and Supports for Electrical Systems."

E. Arrange stub-ups so curved portions of bends are not visible above the finished slab.

F. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.

G. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.

H. Raceways Embedded in Slabs:

1. Run conduit larger than 1-inch (27-mm) trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.

2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.

3. Change from ENT to RNC, Type EPC-40-PVC, rigid steel conduit, or IMC before rising above the floor.

I. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.

J. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire.

K. Raceways for Optical Fiber and Communications Cable: Install as follows:

1. 3/4-Inch (19-mm) Trade Size and Smaller: Install raceways in maximum lengths of 50 feet (15 m).

2. 1-Inch (25-mm) Trade Size and Larger: Install raceways in maximum lengths of 75 feet (23 m).

3. Install with a maximum of two 90-degree bends or equivalent for each length of raceway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.

L. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.

2. Where otherwise required by NFPA 70.

M. Flexible Conduit Connections: Use maximum of 72 inches (1830 mm) of flexible conduit for recessed and semi-recessed lighting fixtures, equipment subject to vibration, noise transmission, or movement; and for transformers and motors. Use a maximum of 8 inches of flexible conduit at cameras, only when EMT cannot run directly into camera housing.

1. Use LFMC in damp or wet locations subject to severe physical damage.

2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.

N. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.

O. Set metal floor boxes level and flush with finished floor surface.

P. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:

1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Division 31 Section "Earth Moving" for pipe less than 6 inches (150 mm) in nominal diameter.

2. Install backfill as specified in Division 31 Section "Earth Moving."

3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches (300 mm) of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Division 31 Section "Earth Moving."

4. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through the floor, unless otherwise indicated. Encase elbows for stub-up ducts throughout the length of the elbow.

5. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor.

   a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches (75 mm) of concrete.

   b. For stub-ups at equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches (1500 mm) from edge of equipment pad or foundation. Install insulated grounding bushings on terminations at equipment.

6. Warning Planks: Bury warning planks approximately 12 inches (300 mm) above direct-buried conduits, placing them 24 inches (600 mm) o.c. Align planks along the width and along the centerline of conduit.

3.4 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping", when included.

END OF SECTION 260533

SECTION 270500

COMMON WORK RESULTS FOR COMMUNICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Sleeves for pathways and cables.

2. Sleeve seals.

3. Grout.

4. Common communications installation requirements.

1.2 SUBMITTALS

A. Product Data: For sleeve seals.

PART 2 - PRODUCTS

2.1 SLEEVES FOR PATHWAYS AND CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

C. Sleeves for Rectangular Openings: Galvanized sheet steel.

1. Minimum Metal Thickness:

a. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and no side more than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).

b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches (1270 mm) and 1 or more sides equal to, or more than, 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

2.2 SLEEVE SEALS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and pathway or cable.

B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Advance Products & Systems, Inc.

b. Calpico, Inc.

c. Metraflex Co.

d. Pipeline Seal and Insulator, Inc.

2. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of pathway or cable.

3. Pressure Plates: Carbon steel. Include two for each sealing element.

4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.3 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR COMMUNICATIONS INSTALLATION

A. Comply with NECA 1.

B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both communications equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

E. Right of Way: Give to piping systems installed at a required slope.

3.2 SLEEVE INSTALLATION FOR COMMUNICATIONS PENETRATIONS

A. Communications penetrations occur when pathways, cables, wireways, or cable trays penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

E. Cut sleeves to length for mounting flush with both surfaces of walls.

F. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level.

G. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pathway or cable, unless indicated otherwise.

H. Seal space outside of sleeves with grout for penetrations of concrete and masonry

1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and pathway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants" when included.

J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pathway and cable penetrations. Install sleeves and seal pathway and cable penetration sleeves with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping" when included.

K. Roof-Penetration Sleeves: Seal penetration of individual pathways and cables with flexible boot-type flashing units applied in coordination with roofing work.

L. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

M. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between pathway or cable and sleeve for installing mechanical sleeve seals.

3.3 SLEEVE-SEAL INSTALLATION

A. Install to seal exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for pathway or cable material and size. Position pathway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pathway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.4 FIRESTOPPING

A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for communications installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping" when included.

END OF SECTION 270500

SECTION 271300

COMMUNICATIONS BACKBONE CABLING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Pathways.

2. UTP cable.

3. Cable connecting hardware, patch panels, and cross-connects.

4. Cabling identification products.

B. Related Sections:

1. Division 28 Section "Conductors and Cables for Electronic Safety and Security" for voice and data cabling associated with system panels and devices.

1.2 BACKBONE CABLING DESCRIPTION

A. Backbone cabling system shall provide interconnections between communications equipment rooms, main terminal space, and entrance facilities in the telecommunications cabling system structure. Cabling system consists of backbone cables, intermediate and main cross-connects, mechanical terminations, and patch cords or jumpers used for backbone-to-backbone cross-connection.

B. Backbone cabling cross-connects may be located in communications equipment rooms or at entrance facilities. Bridged taps and splitters shall not be used as part of backbone cabling.

1.3 PERFORMANCE REQUIREMENTS

A. General Performance: Backbone cabling system shall comply with transmission standards in TIA/EIA-568-B.1, when tested according to test procedures of this standard.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings:

1. System Labeling Schedules: Electronic copy of labeling schedules, in software and format selected by Owner.

2. Cabling administration drawings and printouts.

3. Wiring diagrams to show typical wiring schematics including the following:

a. Cross-connects.

b. Patch panels.

c. Patch cords.

4. Cross-connects and patch panels. Detail mounting assemblies, and show elevations and physical relationship between the installed components.

5. Cable tray layout, showing cable tray route to scale, with relationship between the tray and adjacent structural, electrical, and mechanical elements.

C. Qualification Data: For qualified layout technician, installation supervisor, and field inspector.

D. Source quality-control reports.

E. Field quality-control reports.

F. Maintenance data.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.

1. Layout Responsibility: Preparation of Shop Drawings by an RCDD.

2. Installation Supervision: Installation shall be under the direct supervision of Registered Technician, who shall be present at all times when Work of this Section is performed at Project site.

B. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less.

2. Smoke-Developed Index: 50 or less.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

D. Telecommunications Pathways and Spaces: Comply with TIA/EIA-569-A.

E. Grounding: Comply with ANSI-J-STD-607-A.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Test cables upon receipt at Project site. Test each pair of UTP cable for open and short circuits.

PART 2 - PRODUCTS

2.1 PATHWAYS

A. Cable Support: NRTL labeled for support of Category 6 cabling, designed to prevent degradation of cable performance and pinch points that could damage cable.

1. Support brackets with cable tie slots for fastening cable ties to brackets.

2. Lacing bars, spools, J-hooks, and D-rings.

3. Straps and other devices.

B. Cable Trays:

1. Manufacturers:

a. Cable Management Solutions, Inc.

b. Cablofil Inc.

c. Cooper B-Line, Inc.

d. Cope - Tyco/Allied Tube & Conduit.

e. GS Metals Corp.

2. Cable Tray Material: Metal, suitable for indoors, and protected against corrosion by electroplated zinc galvanizing, complying with ASTM B 633, Type 1, not less than 0.000472 inches (0.012 mm) thick.

a. Basket Cable Trays: Wire mesh spacing shall not exceed 2 by 4 inches (50 by 100 mm).

b. Trough Cable Trays.

c. Ladder Cable Trays.

d. Channel Cable Trays: Slot spacing shall not exceed 4-1/2 inches (115 mm) o.c.

e. Solid-Bottom Cable Trays: One-piece construction. Provide without solid covers.

C. Conduit and Boxes: Comply with requirements in Division 26 Section "Raceway and Boxes for Electrical Systems.

D. Outlet boxes shall be no smaller than 2 inches (50 mm) wide, 3 inches (75 mm) high, and 2-1/2 inches (64 mm) deep.

2.2 BACKBOARDS

A. Backboards: Plywood, [fire-retardant treated,]3/4 by 48 by 96 inches (19 by 1220 by 2440 mm). Comply with requirements in Division 06 Section "Rough Carpentry" for plywood backing panels.

2.3 UTP CABLE HARDWARE

A. Manufacturers:

1. American Technology Systems Industries, Inc.

2. Dynacom Corporation.

3. Hubbell Premise Wiring.

4. KRONE Incorporated.

5. Leviton Voice & Data Division.

6. Molex Premise Networks; a division of Molex, Inc.

7. Nordex/CDT; a subsidiary of Cable Design Technologies.

8. Panduit Corp.

9. Siemon Co. (The).

10. Tyco Electronics/AMP Netconnect; Tyco International Ltd.

B. General Requirements for Cable Connecting Hardware: Comply with TIA/EIA-568-B.2, IDC type, with modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of same category or higher.

C. Connecting Blocks: 110-style IDC for Category 6. Provide blocks for the number of cables terminated on the block, plus 25 percent spare. Integral with connector bodies, including plugs and jacks where indicated.

D. Cross-Connect: Modular array of connecting blocks arranged to terminate building cables and permit interconnection between cables.

1. Number of Terminals per Field: One for each conductor in assigned cables.

E. Patch Panel: Modular panels housing multiple-numbered jack units with IDC-type connectors at each jack for permanent termination of pair groups of installed cables.

1. Number of Jacks per Field: One for each four-pair UTP cable indicated.

F. Jacks and Jack Assemblies: Modular, color-coded, eight-position modular receptacle units with integral IDC-type terminals.

G. Patch Cords: Factory-made, 4-pair cables in 48-inch lengths; terminated with 8-position modular plug at each end.

1. Patch cords shall have bend-relief-compliant boots and color-coded icons to ensure Category 6 performance. Patch cords shall have latch guards to protect against snagging.

2. Patch cords shall have color-coded boots for circuit identification.

2.4 GROUNDING

A. Comply with requirements in Division 26 Section "Grounding and Bonding for Electrical Systems." for grounding conductors and connectors.

B. Comply with ANSI-J-STD-607-A.

2.5 IDENTIFICATION PRODUCTS

A. Comply with TIA/EIA-606-A and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

2.6 SOURCE QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to evaluate cables.

B. Factory test cables on reels according to TIA/EIA-568-B.1.

C. Factory test UTP cables according to TIA/EIA-568-B.2.

D. Cable will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 ENTRANCE FACILITIES

A. Coordinate backbone cabling with the protectors and demarcation point provided by communications service provider.

3.2 WIRING METHODS

A. Wiring Method: Install cables in raceways and cable trays except within consoles, cabinets, desks, and counters, except in accessible ceiling spaces, in attics, and in gypsum board partitions where unenclosed wiring method may be used. Conceal raceway and cables except in unfinished spaces.

1. Install plenum cable in environmental air spaces, including plenum ceilings.

2. Comply with requirements for raceways and boxes specified in Division 26 Section "Raceway and Boxes for Electrical Systems."

B. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.

C. Wiring within Enclosures: Bundle, lace, and train cables within enclosures. Connect to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

3.3 INSTALLATION OF PATHWAYS

A. Cable Trays: Comply with NEMA VE 2 and TIA/EIA-569-A.

B. Comply with requirements for demarcation point, pathways, cabinets, and racks specified in Division 27 Section "Communications Equipment Room Fittings." Drawings indicate general arrangement of pathways and fittings.

C. Comply with TIA/EIA-569-A for pull-box sizing and length of conduit and number of bends between pull points.

D. Comply with requirements in Division 26 Section "Raceway and Boxes for Electrical Systems" for installation of conduits and wireways.

E. Install manufactured conduit sweeps and long-radius elbows whenever possible.

F. Pathway Installation in Communications Equipment Rooms:

1. Position conduit ends adjacent to a corner on backboard where a single piece of plywood is installed, or in the corner of room where multiple sheets of plywood are installed around perimeter walls of room.

2. Install cable trays to route cables if conduits cannot be located in these positions.

3. Secure conduits to backboard when entering room from overhead.

4. Extend conduits 3 inches (76 mm) above finished floor.

5. Install metal conduits with grounding bushings and connect with grounding conductor to grounding system.

G. Backboards: Install backboards with 96-inch (2440-mm) dimension vertical. Butt adjacent sheets tightly, and form smooth gap-free corners and joints.

3.4 INSTALLATION OF CABLES

A. Comply with NECA 1.

B. General Requirements for Cabling:

1. Comply with TIA/EIA-568-B.1.
2. Comply with BICSI ITSIM, Ch. 6, "Cable Termination Practices."
3. Install 110-style IDC termination hardware unless otherwise indicated.
4. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
5. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches (760 mm) and not more than 6 inches (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
6. Install lacing bars to restrain cables, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.
7. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIM, "Cabling Termination Practices" Chapter. Use lacing bars and distribution spools.
8. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
9. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
10. In the communications equipment room, install a 10-foot- (3-m-) long service loop on each end of cable.
11. Pulling Cable: Comply with BICSI ITSIM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.

C. UTP Cable Installation:

1. Comply with TIA/EIA-568-B.2.
2. Do not untwist UTP cables more than 1/2 inch (12 mm) from the point of termination to maintain cable geometry.

D. Open-Cable Installation:

1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
2. Suspend UTP cable not in a wireway or pathway, a minimum of 8 inches (200 mm) above ceilings by cable supports not more than 60 inches (1524 mm) apart.
3. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.

E. Installation of Cable Routed Exposed under Raised Floors:

1. Install plenum-rated cable only.
2. Install cabling after the flooring system has been installed in raised floor areas.
3. Coil cable 6 feet (1800 mm) long not less than 12 inches (300 mm) in diameter below each feed point.

F. Group connecting hardware for cables into separate logical fields.

G. Separation from EMI Sources:

1. Comply with BICSI TDMM and TIA/EIA-569-A recommendations for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.

2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:

   a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches (127 mm).
   b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches (300 mm).
   c. Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches (610 mm).

3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:

   a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches (64 mm).
   b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches (150 mm).
   c. Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches (300 mm).

4. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:

   a. Electrical Equipment Rating Less Than 2 kVA: No requirement.
   b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches (76 mm).
   c. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches (150 mm).

5. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches (1200 mm).

6. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inches (127 mm).

3.5 FIRESTOPPING

A. Comply with requirements in Division 07 Section "Penetration Firestopping."Comply with TIA/EIA-569-A, Annex A, "Firestopping", when included."

B. Comply with BICSI TDMM, "Firestopping Systems" Article.

3.6 GROUNDING

A. Install grounding according to BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter, when indicated.

B. Comply with ANSI-J-STD-607-A.

C. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall allowing at least 2-inch (50-mm) clearance behind the grounding bus bar. Connect grounding bus bar with a minimum No. 4 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.

D. Bond metallic equipment to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.

3.7 IDENTIFICATION

A. Identify system components, wiring, and cabling complying with TIA/EIA-606-A. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

1. Administration Class: 1.
2. Color-code cross-connect fields and apply colors to voice and data service backboards, connections, covers, and labels.

B. Comply with requirements in Division 09 Section "Interior Painting" for painting backboards, when included. For fire-resistant plywood, do not paint over manufacturer's label.

C. See Evaluations for discussion about TIA/EIA standard as it applies to this Section. Paint and label colors for equipment identification shall comply with TIA/EIA-606-A for Class 2 level of administration.

D. Cable Schedule: Install in a prominent location in each equipment room and wiring closet. List incoming and outgoing cables and their designations, origins, and destinations. Protect with rigid frame and clear plastic cover. Furnish an electronic copy of final comprehensive schedules for Project.

E. Cabling Administration Drawings: Show building floor plans with cabling administration-point labeling. Identify labeling convention and show labels for telecommunications closets, backbone pathways and cables, terminal hardware and positions, horizontal cables, work areas and workstation terminal positions, grounding buses and pathways, and equipment grounding conductors.

F. Cable and Wire Identification:

1. Label each cable within 4 inches (100 mm) of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.
2. Each wire connected to building-mounted devices is not required to be numbered at device if color of wire is consistent with associated wire connected and numbered within panel or cabinet.
3. Exposed Cables and Cables in Cable Trays and Wire Troughs: Label each cable at intervals not exceeding 15 feet (4.5 m).
4. Label each terminal strip and screw terminal in each cabinet, rack, or panel.

a. Individually number wiring conductors connected to terminal strips and identify each cable or wiring group being extended from a panel or cabinet to a building-mounted device with name and number of particular device as shown.

b. Label each unit and field within distribution racks and frames.

5. Identification within Connector Fields in Equipment Rooms and Wiring Closets: Label each connector and each discrete unit of cable-terminating and connecting hardware. Where similar jacks and plugs are used for both voice and data communication cabling, use a different color for jacks and plugs of each service.

