DIVISION 13 – SPECIAL CONSTRUCTION

This division contains the following elements:

1.1 General.
1.2 Utility Provisions for Future Expansions.
1.3 Telecommunications Systems.
1.4 Intercom and Clock/Bell System.
1.5 Technology Centers.
1.6 Instructional Technologies (Interactive Whiteboards, Digital Projectors, Interactive Projectors, and Classroom Sound Systems).
1.7 Instructional TV (ITV) System.
1.8 Sound Reinforcement Systems.
1.9 Intrusion Alarm System.
1.10 Card Access Control System.
1.11 Security Camera System (SCS).
1.12 Energy Management System (EMS).

1.1 GENERAL

A. Telecommunication system shall be defined as the combination of telephone and data systems.

B. Coordinate electrical and communication connections with architectural and other elements to eliminate omissions and field conflicts.

C. Power for communications, security, and fire alarm systems, shall be connected to the appropriate emergency power source as identified in Division 16 – Electrical.

D. Electrical design shall comply with the following:
   1. National Electrical Code (NEC) – (NFPA 70)
   2. Florida Building Code (FBC).
   3. All applicable codes and standards.

E. Not all code requirements are listed within this M-DCPS Design Criteria section. Selected code requirements are included in this section for clarification or emphasis only.

F. Consult M-DCPS Information Technology Services - Infrastructure and Systems Support (ITS/ISS) to verify status, and coordinate technology projects, currently active at various school sites.

G. Training of M-DCPS personnel for operation and maintenance of security and energy management systems shall be included in project specifications and shall be scheduled with the M-DCPS Project Manager to occur at the project site within two weeks after Substantial Completion.

H. Include the costs for providing temporary provisions to continue use of existing communication, data, security, and energy management systems during construction at existing facilities, in the construction cost estimate.
1.2 UTILITY PROVISIONS FOR FUTURE EXPANSIONS

A. Unless otherwise directed in writing by M-DCPS Project Manager, the design of all new schools shall identify an area located adjacent to the new facility, for placement of a “future classroom expansion” building. Prior to Phase I Design Development, the A/E shall confirm with the MDCPS Project Manager if this requirement is applicable to the Project.

B. The design of all new schools shall also provide all utility needs for the future classroom expansion, and shall provide utility stub-outs from the new school building, in the direction of the future expansion area. Coordinate quantity, and sizes of all conduits for the future expansion building, according to requirements noted in this Design Criteria.

C. The future expansion shall consist of a prescribed number of classrooms as directed in writing by the M-DCPS Project Manager, or at a minimum, the following number of classrooms:
   1. Elementary Schools - 8 additional classrooms.
   2. K-8 Centers - 18 additional classrooms.
   3. Middle Schools - 18 additional classrooms.
   4. Senior High Schools - 30 additional classrooms.

D. Utility stub-outs shall be extended beyond sidewalks and other permanent construction toward the area designated to accommodate the future classroom expansion building. Provide the following minimum size requirements for the appropriate new or existing school type unless otherwise directed by M-DCPS Project Manager.

<table>
<thead>
<tr>
<th>PROVISIONS</th>
<th>ELEM</th>
<th>MID &amp; K-8</th>
<th>SR. HIGH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sanitary:</td>
<td>4”</td>
<td>4”</td>
<td>4”</td>
</tr>
<tr>
<td>Minimum diameter of cast iron pipe or PVC with 1/8” per foot minimum slope.*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Domestic Water:</td>
<td>2”</td>
<td>2”</td>
<td>2-1/2”</td>
</tr>
<tr>
<td>Minimum diameter of type “L” or “K” copper or PVC. */ **</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>3. Electrical Load:</td>
<td>8</td>
<td>18</td>
<td>30</td>
</tr>
<tr>
<td>Minimum number of Portable single classrooms, with 120/208V single phase, 9 KW demand each.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Switchboard:</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Number of blank spaces for Future 400 amp breaker labeled “FUTURE EXPANSION”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Fire Alarm:</td>
<td>2</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Panel with number of sets of spare zone modules.***</td>
<td></td>
<td></td>
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<tr>
<td>6. Intercom:</td>
<td>8</td>
<td>18</td>
<td>30</td>
</tr>
<tr>
<td>Console rated for number of additional classrooms and with space for equal number of future clocks, speakers and call buttons.</td>
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<td></td>
<td></td>
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<tr>
<td>7. ITV:</td>
<td>250 feet</td>
<td>400 feet</td>
<td>400 feet</td>
</tr>
<tr>
<td>Terminal able to be tapped and transmit the signal though number of feet.</td>
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<td></td>
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<tr>
<td>8. Telecommunication:</td>
<td>8</td>
<td>18</td>
<td>30</td>
</tr>
<tr>
<td>Telephone frame/data cabinet with capacity for number of classrooms.</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>9. Intrusion Detection:</td>
<td>10</td>
<td>23</td>
<td>38</td>
</tr>
<tr>
<td>Panel with minimum number of spare zones, half for doors and half for motion detectors.</td>
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<tr>
<td>10. Energy Management:</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Panel with number of spare control points.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>11. Empty Conduits:</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Number of conduits from each related board or equipment, to future classroom expansion.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Power:</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Number of 4″ conduits from main switchboard to underground junction box.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Audiovisual:</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Number of 2″ conduit for clocks, speakers, call buttons.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. ITV and security from the intercom console connected also to ITV terminal rack.</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
d. Telecommunication: 2 5 8
   Number of 2” conduits from main telecom. room.

e. Fire Alarm: 1-1/2” 1-1/2” 2”
   Diameter of conduit from fire alarm panel.

* PVC is allowed only at exterior buried locations not designated for future expansion and shall have provisions for locating after burial.
** Maintain 30 psi minimum while flushing at the most remote portable classroom location. PVC is allowed only at exterior buried locations not designated for future expansion and shall have provisions for locating after burial.
*** Each set shall be one initiating and two appliance circuits.

E. Provisions for future classroom expansion building (such as plumbing, electrical, fire protection, security, and other listed requirements above) shall be extended to a finish grade landscaped area at least 5 feet beyond an appropriate exterior building location in the area designated by M-DCPS. Do not locate in circulation paths or in areas receiving future construction. Show and note provisions in construction documents. Coordinate with M-DCPS for the exact termination point of all conduits prior to commencement of design. Provide intermediate conduit run pull boxes as per NEC requirements.

F. Terminate water lines for future expansion at a capped valve inside a valve box.

G. Terminate sewer line for future expansion at a concrete box with lid. Bring riser pipe within 6 inches of the surface.

H. Empty conduits shall terminate in pull-boxes sized per NEC, be readily accessible, provide with lockable covers, and identified.
   1. Provide at least one pull-box for each of the following:
      a. Power.
      b. Fire alarm.
      c. Low voltage systems of Telecommunication.
      d. Low voltage systems of security, clocks, ITv and energy management.
      e. Intercom.

I. Indicate dimensions for locations of empty raceways and include information concerning type, size, number, use, intermediate pull-boxes, routing locations, and other related provisions on a construction document site plan labeled “Provisions for Future Classroom Expansion”.

1.3 TELECOMMUNICATION SYSTEM

A. Telecommunication system will be installed by M-DCPS Information Technology Services – Infrastructure and System Support (ITS/ISS).
   1. ITS/ISS will provide and install the following:
      a. Telecommunication equipment, wiring and devices.
      b. ITS data network equipment and wiring.
2. The sizes and runs of conduit and cable trays, outlet boxes, pull-boxes, device boxes/enclosures, dedicated equipment spaces for the telecommunication system, and power for these systems shall be indicated on drawings and furnished and installed by the Contractor.

3. Provide a flexible cost-effective system for distributing the interconnecting wiring between the various devices in this section.

4. In retrofits of existing buildings, or in additions projects, coordinate with ITS/ISS the use of the existing telecommunication equipment rooms, to avoid the rewiring of the entire facility. Each added/remodeled space shall have adequate telecommunication and infrastructure provided to permit ITS telecommunication wiring to be connected to the existing telecommunication room and to new and/or existing satellite wiring closets.

5. Systems shall comply with FBC, and shall be listed by an OSHA approved Nationally Recognized Testing Laboratory (NRTL).

B. Consult with ITS/ISS, (305) 995-3332, regarding all the necessary requirements for telecommunication systems. ITS/ISS will assign a coordinator for each project.

C. Telecommunication system at addition, renovation, or remodeling projects shall be evaluated by the A/E with consultation with the ITS/ISS staff to determine if the existing system is usable, expandable, and complies with FBC and M-DCPS Design Criteria requirements. If the existing system needs to be modified or replaced, ITS/ISS will review and approve the scope of work.

D. Submittals and Review Requirements.

1. During Phase I/II, coordinate the locations and methods of connecting all telecommunications equipment rooms and raceway systems including number & sizes of spare raceways with ITS/ISS and the M-DCPS Project Manager.

2. The Phase I /II power/telecommunication systems drawings shall be submitted to ITS/ISS for their review and approval. These drawings shall include, but not be limited to the following:
   a. Conduit layout at 1/8" scale floor plans with conduit sizes noted.
   b. Main telecommunications room and satellite wiring closets located on minimum 1/4" scale floor plans.
   c. Conduit layout on an overall site plan showing each existing and future building, telephone service to site, conduits between the main telecommunications room and satellite wiring closets, and conduits between the intercom equipment racks and satellite closets.
   d. Electrical legends for all devices, included but not limited to speakers, clocks, bells, call buttons and telecommunication outlets.
   e. Electrical power legend for all electrical outlets in the main telecommunications room and satellite wiring closets.
   f. Location of the dialer for all fire alarms, security and card access systems panels, as well as other panels needing telecommunication/network connectivity.

3. Phase III power/telecommunication system drawings including all FF &E layout drawings shall be submitted to M-DCPS ITS/ISS personnel for their review and approval. The Phase III Documents shall reflect the final Florida Inventory School House (FISH) room numbering scheme approved by M-DCPS, and shall include but not be limited to the following requirements:
   a. Revised drawings and written response to review comments in all previous Phases.
b. Complete electrical specifications.
c. Complete, detailed, and itemized construction cost estimate according to Contract requirements.
d. Completed electrical drawings coordinated with plans and specifications of structural, architectural, electrical, civil, laboratory equipment supplier, kitchen equipment supplier, and Not-In-Contract (NIC) FF &E items.
e. Complete riser diagram showing the location of every telecommunication outlet and conduit sizes from the various wiring closets to the outlets. This shall include the conduits between the wiring closets and the main telecommunications room, and locations/sizes of all pull boxes and junction boxes uses in the conduit system.
f. Location of the dialer for all fire alarms, security, card access systems panels as well as other panels needing telecommunication/network connectivity.

4. All Telecommunication systems shop drawings shall be submitted, through the M-DCPS Project Manager, to ITS/ISS for review, coordination, comments, and acceptance.

5. Once the project is in construction, any new revisions to previously approved drawings pertaining to the telecommunication systems shall be submitted to ITS/ISS for their review, as this may affect their Not-In-Contract wiring bid process.