G. Labels shall be preprinted or computer-printed type with printing area and font color that contrasts with cable jacket color but still complies with requirements in TIA/EIA 606-A, for the following:

1. Cables use flexible vinyl or polyester that flexes as cables are bent.

3.8 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Visually inspect UTP jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with TIA/EIA-568-B.1.

2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.

3. Test UTP copper cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not cross-connection.

a. Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-B.2. Perform tests with a tester that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.

B. Data for each measurement shall be documented. Data for submittals shall be printed in a summary report that is formatted similar to Table 10.1 in BICSI TDMM, or transferred from the instrument to the computer, saved as text files, and printed and submitted.

C. Remove and replace cabling where test results indicate that they do not comply with specified requirements.

D. Prepare test and inspection reports.

END OF SECTION 271300

SECTION 271500

COMMUNICATIONS HORIZONTAL CABLING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Pathways.
2. UTP cabling.
3. Multiuser telecommunications outlet assemblies.
4. Cable connecting hardware, patch panels, and cross-connects.
5. Telecommunications outlet/connectors.
6. Cabling identification products.
7. Cabling administration system

B. Related Sections:

1. Division 27 Section "Communications Backbone Cabling" for voice and data cabling associated with system panels and devices.

1.2 HORIZONTAL CABLING DESCRIPTION

A. Horizontal cable and its connecting hardware provide the means of transporting signals between the telecommunications outlet/connector and the horizontal cross-connect located in the communications equipment room. This cabling and its connecting hardware are called "permanent link," a term that is used in the testing protocols.

1. TIA/EIA-568-B.1 requires that a minimum of two telecommunications outlet/connectors be installed for each work area.
2. Horizontal cabling shall contain no more that one transition point or consolidation point between the horizontal cross-connect and the telecommunications outlet/connector.
3. Bridged taps and splices shall not be installed in the horizontal cabling.

1.3 PERFORMANCE REQUIREMENTS

A. General Performance: Horizontal cabling system shall comply with transmission standards in TIA/EIA-568-B.1, when tested according to test procedures of this standard.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings:

1. System Labeling Schedules: Electronic copy of labeling schedules, in software and format selected by Owner.

2. System Labeling Schedules: Electronic copy of labeling schedules that are part of the cabling and asset identification system of the software.

3. Cabling administration drawings and printouts.

4. Wiring diagrams to show typical wiring schematics, including the following:

   a. Cross-connects.

   b. Patch panels.

   c. Patch cords.

5. Cross-connects and patch panels. Detail mounting assemblies, and show elevations and physical relationship between the installed components.

6. Cable tray layout, showing cable tray route to scale, with relationship between the tray and adjacent structural, electrical, and mechanical elements. Include the following:

C. Samples: For workstation outlets, jacks, jack assemblies, in specified finish, one for each size and outlet configuration and faceplates for color selection and evaluation of technical features.

D. Qualification Data: For Installer, qualified layout technician, installation supervisor, and field inspector.

E. Source quality-control reports.

F. Field quality-control reports.

G. Maintenance data.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.

1. Layout Responsibility: Preparation of Shop Drawings by an RCDD.

2. Installation Supervision: Installation shall be under the direct supervision of Registered Technician, who shall be present at all times when Work of this Section is performed at Project site.

B. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less.

2. Smoke-Developed Index: 50 or less.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

D. Telecommunications Pathways and Spaces: Comply with TIA/EIA-569-A.

E. Grounding: Comply with ANSI-J-STD-607-A.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Test cables upon receipt at Project site. Test each pair of UTP cable for open and short circuits.

PART 2 - PRODUCTS

2.1 PATHWAYS

A. Cable Support: NRTL labeled for support of Category 6 cabling, designed to prevent degradation of cable performance and pinch points that could damage cable.

1. Support brackets with cable tie slots for fastening cable ties to brackets.

2. Lacing bars, spools, J-hooks, and D-rings.

3. Straps and other devices.

2.2 CONSOLIDATION POINTS

A. Manufacturers:

1. American Technology Systems Industries, Inc.

2. Chatsworth Products, Inc.

3. Dynacom Corporation.

4. Hubbell Premise Wiring.

5. Molex Premise Networks; a division of Molex, Inc.

6. Nordex/CDT; a subsidiary of Cable Design Technologies.

7. Ortronics, Inc.

8. Panduit Corp.

9. Siemon Co. (The).

B. Description: Consolidation points shall comply with requirements for cable connecting hardware.

1. Number of Terminals per Field: One for each conductor in assigned cables.

2. Number of Connectors per Field:

a. One for each four-pair UTP cable indicated.

b. One for each four-pair conductor group of indicated cables, plus 25 percent spare positions.

3. Mounting: Recessed in ceiling, Wall, Desk, Furniture.

4. NRTL listed as complying with UL 50 and UL 1863.

5. When installed in plenums used for environmental air, or indicated NRTL listed as complying with UL 2043.

2.3 MULTIUSER TELECOMMUNICATIONS OUTLET ASSEMBLY (MUTOA)

A. Manufacturers:

1. Chatsworth Products, Inc.

2. Hubbell Premise Wiring.

3. Molex Premise Networks; a division of Molex, Inc.

4. Nordex/CDT; a subsidiary of Cable Design Technologies.

5. Ortronics, Inc.

6. Panduit Corp.

7. Siemon Co. (The).

B. Description: MUTOAs shall meet the requirements for cable connecting hardware.

1. Number of Terminals per Field: One for each conductor in assigned cables.

2. Number of Connectors per Field:

a. One for each four-pair UTP cable indicated.

b. One for each four-pair conductor group of indicated cables, plus 25 percent spare positions.

3. Mounting: Recessed in ceiling, Wall, Desk, Furniture.

4. NRTL listed as complying with UL 50 and UL 1863.

5. Label shall include maximum length of work area cords, based on TIA/EIA-568-B.1.

6. When installed in plenums used for environmental air, NRTL listed as complying with UL 2043.

2.4 TELECOMMUNICATIONS OUTLET/CONNECTORS

A. Jacks: 100-ohm, balanced, twisted-pair connector; four-pair, eight-position modular. Comply with TIA/EIA-568-B.1.

B. Workstation Outlets: Two data and one voice-port-connector assemblies mounted in a single faceplate, or per plans.

1. Plastic Faceplate: High-impact plastic. Coordinate color with Division 26 Section "Wiring Devices."

2. For use with snap-in jacks accommodating any combination of UTP work area cords.

3. Legend: Machine printed, in the field, using adhesive-tape label.

2.5 GROUNDING

A. Comply with requirements in Division 26 Section "Grounding and Bonding for Electrical Systems" for grounding conductors and connectors.

B. Comply with ANSI-J-STD-607-A.

2.6 IDENTIFICATION PRODUCTS

A. Comply with TIA/EIA-606-A and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

B. Comply with requirements in Division 26 Section "Identification for Electrical Systems" when included.

2.7 SOURCE QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to evaluate cables.

B. Factory test UTP cables on reels according to TIA/EIA-568-B.1.

C. Factory test UTP cables according to TIA/EIA-568-B.2.

D. Cable will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 ENTRANCE FACILITIES

A. Coordinate backbone cabling with the protectors and demarcation point provided by communications service provider.

3.2 WIRING METHODS

A. Wiring Method: Install cables in raceways and cable trays except within consoles, cabinets, desks, and counters except in accessible ceiling spaces, in attics, and in gypsum board partitions where unenclosed wiring method may be used. Conceal raceway and cables except in unfinished spaces.

1. Install plenum cable in environmental air spaces, including plenum ceilings.

2. Comply with requirements for raceways and boxes specified in Division 26 Section "Raceway and Boxes for Electrical Systems."

B. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.

C. Wiring within Enclosures: Bundle, lace, and train cables to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

3.3 INSTALLATION OF PATHWAYS

A. Cable Trays: Comply with NEMA VE 2 and TIA/EIA-569-A-7.

B. Comply with requirements for demarcation point, pathways, cabinets, and racks specified in Division 27 Section "Communications Equipment Room Fittings." Drawings indicate general arrangement of pathways and fittings.

C. Comply with TIA/EIA-569-A for pull-box sizing and length of conduit and number of bends between pull points.

D. Comply with requirements in Division 26 Section "Raceway and Boxes for Electrical Systems" for installation of conduits and wireways.

E. Install manufactured conduit sweeps and long-radius elbows whenever possible.

F. Pathway Installation in Communications Equipment Rooms:

1. Position conduit ends adjacent to a corner on backboard where a single piece of plywood is installed, or in the corner of room where multiple sheets of plywood are installed around perimeter walls of room.

2. Install cable trays to route cables if conduits cannot be located in these positions.

3. Secure conduits to backboard when entering room from overhead.

4. Extend conduits 3 inches (76 mm) above finished floor.

5. Install metal conduits with grounding bushings and connect with grounding conductor to grounding system.

G. Backboards: Install backboards with 96-inch (2440-mm) dimension vertical. Butt adjacent sheets tightly, and form smooth gap-free corners and joints.

3.4 INSTALLATION OF CABLES

A. Comply with NECA 1.

B. General Requirements for Cabling:

1. Comply with TIA/EIA-568-B.1.

2. Comply with BICSI ITSIM, Ch. 6, "Cable Termination Practices."

3. Install 110-style IDC termination hardware unless otherwise indicated.

4. MUTOA shall not be used as a cross-connect point.

5. Consolidation points may be used only for making a direct connection to telecommunications outlet/connectors:

a. Do not use consolidation point as a cross-connect point, as a patch connection, or for direct connection to workstation equipment.

b. Locate consolidation points for UTP at least 49 feet (15 m) from communications equipment room.

6. Terminate conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.

7. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches (760 mm) and not more than 6 inches (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals.

8. Install lacing bars to restrain cables, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.

9. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIM, "Cabling Termination Practices" Chapter. Install lacing bars and distribution spools.

10. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.

11. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.

12. In the communications equipment room, install a 10-foot- (3-m-) long service loop on each end of cable.

13. Pulling Cable: Comply with BICSI ITSIM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.

C. UTP Cable Installation:

1. Comply with TIA/EIA-568-B.2.

2. Do not untwist UTP cables more than 1/2 inch (12 mm) from the point of termination to maintain cable geometry.

D. Open-Cable Installation:

1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.

2. Suspend UTP cable not in a wireway or pathway a minimum of 8 inches (200 mm) above ceilings by cable supports not more than 60 inches (1524 mm) apart.

3. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.

E. Installation of Cable Routed Exposed under Raised Floors:

1. Install plenum-rated cable only.

2. Install cabling after the flooring system has been installed in raised floor areas.

3. Coil cable 6 feet (1800 mm) long not less than 12 inches (300 mm) in diameter below each feed point.

F. Group connecting hardware for cables into separate logical fields.

G. Separation from EMI Sources:

1. Comply with BICSI TDMM and TIA/EIA-569-A for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.

2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:

   a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches (127 mm).

   b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches (300 mm).

   c. Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches (610 mm).

3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:

   a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches (64 mm).

   b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches (150 mm).

   c. Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches (300 mm).

4. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:

   a. Electrical Equipment Rating Less Than 2 kVA: No requirement.

   b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches (76 mm).

   c. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches (150 mm).

5. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches (1200 mm).

6. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inches (127 mm).

3.5 FIRESTOPPING

A. Comply with requirements in Division 07 Section "Penetration Firestopping", when indicated.

B. Comply with TIA/EIA-569-A, Annex A, "Firestopping."

C. Comply with BICSI TDMM, "Firestopping Systems" Article.

3.6 GROUNDING

A. Install grounding, when indicated, according to BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.

B. Comply with ANSI-J-STD-607-A.

C. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall allowing at least 2-inch (50-mm) clearance behind the grounding bus bar. Connect grounding bus bar with a minimum No. 4 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.

D. Bond metallic equipment to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.

3.7 IDENTIFICATION

A. Identify system components, wiring, and cabling complying with TIA/EIA-606-A. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems", when included.

1. Color-code cross-connect fields. Apply colors to voice and data service backboards, connections, covers, and labels.

B. Comply with requirements in Division 09 Section "Interior Painting", when included. for painting backboards. For fire-resistant plywood, do not paint over manufacturer's label.

C. Paint and label colors for equipment identification shall comply with TIA/EIA-606-A for Class 2 level of administration

D. Cable Schedule: Post in prominent location in each equipment room and wiring closet. List incoming and outgoing cables and their designations, origins, and destinations. Protect with rigid frame and clear plastic cover. Furnish an electronic copy of final comprehensive schedules for Project.

E. Cabling Administration Drawings: Show building floor plans with cabling administration-point labeling. Identify labeling convention and show labels for telecommunications closets, backbone pathways and cables, terminal hardware and positions, horizontal cables, work areas and workstation terminal positions, grounding buses and pathways, and equipment grounding conductors. Follow convention of TIA/EIA-606-A. Furnish electronic record of all drawings, in software and format selected by Owner.

F. Cable and Wire Identification:

1. Label each cable within 4 inches (100 mm) of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.

2. Each wire connected to building-mounted devices is not required to be numbered at device if color of wire is consistent with associated wire connected and numbered within panel or cabinet.

3. Exposed Cables and Cables in Cable Trays and Wire Troughs: Label each cable at intervals not exceeding 15 feet (4.5 m).

4. Label each terminal strip and screw terminal in each cabinet, rack, or panel.

a. Individually number wiring conductors connected to terminal strips, and identify each cable or wiring group being extended from a panel or cabinet to a building-mounted device shall be identified with name and number of particular device as shown.

b. Label each unit and field within distribution racks and frames.

5. Identification within Connector Fields in Equipment Rooms and Wiring Closets: Label each connector and each discrete unit of cable-terminating and connecting hardware. Where similar jacks and plugs are used for both voice and data communication cabling, use a different color for jacks and plugs of each service.

6. Uniquely identify and label work area cables extending from the MUTOA to the work area. These cables may not exceed the length stated on the MUTOA label.

G. Labels shall be preprinted or computer-printed type with printing area and font color that contrasts with cable jacket color but still complies with requirements in TIA/EIA-606-A.

1. Cables use flexible vinyl or polyester that flex as cables are bent.

3.8 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Visually inspect UTP cable jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with TIA/EIA-568-B.1.

2. Visually confirm Category 6e, marking of outlets, cover plates, outlet/connectors, and patch panels.

3. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.

4. Test UTP backbone copper cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not cross-connection.

a. Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-B.2. Perform tests with a tester that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.

5. UTP Performance Tests:

a. Test for each outlet and MUTOA. Perform the following tests according to TIA/EIA-568-B.1 and TIA/EIA-568-B.2:

1) Wire map.

2) Length (physical vs. electrical, and length requirements).

3) Insertion loss.

4) Near-end crosstalk (NEXT) loss.

5) Power sum near-end crosstalk (PSNEXT) loss.

6) Equal-level far-end crosstalk (ELFEXT).

7) Power sum equal-level far-end crosstalk (PSELFEXT).

8) Return loss.

9) Propagation delay.

10) Delay skew.

6. Final Verification Tests: Perform verification tests for UTP systems after the complete communications cabling and workstation outlet/connectors are installed.

a. Voice Tests: These tests assume that dial tone service has been installed. Connect to the network interface device at the demarcation point. Go off-hook and listen and receive a dial tone. If a test number is available, make and receive a local, long distance, and digital subscription line telephone call.

b. Data Tests: These tests assume the Information Technology Staff has a network installed and is available to assist with testing. Connect to the network interface device at the demarcation point. Log onto the network to ensure proper connection to the network.

B. Document data for each measurement. Data for submittals shall be printed in a summary report that is formatted similar to Table 10.1 in BICSI TDMM, or transferred from the instrument to the computer, saved as text files, and printed and submitted.

C. Prepare test and inspection reports.

3.9 DEMONSTRATION

A. Train Owner's maintenance personnel in cable-plant management operations, including changing signal pathways for different workstations, rerouting signals in failed cables, and keeping records of cabling assignments and revisions when extending wiring to establish new workstation outlets.

END OF SECTION 271500

SECTION 282300

SECURITY SYSTEM

PART 1 - GENERAL

1.1 GENERAL

A. This Request for Proposal (RFP) includes Contract Documents such as Bid Instructions, Drawings/Plans, a Specification and other supporting bid information developed by William M. Davies Technical High School to procure and install a Video Assessment and Recording System for the William M. Davies Technical High School facilities located at 50 Jenckes Hill Road, Lincoln, RI.

B. The following general definitions shall apply:

1. The Security Management System (SMS) shall consist of a Closed Circuit Television (CCTV) system.

2. The Owner is William M. Davies Technical High School (Owner).

3. The Owner's Engineering Technical Representative is United Security Solutions - CCRS.

4. The Contractor is the firm selected by the Owner to provide a fully functioning SMS and CCTV system as outlined in this RFP and supporting documents. The Contractor shall supply all equipment, labor, material and services necessary to complete the project construction in accordance with the Contract Documents.

C. In cases where the term "provide" is used throughout this Specification and associated Contract Documents, it shall mean "furnish, install and service".

D. The Contractor shall indemnify and hold harmless, to the fullest extent of the law, the Owner, the Engineer, United Security Solutions, CCRS, and other agents and employees from and against any claims, damages, losses and expenses arising from these Specifications and associated Contract Documents.

E. The Contractor shall consider these plans and specifications as containing confidential information of the Owner. The Contractor shall ensure that these plans and specifications are kept secure at all times and not copied for any reason unless authorized by the Owner and Engineer. The Contractor shall restrict disclosure of specific SMS design information to any other duly assigned and authorized subcontractor personnel who require such disclosure to perform their work under this Contract. All Contractor submittals including any drawings shall be marked "Confidential" in the top and bottom of the page and all subsequent pages should have the restriction appearing as footer at the bottom of the page. The outside back cover of the submission should also contain the "Confidential" header and footer.

F. The Contractor shall survey the site and facilities during the Contractor walkthrough to determine system interfacing requirements. During the walkthrough, the Contractor shall inspect the site and survey the conditions to be encountered during performance of the work. This shall be accomplished prior to submitting a bid. Failure of the Contractor to become familiar with the site conditions shall not relieve the Contractor of responsibility for full completion of the work in accordance with the contract provisions.

1.2 GENERAL BID INSTRUCTIONS

A. Qualified Bidder/ Contractor shall submit bids in accordance with the instructions set forth below in addition to any specific bid instructions provided separately by the Owner.

B. Contractor bid submissions shall include the procurement, installation and services of a video surveillance and recording system for the William M. Davies Technical High School.

C. All submitted proposals must comply with these instructions and specifications in order to be considered valid bids.

D. Bidders are required to complete all bid forms in the format specified. Should the format conflict with the bidder's normal format for responding to bids, the Contractor may provide his bid on his own format only as a supplement to the required bid forms specified and provided herein.

E. All questions or inquiries regarding this bid, to include all Contract Documents, Specification requirements and Bid Document preparation instructions and formats, shall be submitted in writing via facsimile or email at least 7 days prior to the bid due date, or as specified in the Owner's specifications.

F. The Owner will evaluate and respond to all reasonable bid questions within forty-eight (48) hours and provide a complete reply to specific bidder's question(s) with a copy to all prospective bidders whose names are on the Bidders List.

G. In response to this RFP, facsimile or email responses or partial responses are not permitted. Bidders transmitting any or all of their proposal responses via facsimile or email shall be considered non-responsive and their bid rejected. Proposals delivered after the established deadline indicated above will be discarded unopened.

H. The Owner reserves the right to reject any or all proposals, or any part thereof, or to accept any proposal, or any part thereof, or to withhold the award and to waive or decline to waive irregularities in any proposal when it determines that it is in their best interest to do so.

I. The Owner reserves the right to hold all proposals for 90 days after the bid opening date and the right to accept a proposal not withdrawn before the scheduled opening time and date.

J. In order to be considered for selection, qualified Bidders must submit a complete response to this RFP. Four (4) copies of each proposal must be submitted separately to the Owner.

1.3 BIDDER REQUIREMENTS/QUALIFICATIONS

A. Bidder must be fully licensed to work within the state of Rhode Island for all work to be preformed.

B. Bidder must comply with all worker licensing regulations including apprentice to licensed worker requirements.

1.4 BID/PROPOSAL PREPARATION AND SUBMISSION REQUIREMENTS

A. Bidders who do not completely respond to all RFP requirements and/or whose bid response is in any way considered incomplete or unresponsive to Contract Document requirements shall be subject to rejection of their complete bid without cause at the discretion of the Owner.

B. There may arise during the bid process a situation where the plans and specifications do not completely agree or coincide with respect to quality, quantities, and costs with other supporting Contract Documents. In the event such a discrepancy exists, the Bidder shall notify the Owner/Engineer and select the item presenting the higher quality, greater quantity and/or higher cost unless specifically directed by the Owner in writing prior to the bid submission date.

C. Proposals in response to this RFP shall be prepared simply and economically yet remain completely and totally responsive to the RFP requirements. Each copy of the Bidder's proposal

should be bound or contained in a single volume. Include all supporting documentation or technical literature.

D. Contractor proposals, to include the firm fixed price or other bid, shall be signed by an authorized company representative at the company officer level. Failure to submit all information required by this RFP may result in the Owner requiring prompt submission of missing information and/or determining at the Owner's discretion a lowered evaluation of the proposal. Proposals which are substantially incomplete or lack key information may be rejected outright by the Owner.

E. Selected Bidders who submit a proposal in response to this RFP may be requested to give an oral presentation and/or interview describing further details.

F. Contractors may submit alternate bids with the expressed purpose of increasing system functionality and efficiency or reducing costs while maintaining required specification functionality. Alternates will be considered by the Owner only if they are submitted separately as an alternate bid with specific references to the Bidder's main bid. All alternate bids are to be separate from the main SMS bid, appended to the bidder's response and labeled as alternate bids, with a full and detailed explanation of the alternate bid. All alternate bids shall be explained in terms of the Contractor's expected increased efficiency, functionality and/or reduced costs versus the main Bid. The Owner reserves the right to accept any alternative proposal presenting clear advantages to the Owner.

G. Bidders shall also submit the following additional information with their Bid to the Owner:

1. Manufacturers' cut sheets and functional descriptive literature for all functional CCTV/ Security System equipment items specified and included in the Bidder's equipment spreadsheet. This includes any equipment the Bidder is proposing that is not listed in the equipment spreadsheet and any alternate proposal equipment.

2. Proposed Bidder Maintenance and Service Agreement details and costs for years two through five along with a Sample Contract describing the Contractor's proposed scope of Maintenance and Services to be provided to the Owner after the SMS warranty period has expired. Specifically delineate in the Sample Contract both during and after hours labor rates and provide a description of the various service levels available to the Owner.

3. A narrative outline of the Contractor's approach to Preventive Maintenance and expected cost for implementing a Preventive Maintenance Program as proposed by the Bidder.

4. Use the following breakdown to include bid Maintenance and Service contract costs on an annual basis from time of total system acceptance by the Owner:

    a. First Year: No cost, Under Warranty

    b. Second Year: $ (NOTE: Panasonic Equipment replacement will be at no cost, Under Warranty)

    c. Third Year: $

    d. Fourth Year: $

    e. Fifth Year: $

H. Specifically identify in the bid response the name and qualifications of the Bidder's Project Manager assigned to this project, the name of the person to whom Contractor's on-site technical installation personnel will report and the name of the Contractor's senior technical representative to be assigned to this project.

I. Provide itemized list of the equipment and materials offered by the Bidder and their associated material and installation costs on the spreadsheet format provided as bid forms with the Contract Documents.

J. Bidders shall provide a firm fixed price for the complete installation, commissioning and training of the CCTV system in accordance with these Contract Documents. Two major spreadsheet formats are provided for Bidder use in preparing their proposal; the itemized equipment list and the major cost summary located in appendix A and B

K. The completed spreadsheets will be used by the Owner as one of many Contractor evaluation criteria leading to the subsequent negotiation and/or award of a firm fixed price. The unit prices and labor rates included in the Bidders' proposal and reflected on the spreadsheets shall be used for all additions, deductions and alterations to the original contract for the proposed period of the contract. These same spreadsheet unit prices and labor rates will be used for additional purchases by the Owner from the Contractor for a period of two (2) years from the date of final acceptance of the SMS base bid system.

L. Separate spreadsheets shall be used by the Bidder to present any and all alternate bids. For alternative bids; as indicated in Part 2.00, Panasonic is the only manufacture that will be considered for the following system components; Cameras, Network Video Recorder, and the system management software.

1.5 EVALUATION AND AWARD CRITERIA

A. EVALUATION CRITERIA:

1. Contractor's Experience

a. Company
1) Number of years providing CCTV/ Security System /ACS Systems specified
2) Financial stability/history
3) Sufficient number of employees trained and licensed
4) Demonstrated ability to offer a cost-effective solution

b. Staff proposed for completion of project within said timeline

1) Number of staff and designated Project Manager for the duration of the project
2) Experience of staff. Provide resumes for the following
3) Project Manager
4) Account Manager
5) Chief Technician

c. Capability & Skill -- In providing similar CCTV/ Security Systems at other similar locations and to other like accounts in the State of Rhode Island.

2. Contractor References:

a. List the names of three other companies or institutions of similar size and project scope (and points of contact along with current telephone number) where Contractor has provided or is providing similar SMS services.

3. Technical Responsiveness

a. Degree to which the Contractor has demonstrated their CCTV/ Security System’s functionality, capability and flexibility to meet the Owner’s needs.
b. Degree to which the Contractor submitted the required RFP technical information to support bid

c. Bidder's technical installation approach and flexibility in providing required installation, maintenance services and systems to meet the Owner's needs.

4. Cost:
   a. Equipment costs, including labor, for the equipment and systems indicated on the spreadsheets are reasonable.
   b. Annual Maintenance and Preventive Maintenance Service costs (separately) to include parts, labor and upgrades to hardware/software based on yearly costs as outlined in 1.04.G.
   c. Training costs.

B. AWARD CRITERIA: Selection shall be made on the determination that a single Contractor/Bidder is deemed to be fully qualified and best suited among those submitting bids on the basis of the evaluation factors included in the RFP. The evaluation of responses will be based on evidence of:
1. The Contractors Experience (25%)
2. Contactors References (10%)
3. Technical Response (25%)
4. Understanding of the project, the ability to perform the service expeditiously as reflected by current workload and availability of an adequate number of personnel (10%)
5. Cost (30%).

The results shall be determining factor of the best proposal, and shall award the contract to that Contractor.

1.6 REFERENCES AND CODE REQUIREMENTS

A. The video assessment and recording system shall be installed in accordance with all applicable national, state, and local codes and standards, including, but not limited to the most current issue of the following publications, including all amendments thereto of the issue that is current on the date of the contract award. Where conflicts exist between the Contract Documents and the referenced publications, local codes shall govern. All equipment shall be U.L. listed or meet U.L. requirements for its intended use. Applicable requirements of the following publications shall apply to the work under this specification as if fully written herein.

1. Institute of Electrical and Electronic Engineers (IEEE)

2. National Fire Protection Association (NFPA 70-2011NEC)

3. National Fire Protection Association Life Safety Code (NFPA 101)

4. Building Officials & Code Administrators International, Inc. (BOCA) National

5. Building Code or the International Building Code (IBC) and all applicable amendments, errata, and modifications by the local entity

6. Americans with Disabilities Act (ADA)

7. Underwriters Laboratories (UL) Applicable Standards for Safety

8. Underwriters Laboratories (UL) Applicable Standards for Proprietary Security

B. Systems

1. National, State, and Municipal Building Codes and all other Authorities having Jurisdiction

2. The CCTV/ Security Systems equipment and its installation shall comply with all local codes and authorities having jurisdiction in Lincoln, RI

AWARD CRITERIA SCORE CARD

Name:			Date:
AWARD CRITERIA	**SCORE**	**ENTER SCORE (1- 30) BELOW**	**COMMENTS**
Contractors Experience	**1 - 25**		
Contactors References	**1 - 10**		
Technical Response And Understanding Of The Project	**1 - 25**		
Understanding of The Project, the ability to perform the service expeditiously as reflected by current workload and availability of an adequate number of personnel	**1 - 10**		
Total Project Cost	**1 - 30**		
TOTAL SCORE	**>>>>>>**		

ADDITIONAL COMMENTS:

_____

_____

_____

_____

_____

_____

_____

3. When applicable, the Contractor shall submit a letter to the Owner prior to final system acceptance, either signed by the agency having jurisdiction or indicating the installed SMS has been inspected and approved by the agency having jurisdiction with a specific reference to the date of the inspection and those present.

1.7 SCOPE OF WORK

A. The Contractor will act as the prime contractor to the Owner.

B. The scope of this project is to provide all labor, oversight, equipment, materials and services to procure, install, commission, train staff, and service the entire SMS for the William M. Davies Technical High School CCTV project.

C. The Contractor shall be responsible for the electrical wiring for this project, and will provide all line voltage (120-240vac) required for all SMS equipment including wall mounted enclosures and free standing equipment racks, based on the contract drawings and this specification.

D. The Contractor shall be responsible for installing all low voltage cabling associated with the SMS system based on the contract drawings and this specification. The Contractor shall be responsible for providing all surface metal raceways, junction boxes, and conduits necessary to support the cabling and termination of the SMS cable and devices.

E. The Contractor shall be responsible for the installation of wall mounted enclosure(s) and wall mounted equipment rack(s). The Contractor shall furnish the wall mounted enclosure(s) and wall mounted equipment rack(s).

F. The CCTV/ Security Systems offered and installed by the Contractor shall consist of terminating security devices such CCTV cameras and associated equipment in accordance with the contract drawings and this specification.

G. The Contractor shall provide and install client workstations, CCTV recording and viewing equipment and a variety of peripheral devices and communications support devices as required for the project to provide a complete and functional system per the drawings, contract documents and the equipment list provided in section 2:03.

H. The Contractor shall coordinate all network requirements and connections with the telecommunications vendor and a representative of the William M. Davies Technical High School IT department. No devices shall be connected to the Davies network without prior approval.

I. The scope of work is detailed in the Contract Drawings and Contract Documents. The scope includes but shall not be limited to the following:

1. Installation of CCTV cameras to provide comprehensive coverage of the noted areas within the contract drawings. Coordinate the exact location, mounting method, mounting height, area to be covered by, and aiming of each camera with the owner’s representative.

2. Remove current Networked Video Recording (NVR) system/ software

3. Remove current Server unit

4. Replace all Netgear Switches.

5. Installation of the Surveillance Control and Management Systems.

6. Installation of Networked Disk Recorder(s)

7. Integrate current CCTV system to new Networked Video Recorder(s)

J. All cables must be marked with the appropriate cable number based on the Device Schedule included with these contract drawings, within six (6) inches of each end of the cable.

K. Where installed in panels or equipment racks and bundled into harnesses and/or installed within raceways, individual cables terminated at one location only must also be marked inside the room of its eventual termination in addition to other requirements in this specification.

L. All cable marking shall be installed to remain in place after the installation is complete. Cable marking systems shall be of a pre-printed label. No hand written cable markings shall be used for cable identification.

M. The bid sheet appended to this specification contains twenty-six line items for video equipment. The line items that constitute the base bid for this project are identified in the spreadsheet "DAVIES TECHNICAL HIGH SCHOOL CCTV ITEMIZED EQUIPMENT LIST". As part of the bid response, the contractor shall provide pricing for procurement and installation of these line items.

N. The contactor shall include pricing for the procurement and installation of the individual video cameras, associated wiring, conduit, POE extender (AS NEEDED) and other communication equipment. These items are designated by letters I through S on the bid sheet spreadsheet "DAVIES TECHNICAL HIGH SCHOOL CCTV ITEMIZED EQUIPMENT LIST".