E. Telecommunication Systems Requirements:
1. All telecommunication system conduits shall be provided with pull-strings that are properly identified and are of adequate length and pulling strength capabilities.
2. All telecommunication systems conduits penetrations shall be properly fire-caulked.
3. Provide for a system of “homerun” conduits from the nearest satellite wiring closet, to all large-group areas including the Administration, Student Services, Media Center, Dining Room, Auditorium, Exterior Covered Dining and open courtyards, in order to provide wireless connectivity to these areas. For each of these areas, terminate the “homerun” conduit at a centrally located 18" L x 18" W x 6" D junction box with screw-on cover plate mounted above the ceiling. For exterior locations, the 18" L x 18" W x 6" D junction box shall be located above the ceiling of an interior space that has a common wall with the exterior area. At these locations, the interior mounted 18" L x 18" W x 6" D junction box shall also be connected to an exterior wall-mounted 4" L x 4" W x 4" D weather tight junction box with screw-on cover plate, located on the exterior side of the wall. The A/E shall coordinate the location of all wireless connectivity raceway system with M-DCPS ITS/ISS personnel during the Phase III Matrix Review process. All homerun conduits from a single telecommunication outlet shall be based on four (4) telecommunication cables per outlet.
4. Provide a minimum of two (2) 4-inch underground conduits for the AT&T/Florida service entrance. Conduits shall extend from the property line to the main telecommunications room. Conduits shall be incased in concrete the full length and shall be terminated at the main telecommunications room, against the lower left hand corner of one of the walls that does not contain the entrance door, and at the property line, within a 24" W x 36" L x 30" D traffic rated hand-box with screw on cover lid, containing a minimum of a 12-inch layer of 3/4” crushed stone at the bottom of the box for drainage. The A/E shall coordinate the location and installation requirements for these conduits with AT&T/Florida.
5. Coordinate the installation and all power requirements of all AT&T equipment to be located in the Main Telecommunications room with AT&T/Florida Building Industry Consultant Services (BICS).

6. Provide each office and instructional space with a minimum of one telephone outlet or more according to program requirements, with appropriate conduit with pull strings.

7. Provide an empty conduit system from the nearest satellite wiring closet to the following locations, for the installation of ITS wiring according to program requirements:
   a. Telecommunication Locations:
      1) All Instructional spaces (classrooms and labs). Coordinate layouts of devices with M-DCPS ITS/ISS.
      2) Administration and Student Services areas:
         a) All staff offices.
         b) All conference rooms.
         c) All secretarial stations.
         d) Clinic.
         e) Student activities and student careers rooms.
         f) Production workroom (for NIC copiers).
         g) Student records (for NIC copiers).
         h) At each reception counter area.
      3) Media center:
         a) Media center director’s office.
         b) Reading Room (for NIC copiers).
         c) Electronic catalog carrels.
         d) Circulation desk.
         e) Provide telecommunication outlets in the Reading Room for “Bring-Your-Own-Device” student program. Each telecommunication outlet shall be accompanied by a 120V duplex receptacle.
      4) Food Service Areas:
         a) Two (2) outlets at the Food Service Manager’s office.
         b) At each Point-of-Sale (POS) cash register. See Educational Specifications for actual number of POS stations.
         c) At each food-cart alcove. See Educational Specifications for actual number of food-cart alcoves.
         d) Provide telecommunication outlets in the Cafeteria and exterior student dining areas for “Bring-Your-Own-Device” student program. Each telecommunication outlet shall be accompanied by a 120V duplex receptacle.
      5) Teachers’ Lounge.
      6) Custodial central receiving.
      7) Zone mechanic’s office.
      8) Auditorium stage and control booth.
      9) Cafetorium stage and control booth.
      10) Language Arts Lab (Little Theater) control booth.
      11) Network Server rooms.
      12) Teacher planning rooms.
      13) Concession booths at Auditorium and Gymnasium.
      14) Irrigation control system controller.
15) Card Access control panels.
16) Intrusion alarm panels.
17) Fire Alarm Digital Alarm Communicator Transmitter (DACT) (for two separate telephone outlets per NFPA 72).
18) Security Camera System Control Room.
19) Energy Management System Control panel.
20) Elevator equipment rooms.
21) Outdoor marquee school sign.
22) Electric utility meter room.
23) At each visitor’s entrance area, provide one data outlet and one quadraplex 120V electrical outlet for use with an NIC “Visitors Identification scanning system”.
24) Pay telephones locations.
25) Fuel islands.
26) Other spaces as may be required by the Educational Specifications and/or school building staff.

8. Provide at least one pull-box for every 100 feet of conduit run.
   a. Install additional pull/junction boxes in runs exceeding 100 feet.
   b. Conduit runs shall not have more than two 90-degree bends or equivalent. Provide additional pull-boxes regardless of length to meet this requirement.
   c. Each conduit run from the main telecommunications room or satellite wiring closets to each telecommunications station shall not be longer than 250 feet.

9. Use center hung cable tray systems when appropriate and cost effective, with routings following corridors to the main telecommunication room and satellite wiring closets for telecommunication and intercom wiring distribution.

10. When cable trays are used, specify a dedicated cable tray for sole use by ITS/ISS. Provide the dedicated cable tray in each building leading from the main telecommunication room and each communication satellite wiring closet and running the entire length of the corridors. Specify that under no circumstance shall the Contractor use the ITS/ISS dedicated cable trays for placement of any other in-contract wiring.

11. All cable trays shall comply with the following:
   a. Provide properly sized metallic conduit with pull string, from the cable tray to each piece of equipment, device, or telecommunications outlet.
   b. Cable trays shall be concealed above fully accessible ceilings. Cable trays in exposed locations or above plaster, metal, concealed spine, or any other inaccessible ceilings are not allowed.
   c. Cable trays shall not run at exterior covered walkways
   d. Cable trays shall not obstruct light fixtures, access panels, damper controls, piping valves, or other equipment requiring access.
   e. Maintain fire ratings when conduits or cable trays penetrate fire rated assemblies.
   f. Size cable trays for 140 percent of required capacity and specify positioning of hangers with adequate clearance to allow an installation of a future second tray.
   g. Cable trays shall be grounded by 1 #6 AWG copper ground wire.

12. Mount telecommunication outlets according to the following:
   a. Telecommunication outlets shall be provided flush mounted on the wall, 18 inches above finish floor to center of outlet, unless otherwise indicated in this Division or the Educational Specifications issued for the project.
b. Secretarial stations: 18 inches above finish floor to center of outlet or in an appropriate floor outlet depending on the design layout. Floor outlets shall be avoided if possible.

c. Computer labs: In addition to the requirements for instructional areas, provide each computer lab with the following:

1) A 2-piece, 2-compartment raceway system using one (1) duplex receptacle per data outlet. See Appendix “Computer Lab” Layout for details. Data outlet covers to be provided by the Contractor. Extend appropriately sized conduit from the raceway to a satellite closet. Each computer lab outlet box requires one 4-pair cable. Size conduit as follows:

<table>
<thead>
<tr>
<th>Conduit Size</th>
<th>Number of Cables When Pulled Together</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot; (minimum)</td>
<td>2</td>
</tr>
<tr>
<td>3/4&quot; (minimum)</td>
<td>4</td>
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<tr>
<td>1&quot;</td>
<td>7</td>
</tr>
<tr>
<td>1-1/4&quot;</td>
<td>12</td>
</tr>
<tr>
<td>1-1/2&quot;</td>
<td>19</td>
</tr>
<tr>
<td>2&quot;</td>
<td>30</td>
</tr>
<tr>
<td>2-1/2&quot;</td>
<td>54</td>
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<tr>
<td>3&quot;</td>
<td>80</td>
</tr>
</tbody>
</table>

d. Food Service Areas:

1) Manager’s office strobe/bell: Provide a 1/2” conduit from the nearest satellite wiring closet to a junction box outside the office in the kitchen for a M-DCPS provided strobe light/bell unit. Locate the kitchen junction box centerline 7’-6” above finished floor in an unobstructed visible location.

2) Point-of-Sale (POS) System:

   a) Provide each POS cashier station one (1) telecommunication outlet, and one (1) 120V duplex outlet on a 20-Amp dedicated circuit.

   b) Telecommunication lines for POS cashier stations shall be terminated at the nearest satellite wiring closet and shall not exceed 300 feet in total length (includes all vertical and horizontal runs). Daisy-chaining data wiring between POS stations is not permitted.

   c) Data and electrical outlets serving POS cashier station at interior and exterior serving bays shall be located in an easily accessible area underneath each POS cashier station, a minimum of one foot above the finish floor to center line, and in a manner that when connected to the POS cash register, the exposed data and electrical wiring will not create a trip hazard for students and employees.

   d) Verify placement and specifications for all telecommunication wiring within the food service area with M-DCPS Food Service and ITS/ISS personnel.

3) At the manager’s office, provide two (2) telecommunication outlets, dedicated to the POS system, and connected directly to the main telecommunication room with a 3/4” conduit with pull string.
e. Floor mounted telecommunication outlets shall have a mounting frame for a duplex receptacle, a brass cover with brass screws, and two hinged lids to allow the use of either or both outlets.

f. Provide a 3/4” conduit homerun to the nearest communication closet for each floor mounted telecommunication outlet. Wiring of floor-mounted outlets in a “daisy-chain” fashion is not permitted.

   a. Provide a main telecommunications room and satellite wiring closets for installation of all telecommunication equipment and wiring as indicated in this Division. Main telecommunication room and satellite rooms shall be located not to exceed the maximum allowable length of 250 feet for communication cables.
   b. The main telecommunications room and satellite wiring closets shall be designed without any columns or beams interrupting these spaces, and with a minimum unobstructed clear ceiling height of 10 feet AFF.
   c. Design the entry doors to the main telecommunication room and all satellite wiring closets to swing out, to permit maximum use of the interior space for these rooms.
   d. Locate main telecommunication room and satellite wiring closets away from generators, compressors, electrical switchboards, transformers, panelboards, and any other potential sources of radiated or conducted electrical interference, as electrically generated magnetic fields.
   e. Electrical panels, transformers, switches, or any other similar electrical equipment shall not be located in the main telecommunications room or any of the satellite wiring closets.
   f. HVAC ducts, water, sewer, air-conditioning chilled water, or other similar piping shall not enter or pass through the main telecommunications room or any of the satellite wiring closets.
   g. Walls in the main telecommunications room and in all satellite wiring closets shall be covered from floor to ceiling with 3/4” thick plywood backboards painted with fire retardant gray paint. Data conduits entering/exiting these rooms shall be terminated at the top or bottom edge of these backboards and all penetrations shall be fire rated.
   h. The floor for main telecommunications room and all satellite wiring closets shall be designed for a minimum live load of 150 pounds per square foot.
   i. The flooring for the main telecommunications room and all satellite wiring closets shall be finished with pigmented concrete sealer or pigmented concrete stain prior to the installation of any communications equipment.
   j. The main telecommunications room and all satellite wiring closets shall be provided with supplemental HVAC necessary to maintain a temperature of 75 degrees F. and a relative humidity of 60 percent at all times (24/7). The heat load for the Not-in-Contact (NIC) equipment designated for Main Telecommunication Room is approximately 20,000 BTU/hr. The heat load for the NIC equipment designated for the satellite wiring closets is approximately 5,000 BTU/hr. For each Project, the A/E shall coordinate with ITS personnel to confirm the heat load for the actual NIC equipment that will be designated for each of these spaces.
   k. See Design Criteria Appendix for main telecommunications room and satellite wiring closet layouts.
14. Main Telecommunications Room.
   a. Minimum room dimensions shall be 11 feet deep, 29 feet wide, and 10 feet high, with a 3 feet x 7 feet high metal door, with “MAIN TELECOMMUNICATIONS ROOM” signage (and also including the FISH room number, with Braille, mounted at a location accessible to the disabled, in accordance with FBC).
   b. In new construction, the main telecommunications room shall be a separate room located adjacent to the Administration area.
   c. Provide 2 separate isolated grounds, one of which shall be dedicated for the telecommunication system only.
   d. All interior walls of the Main telecommunication room shall be fully covered with 3/4” fire retardant plywood from floor to 10 feet above finished floor.