O. As an ADD to the base bid the contactor shall include pricing for the procurement and installation of any item not listed in the bid sheet needed to produce a complete working Security System

Device Number	**Location Description**
1	Hall near Administration and Health (view: exit)
2	Near Health office (view: front hall toward lobby and bathrooms)
3	Front hall (view: hall and bathrooms)
4	Hall near office (view: hall and exit)
5	Lunch line
6	Cafetorium
7	Cafetorium
8	Cafetorium
9	Cafetorium
10	Rear hall (view: hall and stairwell)
11	Stairwell (view: up and down)
12	Under stairwell (view: stairs and exit)
13	Front hall near lobby area
14	Lobby area
15	Lobby area
16	First level tunnel (view: hall and exit)

17	Locker area (wall of room 122)
18	Ramp Area (wall of room 122)
19	Motorola Center (view: bathrooms)
20	Common Area (view: hall toward ramp area)
21	Wall of bathrooms (view: hall and rear exit)
22	Back stairwell lower level
23	Top of Ramp (view: down ramp)
24	Ramp area near Guidance (focused at exit and guidance)
25	Stairwell behind Guidance
26	Hall room 229
27	Top of ramp (opposite room 226)
28	Hall room 223 (view: toward elevator area and hall)
29	Opposite room 221 (view: upper level tunnel)
30	Room 221 (view: stairwell)
31	Room 220 (view: hall toward reading lab)
32	Upper level tunnel
33	Room 218
34	Room 208 (view: toward room 218)
35	Room 208 (view: hall and bathrooms)
36	Room 205 (Common area)
37	Stairwell (Lobby area)
38	Stairwell (near room 202 - view: down toward exit)
39	Weight room area (view: hall toward locker rooms)
40	Exit (near coaches office)
41	Gym area - Hall (Men’s Locker Room)
42	Gym area – Hall (Women’s Locker Room)
43	Gymnasium Area main exit
44	Exterior camera (ramp near gym and field area)
45	Hall behind Gymnasium
46	Mounted on wall between gym and bathrooms (view: exit area)
47	Wall opposite room 013 (view: toward bathrooms)
48	Room 013
49	Room 018 (view: exit)
50	Hall (near machine room)

51	Receiving area
52	Opposite room 005
53	Exit near Library
54	Wall opposite library (view: library entrance)
55	Opposite room 006 (view: hall toward receiving area)
56	Ramp (lower level toward receiving area)
57	Ramp (lower level toward library area)
58	Ramp (lower level toward Gym area)
59	Teachers Lounge (modular building – view: hall and bathrooms)
60	Teachers Lounge (modular building – view: main exit)

1.8 DESIGN REQUIREMENTS

A. The CCTV/ Security System shall be provided with capacities that will allow for future addition of all components included in this specification, as well as software upgrades.

1.9 SUBMITTALS

A. The Contractor shall prepare and submit acceptable catalogue sheets for all equipment for the CCTV/ Security System, as specified below. The Contractor shall bear all liability and penalties for damages arising from his failure to submit equipment that meets these Specifications.

B. All submittals including any drawings shall be marked “Confidential” in the top and bottom of the page and all subsequent pages should have the restriction appearing as footer at the bottom of the page. The outside back cover of the submission should also contain the “Confidential” header and footer.

C. At the time of the bid, the Contractor shall submit the following material:

1. Using the recommended SMS Base Bid Spread Sheet and SMS Major Cost Summary formats, provide a Base Bid and complete Proposal per the enclosed proposal instructions for the Davies facility on a firm fixed price system installation and complete system turnover basis.

2. A description of the proposed SMS system operation, to include any and all departures (exceptions, variances or substitutions) listed at the time of the Base Bid. Failure to submit a description of system operations and any departures from these Specifications at the time of the Base Bid shall be cause for summary rejection of the submittal documents at the discretion of the Owner.

3. Printed data/cut sheets providing product descriptions of the preliminary equipment intended to be installed, and any special installation procedures to be used for the SMS to satisfy the requirements of this specification. Sheets shall be printed in color and double sided for each individual product submitted. Product sheets shall be bound in a three ring binder and arranged as the products appear in Section 2.00 of this specification.

4. A list of recommended spare equipment for the SMS with unit prices.

5. A detailed proposed schedule of installation milestones, man loading charts, events, testing and commissioning and turnover for approval by the Owner.

6. The Contractor shall provide any special mounting details for power supplies as needed.

7. Provide the required Vendor Quality Assurance information specified below.

8. Any additional information as required by other sections of this specification.

D. After bid award, the Contractor shall submit 3 copies of the following materials for review and approval:

1. Prepare and submit complete Shop Drawings in the manner described herein. Shop Drawings shall include all necessary wiring diagrams and connectivity points of all equipment. Shop drawings shall be required of all SMS devices including all peripheral alarm devices, access control devices, magnetic door contacts, electric mortise locks, power supplies, intercoms and request to exit devices and related equipment.

2. The Contractor shall provide a Wiring Schedule as part of Shop Drawings showing the individual SMS device type, wiring type, and device location of all interior and exterior SMS devices.

3. Printed data/cut sheets providing product descriptions of the final equipment selected to be installed and any special installation procedures to be used for the CCTV/ Security System to satisfy the requirements of this specification. Sheets shall be printed in color and double sided for each individual product submitted. Product sheets shall be bound in a three ring binder and arranged as the product appears in Part 2.00 of this specification.

4. The contractor shall supply comprehensive “record drawings” in standard CAD format (.DWG) and digital pictures of the security system. The “record drawings” shall include the specific location of all components, wiring diagrams, and schematics to allow for the understanding and troubleshooting of the system. The digital pictures should comprehensively represent both the Davies facility and the security system. The Engineer will provide a basic architectural floor plan in CAD for the Contractor’s use.

5. Shop Drawings shall also include an SMS System Description and Analysis. The data package shall include system descriptions. Descriptions and calculations shall show how the equipment will operate as a system to meet the performance of this specification. The data package shall include the following:

   a. Description of site equipment and its configuration

   b. Operating protocol description

   c. Start up operations

   d. System expansion capability and method of implementation

   e. System power requirements and UPS sizing

6. Provide complete copies of manufacturer’s operating equipment manuals, diagrams and other data to the Owner’s Representative for the operation and maintenance of this equipment.

7. Accurate information, in the form of a spreadsheet, regarding the total consumed wattage and BTU requirements shall be provided for all equipment located in each of the SMS equipment locations where line voltage power is to be supplied to CCTV/ Security

System equipment.

8. Any additional information as required by other sections of this specification.

1.10 SAMPLES

A. Submit samples of all CCTV/ Security System materials as requested by the Owner's Project Manager.

B. If and when requested, submit samples of any specific CCTV/ Security System devices to the Owner's Project Manager for approval. Samples might include motion detectors, cameras, communications devices and other similar CCTV/ Security System equipment. In cases of alternative bids, submit samples of all equipment items.

1.11 RECORD DRAWINGS

A. The Contractor shall furnish and keep on the job at all times, one (1) complete separate set of red-line drawings, elementary diagrams and wiring diagrams of the SMS on which shall be clearly, neatly and accurately noted, promptly as the work progresses, all architectural and electrical/electronic changes, revisions and additions to the work. Wherever work is installed otherwise than as shown on the Contract Drawings, such changes shall be noted.

B. Indicate daily progress on these prints by coloring in various devices as they are installed, wired and initially tested.

C. No approval of requisition for work installed will be given unless supported by record prints as required above.

D. At the conclusion of the work, prepare Record Drawings in accordance with the Contract requirements.

1.12 COOPERATION AND COORDINATION WITH OTHER TRADES

A. The work shall be so performed such that the Contractor shall coordinate with all other trades to ensure no delays and that the work of other contractors is not interfered with.

B. Materials and apparatus shall be installed as fast as conditions of the building will permit and must be installed promptly when and as directed.

C. The SMS shall be furnished and installed by a company that is a qualified security systems integrator. The Contractor shall be responsible for properly preparing the project for installation.

D. Contractor shall be responsible for providing, installing, programming, troubleshooting, training and warranty service of all security systems devices and cabling, terminal equipment, control and display equipment specified in this section for a completely operational system.

1.13 OPERATING INSTRUCTIONS AND MAINTENANCE MANUALS

A. Furnish operating and maintenance (O&M) manuals in accordance with General Conditions and forward them to the Owner's Project Manager prior to CCTV/ Security System test and evaluation. These manuals shall be bound.

B. Furnish a draft copy of the operation and maintenance manuals which shall be delivered to the Owner's Project Manager prior to beginning the performance verification test for use during site testing.

C. The Contractor shall enter and program all SMS data needed to make the system operational.

Deliver the data to the Owner's Project Manager on data entry forms, utilizing data from the contract documents and all pertinent information in the Contractor's possession required for complete installation of the database. The Contractor shall identify to the Owner's Project Manager any additional data needed to provide a complete and operational CCTV/ Security System.

D. Two copies of the system manuals shall be provided. Manuals shall be bound in hardback, loose-leaf binders. The draft copy used during site testing shall be updated with any changes required prior to final delivery of the manuals. Each manual's contents shall be identified on the cover. The manuals shall have a table of contents and tab sheets. Tab sheets shall be placed at the beginning of each chapter or section and at the beginning of each appendix. The final copies delivered after completion of the endurance test shall include all modifications made during installation, checkout, and acceptance.

E. The operating instructions shall be specific for each system and shall include copies of posted specific instructions.

F. For maintenance purposes, provide shop drawings, parts lists, specifications and manufacturer's bulletins for each piece of SMS equipment.

G. In addition to other sections of this specification, O&M manuals, shop drawings, parts list and equipment specifications shall be provided to the Owner's Project Manager in digital format

H. Documentation shall be arranged on the soft media in folders by CCTV/ Security System/ subsystem.

1.14 WORKMANSHIP

A. It is the intent of this Specification to provide for the system equipment and installation of the SMS that complies in all respects with the requirements of all applicable codes and standards. Equipment, material, installation practices, etc. that do not meet requirements or do not meet the performance standards herein specified shall not be acceptable.

B. The entire work provided by the Contractor shall be constructed and finished in every respect in a workmanlike and substantial manner. It is not intended that the contract drawings shall show every installation support device, pipe, fitting or fixture associated with installation and operation. The Contractor shall furnish and install all parts as may be necessary to complete the SMS in accordance with the best trade practice and to the satisfaction of the Owner's Project Manager.

C. The Contractor shall keep other contractors fully informed as to shape, size and position of all openings required for his equipment and shall give full information to the other subcontractors sufficiently in advance of the work so that all openings may be built in advance.

D. In the case of failure on the part of the Contractor to give proper notice and timely information as noted above, the Contractor shall do his own cutting and patching or have the same done by another subcontractor, but in any case, without expense to the Owner and only upon prior approval of the Project Manager and/or Owner.

E. The Contractor shall obtain detailed information from the manufacturers of the CCTV/ Security System equipment on the proper method of installation and connecting same. He shall also obtain all information from the other subcontractors which may be necessary to facilitate his work and the completion of the whole project.

F. Remove all rubbish and debris and all refuse from workmen's lunches daily from the site, and, at completion, remove all surplus materials and temporary works, and leave all work in clean condition, acceptable to the Owner.

1.15 APPROVED EQUAL

A. Approved equal shall mean that the use of all materials shall be submitted to the Owner's Project Manager for approval, and that such approval shall be at the sole discretion of the Owner.

B. The term "submit for approval" or similar expressions shall mean that work shall be contingent upon the specific approval of shop drawings, etc., by the Owner in writing.

1.16 MAINTENANCE AND SERVICE

A. The Contractor shall provide all services required and equipment necessary to maintain the entire SMS in an operational state as specified for a period of 1 year after formal written acceptance of the system, and shall provide all necessary material required for performing scheduled adjustments or other nonscheduled work.

B. The adjustment and repair of the SMS includes all computer equipment, software updates, communications transmission equipment, local processors, facility interface, and support equipment. Responsibility shall be limited to Contractor installed equipment.

C. Provide the manufacturer's required adjustments and other work as necessary.

D. Contractor's service personnel shall be qualified to accomplish all work promptly and satisfactorily. The Owner shall be advised in writing of the name of the designated service representative, and of any change in personnel.

E. The Owner will initiate service calls when the SMS is not functioning properly. Qualified personnel shall be available to provide service to the complete SMS. The Owner shall be furnished with a telephone number where the service supervisor can be reached at all times. Service personnel shall be at the site within twenty four (24) hours after receiving a request for service. The SMS shall be restored to proper operating condition within one (1) calendar day after receiving a request for service. The contractor shall initiate all service and repair within four (4) hours from receipt of a report of a system malfunction.

F. Performance of scheduled adjustments and repair shall include verification of operation of the SMS as demonstrated by the applicable tests of the performance verification test.

G. The Contractor shall keep records and logs of each task, and shall organize cumulative records for each major component and for the complete system chronologically. A continuous log shall be maintained for all devices. The log shall contain calibration, repair, and programming data. Complete logs shall be kept and shall be available for inspection on site, demonstrating that planned and systematic adjustments and repairs have been accomplished for the CCTV/ Security System.

H. The Contractor shall separately record each service call request, as received. The form shall include the serial number identifying the component involved, its location, date and time the call was received, nature of trouble, names of the service personnel assigned to the task, instructions describing what has to be done, the amount and nature of the materials to be used, the time and date work started, and the time and date of completion. The Contractor shall deliver a record of the work performed within 5 days after work is accomplished.

I. The Contractor shall make recommendations for system modification in writing to the Owner. No system modifications, including operating parameters and control settings, shall be made without prior approval of the Owner. Modifications made to the systems shall be incorporated into the operations and maintenance manuals, and other documentation affected.

J. The Contractor shall provide software updates automatically the first warranty year and upon approval of the Owner in subsequent years based upon an extended service agreement. These

updates shall be accomplished in a timely manner, fully coordinated with the Owner, and shall be incorporated into the operations and maintenance manuals, and software documentation. There shall be at least one scheduled update near the end of the first year's warranty period, at which time the Contractor shall install and validate the latest released version of the manufacturer's software.

1.17 QUALITY ASSURANCE

A. The Contractor shall establish and maintain a quality assurance (QA) program and specific procedures which provide documented evidence of system compliance and ensures that all security related and manufactured components and SMS installation meet or exceed all contract requirements. All Contractor inspections and tests, which are conducted under this quality assurance program, shall be subject to review by the Owner.

B. The Contractor shall be experienced in the operations they are engaged to perform.

C. The SMS shall be provided/ installed by a single firm/company (Contractor) that is a qualified security systems integrator. The Contractor shall have local in-house engineering and project management capabilities consistent with the requirements of the project.

D. The Contractor must customarily furnish the size, scope and nature of this section in its entirety with labor consisting of employees who are on their payroll and are authorized, certified, experienced and qualified to provide, install, program, troubleshoot, train, warrant and service this section in its entirety.

E. With his proposal the Contractor hereby certifies that it is qualified in all areas pertaining to, either directly or indirectly, the project scope of work. In the event the Contractor becomes unable to complete the project or any portion thereof in accordance with the Contract Documents or to the satisfaction of the Owner’s Project Manager or its representatives, due to a lack of understanding of equipment, systems, requirements or services required by the Contract Documents, it shall be the responsibility of the Contractor to retain the services of the applicable manufacturer's representatives to expeditiously complete the project in accordance with the agreed upon and submitted construction schedule with no additional cost to the Owner.

F. The Contractor shall provide factory certified technicians to install, troubleshoot commission and maintain the CCTV/ Security System specified herein.

G. Provide at the time of the installation the latest version, unless specified otherwise, of all equipment and software. Discontinued equipment will not be accepted and shall not be installed by the Contractor.

H. All exterior devices shall be sealed and protected against all weather conditions including heat, cold, moisture, dust and sand.

1.18 WARRANTY

A. The Contractor shall warrant to the Owner that it is the owner of the equipment and that the equipment will be free and clear of any lien or encumbrance on the final acceptance date. The Contractor shall further warrant for a period of two (2) year from the final acceptance date agreed by the Owner that all security equipment and labor provided in the complete SMS system will, under normal use and service, be free from defects and faulty workmanship.

B. The Contractor's obligation under this warranty is to repair or replace defective equipment, parts, and associated labor thereto at the Contractor's expense. The Contractor shall warrant that replacement or repaired equipment furnished hereunder and labor shall be in accordance with current industry standards.

C. The foregoing warranty does not extend to the equipment or any part thereof which has been subjected by the Owner to unauthorized modification, movement, misuse, neglect, or accident, faulty installation, maintenance, or repairs performed by the Owner or a third party. This applies to SMS equipment used in violation of instructions furnished by Contractor as well as removal, defacement, or alteration of the date of manufacture or manufacturer's serial number. This includes increased or additional warranty service requirements for the equipment resulting from Owner's connection of devices, which are incompatible with the equipment, or to any other external cause not attributable to defects in material or workmanship on the part of Contractor.

D. The Owner is granted a nontransferable fully paid license to use all software furnished by the Contractor as part of the security equipment under terms established by the software manufacturer. The Owner will be provided with a copy of all applicable licenses. The Contractor shall warrant that it has the right to grant such licenses.

E. A copy of the Contractor's standard warranty agreement must be provided.

F. For the purpose of this contract, failures are defined as follows:

1. Complete failure of the components controlling the system security equipment or interfacing with existing equipment.

2. Complete or partial failure of the panel(s) or workstation(s), resulting in the loss of monitoring or reporting capability.