15. Satellite Wiring Closets.
   a. Minimum satellite room size shall be 11 feet deep, 15 feet wide, and a minimum of 10 feet clear height.
      1) Access shall be provided from an enclosed interior corridor using a 3'-0" wide x 7'-0" high metal door swinging out and containing a properly rated bottom-louvered section 12" high x 24" wide (where the fire rating/label requirement of the door precludes the use of louvers, an alternate means of ventilating the closet must be designed) and signage indicating “TELECOMMUNICATIONS ROOM” (and also including the FISH room number, with Braille, mounted at a location accessible to the disabled, in accordance with FBC).
      2) All interior walls of the satellite wiring closets shall be fully covered with 3/4” fire retardant plywood from floor to 10 feet above finished floor.
   b. Satellite Wiring Closet Locations.
      1) Locate in a separate room adjacent to electrical rooms.
      2) Shall not exceed a 300-foot maximum wire run between satellite wiring closets and the main telecommunications room.
      3) Shall not exceed a 250-foot maximum wire run between satellite wiring closet and telecommunication outlets.
      4) In multistory buildings, stack satellite-wiring closets vertically and connect with a minimum of three 4” sleeves through the slab. The first floor of the stacked wiring closet shall be fed by four (4) 4” diameter conduits back to the main telecommunications room. When stacking is not possible, or for isolated conditions, provide a minimum of three (3) 3” diameter conduits between each satellite wiring closet and the main telecommunications room.

16. Electrical requirements for the main telecommunications room and satellite wiring closets shall include but not be limited to the following:
   a. Provide grounding and bonding in accordance with ANSI/TIA/EIA-607 and as follows:
      1) At the main telecommunications room provide one (1) 4” high x 20” long x 1/4” thick solid copper ground busbar at the lower hand corner of each backboard wall (minimum of three).
      2) At each satellite wiring closet provide one (1) 2” high x 10” long x 1/4” thick solid copper ground busbar at the lower hand corner of each backboard wall (minimum of three).
      3) All ground busbars shall be listed by an OSHA approved Nationally Recognized Testing Laboratory (NRTL).
4) Ground busbars shall be installed 10 inches above finish floor to bottom.
5) Each ground bar shall have at least 12 branch terminals and be connected by 
   #6 AWG copper to one of the following building grounds.
   a) The metal frame of the building if effectively grounded.
   b) A buried metal water pipe system not less than 10 feet long.
   c) An electrode with at least 2" thick concrete encasement located within and near
      the bottom of a concrete foundation in direct contact with earth. The
      foundation shall have at least 20 feet of either bare solid copper wire
      not less than #4 AWG or one or more steel bars of not less than 1/2"
      diameter.
   d) A ground ring of at least 20 feet of not less than #2 AWG bare copper
      conductor in direct contact with earth and buried at least 2-1/2 feet
      encircling the building or structure and with a #6 AWG wire attached to
      the permanent power ground.
6) Ground conductors shall utilize their own dedicated conduits and not share
   any of the telecommunication conduits, cable trays or raceways.
   b. Provide 120V quadruplex electrical outlets 4-feet on-centers around entire
      perimeter of the main telecommunications room and all satellite wiring closets.
      Each electrical outlet shall be on a 20-Amp dedicated circuit.
   c. At the main telecommunications room provide two (2) 240V L6-30 twist-lock type
      electrical outlets each on 30-Amp dedicated circuits.
   d. Coordinate the exact location of all outlets with ITS/ISS personnel.
   e. All electrical outlets located within the main telecommunications room, shall be
      wired to emergency power service panel.
   f. Provide lighting with a minimum of 30 foot-candles measured at 3'-0" above
      finished floor level. Use Radio Frequency Interference (RFI)/Electromagnetic
      Interference (EMI) suppressed fluorescent lighting. Electronic ballasts for
      fluorescent fixtures shall comply with FCC-47 CFR Part 18, Non-Consumer limits
      for commercial applications limiting the effects of EMI/RFI.
   g. All equipment mounted outdoors shall be placed in water tight enclosures.
   h. Size system to meet all M-DCPS ITS/ISS requirements future expansion.

1.4 INTERCOM AND CLOCK SYSTEM

A. Intercom System.
   1. Provide a fully integrated digital intercom and clock system with centrally located
      gateway terminals utilizing fiber optic, CAT5/6, copper cabling or as recommended
      by manufacturer in accordance with M-DCPS Design Standards.
   2. The intercom system shall connect the administration and student services areas, with
      all student occupied areas and other spaces as indicated in this document and in the
      “General Consideration” section of the Educational Specifications for the Project.
   3. At new additions or remodeling projects, coordinate with M-DCPS Facilities
      Operations / Maintenance to ensure that the scope of work and the proposed new
      equipment is fully compatible with the existing intercom systems.
   4. The intercom system shall be listed by an OSHA approved Nationally Recognized
      Testing Laboratory (NRTL).
5. The intercom system shall consist of remote 8-Ohm speakers with 25-volt transformers connected via conduit to an intercom control main console with two-way voice communication capability.
   a. Provide conduit and enclosure boxes as required in this Design Criteria.
   b. Speaker design, wiring and/or layout shall prevent adjacent rooms from being inoperative during speaker component failure.
6. Intercom and clock system shall be provided as follows:
   a. Provide two-way call buttons, clocks and speakers at the following locations:
      1) All Instructional spaces (classrooms, labs, multipurpose rooms, etc.).
      2) Staffed administration and student services secretarial areas.
      3) Auditorium/Cafetorium stage.
      4) P.E. Storage rooms when located directly adjacent to a P.E. covered play area (shelter).
      5) At all self-contained administrative offices.
      6) At Media Center adjacent to circulation desk.
   b. Provide clock and speakers at the following locations:
      1) Food Service including but not limited to Food Prep area, Interior Dining and Serving areas (interior and exterior serving bays).
      2) Physical Education areas including the Gymnasium, Locker rooms, Training Rooms, Concessions, Ticket Booth and other related spaces.
      3) Auditorium including Concessions and Ticket Booth areas.
      4) Stage related spaces including Dressing Rooms and Control Booth.
      5) Custodial Receiving area.
      6) Other areas as specify in the Educational Specifications developed for the Project.
   c. Provide intercom speakers at the following locations:
      1) Group toilet rooms.
      2) Interior and exterior corridors and courtyards.
      3) Physical Education shelters and exterior hard-court areas.
      4) Exterior dining shelter.
      5) Bus drop-off covered area.
      6) Specify placement of exterior speakers so as to avoid sound generated by speakers from becoming a nuisance to occupants of neighboring properties.
   d. Provide two-way communications at areas for emergency rescue assistance, in conformance with FBC.
7. Use the intercom system to replace fire alarm pull-stations if allowed by FBC and the Florida Fire Prevention Code.
   a. Provide a two-way communicating system between all normally occupied spaces and a manned location where a general alarm can be sounded.
   b. Omit the manual pull-stations, except at the manned location and in spaces with a capacity of one hundreds (100) or more occupants or in other spaces as required by FBC and the Florida Fire Prevention Code, provided the following conditions are met:
      1) The communication system shall be a two-way system with the capability of originating calls from any station.
      2) Stations shall be located in all student-occupied areas.
      3) The communication system shall be connected to emergency power.
8. The sizes, runs of conduit, cable trays, outlet boxes, pull-boxes, intercom speaker/clock back boxes device box/enclosures, dedicated equipment spaces and power for these systems shall be indicated on drawings and provided and installed within the general construction contract.

9. Connect the intercom system and the clock/bell system to the Facility’s emergency generator power supply.
   a. Specify an uninterruptible power supply system (UPS) as a secondary backup source of emergency power with sufficient capacity to operate the complete intercom system, including two-way communication, under idle load for 24 hours plus all speakers at full load for a continuous period of 5 minutes. Submit battery load calculations to Building Code Consultant (BCC).
   b. Specify a point of connection to notify M-DCPS District Communication Management (DCOM) (305) 995-1550, (a division of M-DCPS Districts Inspections, Operations, and Emergency Management), when the system is on emergency power.

10. At new Facilities, locate the intercom main control console and UPS power backup components within the Media Center Director’s Office/Technical Processing Room.
   a. Intercom functions shall be controlled by intercom administrative telephone units, each containing a built-in display or a desk-mount display, and located as follows:
      1) One (1) at the Principal’s office,
      2) One (1) in the administration secretarial area adjacent to the F/A panel,
      3) One (1) at the media center adjacent to the intercom console,
      4) If the facility is an Enhanced Hurricane Protected Area (EHPA), provide one (1) intercom administrative telephone within the EHPA Manager’s Office.
      5) Specify that all intercom administrative telephones shall be capable of operating to make normal and emergency intercom announcements.
   b. Provide a highly visible (flush or surface) wall-mounted emergency visual display directly above the administrative telephone located in the Administration secretarial area.
   c. The digital base intercom system wiring is based on cat 5/6 cabling. Specify all communication system wiring shall be terminated at a punch-down metal enclosure located directly behind the main intercom control console. Enclosure shall be 48" W x 72" H x 10" D, and shall have hinged doors with locking mechanism. Interior of enclosure shall have surge protection devices for the intercom system and punch-down blocks at least 3 inches apart and at least 3 inches from the sides of the cabinet. This cabinet shall be provided a minimum of 3 feet clearance in front of cabinet for maintenance purposes. From this enclosure provide for each building, a minimum of two (2) 2" dedicated conduits with pull strings and/or cable trays (sized to meet NEC requirements plus 25% for future expansion), terminating at a 24" W x 24" L x 10" D cabinet, with screwed-on cover, located within a satellite wiring closet in each building. From each of these wiring cabinets provide selected raceways terminating at each audio device within each building.
   d. Provide one (1) 2" conduit from the intercom punch-down enclosure located behind the head-end unit, to the Main Telecommunications Room with pull strings.
   e. Provide transient/surge protection on all incoming and outgoing data circuits.
11. The two-way voice communications from instructional spaces will be accessed through a normal/emergency call button outlet box located adjacent to the Instructor’s technology center at 48” AFF:
   a. Normal call – neutral color button.
   b. Emergency call – red button.
12. The intercom speakers shall be wall mounted in a standard clock/speaker assembly. See “Clock System” section for mounting locations.
13. Toilet rooms, hallways and normally unoccupied spaces other than storage rooms shall have ceiling speaker enclosure boxes installed for intercom purposes.
14. The dining room, kitchen food prep area, auditorium/cafetorium, gymnasium, and large group meeting areas shall have additional speakers and enclosure boxes. Determine speaker quantity based on speaker type, room size, configuration, and acoustical characteristics, including space ambient noise.
15. Provide the Closed Circuit Television Production Studio, Closed Circuit Television room and the Stage area with a clock and an intercom speaker with a key-operated volume control (on-off) switch. Volume (on-off) switch shall be located in an accessible area at 48” AFF, and shall be properly labeled. All other occupied spaces shall have the standard clock/speaker assembly.
16. Provide the Principal and all Assistant Principals offices an intercom speaker volume control (high-low) switch mounted adjacent to the Staff’s technology center at 48” AFF.
17. Locate speakers and exterior horns as may be necessary to comply with sound level requirements for interior and exterior spaces.

B. Clock System.
1. Provide a fully synchronized digital based master-clock system. Master clock unit shall have a digital display and be located adjacent to the P/A intercom console. Secondary clocks shall be analog. Digital clocks may be used with written permission from M-DCPS Facilities Design and Standards on a per project basis, Provide an integrated bell system as part of the master clock system.
2. Provide flush-mounted clock/speaker enclosure boxes 7′-6” above finish floor to clock centerline, on a wall providing glare-free and unobstructed viewing in instructional spaces, administration offices, student support services, custodian and cafeteria offices, and other occupied spaces. At instructional areas do not locate the clocks/speaker directly above the location of the interactive whiteboard. Refer to the Appendix section of these Design Criteria for other requirements.
3. Clock/speaker assemblies may be surface mounted in retrofit applications.
4. Speaker wiring conduit shall be at least 1/2” and according to manufacturer’s requirements.
5. When the clock system is a conventional hard-wired (that is to say that it is not a “reduced-wire” or a “wireless” clock system) the clock wiring shall be in a separate conduit from all other wiring. Conduit branching to each clock shall be in at least 1/2” conduit.

C. Wiring and Conduits - General Requirements:
1. Intercom and Clock wiring shall be installed in separate dedicated conduit systems that comply with the following:
   a. Provide at least one pull-box for every 100 feet of conduit run.
b. Conduit runs shall not have more than two 90-degree bends or equivalent. Provide additional pull-boxes regardless of length to meet this requirement.
c. Specify a junction box at each point in the clock conduit system for connecting the clock wiring buss in the conduit to each clock by tapping a branch-wiring run from the buss to the clock.
d. Use the clock section of the back-box as the junction box and wiring the clock buss, with some slack in each box, from the clock to clock in a daisy chain fashion.
e. Size all conduits to meet NEC requirements plus 25% for future expansion.

2. Cable tray systems, when appropriate and cost effective, may be used for the intercom wiring raceway system. All cable trays shall be grounded. Under no circumstance shall clock wiring be installed on cable trays.

3. Underground wiring between buildings and portables shall be aquaseal type with no splices.

1.5 TECHNOLOGY CENTERS

A. The technology center organizes the electronic access functions within a room, at a centralized location.

B. All occupied spaces shall be provided with a technology center.

C. Technology centers shall be located within easy access, control, and use by the instructor or staff, and away from egress doors and egress path.

D. Locate all Technology Center devices, including but not limited to the normal call /emergency call buttons, telecommunication outlets, ITV coaxial outlet, electrical outlets and all empty conduits and outlet boxes serving communication wiring for NIC instructional technology equipment, according to the appropriate configuration reflected in the Appendix section of these Design Criteria, and the program requirements contained in the Educational Specifications developed for the project.

1.6 INSTRUCTIONAL TECHNOLOGIES (Interactive Whiteboards, Digital Projectors, Interactive Projectors, and Classroom Sound Systems)

A. Instructional spaces (classrooms and labs) shall be provided with an interactive whiteboard system centrally located at the front wall of the classroom. Refer to M-DCPS Educational Specifications for different configuration options and their related infrastructure requirements.

B. Spaces designated to receive an NIC interactive whiteboard will also receive an NIC digital projector that will be either wall-mounted or ceiling-mounted. Coordinate with M-DCPS Facilities Design and Standards to confirm the type of NIC digital projector that will be provided at each location.
   1. In areas where the NIC projector is to be wall-mounted, include flat-metal blocking at the wall location where the NIC projector bracket will be installed. Coordinate with M-DCPS Office of Facilities Design and Standards (FF&E Staff) to obtain information on the brand and model of the NIC wall-mounted projector that will be installed in each location in order to determine the size and configuration for the wall blocking required at each location.
2. In areas where the NIC projector is to be ceiling-mounted, the NIC projector bracket will be secured to the underside of the structure at 7'-6" to 9'-4" in front, and along the vertical center line of the NIC interactive whiteboard. In these spaces, the A/E shall ensure that the area above and below the acoustical ceiling from 7'-0" to 11'-0" in front of the NIC interactive whiteboard, is clear of any obstacles that may prevent proper placement and alignment of the NIC ceiling mounted bracket and projector.

3. Refer to the “Technology Center” section of this Division, for detail on additional requirements.

1.7 INSTRUCTIONAL TV (ITV) SYSTEM

A. Specify the installation of an Instructional TV (ITV) System capable of receiving, producing and distributing instructional TV programming throughout the Facility. System shall include but not be limited to all conduits, coaxial cables, coaxial outlets, ITV equipment, CATV service, and TV tower with antenna(s) and accessories, necessary for the reception of Educational Broadband Services (EBS).

B. ITV coaxial outlets shall be provided throughout the facility as follows:
   1. One in each instructional space (classrooms and labs) located by the Instructor’s Technology Center, and at 18” AFF.
   2. One (1) in each office located within the administration and student services areas. Locate ITV coaxial outlet adjacent to the technology center for each office, and at 18” AFF.
   3. One (1) in the Principal’s office. Locate the ITV coaxial outlet 60” AFF, and on a wall that will provide occupants sitting within the Principal’s office and the adjacent conference room, clear line-of-sight to an NIC flat-panel TV provided by M-DCPS FF & E Vendor.
   4. One (1) in each conference room serving the student services and administration areas. Locate ITV coaxial outlet 18” AFF and directly below the NIC interactive whiteboard designated for these rooms.
   5. Six (6) in the Senior High School Auditorium seating area. Locate all ITV coaxial outlets a minimum of 9'-0" AFF, and evenly spaced throughout the auditorium. From this allocation provide one (1) ITV coaxial outlet on each side of the proscenium wall opening.
   6. Eight (8) in the Senior High School dining area. Locate all ITV coaxial outlets a minimum of 9'-0" AFF, and evenly distributed throughout the dining room. When the dining room serves as a Cafetorium, provide from this allocation one (1) ITV coaxial outlet on each side of the stage proscenium wall opening.
   7. Six (6) in Cafeteriums serving Elementary Schools, K-8 Centers and Middle Schools. Locate ITV coaxial outlets a minimum of 9'-0" AFF, and evenly distributed throughout the dining room. Provide from this allocation one (1) ITV coaxial outlet on each side of the stage proscenium wall opening.
   8. One (1) inside the Auditorium/Cafetorium Control Booth, located above the counter in close proximity to the Audio board.
   9. One (1) in the Teachers’ Dining Lounge, mounted at 7'-0" AFF and on a wall that will provide maximum view-angle from the entire room of the N.I.C. flat-panel TV that will be provided by M-DCPS FF & E Vendor.
10. One (1) in teacher planning spaces greater than 300 NSF, mounted at 7'-0" AFF and on a wall that will provide maximum view-angle from the entire room of the N.I.C. flat-panel TV that will be provided by M-DCPS FF & E Vendor.

11. In the Media Center Suite, provide ITV coaxial outlets in accordance with the General Considerations section of the Educational Specifications.

12. At other locations as may be required by the Educational Specifications.

13. Adjacent to all ITV coaxial outlets located higher than 18" AFF, provide one (1) 120V duplex outlet on a 20-Amp dedicated circuit. In addition, at each of these locations provide metal blocking 18" H x 32" W (secured to a minimum of three wall studs) to provide support to an NIC flat-panel TV that will be provided by an M-DCPS FF & E vendor.

14. Show location of all coaxial outlets and related electrical outlets on the Plans.

15. Provide elevation of each wall where outlets are depicted, showing vertical and horizontal measurements at 1/4" scale.

C. TV Tower:

1. Specify the installation of a metal monopole TV tower with a minimum exposed-height of 125 feet above finish grade. TV Tower design shall include but not be limited to the following:
   a. Antennas, cables, and accessories as noted in M-DCPS Design Standards.
   b. Proper grounding in accordance with NEC, and lighting protection in accordance with NFPA 780.
   c. A safety climbing cable beginning at 20 feet above finish grade and terminating at the top of pole, with mid position latches located 25 feet on-centers.
   d. One (1) 36" L x 24" W x 8" D NEMA 3R weatherproof enclosure containing an oval-shape hinged access-panel a minimum of 30" high x 10" wide. Enclosure shall be mounted to the base of the tower so that the bottom of the enclosure is 36" above finish grade. Mounted on the lower right hand corner within the enclosure, provide one (1) 120V GFI quadruplex outlet to a 20-Amp dedicated circuit.

2. Design of the TV Tower shall comply with Florida Building Code. A/E shall submit calculations signed and sealed by a Florida registered professional engineer establishing compliance with the requirements of the FBC, to the Building Code Consultant (BCC).

3. The TV tower shall be located so as to have clear line-of-sight of the M-DCPS transmitter. Consult with M-DCPS Media Programming (WLRN) – Field Engineering Office, (786) 275-0808, prior to determining the on-site location for the TV Tower.

4. The TV tower shall be located so that the cable run from the base of the TV tower to the ITV “Hub” junction box located adjacent to the ITV head end equipment rack does not exceed 300 feet, unless prior written approval is obtained from M-DCPS Media Programming (WLRN) – Field Engineering Office [(786) 275-0808].

5. Prior to Phase III, employ the services of a qualified telecommunications firm, having professional experience in measuring electromagnetic (microwave) emissions, to determine whether a clear radio path line-of-sight exist between the transmitter antenna located 800 feet above grade level (AGL) at 3300 SW 52 Avenue, Pembroke Park, FL 33023 (coordinates 25° 58′ 47.0" North and 80° 11′ 45.0" West), and the receiver antenna located 125 feet AGL at the proposed school site.
   a. All final calculations shall include 125-foot long, 1/2" heliax cable signal attenuation from the antenna, due to signal loss from the antenna to the down converter located at the base of the TV tower.
b. Results from the test shall be used by the A/E to determine best suitable location for the TV tower.

6. Provide a copy of the TV tower design (height, type, location, etc.) and a copy of Line-of-Sight and Signal Strength Testing report to M-DCPS Media Programming (WLRN) - Field Engineering Office (786) 275-0808, for their review and acceptance prior to the submittal of the design documents to the Building Code Consultant (BCC) for permitting purposes.