3. Complete failure of the security equipment, resulting in loss of all system capability.

G. All other failures shall be considered minor failures. The Owner will call a designated Contractor-provided telephone number to effect Contractor notification of maintenance problems. The Owner will make reasonable repeat attempts to make notification. However, response time requirements shall be measured from the time of the first attempt by the Owner to notify the Contractor.

H. The Contractor shall maintain an inventory of security equipment spare parts, materials, consumables, and any other system item in order to meet the specified warranty maintenance requirements and keep the security equipment in a continuous operational mode during the warranty period.

I. Maintenance service shall not be assigned or transferred to any agent or other Contractor.

J. The Contractor shall identify and provide proof in writing of manufacturers who warranty their equipment for a period of longer than one year. Additional warranty extension time frames beyond one (1) year shall also be identified in this document. This document is required with the other submittal documents identified in Section 1.08.A above.

K. It is understood that unless required by other sections of this specification, or requested by the Owner, the Contractor is not responsible to provide additional warrantee coverage at no cost to the owner, matching that of the manufacturer’s offering extending beyond two (2) year.

1.19 DRAWINGS

A. The security drawings are diagrammatic only and are not intended to show every detail of construction or arbitrary location of wiring. Each system shall be complete with minor parts not specifically noted on the Drawings, but required for a properly functioning system conforming to state and local codes. Where building construction makes it advisable or necessary to change location of wiring or devices without increasing the cost of the work, such changes shall be made with the consent of the Owner and at no additional cost.

B. In case of conflict with building parts or the work of other trades, the Owner shall be notified

immediately and requested to render a decision so that there will be no delay in CCTV/ Security System construction.

1.20 LIST OF DRAWINGS

A. GENERAL

TITLE SHEET

1. SE1.0 – LEGEND and GROUND FLOOR PLAN
2. SE1.1 – FIRST FLOOR PLAN
3. SE1.2 – SECOND FLOOR PLAN
4. SE-2.0 – SECURITY RISER DIAGRAM
5. SE-2.1 – SECURITY BLOCK DIAGRAM
6. SE-3.0 – SECURITY TYPICAL DRAWINGS

1.21 COMPLETION and CLOSEOUT

A. The contractor shall substantially complete the SMS installation according to the established move-in date to the facility by the Owner. Substantially complete is defined as the security system being operational locally.

B. Failure to complete and provide the system for acceptance as specified on the date required shall result in the imposition of a penalty against the contractor. The penalty shall be all costs incurred by the Owner to provide, “adequate” security coverage and situational awareness for the affected area.

C. A point to point test of all parts of the system shall be required for acceptance. Completed system acceptance testing will establish system operability and the warranty commencement date, and will be completed and documented by Contractor and an Owner’s representative.

D. Upon Completion and Prior to final acceptance, contractor shall provide three (3) copies of the following.

1. O&M Manuals. Both hard copy and digital format
2. Warranties
    a. Manufactures
    b. Installation
3. Service agreement
4. Test results. Both hard copy and digital format
5. Recommended spare parts list.

PART 2 - PRODUCTS

2.1 GENERAL PRODUCT DESCRIPTION

A. It is the intent of this specification to describe to the Contractor the scope of work pertaining to the installation of an integrated Security Management System at the William M. Davies Technical High School.

B. The CCTV/ Security System shall be capable of integrated intrusion detection, video surveillance and recording, and alarm monitoring that allows for easy expansion or modification of inputs and outputs.

2.2 PRODUCT QUALITY ASSURANCE

A. The Contractor shall state what, if any, specific points of the proposed CCTV/ Security System systems' operation or the proposed equipment's quality differ in any way from that of the manufacturer's listed below by submission of a complete technical compliance checklist for that specific item of equipment, including any supporting literature and drawings. Only those departures from these Specifications, submitted in writing at the time of the bid, shall be considered by the Owner's Project Manager.

B. Approval of substitutions, based on submittal documents furnished by the Contractor, shall only be construed as acceptance pending final test and approval of the system. The Contractor shall continue to bear the liability for replacement of substituted equipment if, in the opinion of the Owner, the substitute equipment fails to perform as specified within six (6) months after scheduled project completion.

C. Units of the same type of equipment shall be products of a single manufacturer. All material and equipment shall be new and currently in production. Each major component of equipment shall have the manufacturer's model and serial number in a conspicuous place.

D. System enclosures shall be metallic. All terminal devices to be used in an interior environment shall be housed in an enclosure that provides protection against dust, falling dirt, and dripping non-corrosive liquids

E. Enclosures, cabinets, equipment racks having hinged doors shall further be supplied with a key lock to minimize unauthorized entry into equipment. All key locks must be identically keyed to facilitate service.

F. Equipment List: The main components of CCTV/ Security System are, but not limited to.

1. Panasonic Vandal-Resistant Fixed Network Camera

2. Panasonic Management Software Solution – Model # WV-ASM100

3. 6 TB Panasonic Network Disk Recorders – Model # WJ-ND4006000

4. CPU with 19 inch Monitor

5. Cisco 24 port POE Switches – Model #3560

6. UPS

2.3 VIDEO MANAGEMENT/DISPLAY AND IDS CONTROL CLIENT WORKSTATION

A. Software requirements: For video management and display, the client workstation shall have Panasonic Network Video Recorder client software installed and programmed to connect to the Network Video Recorder (s) via the Davies Technical High school Network.

B. Hardware requirements: The CCTV/ Security System Workstation shall be 100% IBM Personal Computer Standard compatible and scaled according to the following minimum system

configuration:

1. CPU
    a. Intel CoreTM2 Quad Q9650 or faster
    b. Intel CoreTM i7-920 or faster (Panasonic recommends)
2. RAM: 3GB or more
3. Video Card: VRAM: 256MB or more, compatible with DirectX 9.0c
4. OSM
    a. Microsoft Windows 7 Professional (32bit/64bit) (English Version)
    b. Microsoft Windows Vista Business SP2 (32bit/64bit) (English Version)
    c. Microsoft Windows XP Professional SP3 (32bit) (English Version)
5. The SMS Video Client Workstation monitor shall be of a widescreen format to provide multiple options for viewing and controlling video. The monitor shall be furnished with the following requirements:
    a. Screen resolution: 1,366 x 768
    b. High contrast: 1000: 1 (typical)
    c. HDMI 1080p compatible
    d. Full color display: approx. 16.7 million colors
    e. BNC composite input with loop through output, HDMI input and RGB for PC input
    f. Selectable screen aspects and scanning ranges: 16:9 full, 16:9 zoom, 4:3 full, 4:3 zoom and dot-by-dot
    g. Automatic power-save function for no signal input or can be activated manually
    h. Horizontal resolution: 500 TV lines for composite video
    i. 18.5" diagonal

C. POE NETWORK REQUIREMENTS

1. Provide 24 port Cisco POE Switches model # 3560: POE Switches shall be connected to MDF utilizing existing multimode fiber optic backbone cabling. The owner's network administrator will provide Contractor with information on what strands are available in each designated IDF.

2.4 DIGITAL VIDEO RECORDER – Panasonic WJ-ND4006000 (6TB)

A. The Digital Video Recorder shall be fully compatible and integrated with the CCTV/ Security System and Video Management Display Systems. Components of the system shall include the following:

1. The Recorder will be a High Performance Network Disk Recorder for Panasonic i-Pro

Network Cameras

2. The WJ-ND400 recorder shall be capable of connecting to up to 64 network cameras without extra license fees and their images can be recorded simultaneously.

3. The recorder shall be equipped with 9 hot plug HDD slots.

4. It shall allow up to 9TB HDD storage to be installed in the main unit.

5. The WJND400 recorder shall have the capability of expansion up to 54 TB with five optional WJ-HDE400 Hard Disk Extension Units, each with 9 HDD slots.

6. The recorder shall support all Panasonic i-Pro Network Cameras.

7. The recorder shall also support the following Panasonic Communications Company IP cameras and video encoders (JPEG support only)

8. The recorder shall have Intelligent VMD search function that, allow motions in a specified area in the recorded images of the compatible i-Pro cameras to be quickly searched.

9. The recorder shall utilize an embedded real-time operating system and shall not be based on a Microsoft Windows OS. The OS must reside completely in the hardware and not be installed on the hard disk drives. Installed disk drives must be dedicated to recording videos.

10. The recorder shall support MPEG-4 and JPEG multi format.

11. The recorder shall provide Various Recording Mode: Manual, Schedule, Event (Pre/Post), Emergency, and External Timer. It shall have the capabilities to control: Pan/Tilt, Zoom, Focus, Brightness and Preset Positions. It shall be able to search using: Time & Date, Event Type and Camera number.

12. The recorder shall have up to 8 recording programs including individual recording mode for each camera, and 6 time schedules per day.

13. The recorder shall have up to 64 audio capabilities and can be recorded and played back at G.726 (ADPCM) 32 kbps.

14. The recorder shall have various alarm sources such as 32x Terminal inputs, 64x Camera alarm, Panasonic Alarm Protocol. The alarm actions shall include Alarm recording, E-mail notification, Alarm message, Camera positioning, FTP image transfer, Terminal output, Panasonic alarm protocol output, Buzzer and LED.

15. The recorder shall have 2x built-in Gigabit network interfaces (10Base-T / 100Base-TX / 1000Base-T) for camera recording and client access.

16. The recorder shall have the quick discovery and IP setup function for Panasonic i-Pro network cameras.

17. The recorder shall have the capabilities to transfer recorded images to FTP server upon alarm and/or live image periodically. Images recorded in the SD memory card in the i-Pro network cameras can be transferred to the recorder automatically even when the recorder is in recording status.

18. The recorder shall have User/Host authentication, 4 programmable user levels, 16 user priorities and User-Camera View/Control partitioning setup for sophisticated user management. It shall be capable of up to 32 user registrations.

19. The recorder shall have Alteration detection and recorded data encryption for data security.

20. Multi recorder, Multi site systems shall be connected with the optional WV-ASM100 i-Pro Management Software.

21. The recorder shall have RAID5/6 redundant recording for data security. The RAID6 feature allows the recorder to recover from a two-disk failure without any loss of data (minimum four HDDs are required). With hot plug support, drives can be replaced without any downtime, allowing 24/7 operations. It shall have Disk partitioning to include Normal, Event, Pre-Event and Copy for flexible record management.

22. The recorder shall be viewable from any properly connected PC using Microsoft Internet Explorer version 6.0 or later

23. The recorder shall provide user authentication and support different user privileges based on logon ID. From the client the user shall (with proper authentication) be able to do the following:

    a. Setup cameras

    b. Define live viewing, recording rates and quality settings

    c. Define recording programs and schedules

    d. View live video in either single or quad views

    e. Search and playback recorded video

    f. Download selected recorded video

    g. Control connected PTZ cameras

24. The recorder shall work with the optional viewer software WV-ASM100 which is capable of viewing multiple cameras from multiple recorders on a single screen and provide the following features:

    a. Software shall be able to manage up to 100 network-connected ND300s, ND400s and/or HD300A recorders.

    b. Software shall be able to display live video from any camera on any connected recorder.

    c. Software shall be able to display 1, 2x2, 3x3 or 4x4 multiplexed video.

    d. Software shall show registered recorders as icons in a drop down menu. Cameras will be shown as icons on the same menu, indented under the attached recorder.

    e. Software shall enable user to assign any video from any recorder into any window on the multiplexed display.

    f. Software shall permit registration of up to 32 users, each with their own password, and provide up to 5 different levels of user privileges.

    g. Software shall permit the remote operation of properly configured PTZ cameras according to the user privilege level.

h. Software shall provide search functions for registered recorders and allow search by Event, Mark or Motion. It must apply these search criteria across multiple recorders.

i. Software shall permit the simultaneous playback of up to 16 videos.

j. Software must run on an IBM-PC/AT compatible computer with the following minimum specifications:

1) OS: Microsoft Windows XP Home SP2/ XP Professional SP2/ 32bit Vista Ultimate
2) CPU: Intel Core 2 Duo 2.66 GHz or faster
3) RAM: 1 GB or more
4) VRAM: 64 MB or more
5) Microsoft DirectX 9.0c or later
6) Graphics Card supporting more than 1024 x 768 resolutions
7) 100/1000 Ethernet Network Card
8) Internet Explorer 6.0 SP2 or later
9) Mouse, Keyboard, 1x USB port
10) Supported protocols:
11) TCP/IP, UDP/IP, HTTP, FTP, SMTP, DHCP, DNS, DDNS, NTP, SNMP
12) The power source shall be 120VAC, 60Hz at approx. 170W.

B. MANUFACTURERS/ WARRANTY

1. Provide High Performance Network Disk Recorder compatible with Panasonic i-Pro Network Cameras

2. Provide manufacturer's standard warranty

2.5 Surveillance Control and Management Systems

A. The management software must be compatible to Panasonic WV-ASM100 - Management Software Solution

1. Panasonic WV-ASM100 Management Software Solution for Panasonic NVR’s, DVR’s and i-Pro Cameras

2. Complete software management and live monitoring software for Panasonic WJ-ND200/ND300A/ND400 NVR series, WJ-HD300A/WJ-RT416 DVR series and i-Pro network cameras

3. Up to 100 recorders, 64 encoders and 256 directly connected cameras can be registered, and up to 6,400 cameras registered in the recorders

4. For flexible design, live images can be received directly from the camera/encoder or via the recorder

5. Multi-monitor option enables simultaneous use of Operation Display (1/4/9/16 split), Live Display (1/4/9/16 split) and Map Display each on a dedicated monitor

6. Up to 400 camera groups: cameras and multi-screen mode for the Operation Display can be programmed and called up by manual or sequence operation

7. Image resolution dynamically changes depending on the screen mode: VGA for Quad screen, QVGA for 16 split screen

8. Panasonic camera control

9. A camera, a group or a sequence can be called up on the Operation Display by ID with the optional system controller WV-CU950

10. Alarm pop-up notification/messaging

11. Up to 64 camera icons can be freely positioned on a map with alarm status indicated by the color of the icons

12. Download video clips for archiving

13. Video analytic functions from WJ-NT314 encoder can be displayed management software WV-ASM100 (Ver. 6.0)

B. MANUFACTURERS/ WARRANTY

1. Provide i-Pro camera and management operation for multi-recorder multi-site system

2. Provide manufacturer's standard warranty.

2.6 CLOSED CIRCUIT TELEVISION (CCTV) CAMERAS

A. Vandal-Resistant Fixed CCTV Cameras: Cameras must be compatible to **Panasonic Network Camera Model No. WV-NW502S**

1. The fixed CCTV cameras shall be discreet miniature dome cameras surface mounted on ceiling locations as shown on the contract drawings.