7. Broadband amplifiers may be allowed only when accepted by M-DCPS Media Programming (WLRN).

8. See Design Criteria Appendix and Educational Specifications for additional requirements.

D. Cable TV (CATV) Service.

1. Coordinate with the appropriate CATV service-provider the location for the CATV raceway; from the off-site point of connection designated by the CATV service provider, to the point-of-termination at the ITV head-end equipment rack.

2. A/E design shall specify a fully operational, "turnkey" Cable TV system installation, from the point of connection to the point of termination at the ITV head-end equipment rack.

3. At the property line, provide a 36" L x 36" W x 36" D traffic-rated concrete vault with a lockable hinged cover, to serve as the CATV service entry point. From this concrete vault provide a 4" conduit terminating at the ITV “Hub”. This conduit shall have no more than two (2) 90º long-sweep elbows (or a maximum of 180º turn) along its entire length, and shall be provided with manhole pull-boxes at interval required by the CATV service provider.

E. ITV Production and Distribution Equipment - Location and Other Requirements:

1. At Elementary Schools:
   a. The ITV production equipment will be mounted on a mobile cart located within the Media Center CCTV Room.
   b. The ITV distribution equipment racks shall be located within the Director’s Office/Technical Processing room. This room shall be provided with a supplemental HVAC system that will maintain a constant temperature of 75 degrees F. and a relative humidity of 60 percent 24/7. See Division 15 of the Design Criteria for additional details on the HVAC requirements.
   c. The ITV distribution equipment racks shall be arranged in a side-by-side configuration with one end of the assembled racks placed against a wall. The opposite end of the assembled racks, as well as the rear of the racks, shall be provided a 36" minimum clearance in order to provide service to all rack equipment. See M-DCPS Master Specifications for equipment details.
   d. On the wall directly behind the ITV distribution equipment rack, provide four (4) side-by-side 120V duplex outlets each on a 20-Amp dedicated circuit.
   e. At the rear of the ITV distribution equipment racks, and directly against the wall that the racks will be placed against, provide a surface mounted 36" L x 36" W x 8" D junction box with a hinged door. This junction box will be noted as the ITV “Hub”. From this junction box, provide the following conduits, junction boxes, cables, etc.: 
1) One (1) 4" conduit (with pull string) connected to a 36" L x 24" W x 8" D NEMA 3R enclosure located at the base of the TV tower. This conduit shall be provided complete with one (1) RG-11 cable (rated for wet-locations), with 75 Ohm type “F” female connectors on both ends. See the “TV Tower” section under this Division for additional requirements on the NEMA 3R enclosure.

NOTE: If the total distance (horizontal plus vertical runs) from the base of the ITV Tower to the “Hub” exceeds a total of 300 feet, replace the RG-11 cable with a 75 Ohm coaxial cable Model No. PIII -700 JCASS as produced by CommScope or M-DCPS approved equal. This cable shall be installed with no splices along its entire length and shall be terminated with 75 Ohm type “F” female connectors on both ends. Provide pull-boxes at a maximum “on-center” distance of 150 feet along the entire raceway. At exterior areas, provide Brooks Products Model No. 66 (30" L x 17" W) traffic rated pull-boxes w/cover, or approved equal. At interior areas provide a standard 18" L x 18" W x 8" D lockable metal junction box with hinged door cover.

2) One (1) 4" conduit and cable, terminating at a 36" L x 36" W x 36" D traffic-rated lockable concrete vault with lockable hinged cover located by the property line. See “Cable TV Service” under this Division for additional requirements.

3) One (1) 2" conduit (with pull string) connected to a wall-mounted 12" L x 12" W x 4" D recessed junction box with hinged door (noted as the “I/O” junction box) located in the CCTV Room. This junction box shall be located on the wall opposite of the Chroma-key wall, at 18" AFF and adjacent to a corner away from traffic. Using a 1-1/2" conduit, connect this junction box to a wall-mounted 12" L x 12" W x 4" D recessed junction box, located 18" AFF and adjacent to one of the curved corners of the Chroma-key wall. Each 12" L x 12" W x 4" D junction box shall have a lockable hinged door and one (1) 120V quadruplex outlet each on a 20-Amp dedicated circuit, located directly adjacent to it.

4) One (1) 2" conduit, complete with RG-11 cable, connected to an 8" L x 8" W x 4" D wall-mounted recessed junction box (complete with RF wall plate) located 18" AFF on the vertical face (the apron) of the front of the Cafetorium stage. Adjacent to this junction box, provide one 8" L x 8" W x 4" D wall-mounted recessed junction box connected to the Cafetorium sound equipment by a 1" conduit containing one “program-out” audio line-level cable with an XLR male connector and wall plate. Each junction box shall be provided with lockable hinged door and one (1) 120V quadruplex outlet on a 20-Amp dedicated circuit, located directly adjacent to it.

5) Each building designated to receive ITV signals, shall be provided an ITV “trunk line” dedicated for that building (e.g., 4 buildings = 4 separate trunk lines). Each trunk line shall consist of one (1) 2" conduit, with RG-11 cable, extending from the “Hub” to the nearest telecommunication room for each building. At the telecommunication room, the conduit shall be terminated at a 24" L x 24" W x 6" D junction box containing a signal amplifier, a signal splitter and a 120V duplex outlet on a 20-Amp dedicated circuit. A maximum of one (1) amplifier is permitted per building. From this junction box, the ITV signal shall be distributed throughout the building using a series of “sub trunk
lines”. A maximum of six (6) sub trunk lines are permitted per amplifier. Each sub trunk line shall consist of the following:

a) One (1) 1” conduit with RG-11 cable, connected to a series of 8” L x 8” W x 6” D junction boxes with screw-on cover, each containing a directional coupler. A maximum of five (5) directional couplers are permitted on each “sub trunk line”.

b) From each directional coupler, the ITV signal shall be extended to each designated space using a TV drop. Each TV drop shall consist of a 3/4” conduit with RG-6 cable, a junction box and TV cable wall plate. A maximum of six (6) drops are allowed for each directional coupler.

c. Within the CCTV Room, provide two (2) wall-mounted data outlets; one at the center of the Chroma-key painted wall, and the other on the opposite wall. Mount outlets at 18” AFF. Provide a 120V duplex outlet on a 20-Amp dedicated circuit, adjacent to each data outlet.

g. See M-DCPS Design Standards and M-DCPS Design Criteria Appendix for additional ITV requirements.

2. At Middle Schools and K-8 Centers:

a. The ITV production equipment will be mounted on a mobile cart located within the Media Center CCTV Room.

b. The ITV distribution equipment racks shall be located within the Director's Office/Technical Processing room. This room shall be provided with a supplemental HVAC system that will maintain a constant temperature of 75 degrees F. and a relative humidity of 60 percent 24/7. See Division 15 of the Design Criteria for additional details on the HVAC requirements.

c. The ITV distribution equipment racks shall be arranged in a side-by-side configuration with one end of the assembled racks placed against a wall. The opposite end of the assembled racks, as well as the rear of the racks, shall be provided a 36” minimum clearance in order to provide service to all rack equipment. See M-DCPS Master Specifications for equipment details.

d. On the wall directly behind the ITV distribution equipment rack, provide four (4) side-by-side 120V duplex outlets each on a 20-Amp dedicated circuit.

e. At the rear of the ITV distribution equipment racks, and directly against the wall that the racks are placed against, provide a surface mounted 36” L x 36” W x 8” D junction box with a lockable hinged door. This junction box will be noted as the ITV “Hub”. From this junction box, provide the following conduits, junction boxes, cables, etc.:

1) One (1) 4” conduit (with pull string) connected to a 36” L x 24” W x 8” D NEMA 3R enclosure located at the base of the TV tower. This conduit shall be provided complete with one (1) RG-11 cable (rated for wet locations), with 75 Ohm type “F” female connectors on both ends. See the “TV Tower” section under this Division for additional requirements on the NEMA 3R enclosure.

NOTE: If the distance (horizontal plus vertical runs) from the base of the ITV Tower to the “Hub” exceeds a total of 300 feet, replace the RG-11 cable with a 75 Ohm coaxial cable Model No. PIII -700 JCASS as produced by CommScope or M-DCPS approved equal. This cable shall be installed with no splices along its entire length and shall be terminated with 75 ohm type
“F” female connectors on both ends. Provide pull-boxes at a maximum “on-center” distance of 150 feet along the entire raceway. At exterior areas, provide Brooks Products Model No. 66 (30” L x 17” W) traffic rated pull-boxes w/ covers, or approved equal. At interior areas provide a standard 18” L x 18” W x 8” D lockable metal junction box with hinged door cover.

2) One (1) 4” conduit and cable, terminating at a 36” L x 36” W x 36” D traffic-rated junction box located by the property line. See “Cable TV Service” under this Division for additional requirements.

3) One (1) 2” conduit (with pull string) connected to a wall-mounted 12” L x 12” W x 4” D recessed lockable junction box with hinged door (noted as the “I/O” junction box) located in the CCTV Room. This junction box shall be located on the wall opposite of the Chroma-key wall at 18” AFF and adjacent to a corner away from traffic. Using a 1-1/2” conduit, connect this junction box to a wall-mounted 12” L x 12” W x 4” D recessed junction box, located 18”AFF, and adjacent to one of the curved corners of the Chroma-key wall. Each 12” L x 12” W x 4” D junction box shall be provided with lockable hinged doors and one (1) 120V quadruplex outlet each on a 20-Amp dedicated circuit, located directly adjacent to it.

4) One (1) 2” conduit, complete with RG-11 cable, connected to an 8” L x 8” W x 4” D wall-mounted recessed junction box (complete with RF wall plate) located 18” AFF on the vertical face (the apron) of the front of the Cafetorium stage. Adjacent to this junction box, provide one 8” L x 8” W x 4” D wall-mounted recessed junction box connected to the Cafetorium sound equipment by a 1” conduit containing one “program-out” audio line-level cable with an XLR male connector wall plate. Each junction box shall be provided with lockable hinged doors and one (1) 120V quadruplex outlet on a 20-Amp dedicated circuit, located directly adjacent to each box.

5) One (1) 2” conduit complete with one (1) RG-11 cable terminating at the sound-equipment rack serving the Language Arts Labs (Little Theater). From the sound-equipment rack provide one (1) 1” conduit, complete with RG-6 (Belden 1694A) cable, terminating at a wall-mounted 4” L x 4” W x 4” D recessed junction box (complete with BNC wall plate) located below the observation window of the control booth, at 18”AFF and facing the Language Arts Labs. Provide a 120V quadruplex outlet on a 20-Amp dedicated circuit, adjacent to the 4” L x 4” W x 4” D junction box.

6) Each building designated to receive ITV signals, shall be provided an ITV “trunk line” dedicated for that building (e.g., 6 buildings = 6 separate trunk lines). Each trunk line shall consist of one (1) 2” conduit, with RG-11 cable, extending from the “Hub” to the nearest telecom room for each building. At the telecom room, the conduit shall be terminated at a 24” L x 24” W x 6” D junction box containing a signal amplifier, a signal splitter and a 120V duplex outlet on a 20-Amp dedicated circuit. A maximum of one (1) amplifier is permitted per building. From this junction box, the ITV signal shall be distributed within the building using a series of “sub trunk lines”. A maximum of six (6) sub trunk lines are permitted per amplifier. Each sub trunk line shall consist of the following:
   a) One (1) 1” conduit with RG-11 cable, connected to a series of 8” L x 8” W x 6” D junction boxes with screw-on cover each containing a
directional coupler. A maximum of five (5) directional couplers are permitted on each “sub trunk line”.

b) From each coupler, the ITV signal shall be extended to each designated space using a TV drop. Each TV drop shall consist of a 3/4” conduit with RG-6 cable, a junction box and TV cable wall plate. A maximum of six (6) drops are allowed for each directional coupler.

e) Within the CCTV Room, provide two (2) wall-mounted data outlets; one at the center of the Chroma-key painted wall, and the other on the opposite wall, mounted at 18” AFF. Adjacent to each data outlet box, provide one (1) 120V duplex outlet on a 20-Amp dedicated circuit.

f) See M-DCPS Design Standards and M-DCPS Design Criteria Appendix for additional ITV requirements.

3. At Senior High Schools:
   a. The CCTV Distribution Center room shall be located directly adjacent to the CCTV Control Room. The CCTV Distribution Center Room, the CCTV Control Room and the Technical Processing/Media Center Director’s Office shall be provided with a supplemental HVAC system that will maintain a temperature of 75 degrees F. and a relative humidity of 60 percent 24/7. See Division 15 of the Design Criteria for additional details on the HVAC requirements.

   b. The dimmer equipment rack for the CCTV Production Studio lighting shall be located in an accessible but out-of-the-way corner of the CCTV Prop Storage Room. The dimmer equipment rack shall be wired to a dimmer remote control jack located in the CCTV Production Studio on the wall opposite the Chroma-key wall and at 18” AFF.

   c. The ITV distribution equipment racks shall be located within the CCTV Distribution Center room. These racks shall be arranged in a side-by-side configuration. One end of the assembled racks shall be placed against a wall and the opposite end as well as the rear of the rack shall be provided a minimum of 36” clearance in order to properly service all rack mounted equipment. See M-DCPS Master Specifications for equipment details.

   d. On the wall directly behind the ITV distribution equipment rack, provide four (4) side-by-side 120V quadruplex outlets each on a 20-Amp dedicated circuit.

   e. At the rear of the ITV distribution equipment racks, and directly against the wall that the racks are placed against, provide a surface mounted 36” L x 36” W x 8” D junction box with a lockable hinged door. This junction box will be noted as the ITV “Hub”. From this junction box, provide the following conduits, junction boxes, cables, etc.:

      1) Two (2) 2” Greenfield conduits with pull string connected to the rear of the distribution racks to run communications wiring thought.

      2) One (1) 2” conduit with pull string connected to the 36” L x 36” W x 8” D (I/O) junction box with hinged lockable door located in the CCTV Production Control Room.

      3) One (1) 4” conduit with pull string connected to a 36” L x 24” W x 8” D NEMA 3R enclosure located at the base of the TV tower. This conduit shall be provided complete with one (1) wet-location rated RG-11 cable with 75 Ohm type “F” female connectors on both ends. See “TV Tower” section under this Division for additional requirements on the NEMA 3R enclosure.
NOTE: If the distance (including horizontal and vertical runs) from the base of the ITV Tower to the “Hub” exceeds a total distance of 300 feet, replace the wet location rated RG-11 cable with a 75 Ohm coaxial cable Model No. PIII -700 JCASS as produced by CommScope or M-DCPS approved equal. This cable shall be installed with no splices along its entire length and shall be terminated with 75 Ohm type “F” female connectors on both ends. Provide pull-boxes at a maximum “on-center” distance of 150 feet along the entire raceway. At exterior areas, provide Brooks Products Model No. 66 (30” L x 17” W) traffic rated pull-boxes w/cover, or approved equal. At interior areas provide a standard 18” L x 18” W x 8” D lockable metal junction box with hinged door cover. One (1) 4” conduit and cable, terminating at a 36” L x 36” W x 36” D traffic-rated lockable concrete vault with lockable hinged cover, located by the property line. See “Cable TV Service” under this Division for additional requirements.

4) One (1) 2” conduit with pull string connected to a wall-mounted 8” L x 8” W x 4” D recessed junction box, with lockable hinged door, located in the Workshop, at 18” AFF. Directly adjacent to the 8” L x 8” W x 4” D junction box, provide a 120V quadruplex outlet on a 20-Amp dedicated circuit.

5) One (1) 2” conduit, complete with RG-11 cable, terminating at the sound-equipment rack serving the Gymnasium. From this sound-equipment rack, provide one (1) 1” conduit, complete with RG-6 (Belden 1694A) cable, terminating at a wall-mounted 4” L x 4” W x 4” D recessed junction box, (complete with BNC wall plate), located 18” AFF and on a clear section of wall that faces the Gymnasium floor. Provide a 120V electrical quadruplex outlet on a 20-Amp dedicated circuit, adjacent to the 4” L x 4” W x 4” D junction box.

6) One (1) 2” conduit complete with one (1) RG-11 cable terminating at the sound-equipment rack serving the Language Arts Labs (Little Theater). From the sound-equipment rack provide one (1) 1” conduit complete with RG-6 (Belden 1694A) cable, terminating at a wall-mounted 4” L x 4” W x 4” D recessed junction box (complete with BNC wall plate) located 18” AFF, below the observation window of the control booth facing the Language Arts Labs. Adjacent to the 4” L x 4” W x 4” D junction box, provide a 120V quadruplex outlet on a 20-Amp dedicated circuit.

7) Each building designated to receive ITV signals, shall be provided an ITV “trunk line” dedicated for that building (e.g., 8 buildings = 8 separate trunk lines). Each trunk line shall consist of one (1) 2” conduit, with RG-11 cable, extending from the “Hub” to the nearest telecom room for each building. At the telecom room, the conduit shall be terminated at a 24” L x 24” W x 6” D junction box hinged lockable door containing a signal amplifier, a signal splitter and a 120V duplex outlet on a 20-Amp dedicated circuit. A maximum of one (1) amplifier is permitted per building. From this junction box, the ITV signal shall be distributed within the building using a series of “sub trunk lines”. A maximum of six (6) sub trunk lines are permitted per amplifier. Each sub trunk line shall consist of the following:

a) One (1) 1” conduit with RG-11 cable, connected to a series of 8” L x 8” W x 6” D junction boxes with screw-on cover each containing a
directional coupler. A maximum of five (5) directional couplers are permitted on each “sub trunk line”.

b) From each coupler, the ITV signal shall be extend to each designated space using a TV drop. Each TV drop shall consist of a 3/4” conduit with RG-6 cable, a junction box and TV cable wall plate. A maximum of six (6) drops are allowed for each directional coupler.

c) The ITV production equipment racks shall be located in the CCTV Control Room. These racks shall be arranged in a side-by-side configuration. One end of the assembled racks shall be placed against a wall and the opposite end, as well as the rear of the rack, shall be provided a minimum of 36” clearance in order to properly service all rack mounted equipment.

d) On the wall directly behind the ITV production equipment rack, provide four (4) side-by-side 120V quadruplex outlets, each on a separate 20-Amp dedicated circuit.

f. At the rear of the ITV production equipment racks, and directly against the wall that the racks are placed against, provide a surface mounted 36” L x 36” W x 8” D junction box with a lockable hinged door. This junction box will be noted as the ITV “I/O”. From this junction box, provide the following conduits, junction boxes, and cables:

1) Two (2) 2” Greenfield conduits connected to the rear of the production equipment racks to run audio/video wiring thought.

2) One (1) 1” conduit with pull string, terminated at a wall-mounted 4” L x 4” W x 4” D recessed junction box with screw on cover located in the Production Studio directly opposite the Chroma-key wall and at 18” AFF. This box will be used for the video program-out monitor. Directly adjacent to this junction, provide one (1) 120V duplex outlet on a 20-Amp dedicated circuit.

3) One (1) 4” conduit with pull string, terminating within the CCTV Production Studio, at a surface mounted 12” L x 12” W x 8” D junction box, with lockable hinged door, mounted at 18” AFF and on the wall directly opposite the Chroma-key wall.

4) One (1) 1” conduit with pull string, terminating at a wall-mounted 4” L x 4” W x 4” D junction box with screw-on cover, located in the Production Studio directly opposite the Chroma-key wall and at 7’-0” AFF. This box will be used for connection of the countdown clock and speakers. Directly adjacent to this junction box, provide one (1) 120V duplex outlet on a 20-Amp dedicated circuit.

5) One (1) 2” conduit with pull string, terminating at a wall-mounted 12” L x 12” W x 4” D recessed junction box, with a lockable hinged door, located within the CCTV Production Studio at 18”AFF and adjacent to one of the curved corners of the Chroma-key wall. This box will be used for connection of the microphone jacks. Directly adjacent to the 12” L x 12” W x 4” D junction box, provide a 120V quadruplex outlet on a 20-Amp circuit.

6) One (1) 2” conduit with pull string, terminating at a recessed wall-mounted 8” L x 8” W x 4” D recessed junction box located within each Editing Room, at 18” AFF. (Total of two). Directly adjacent to each 8” L x 8” W x 4” D junction box, provide a 120V quadruplex outlet on a 20-Amp dedicated circuit.
7) One (1) 4” conduit with pull strings, terminating at a wall-mounted 12” L x 12” W x 8” D recessed junction box with lockable hinged door located at 18”AFF and below the observation window of the Control Booth in the Auditorium/Cafetorium, facing the audience seating area. Provide adequate number of 12” L x 12” W x 8” D pull-boxes with screw on cover along the length of this conduit to restrict the total number of “bends” along its entire length to 180°. From the 12” L x 12” W x 8” D junction box located below the observation window, provide the following:
   a) One (1) 4” conduit with pull string, terminating at a wall-mounted 12” L x 12” W x 8” D recessed junction box with lockable hinged door located at the center of the “apron” of the stage (the vertical section of the thrust-stage facing the seating area) and 18” AFF.
   b) One (1) 1” conduit terminating adjacent to the Audio rack located within the Control Booth.
   i. Within the CCTV Production Studio, provide two (2) wall-mounted data outlets; one at the center of the Chroma-key painted wall, and the other on the opposite wall. Mount outlets at 18” AFF. Adjacent to each data outlet, provide a 120V duplex outlet each on a 20-Amp dedicate circuit.
   j. See M-DCPS Design Standards and M-DCPS Design Criteria Appendix for additional ITV requirements.

1.8 SOUND REINFORCEMENT SYSTEMS

A. Provide a sound reinforcement system in the Auditorium/Cafetorium, cafeteria, gymnasium, theater lab (language arts), gymnastics dance, and at other locations as may be required by the Educational Specifications. Sound reinforcement system shall have the following operational capabilities:
   1. Sound reinforcement for live presentations.
   2. Recording of live performances and reproduction of prerecorded cassettes and compact disks.
   3. Stage monitor system for future portable speakers suitable for audio monitoring and sound effects.
   4. Provide for external recordings, radio, television, and other media feed outputs.
   5. Properly matched projector input.
   6. Cue headset systems with inputs noted.