2. The fixed CCTV cameras shall be comparable to i**-Pro** Network Camera Model No. WV-NW502, and must have the following features and performance characteristics:

a. Multiple H.264 (High profile) streams and JPEG streams ensure simultaneous real time monitoring and high resolution recording by “UniPhier®” Panasonic’s proprietary System LSI platform.

b. Full frame (Up to 30 fps) transmission at 1,280 x 960 image size (1.3 Megapixel mode)

c. **Super Dynamic** and ABS (Adaptive Black Stretch) technologies deliver 128x wider dynamic range compared to conventional cameras.

d. Up to 3 Megapixel (2,048 x 1,536) JPEG stream (3 Megapixel mode, JPEG only)

e. H.264 and MPEG-4 are selectable for system migration.

f. High sensitivity with Day/Night function: 1.0 lux (Color), 0.08 lux (B/W) at F1.2 (Wide,1.3 Megapixel mode)

g. ABF (Auto Back Focus) ensures easy installation and stable focus in both color and B/W modes.

h. Adaptive Digital Noise Reduction: Integration of 2D-DNR and 3DDNR ensures noise reduction in various conditions.

i. Progressive scan ensures clear images with less motion blur and no tearing even when the subject is moving.

j. Superior color reproduction by primary (RGB) color filter

k. Electronic sensitivity enhancement: Auto (Up to 16x) / OFF

l. Selectable light control modes: Outdoor / Indoor / ELC / Fixed electronic shutter Outdoor / Indoor: Electronic shutter and ALC lens iris control are automatically controlled depending on the mode and luminance level. ELC: Up to 1/10,000 Electronic shutter is automatically applied for a fix iris lens. Fixed electronic shutter: Up to 1/10,000 fixed electronic shutter can be selectable.

m. VMD (Video Motion Detector) with 4 programmable detection areas, 15 steps sensitivity level and 10 steps detection size

n. Face detection to detect the position of human face, the information is sent by XML or video stream.

o. Meta data for VMD is supplied to work with the WJ-ND400 playback VMD function.

p. Privacy Zone can mask up to 8 private areas, such as house windows and entrances/exits.

q. 2x, 4x digital zoom controlled by browser

r. Camera title display: Up to 20 alphanumeric characters on the browser. Up to 16 alphanumeric characters with three selectable character sizes embedded in the image

s. Alarm sources including 3 terminal input, VMD and Panasonic alarm command can trigger actions such as SD/SDHC memory recording, FTP image transfer, E-mail notification, Indication on browser, Alarm terminal output, and Panasonic protocol output.

t. Full duplex bi-directional audio allows interactive communication between camera site and monitoring site.

u. JPEG image compression ratio can be changed by alarm so that higher quality image can be provided.

v. Prioritized stream control: One of the video streams can be prioritized when multiple recorders or client PCs are accessing the camera so that the recorder or the client PC can maintain the frame rate.

w. SD/SDHC Memory card slot for manual recording, alarm recording and backup upon network failure.

x. H.264/MPEG-4 max. bit rate/client and Total bit rate control allows flexible network traffic management. Frame rate priority mode controls bit rate and compression ratio to provide the specified frame rate.

y. Alarm log, Manual REC log, FTP error log saved in the SD/SDHC memory card is displayed on the browser GUI and can be downloaded to the client PC. Playback or Image data download through the log is also available.

z. Internet mode: H.264/MPEG-4 images can be transmitted over HTTP protocol.

aa. Multi-language GUI and setup menu: English, French, Italian, Spanish, German, Russian (PAL) / English, French (NTSC) * Installation required except for English

bb. IPv4/IPv6 protocol supported

cc. Analog Monitor output for easier installation

dd. IP66 rated water and dust resistant. Compatible with IEC60529 measurement standard.

ee. Dehumidification device for use in various weather conditions

ff. Vandal resistant mechanism for high reliability

gg. 2.8~ 8.0 mm, 2.8x Vari-focal Auto Iris lens

B. MANUFACTURERS/ WARRANTY

1. Provide manufacturer's standard warranty

2.7 CCTV VIDEO TRANSMISSION AND POWER DISTRIBUTION

A. All CCTV cameras shall utilize CAT6 unshielded twisted pair cabling for the purpose of video transmission to the head end location. Use all 4 pairs (8 pins) of the LAN cable. The maximum cable length is 300 feet. Make sure that the POE device in use is compliant with IEEE802.3af standard. Termination of cabling at the fixed camera shall be accomplished by the manufacturer’s specifications for UTP video and power transmission.

2.8 UNINTERRUPTABLE POWER SUPPLY (UPS)

A. The Contractor shall supply UPS for CCTV/ Security System equipment mounted in equipment racks with sufficient capacity to maintain complete equipment operation for a period of no less than one (1) hour. UPS units shall be rack mounted within vertical equipment rack(s), tower style for wall mounted equipment rack(s) and support all of the equipment within the associated rack.

B. The capability to add battery expansion modules is required.

C. It is the expectation of this section that the Contractor shall provide, as part of the submittal process, supporting documentation for the size selection of the UPS units. This shall be a document showing the calculation of the power requirements of the equipment installed as part of this contract as well as that of intended future equipment and how the resolution of the UPS unit’s size was achieved.

D. Where the UPS is capable of AC power fail notification via hard wired output, such outputs shall be wired to the IDS for AC power fail notification on a 24x7x365 basis.

E. Vertical equipment rack UPS unit(s) shall be per drawings, or approved equal.

F. Supplemental battery expansion modules shall be compatible with the UPS.

G. Wall mounted equipment rack UPS unit(s) shall be the APC model SUM1500RMXL2U or approved equal.

H. Where not locked inside CCTV/ Security System enclosures or racks, plug connected UPS unit(s) shall have their 120vac connection protected inside locked CCTV/ Security System enclosures or equipment racks.

I. All loads connected to the UPS units not locked inside CCTV/ Security System enclosures or racks, via cord and plug connection, shall have a locking mechanism to prevent accidental disconnection of loads. This may be accomplished via ground locking cord caps.

2.9 WIRE AND CABLE

A. The Contractor shall provide all wire & cable necessary to comply with the Contract Drawings. All wire and cable components shall be able to withstand the environment the wire or cable is installed in for a minimum of 20 years.

B. Interconnecting cable carrying digital data shall be not less than 22 AWG and shall be constructed of stranded copper wires for each conductor. Shielded cable or individual shielded conductors within the cable shall have a shield that provides 100 percent coverage. Cables with a single overall shield shall have a tinned copper shield drain wire. Plenum or riser cables shall be ANSI-C2 CL2P certified. All wiring shall meet and be installed within all NFPA 70 standards.

C. Network cable utilized for Ethernet communications shall be a minimum of CAT6, 24 AWG 4 pair unshielded.

D. Cabling for the purpose of video, data and fixed camera power transmission shall be a minimum of CAT6, 24 AWG 4 pair unshielded.

E. All wiring/cabling is to be protected from accidental and/or intentional tampering through the use of conduit and/or concealment. In areas where cabling is exposed and easily accessible, must be placed into a metallic conduit, metallic surface metal raceway or flexible metallic conduit.

2.10 PREDELIVERY TESTING

A. The Contractor shall assemble and test the Owner’s SMS at a Contractor maintained facility as a system prior to on-site delivery to demonstrate that the performance of the system satisfies the requirements of this specification in accordance with the approved pre-delivery test procedures. The tests shall take place during regular daytime working hours on weekdays.

PART 3 - EXECUTION

3.1 GENERAL

A. The Contractor shall install all proposed CCTV/ Security System components in accordance with the manufacturers’ instructions and as shown on the Contract Drawings. Furnish all necessary interconnections, services, and adjustments required for a complete and operable CCTV/ Security System as specified and shown on the Contract Drawings. All low voltage wiring outside the control console/control desk area, cabinets, boxes, and similar enclosures, shall be plenum rated wiring.

B. In the event the Contractor notes any condition that affects or potentially could affect the performance of the CCTV/ Security System, the Contractor shall submit a report to the Owner documenting any changes to the site or conditions.

C. The Contractor shall inspect locations where installation work will be performed and verify that conditions found are in accordance with the Contract Documents and are acceptable for the Contractor's installation work. Report any discrepancies in writing to the Owner, stating suggested means of correction.

D. All device mounting locations, precise wire and cable runs, and any conduit routing have not been specified on the Contract Drawings. Coordinate all aspects of installation with the Owner and ensure that adequate conduit is provided, that equipment back boxes are adequate for system installation, that power has been provided and properly located.

E. The Contractor shall check all power and communications cabling for continuity before making connections.

F. Coordinate all camera fields of view and mounting and housing details/finishes with the Owner's representative prior to installation. The Contractor shall coordinate finishes and colors of all equipment with the Owner.

G. No alarm system in the project premises shall be disarmed or disabled, nor shall any zones, sensors or system devices be disconnected, nor shall any system be impaired in any manner or fashion without making a prior written announcement and receiving a written acknowledgement and authorization from the Owner representative identified as responsible for the system to be impacted.

3.2 PREPARATION

A. Arrange through the Owner's Representative to have temporary electrical power for installation work and testing of security system components as necessary.

B. The Contractor shall coordinate with the work of other Contractors, as required and as necessary, for the purposes of having the security installation progress as rapidly and as smoothly as possible with minimum interference.

C. Before starting work, the Contractor shall submit information to the Owner's Representative concerning any additional or reconfigured openings and/or penetrations into the core building that may be required for the work. In no case shall the Contractor make any core building penetration or opening in the building exterior without expressed approval of the Owner in writing.

3.3 COMPLIANCE

A. Install the equipment in accordance with the contract documents, all applicable codes and standards and the manufacturer's written instructions. The installed CCTV/ Security System shall meet all applicable equipment and performance requirements.

B. Standardize the installation practices and material to provide uniform materials and procedures to the maximum extent possible.

C. Locate pull boxes, wire-ways or other items requiring inspection, removal, or replacement conveniently and accessibly with reference to the finished facilities.

D. Installation of electrical service to equipment shall conform to specific UBC Codes and Standards, NFPA 70, and other applicable requirements.

3.4 INSTALLATION REQUIREMENTS

A. Control signal, communications, and data transmission line grounding shall be installed as necessary to preclude ground loops, noise, and surges from adversely affecting system operation. Provide mounting hardware as required.

B. Components within the system shall be configured with appropriate service points to pinpoint system trouble in less than 20 minutes.

C. All wiring, including low voltage wiring, cabinets, boxes, and similar enclosures shall be plenum rated.

D. All equipment connected to alternating current circuits shall be protected from power line surges. Equipment protection shall meet the requirements of ANSI C62.41. Fuses shall not be used for

surge protection.

E. All inputs shall be protected against surges induced on device wiring. Outputs shall be protected against surges induced on control and device wiring installed. All communications equipment shall be protected against surges induced on any communications circuit. All cables and conductors, except fiber optics, shall have surge protection circuits installed at each end.

F. Inspect each component, determine obvious defects, if any, and correct.

G. Perform tests as recommended by manufacturer or as required to ensure the security equipment is operating properly and meets specified requirements.

H. Correct all deficiencies detected and retest affected components.

I. Record test data, tabulate, and write narrative describing tests, results, deficiencies found, corrective measures, and results of retesting. Certify to the Owner that the security equipment has been tested and is ready for performance verification testing.

J. All enclosure penetrations shall be bushed with a fitting or bushing approved for the purpose, to provide physical protection of cable entering or exiting the enclosure.

K. Penetrations of enclosures involving transitions of cable shall be sealed with rubber silicone or similar sealant to preclude the entry of water.

L. During and upon completion of the installation, all debris created by the Contractor’s installation shall be removed by the Contractor from the premises daily and disposed of as directed.

3.5 SITE TESTING

A. GENERAL

1. The Contractor shall provide all personnel, equipment, instrumentation, and supplies necessary to perform all testing of the CCTV/ Security System. The Owner's representative will witness all performance verification and endurance testing. Original copies of all data produced during performance verification and endurance testing shall be turned over to the Owner at the conclusion of each phase of testing.

2. The Contractor shall calibrate and test all equipment, verify signal/control cable operation, place the integrated system in service, and test the integrated system.

B. PERFORMANCE VERIFICATION TEST:

1. The Contractor shall demonstrate that the completed Owner CCTV/ Security System complies with the contract requirements. Using approved test procedures, all physical and functional requirements of the SMS project shall be demonstrated and shown.

C. CCTV/ SECURITY SYSTEM ENDURANCE TEST

1. The CCTV/ Security System endurance test shall be conducted 24 hours per day for two (2) consecutive calendar days, including holidays, and the system shall operate under normal conditions as specified. The Contractor shall make no repairs during this phase of testing unless authorized by the Owner’s representative in the event of a major failure. If the system experiences no failures during testing, the Contractor may proceed directly to Acceptance Testing upon receipt of authorization from the Owner. If the system experiences a major failure(s) during testing, the Endurance Test shall be stopped and rescheduled by the Owner after the Contractor has completed necessary repairs and declares to the Owner that the system is ready for a second endurance test.

2. The Contractor will not be held responsible for failures in system performance resulting from the following:

   a. An outage of the main power in excess of the capability of any backup power source, provided that the automatic initiation of all backup sources was accomplished and that automatic shutdown and restart of the CCTV/ Security System performed as specified.

   b. Failure of furnished communications circuit, provided that the failure was not due to Contractor furnished equipment, installation, or software.

   c. Failure of existing owned equipment, provided that the failure was not due to Contractor furnished equipment, installation, or software.

   d. The occurrence of specified nuisance alarms.

   e. The occurrence of specified environmental alarms.

D. SYSTEM COMMISSIONING

1. GENERAL: After all installation and acceptance test requirements specified have been complied with, the equipment shall be commissioned. After commissioning has been completed, The Owner will take possession of the equipment and utilize it in accordance with the conditions described in the contract documents.

2. PRECOMMISSIONING: Outstanding work items that may exist, such as facility interfaces, project record drawings, and/or in-process change orders, shall be documented and submitted to the Owner for review prior to the start of equipment commissioning. Documentation of outstanding work items shall take the form of punch lists of critical action items lists which describe the work, the expected completion schedule, and the impact upon operation. Depending upon the nature of the outstanding work items, the Owner may grant a waiver to accomplish partial commissioning of any of the equipment. Completion of waived outstanding work items shall then be assigned to the post-commissioning operations and maintenance.

3. COMMISSIONING: The CCTV/ Security System commissioning procedure will be witnessed by the Owner's representatives. The commissioning procedure shall be conducted by the Contractor and shall consist of a detailed inspection, and a physical accounting of each equipment item. An operational demonstration shall then be conducted in which the equipment shall function in the normal operational mode, and shall operate completely error-free in terms of hardware and software performance. Occurrence of any equipment failure shall terminate the demonstration. The demonstration shall restart and run for a period of time designated by the Owner's representative after the failure has been corrected. Except for any outstanding work items as previously described, this shall complete the commissioning procedure.

3.6 CLOSEOUT DOCUMENTATION

A. OPERATIONS AND MAINTENANCE MANUALS: The Contractor shall provide the Owner with applicable Operations and Maintenance (O&M) manual(s), as specified in Part I, which describe the equipment installed under this contract. The O&M manual(s) shall, as a minimum, consist of an operations section; documentation shall contain sufficient written text and illustrations necessary to present a full description of the equipment, including an overview, concept of operation or maintenance, operating instructions using all functions and capabilities, and interfaces with other systems/subsystems.

B. WARRANTIES: The contractor shall provide the Owner with applicable warranties as specified in Part 1, which describes the equipment and warranty requirements of this contract. Warranties shall be provided for all manufactured and installed items including labor as specified.

C. TEST RESULTS: The contractor shall provide the owner with all test results as specified in contract documents. Test results shall be test program/ equipment generated and printed for review. Test results shall include all cabling and system components.

D. SPARE PARTS LIST: The contractor shall provide the owner with a list of recommended spare parts which should be purchased and kept available to maintenance staff.

E. RECORD DRAWINGS: The contractor shall provide the owner with all record drawings as specified in contract documents.

3.7 PROJECT MANAGEMENT

A. The Contractor shall provide written project progress reports to the Owner's Representative, either by fax or electronic mail. Project progress reports shall be submitted on a weekly basis.

3.8 TRAINING

A. The Contractor shall conduct training courses for designated Owner personnel in the maintenance and operation of the Owner CCTV/ Security System as specified.

B. The training shall be oriented to the specific system being installed under this contract. Training manuals shall be delivered for each trainee with two additional copies delivered for archiving at the project site.

C. The Contractor shall prepare, administer, and conduct a training program for designated Owner operator personnel to fully and efficiently operate the installed CCTV/ Security System and maintain configurable data bases.

D. At a minimum, the following training elements should be incorporated into the training program and documented separately for individual training segments:

1. System back-up and restoration, software access and operator tasks

2. CCTV system interfaces and control

3. Maintenance and preventive maintenance

E. Training shall be in sufficient scope and depth to ensure that all designated personnel who complete the program shall be fully qualified and capable of operating the system and subsystems as installed.

F. The Contractor shall provide training, orientation, and "hands-on" practical familiarization necessary to ensure a smooth transition between system installation and operational activities.

G. Operator training shall be provided for the topics and periods indicated in above at least one week prior to the scheduled turnover to the Owner of the system. Upon completion of training, each trainee, using appropriate documentation, should be able to perform elementary operations with guidance and describe the general hardware architecture and functionality of the system.

H. Upon completion of training outlined above, each trainee should be able to start the system, operate the system, recover the system after a failure, and describe the specific hardware architecture and operation of the system.

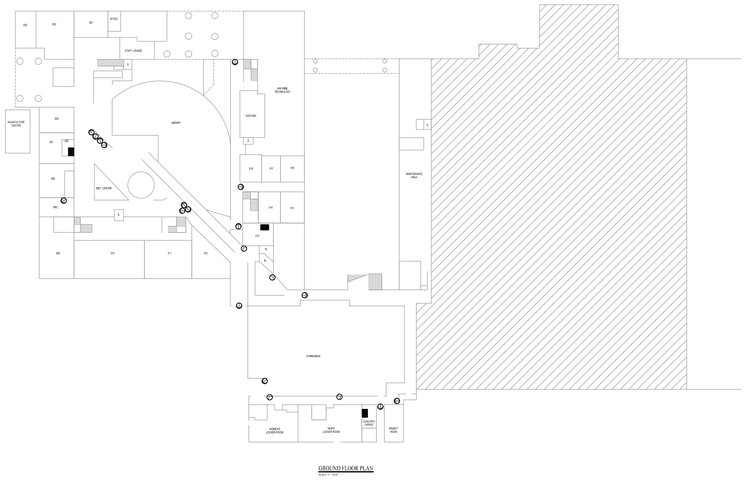
I. The course shall consist of hands-on training under the constant monitoring of the instructor. The instructor(s) shall be responsible for determining the appropriate password to be issued to the student commensurate with each trainee's acquired skills at the beginning of each of these individual training sessions.