B. See Design Criteria Appendix for sound reinforcement system riser diagrams.

1.9 INTRUSION ALARM SYSTEM:

A. Specify an intrusion detection system that is listed by an OSHA approved Nationally Recognized Testing Laboratory (NRTL), and is complete with control panel(s), keypads, extended zone modules, and supervised remote power supplies.
   1. Show component locations on construction documents.
   2. In addition to standard functions, include the capability to bypass any zone or use time delay operation.
   3. The system shall be hardwired in its entirety.
   4. Provide system with electric transient surge protection.
   5. Provide all electrical components with electric transient surge protection.

B. The intrusion alarm system shall be zoned to annunciate the location of activated device within the facility initiating the signal.

C. The security system wiring shall run in cable trays, whenever feasible, with connections from the cable tray to any device or equipment in dedicated metallic conduit. All cable trays shall be grounded as per NEC requirements.

D. The security wiring shall be:
   1. Power: 1 pair (stranded size varies with load and distance)
   2. Signal: 1 pair (3 #22 AWG stranded loop system)

E. Specify that the activation of any device that occurs during non-student-occupied hours shall alert the Schools Administration area, and M-DCPS District Communication Management (DCOM) (a division of M-DCPS Districts Inspections, Operations, and Emergency Management).

F. Specify that the programming and interface to DCOM shall be provided by the Contractor.

G. Door Contacts.
   1. Provide door contacts and related devices at the following locations:
      a. At all exterior doors, roof hatches, and smoke vents.
      b. At all interior doors controlled by the Card Access Control System.
      c. At all interior doors to high security spaces including but not limited to student records vault, Media Center audiovisual storage, CCTV Studio, CCTV Control Room, CCTV Technical Processing Room, computer equipment rooms, flammable and hazardous storage rooms, and facility operation and management equipment rooms.

H. Motion Detectors.
   1. At the ground floor and other spaces at floors with potential access from adjacent roofs, covered walkways or overhangs, provide motion detectors in each area or space with windows, fixed glass, or glass block to the exterior and any room with vision panels.
   2. Provide motion detectors at enclosed stair towers at the floors above the ground floor to protect the egress doors to the stairs.
   3. Provide motion detectors at exterior accessed storage rooms.
   4. Provide individual zones for each motion detector.
   5. Motion detectors shall be dual technology (PIR/microwave).

I. The system shall provide for the separate partitioning of cafeterias, cafeteriums, auditoriums, food service areas, gymnasiums/locker rooms, media centers, administration areas, music rooms, little theaters, and other areas when specified in the Educational Specifications developed for the project. A building may have multiple partitions but one partition should not include multiple buildings.

J. A maximum of 4 associated door switches may be grouped in a zone. Provide independent wiring to each switch from a junction box located next to the expansion zone module (EZM) before converting to a zone.
K. Provide an intrusion detection keypad within 5 feet from any door controlled by the card access control system. Keypad shall be located on the inside of the controlled area.

1.10 CARD ACCESS CONTROL SYSTEM:

A. Provide a network ready, and web browser based card access control system in all new construction and designated renovation projects, to monitor and control access to designated areas.

B. Access control systems shall be stand-alone and shall have the ability to integrate with the fire alarm, intrusion detection and security camera systems.

C. The design shall include necessary components, wiring, for power and control to sensors, card access controls, locks, and other door hardware items or devices required for a complete operable and fully integrated system.

D. Provide an uninterruptible power supply system (UPS) for the card access control system.

E. Provide all interior and exterior perimeter doors leading to each Card Access control area a door-contact that is monitored by the Facilities Intrusion Alarm System.

F. Card access control systems shall be referenced and properly coordinated between all construction disciplines such as architectural, structural and electrical, and shall be noted in the door schedule, hardware schedule and hollow metal door specifications.

G. Card Access design, showing the location of all card-readers shall be submitted to M-DCPS Police, the School Principal, Facilities Operations Maintenance Capital Task Force personnel and the appropriate RMC’s Audio-Video Foreperson, for their review and approval during the Phase I/II Matrix Review, and again at the Phase III Matrix Review Meeting.

H. The Card Access Control System shall include but not be limited to the following:
   1. A proximity card-reader installed adjacent to the primary entrance to each card accessed control area.
   2. An intrusion detection keypad located within 5 feet on the interior side of each card access control entry point.
   3. All doors located along the perimeter of all Card Access Control area (i.e. primary entrance door, emergency entrance door, remaining entry doors) shall be provided with all applicable hardware as called for under Division 8 of M-DCPS Design Criteria.
   4. A LAN/WAN connection at each card access panel, meeting the manufacturer’s requirements and compatible with M-DCPS District Communications Operations Management (DCOM).
   5. Provide a 1" diameter conduit with pull string from each card access control panel to the SCS Control Room and a 1" diameter conduit from each card access control module to the nearest SIDF dedicated wall area.
   6. Provide a grounding system to protect all electronic equipment in the SCS control room.
7. A/E design shall include all necessary conduits, cabling and infrastructures for all components, including modules, controllers, sensors, power supplies, and door hardware.

8. The card access control system shall be connected to an emergency power source necessary to operate all system components.

9. Provide fire-seal to all conduit penetrations.

10. Refer to the Door Hardware section of Division 8 of the Design Criteria for additional details on the door hardware for the card access control system.

I. Card access control points shall include, but are not limited to the following:
   1. Main entrance to the Administration and Student Services areas. (*), (**)
   2. Food services kitchen receiving door. (*), (**)
   3. Media center main entrance door. (*), (**)
   4. Auditorium main entrance door. (*), (**)
   5. Music band room. (*)
   6. Security Camera System Control Room. (*), (**)
   7. At an exterior door providing direct access the Physical Education locker rooms. (*)
   8. Main Telecommunication Room. (***)
   9. Testing Materials Storage Room as identified by Administrative Staff. (***)
   10. Other spaces as designated by the Educational Specifications. (*), (**)

(*) Exterior doors to these areas require magnetic door locks.
(**) Interior doors to these areas require electric door strikes.
(***) Entry door to these rooms require magnetic door lock regardless of their location.

J. All magnetic door locks and door strikes shall be installed to fail safe. Refer to Door Hardware section in Division 8 for additional details on door hardware for the card access control system.

K. Provide a surge protective device (SPD) to protect all phases of the electrical panels supplying power to the card access control system.

L. All modules and components of the access control system shall be powered from the emergency power source.

1.11 SECURITY CAMERA SYSTEM (SCS):

A. All projects involving the construction of a new Facility or a major addition will be provided with a NIC Security Camera System (SCS) installed by M-DCPS Facilities Operations - Maintenance Capital Task Force (Security Cameras Dept.). The A/E design shall include all necessary infrastructures to support all NIC SCS equipment, including but not limited to, all raceways (conduits and cable-trays), dedicated electrical power and wiring, and the construction of all spaces necessary for the proper operation and secure storage of the SCS equipment.

B. The quantity of NIC security cameras required for each Facility will vary depending on the scope of work and the design layout developed by the A/E. During the Phase II and Phase III Matrix Design Review Meetings, the A/E shall coordinate with M-DCPS Police, School Principal, and M-DCPS Facilities Operations - Maintenance Capital Task Force (Security Cameras Dept.) for the final quantity of NIC security cameras required for each Facility.
Cameras Dept.), to obtain approval of the exact location for each NIC security camera to be provided at the Facility.

C. During Phase II submittal, the A/E shall submit M-DCPS Facilities Operations - Maintenance Capital Task Force (Security Cameras Dept.), a security camera system riser diagram for their review and approval.

D. Camera locations shall complement exterior building aesthetics. Landscaping materials (i.e., trees, shrubs, etc.) shall be selected and placed so as to avoid obstructing the view of areas of the school site being monitored by the security camera system.

E. In all new Facilities, provide a dedicated SCS control room meeting the following requirements:
   1. The SCS control room shall be a minimum of 8'-0" W x 12'-0" L x 9'-0" clear ceiling height.
   2. The SCS control room shall be located adjacent to the School’s main Administration area, and shall have the same finishes as the Administration Secretarial areas.
   3. The SCS control room shall have no windows or vision panels and all perimeter walls shall extend to the underside of the structure.
   4. Entrance to the room shall have a steel door and frame, complete with a high security lock, and a card access control system in compliance with Division 13 of these Design Criteria.
   5. The SCS control room shall be provided with a supplemental HVAC system capable of maintaining a constant temperature of 75 degrees F. and a relative humidity of 60 percent, continuously (24/7). The cooling capacity shall be calculated based on a minimum heat load of 20,000 Btu/hr. See Division 15 of these Design Criteria for additional details.
   6. Within the SCS control room, provide an 8'-0" wide clear wall area (floor to ceiling) dedicated for the installation of the SCS racks and other SCS wall-mounted equipment. Locate this wall area away from the entrance to this room or any path of egress.
   7. Within the SCS control room, provide one (1) 120V (SPD) duplex outlet on a 20-Amp dedicated circuit, for every thirty-two (32) NIC security cameras to be installed at the Facility. In addition, provide two (2) 120V (SPD) duplex outlets each on 20-Amp dedicated circuits, to serve other NIC SCS equipment shall be clustered in a linear fashion, on the same wall as the NIC SCS equipment rack. A/E shall coordinate with personnel from M-DCPS Facilities Operations - Maintenance Capital Task Force (Security Cameras Dept.) to identify exact location for the SCS equipment rack.
   8. Provide one (1) 1-1/2" diameter conduit with pull string from the SCS Control Room to the School’s Main Server room.
   9. Provide one (1) telephone outlet along wall dedicated for the SCS equipment rack.
   10. Provide a grounding system to protect all electronic equipment located in this room. Coordinate with personnel from M-DCPS Facilities Operations - Maintenance Capital Task Force for specific equipment requirements.

F. All SCS security cameras will be wired to NIC Security Intermediate Distribution Frame (SIDF) equipment located within a nearby telecommunications wiring closet. The A/E design shall identify the location of each SIDF and all the security cameras that each serves. The A/E shall ensure that the cable distance from the SIDF to each camera that it serves does
not exceed 250 feet. The A/E design shall include the following power supply and wiring raceways to support the SCS:

1. Provide a conduit or a “common-use” cable-tray from each security camera location to the nearest SIDF. Provide one (1) 3/4” diameter conduit with pull string from every two (2) security cameras, or one (1) 1” diameter conduit with pull string from a maximum of four (4) cameras “cascaded” together. When a “common-use” cable-tray is used, provided a conduit path from the cable-tray to the SIDF to permit installation of the NIC SCS wiring.

2. At each SIDF location, provide a 4'-0” wide clear wall area (floor to ceiling), with a 5'-0” clearance from any adjacent wall or other non-SCS equipment. This wall area shall be dedicated for SCS equipment only. Centered on this wall area, provide one (1) 120V (SPD) duplex outlet on a 20A dedicated circuit. As part of the design, the A/E shall consider the NIC SIDF rack to have a footprint of 30” x 30”, and an unobstructed maintenance clearance space of 36” in front of the rack.