J. The Contractor shall provide and use all training aids such as films, slides, audio/video tapes, etc. as necessary to complement instruction and enhance learning. Provide a Training Manual for trainees' use during and after training. The Training Manuals shall include a list of recommended references useful for learning the details of CCTV/ Security System operation.

K. Training requirements defined by this section of the specification shall be conducted for a minimum of eight hours for a minimum of four operators.

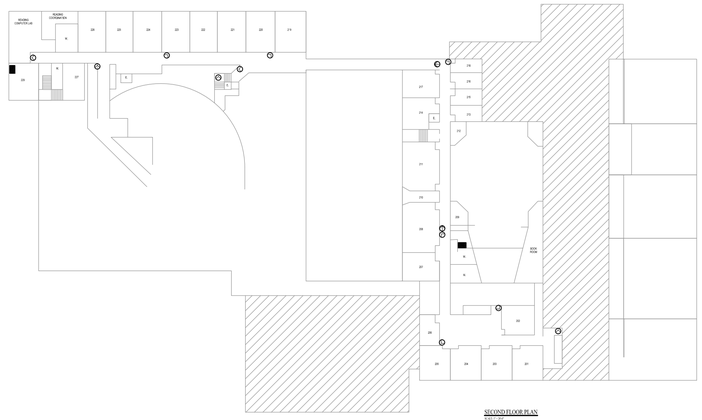
END OF SECTION 282300

WILLIAM M. DAVIES JR. HIGH
TECHNICAL SCHOOL
50 JENKES HILL RD.
LINCOLN, RI 02865



GROUND FLOOR PLAN

FIRST FLOOR PLAN



SECOND FLOOR PLAN

DAVIES TECHNICAL HIGH SCHOOL
SECURITY DESIGN

AUGUST 4, 2011

CREATIVE ENVIRONMENT CORP. CONSULTING ENGINEERS

HVAC•ELECTRICAL•PLUMBING
•FIRE PROTECTION•

50 OFFICE PARKWAY
EAST PROVIDENCE, RI 02914
P: 401.438.7733
F: 401.438.7620
WWW.CEC-ENGINEERING.COM

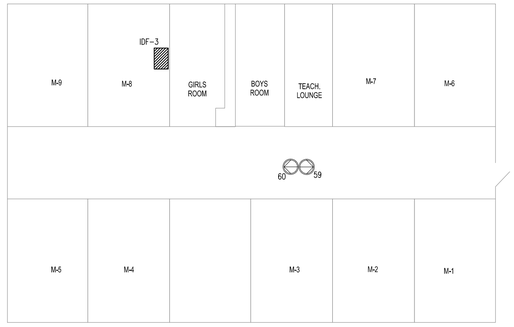
DRAWING LIST:

SE1.0	GROUND FLOOR PLAN
SE1.1	FIRST FLOOR PLAN
SE1.2	SECOND FLOOR PLAN

CCRS
United Security Solutions
Security Division of CCRS

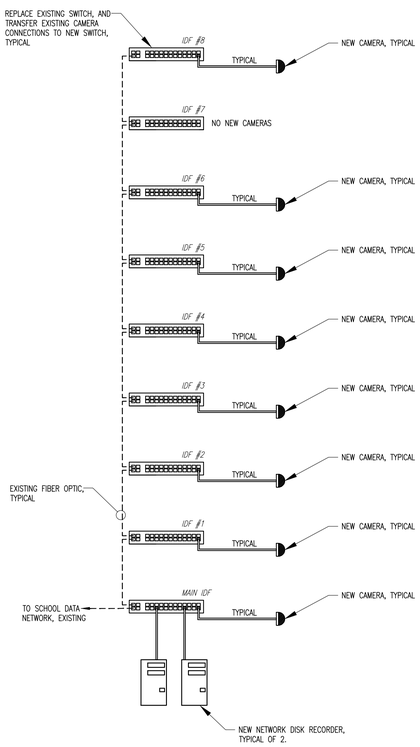
P.O. BOX 802
COVENTRY, RI
P: 401.623.8965
F: 401.250.5565
WWW.UNITEDSECURITYSOLUTIONS.NET

CCE 20143 DAVIS TECHNICAL HIGH SCHOOL SECURITY DESIGN – 8/4/11



MODULAR BUILDING PLAN

SCALE: 1" = 10'-0"



CAMERA RISER DIAGRAM

NTS

SYMBOL LEGEND:

- DIRECTIONAL CAMERA
- WIDE ANGLE CAMERA
- IDF

IDF CAMERA RUNS:

IDF	CAMERA NUMBER
1:	17-25
2:	1-16
3:	59, 60
4:	26-31
5:	44-50 AND 56-58
6:	51-55
7:	NO NEW CAMERAS
8:	39-43
MAIN	32-38

EMT CONDUIT CHART

(FOR CAT6 CABLE)

NUMBER OF CABLES, UP TO:	EMT CONDUIT SIZE
2	3/4"
5	1"
10	1.25"

NOTE:
MINIMIZE NUMBER OF CONDUIT BY RUNNING MULTIPLE CABLES IN ONE CONDUIT. SEE SAMPLE ON SHEET SE1.2.

IDF NOTES:

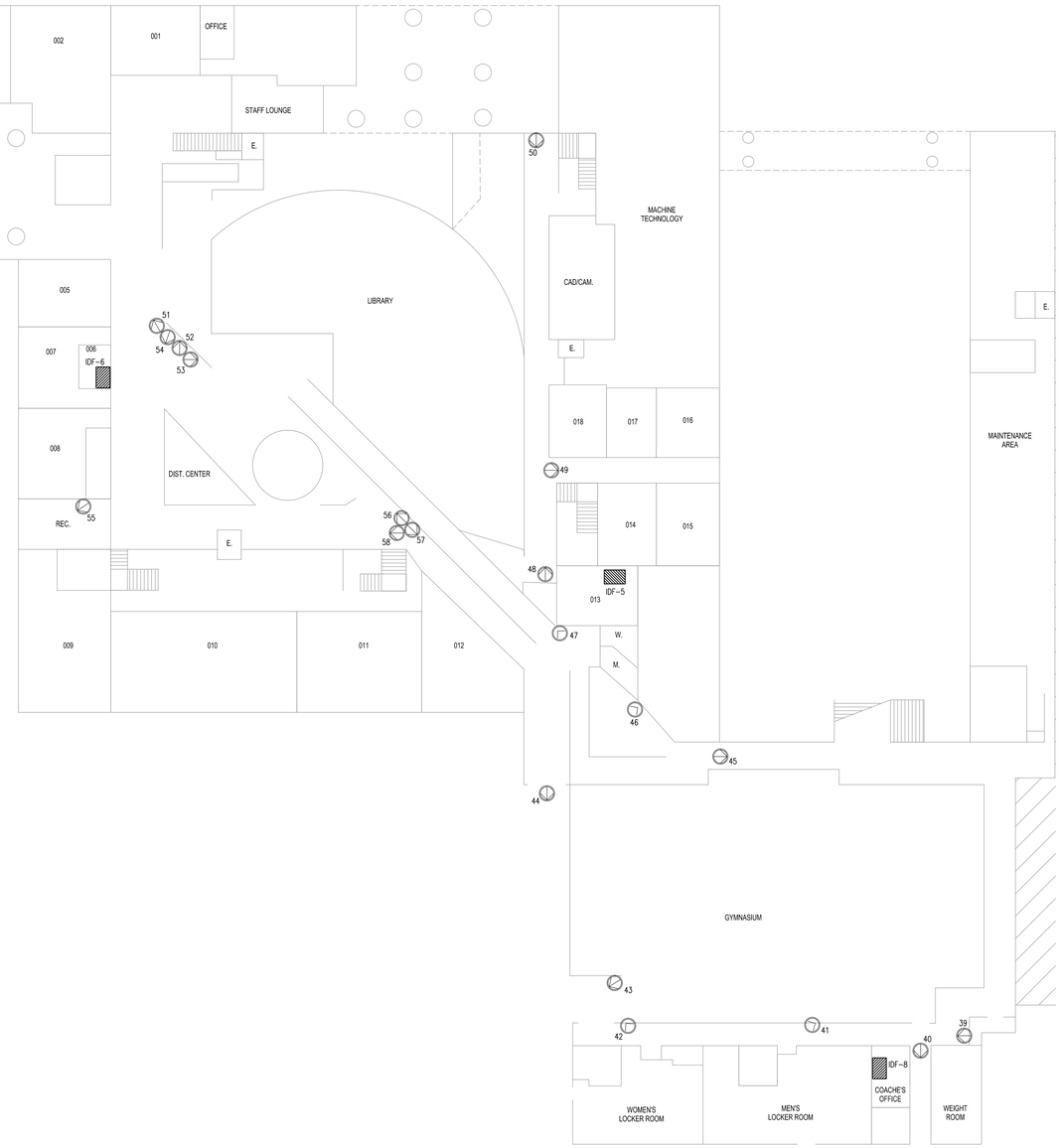
1. AT ALL IDF LOCATIONS: REMOVE ONE EXISTING NETGEAR SWITCH AND TRENDNET FIBER OPTIC BOX, UNLESS OTHERWISE NOTED. SAVE ALL EQUIPMENT, MOUNTING BRACKETS, POWER CORDS, ETC., AND RETURN TO OWNER.
2. AT ALL IDF LOCATIONS: PROVIDE AND INSTALL (1) CISCO 3560 24-PORT, RACK MOUNTED SWITCH. USE CISCO #:WS-C3560G-24PS-S
3. AT IDF-6, EXISTING TRENDNET FIBER OPTIC BOX SHALL REMAIN TO BE USED TO CONNECT FIBER OPTIC CONNECTION TO MODULAR BUILDING.
4. AT MAIN IDF (MIDF), LOCATED ON FIRST FLOOR, PROVIDE AND INSTALL (1) RACK MOUNTED APC UPS. APC MODEL #:SMX2200RMLV2U

CABLING NOTES:

1. PROVIDE EMT FOR ALL EXPOSED CABLES. CONTRACTOR SHALL PROVIDE ALL NECESSARY BRACKETS, ANCHORS, ELBOWS, CONNECTORS, ETC. TO MOUNT EMT TO SURFACE.
2. WHERE POSSIBLE INSTALL ALL CABLES ABOVE ACCESSIBLE CEILINGS. PROVIDE J-HOOKS TO SUPPORT CABLES. SPACE J-HOOKS AT A MAXIMUM OF 3 FEET APART.

GENERAL NOTES:

1. ALL CONDUIT, FITTINGS, SUPPORTS, AND JUNCTION BOXES SHALL BE STEEL.
2. ALL CABLE AND EQUIPMENT SHALL BE RATED CAT6.
3. A MAXIMUM OF 8" OF GREENFIELD FLEXIBLE STEEL CONDUIT MAY BE USED TO CONNECT CAMERAS TO EMT .
4. ALL CABLE SHALL BE PLENUM RATED.



GROUND FLOOR PLAN

SCALE: 1" = 20'-0"

United Security Solutions
Security Specialists at CCRS
P.O. BOX 929
CRANSTON, RI
P: 401.823.5885
F: 401.823.5955
WWW.UNITEDSECURITYSOLUTIONS.NET

HVAC • ELECTRICAL • PLUMBING
• FIRE PROTECTION
50 OFFICE PARKWAY
EXETER, RHODE ISLAND 02814
P: 401.438.7733
F: 401.438.7920
WWW.EGCENGINEERING.COM

Project:
DAVIES TECHNICAL HIGH SCHOOL
SECURITY IMPROVEMENTS
50 JENKES HILL RD.
LINCOLN, RI 02865

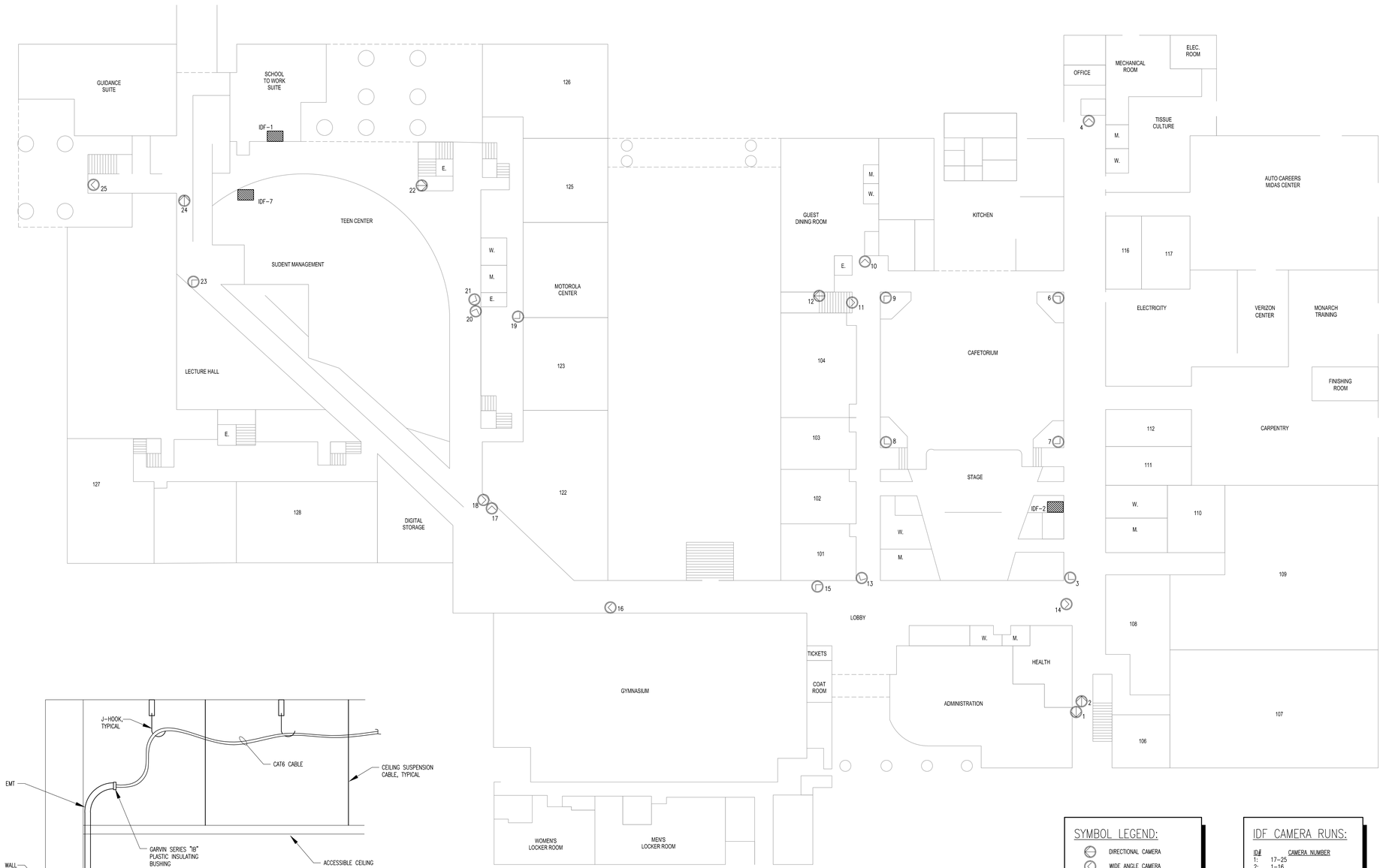
Status:
FOR CONSTRUCTION

No.	Revision/Issue	Date

Sheet Title:
GROUND FLOOR PLAN

Project No:	201163
Drawn By:	JR
Checked By:	PDS
Scale:	AS NOTED
Date:	08/04/11

Drawing No:
SE1.0



FIRST FLOOR PLAN

SCALE: 1" = 20'-0"

SUSPENDED CEILING CABLING DETAIL

NTS

SYMBOL LEGEND:

- DIRECTIONAL CAMERA
- WIDE ANGLE CAMERA
- IDF

IDF CAMERA RUNS:

IDF	CAMERA NUMBER
1:	17-25
2:	1-16
3:	59, 60
4:	26-31
5:	44-50 AND 56-58
6:	51-55
7:	NO NEW CAMERAS
8:	39-43
MAIN	32-38

GENERAL NOTES:

1. ALL CONDUIT, FITTINGS, SUPPORTS, AND JUNCTION BOXES SHALL BE STEEL.
2. ALL CABLE AND EQUIPMENT SHALL BE RATED CAT6.
3. A MAXIMUM OF 8" OF GREENFIELD FLEXIBLE STEEL CONDUIT MAY BE USED TO CONNECT CAMERAS TO EMT .
4. ALL CABLE SHALL BE PLENUM RATED.

EMT CONDUIT CHART

(FOR CAT6 CABLE)

NUBMER OF CABLES, UP TO:	EMT CONDUIT SIZE
2	3/4"
5	1"
10	1.25"

NOTE:
MINIMIZE NUMBER OF CONDUIT BY RUNNING MULTIPLE CABLES IN ONE CONDUIT. SEE SAMPLE ON SHEET SE1.2.

IDF NOTES:

1. AT ALL IDF LOCATIONS: REMOVE ONE EXISTING NETGEAR SWITCH AND TRENDNET FIBER OPTIC BOX, UNLESS OTHERWISE NOTED. SAVE ALL EQUIPMENT, MOUNTING BRACKETS, POWER CORDS, ETC., AND RETURN TO OWNER.
2. AT ALL IDF LOCATIONS: PROVIDE AND INSTALL (1) CISCO 3560 24-PORT, RACK MOUNTED SWITCH. USE CISCO #:WS-C3560-24PS-S
3. AT IDF-6, EXISTING TRENDNET FIBER OPTIC BOX SHALL REMAIN TO BE USED TO CONNECT FIBER OPTIC CONNECTION TO MODULAR BUILDING.
4. AT MAIN IDF (MIDF), LOCATED ON FIRST FLOOR, PROVIDE AND INSTALL (1) RACK MOUNTED APC UPS. APC MODEL #:SMX2200RMLV2U

CABLING NOTES:

1. PROVIDE EMT FOR ALL EXPOSED CABLES. CONTRACTOR SHALL PROVIDE ALL NECESSARY BRACKETS, ANCHORS, ELBOWS, CONNECTORS, ETC. TO MOUNT EMT TO SURFACE.
2. WHERE POSSIBLE INSTALL ALL CABLES ABOVE ACCESSIBLE CEILINGS. PROVIDE J-HOOKS TO SUPPORT CABLES. SPACE J-HOOKS AT A MAXIMUM OF 3 FEET APART.

United Security Solutions
security systems and services
P.O. BOX 929
CRANSTON, RI
P: 401.633.3955
F: 401.633.3956
WWW.UNITEDSECURITYSOLUTIONS.NET

HVAC • ELECTRICAL • PLUMBING
• FIRE PROTECTION
50 OFFICE PARKWAY
EXETER, RHODE ISLAND 02814
P: 401.438.7733
F: 401.438.1920
WWW.GSCENGINEERING.COM

Project:
DAVIES TECHNICAL HIGH SCHOOL
SECURITY IMPROVEMENTS
50 JENKES HILL RD.
LINCOLN, RI 02865

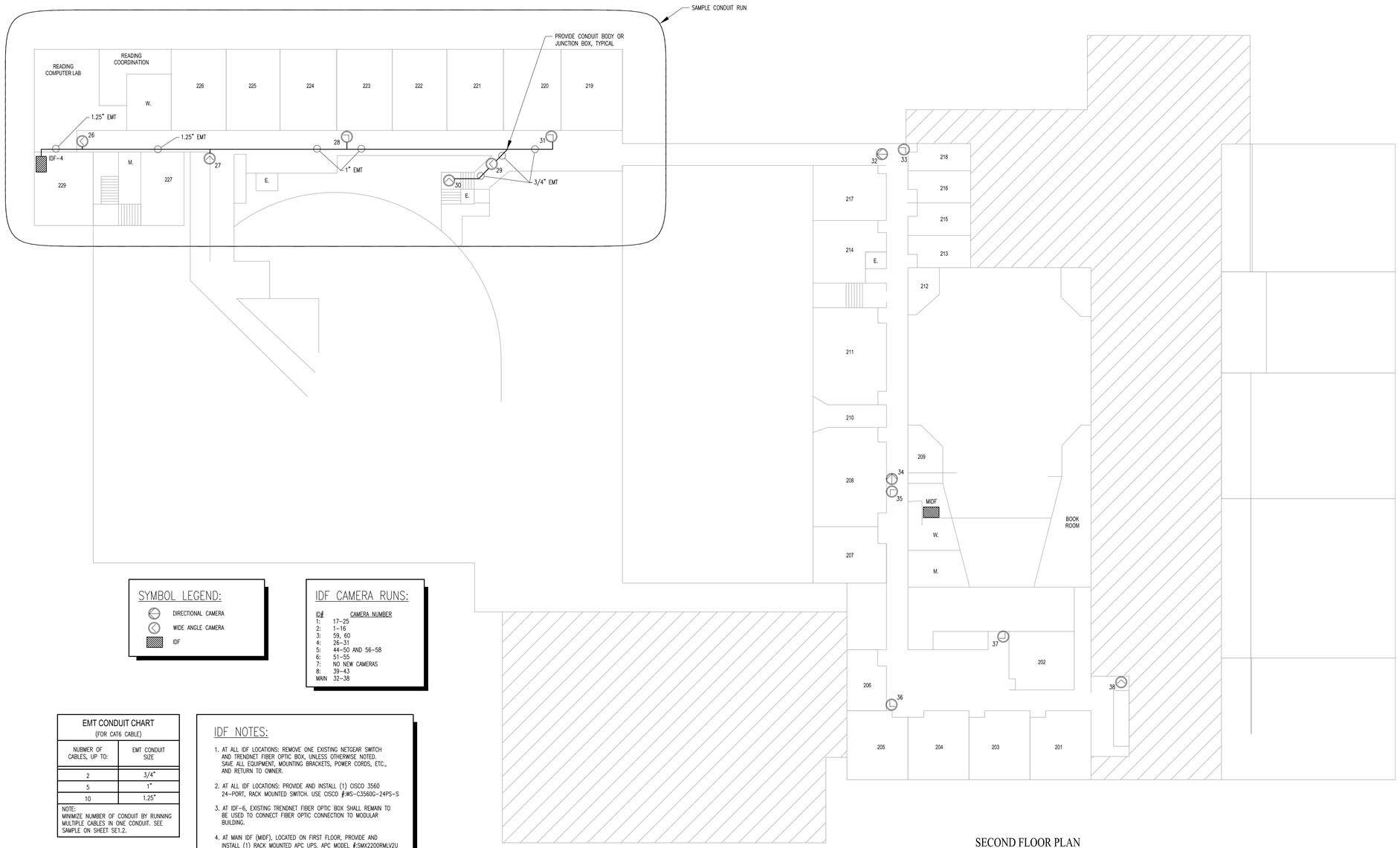
Status:
FOR CONSTRUCTION

No.	Revision/Issue	Date

Sheet Title:
FIRST FLOOR PLAN

Project No:	201163
Drawn By:	JR
Checked By:	PDS
Scale:	AS NOTED
Date:	08/04/11

Drawing No:
SE1.1



SECOND FLOOR PLAN

SCALE: 1" = 20'-0"

SYMBOL LEGEND:

- DIRECTIONAL CAMERA
- WIDE ANGLE CAMERA
- IDF

IDF CAMERA RUNS:

IDF	CAMERA NUMBER
1:	17–25
2:	1–16
3:	59, 60
4:	26–31
5:	44–50 AND 56–58
6:	51–55
7:	NO NEW CAMERAS
8:	39–43
MAIN	32–38

EMT CONDUIT CHART

(FOR CAT6 CABLE)

NUBMER OF CABLES, UP TO:	EMT CONDUIT SIZE
2	3/4"
5	1"
10	1.25"

NOTE:
MINIMIZE NUMBER OF CONDUIT BY RUNNING MULTIPLE CABLES IN ONE CONDUIT. SEE SAMPLE ON SHEET SE1.2.

IDF NOTES:

1. AT ALL IDF LOCATIONS: REMOVE ONE EXISTING NETGEAR SWITCH AND TRENDNET FIBER OPTIC BOX, UNLESS OTHERWISE NOTED. SAVE ALL EQUIPMENT, MOUNTING BRACKETS, POWER CORDS, ETC., AND RETURN TO OWNER.
2. AT ALL IDF LOCATIONS: PROVIDE AND INSTALL (1) CISCO 3560 24-PORT, RACK MOUNTED SWITCH. USE CISCO #:WS-C3560G-24PS-S
3. AT IDF-6, EXISTING TRENDNET FIBER OPTIC BOX SHALL REMAIN TO BE USED TO CONNECT FIBER OPTIC CONNECTION TO MODULAR BUILDING.
4. AT MAIN IDF (MIDF), LOCATED ON FIRST FLOOR, PROVIDE AND INSTALL (1) RACK MOUNTED APC UPS. APC MODEL #:SMX2200RMLV2U

CABLING NOTES:

1. PROVIDE EMT FOR ALL EXPOSED CABLES. CONTRACTOR SHALL PROVIDE ALL NECESSARY BRACKETS, ANCHORS, ELBOWS, CONNECTORS, ETC. TO MOUNT EMT TO SURFACE.
2. WHERE POSSIBLE INSTALL ALL CABLES ABOVE ACCESSIBLE CEILINGS. PROVIDE J-HOOKS TO SUPPORT CABLES. SPACE J-HOOKS AT A MAXIMUM OF 3 FEET APART.

GENERAL NOTES:

1. ALL CONDUIT, FITTINGS, SUPPORTS, AND JUNCTION BOXES SHALL BE STEEL.
2. ALL CABLE AND EQUIPMENT SHALL BE RATED CAT6.
3. A MAXIMUM OF 8" OF GREENFIELD FLEXIBLE STEEL CONDUIT MAY BE USED TO CONNECT CAMERAS TO EMT .
4. ALL CABLE SHALL BE PLENUM RATED.

United Security Solutions
Security Systems Integrators
P.O. BOX 929
CRANSTON, RI
P: 401.633.3955
F: 401.633.3965
WWW.UNITEDSECURITYSOLUTIONS.NET

HVAC • ELECTRICAL • PLUMBING
• FIRE PROTECTION
50 OFFICE PARKWAY
EXETER, RI 02822-9814
P: 401.438.7733
F: 401.438.1920
WWW.DSCHAEFERENG.COM

Project:
DAVIES TECHNICAL HIGH SCHOOL
SECURITY IMPROVEMENTS
50 JENKES HILL RD.
LINCOLN, RI 02865

Status:
FOR CONSTRUCTION

No.	Revision/Issue	Date

Sheet Title:
SECOND FLOOR PLAN

Project No:	201163
Drawn By:	JR
Checked By:	PDS
Scale:	AS NOTED
Date:	08/04/11

Drawing No:
SE1.2

DAVIES TECHNICAL HIGH SCHOOL CCTV ITEMIZED EQUIPMENT LIST

				Unit		Extended
		Manufacturer	**Model**	**Cost**	**Quanity**	**Cost**
	Client Headend Station					
A						$0.00
B	**Storage Solutions- Network Video Recorder (6TB)**	**Panasonic**	**WJ-ND4006000T**		**2**	**$0.00**
C						**$0.00**
D	**Management Software Solution**	**Panasonic**	**WV-ASM100**		**1**	**$0.00**
E						**$0.00**
F	**Rack Mounted UPS**	**APC**			**1**	**$0.00**
	CCTV					
G	**Super Dynamic Megapixel Vandal Resistant Fixed Dome Network Camera**	**Panasonic**	**WV-NW502S**		**59**	**$0.00**
H	Interior Vandal Proof Dome Camera 3.8-9mm Lens (IP Fixed Camera - alternate)	Panasonic				**$0.00**
	Exterior Vandal Proof Dome Camera 3.8-9mm Lens (IP Fixed Camera)	**Panasonic**			**1**	**$0.00**
	Exterior Vandal Proof Dome Camera 3.8-9mm Lens (IP Fixed Camera)					**$0.00**
I	**Miscellaneous Equipment**					
J	Cable, Connectors and Fasteners					$0.00
K	Conduit					$0.00
L	Electrical Power/ Outlets for IDF/ MDF/ CCTV					$0.00
M	Fiber					$0.00
N						$0.00
O	Vertical Equipment Rack Power Supply					$0.00
P						$0.00
	Communication Equipment					
Q	**24 Port POE Network Switches**	**Cisco**			**8**	**$0.00**
R						$0.00
S	POE Extender					$0.00
	Other Equipment					
T						$0.00
U						$0.00
V						$0.00
W						$0.00
X						$0.00
Y						$0.00
Z						$0.00
	Total Equipment Cost					$0.00
	Estimated Project Management					
	Estimated Permits					
	Total Cost					$0.00

DAVIES TECH HIGH SCHOOL CCTV MAJOR COST SUMMARY

		IP	Material/Wiring	OTHER		LABOR	TOTAL	TOTAL
CAM #	TYPE	CAMERA	Housing/Lenes	EQUIPMENT	HOURS	RATE	LABOR	COST
1	FIXED						$ -	$ -
2	FIXED						$ -	$ -
3	FIXED						$ -	$ -
4	FIXED						$ -	$ -
5	FIXED						$ -	$ -
6	FIXED						$ -	$ -
7	FIXED						$ -	$ -
8	FIXED						$ -	$ -
9	FIXED						$ -	$ -
10	FIXED						$ -	$ -
11	FIXED						$ -	$ -
12	FIXED						$ -	$ -
13	FIXED						$ -	$ -
14	FIXED						$ -	$ -
15	FIXED						$ -	$ -
16	FIXED						$ -	$ -
17	FIXED						$ -	$ -
18	FIXED						$ -	$ -
19	FIXED						$ -	$ -
20	FIXED						$ -	$ -
21	FIXED						$ -	$ -
22	FIXED						$ -	$ -
23	FIXED						$ -	$ -
24	FIXED						$ -	$ -
25	FIXED						$ -	$ -
26	FIXED						$ -	$ -
27	FIXED						$ -	$ -
28	FIXED						$ -	$ -
29	FIXED						$ -	$ -
30	FIXED						$ -	$ -
Total		$ -	$ -	$ -	0.00		$ -	$ -

			Extended		LABOR	TOTAL	TOTAL
Head-End	Unit Cost	Quanity	Cost	HOURS	RATE	LABOR	COST
WORK STATION		1	$ -			$0.00	$ -
DVR		2	$ -			$0.00	$ -
MGT SYSTEM			$ -			$0.00	$ -
PROGRAMING		1	$ -			$0.00	$ -
NETWORK SWITCH			$ -			$0.00	$ -
OTHER							
			$ -			$0.00	$ -
			$ -			$0.00	$ -
Total	$ -		$ -	0.00		$ -	$ -

APENDIX-B

DAVIES TECH HIGH SCHOOL CCTV MAJOR COST SUMMARY

		IP	Material/Wiring	OTHER		LABOR	TOTAL	TOTAL
CAM #	TYPE	CAMERA	Housing/Lenes	EQUIPMENT	HOURS	RATE	LABOR	COST
31	FIXED						$ -	$ -
32	FIXED						$ -	$ -
33	FIXED						$ -	$ -
34	FIXED						$ -	$ -
35	FIXED						$ -	$ -
36	FIXED						$ -	$ -
37	FIXED						$ -	$ -
38	FIXED						$ -	$ -
39	FIXED						$ -	$ -
40	FIXED						$ -	$ -
41	FIXED						$ -	$ -
42	FIXED						$ -	$ -
43	FIXED						$ -	$ -
44	FIXED						$ -	$ -
45	FIXED						$ -	$ -
46	FIXED						$ -	$ -
47	FIXED						$ -	$ -
48	FIXED						$ -	$ -
49	FIXED						$ -	$ -
50	FIXED						$ -	$ -
51	FIXED						$ -	$ -
52	FIXED						$ -	$ -
53	FIXED						$ -	$ -
54	FIXED						$ -	$ -
55	FIXED						$ -	$ -
56	FIXED						$ -	$ -
57	FIXED						$ -	$ -
58	FIXED						$ -	$ -
59	FIXED						$ -	$ -
60	FIXED						$ -	$ -
Total		$ -	$ -	$ -	0.00		$ -	$ -