3. Provide one (1) 1” diameter conduit with pull string from each intrusion alarm panel to the SCS Control Room.

4. Provide one (1) 1-1/2” diameter conduit with pull string from each SIDF to the SCS control room.

5. Provide one (1) 1” diameter conduit with pull string from each intrusion alarm zone module to the nearest SIDF.

6. Provide a 1” diameter conduit with pull string from each card access control panel to the SCS Control Room. (See Division 13 of these Design Criteria for additional requirements on the card access control system).

7. Provide a 1” diameter conduit from each card access control module to the nearest SIDF. Terminate the conduit at the wall area dedicated for the security camera system.

8. Unless required by Code or otherwise indicated in this document, all underground conduits serving the SCS shall be a minimum of 1” diameter with pull string.

9. All electrical outlets serving the SCS shall be connected to the Facility’s emergency-power supply.

10. Provide a Surge Protective Device (SPD) system to adequately protect all phases of electrical panels supplying power to the SCS.

11. All conduits terminating at the SIDF or the SCS control room shall be terminated against the wall designated for the SCS camera equipment.

12. All empty conduits shall be provided with pull-strings and proper identification.

13. All empty conduits serving the SCS shall be provided with necessary junction boxes and long-sweep ells to accommodate the use of fiber-optic cable in these conduits.

14. All video locations must have a clear path to the terminating IDF or MDF room. All conduits shall contain pull strings and be marked at both ends indicating each location.

15. It is desirable, but not mandatory, to provide each SIDF and IDF location, an HVAC system capable of maintaining a constant temperature of 75 degrees F. and a relative humidity of 60 percent, continuously (24/7).

G. Camera locations will vary depending on the scope of work and the A/E design solution for the facility. At a minimum, provide all necessary infrastructures to support the installation of NIC security cameras at the following locations:

1. All major points of congregation, including but not limited to auditoriums, cafeterias, gymnasiums, media centers, court yards, vestibules, and spill-out areas, etc..

2. Building perimeter, including all building entrances and exits.
3. All stairwells and landings.
4. At all corridors in quantities to ensure continuous line-of-sight monitoring of the entire length of the corridor. Provide a minimum of one (1) camera location for every 150 LF of “straight” section of corridor and one (1) camera location within each section of corridor contained by smoke-doors.
5. Outside each student group restroom vestibule.
6. At all elevator lobbies.
7. At the exterior of the door to the Security Camera System Control Room.
8. At Administration and Student Services areas to monitor reception counters.
9. Central and kitchen receiving areas.
10. Physical Education courts and fields.
11. At all walkways and breezeways.
12. Parking lots (driving lanes), parking lot entrances and service drive entrances.
13. Parent drop-off and bus drop-off areas.
14. At all vending machine locations.
15. Entrance to the emergency generator room, main telecommunications room and security camera control room.
16. Each aboveground fuel storage tanks and gas meter location.
17. Cameras are not allowed in instructional spaces, locker rooms, toilet rooms, or any other locations prohibited by statute.
18. Camera locations shall be determined so as to provide an overlap of the designated field of vision and eliminate blind spots.
19. When necessary, camera locations shall be off-set to avoid line-of-sight interference caused by adjacent exit-signs and other ceiling mounted obstructions.

H. Exterior mounted Security Cameras:
1. Whenever possible, exterior camera mountings shall be placed at least 14 feet above finish grade to provide protection from vandalism.
2. For cameras that will be mounted to the exterior perimeter of buildings, the connection junction box shall be located immediate interior to the camera location, and have a 3/4" threaded nipple w/cap, penetrating the perimeter wall at the location where camera will be located.
3. Coordinate placement of landscaping to ensure that security cameras have unobstructed view of designated areas after trees and shrubs have reached their full matured height.
4. A/E shall ensure that site lighting does not interfere with camera viewing capabilities.
5. All pole-mounted and roof-mounted exterior cameras shall be provided TVSS and lightning protection. In retrofit projects, provide re-certification of existing lighting protection systems to include exterior mounted cameras.
6. At each pole where a security camera will be mounted, provide the following:
   a. From the nearest SIDF room, provide a 1" conduit to an in-ground Brooks box located 36" from the base of the pole. From this Brooks box, run a 1" conduit to a 6" x 6" x 6" NEMA 4 junction box (with screw-on cover), secured to the pole at 14'-0" above finished grade. Provide a pull string for the NEMA 4 box to the SIDF room.
   b. Provide a 120V duplex outlet on a 20-Amp dedicated circuit, within a 6" x 6" x 6" NEMA 4 junction box (with screw-on cover) secured to the pole at 14 feet above finish grade. Power for the dedicated outlet will be provide from the nearest emergency electrical panel. For easy of service, provide along the path of the
conduit feeding this service, an in-ground Brooks box 36" from the base of the pole

I. In new additions and remodeling projects, A/E shall coordinate with personnel from M-DCPS Facilities Operations - Maintenance Capital Task Force (Security Camera Dept.) to determine specific requirements for interconnecting the new security camera system with the existing equipment. In these projects, provide a 1-1/2" diameter conduit, with pull string, from all new intrusion alarm panels, and terminate them adjacent to the intrusion alarm panel at the existing facility.

   1. Cameras will consist of fixed position having variable-focal lens, fixed position with telephoto lens remotely controlled, fixed-position 180-360 degree viewing lens, and pan-tilt-zoom remotely controlled units.
   2. Exterior pan-tilt-zoom units will be configured to match the surrounding atmospheric conditions.
   3. Controllable cameras will be programmed according to the facilities schedule to preset positions.
   4. Lenses will be specified according to the field of view, distance, and light conditions.
   5. All cameras will be provided with an M-DCPS accepted vandal resistant weatherproof housing and thermostatically controlled fan.
   6. All cameras will be placed to provide an overlap of the designated field of vision and eliminate blind spots.
   7. Video modules, connector panels and communication devices shall be used for the transmitting of video signals from each camera to the SIDF and SCDF rooms.
   8. Equipment racks and stands shall be used for SCS equipment and devices in the SCDF and SIDF rooms.
   9. Recording / Archiving machines shall be used for storing video recordings.
   10. Video monitoring systems shall be used in the SCDF and or SIDF for local live monitoring and video retrieval.
   11. The use of covert or dummy cameras is not allowed.

1.12 ENERGY MANAGEMENT SYSTEM (EMS)

A. General:
   1. All new Facilities shall be provided with an Energy Management System (EMS).
   2. At existing facilities with an operational EMS, all new work or renovations shall be provided with an EMS that is compatible with the existing EMS. Coordinate with M-DCPS District Inspections, Operations and Emergency Management (DIOEM) (305-995-1550), to determine the extent and scope of the EMS to be provided.
   3. EMS design shall focus on reducing the energy consumption of the new Facility as well as minimizing operational servicing and repairs. A critical aspect of the overall design shall give serious considerations to the installed cost, based on the size and function of the Facility.
   4. The EMS design shall comply with:
      a. Florida Building Code (FBC)
      b. Enhanced Hurricane Protection Area (EHPA) as defined in FBC 423.25
      c. National Fire Protection Association (NFPA) 70
      d. National Electric Code (NEC)
e. ASHRAE 135
g. Underwriters Laboratories UL 916, “Standards for Energy Management Equipment” or other similar standards from an OSHA approved Nationally Recognized Testing Laboratory (NTRL).
h. Section 255.257.of Florida Statutes.
i. M-DCPS Master Specifications Section 13810.

5. The EMS design shall be a fully integrated, communication network system, configured in a “Triad” and comprising the on-site Facility EMS Center, the Regional Maintenance Center (RMC) EMS Station, and the School Board Administration Building (SBAB) Energy Management Terminal LAN communication network.


7. The EMS design shall provide a backup power source for the EMS Center Console, all Building Controllers and controllers serving all major electro/mechanical equipment. During power interruptions, the backup power source shall be capable of maintaining the contents of the EMS functional parameters that are stored in volatile memory (e.g., RAM memory) for a minimum of seventy-two (72) hours.

8. See Design Criteria Appendix for additional information.

B. Functional Configuration:
1. The District EMS Network basic functional design shall achieve remote monitoring and programming of the following:
   a. HVAC parameters modulation.
   b. HVAC equipment auto start/stop.
   c. Timely activation of selective interior and exterior building lighting.

2. The EMS shall have a Triad in tandem configuration, comprised of separate but, concurrently interacting control loops:
   a. On-site EMS Control Subsystem Loop: It shall be the functional core of the School EMS Center. It shall be dedicated to local mode activation and control of diverse equipment confined within the school campus. It shall act independently and be exclusive from any pre-set EMS automation program established by others, to regulate the levels of ambient comfort in occupied spaces. It shall be achieved by means of a centralized console having a “touch screen” monitor depicting a descriptive digital display identifying the actual status of the physical plant performance parameters. The School EMS Center infrastructure shall contain built-in temperature range limiting features. On-site operational control programming shall make the School EMS Center to be self-standing and able to be connected to work simultaneously in conjunction and parallel with the corresponding RMC’s EMS Station and/or the SBAB EMS Terminal. The School EMS Center console display shall be installed in a secure area within the Administration area visible from the Principal's office. Installation shall be flush mounted, so that the bottom edge of the status display window appears at 4'-0" above finish floor, unless otherwise required by applicable accessibility Codes.

   b. Off-site EMS Control Subsystem Loop: It serves to concurrently access each active School EMS Center microprocessor from its corresponding RMC EMS Station. It shall be able to establish operational dialogues by interconnecting in
tandem with assigned schools via electronic communication means. It shall act mainly as a “partner”, dedicated to assist by remote mode in the activation and proper performance of the physical plant machinery, buildings controllers programming and network general conditions monitoring. It shall be capable of remote graphic displays and depicting individual EMS network components working status in real time.

c. The SBAB EMS Terminal represents the third operational element of the District’s EMS Triad. It shall perform diverse supplementary tasks, in particular physical plant equipment start/stop and on/off power activation scheduling, personnel training, and assist in emergency communications response.

C. EHPA - Emergency Shelter Manual Override

1. EHPA Manual Override Panel: At Facilities designated by M-DCPS as an EHPA, provide one EHPA manual override panel for use by authorized Staff to activate manual override of cooling, ventilation and lighting systems serving the designated EHPA zones. Installation of the EHPA Override Panel shall comply with the following:
   a. Install the EHPA Override Panel in the EHPA Emergency Shelter Director’s office. The cabinet shall be labeled “EMERGENCY SHELTER - MANUAL OVERRIDE PANEL LOCATED INSIDE”.
   b. Override-panel shall be operated with a single push button switch and shall have a status light labeled “EMERGENCY SHELTER MANUAL OVERRIDE”, to signal activation.
   c. Upon activation, the EMS shall convert its operating mode to “SHELTER ACTIVE MODE”, providing 24/7 mechanical cooling and ventilation, including lighting, to the designated EHPA zones.
   d. In the “SHELTER ACTIVE MODE”, the system shall override all EMS “time-schedules”, demand-limiting, or energy-saving programs that may compromise the use of the Facility as an EHPA.
   e. The EHPA Emergency Shelter Director’s Office air conditioning, EHPA ventilation and life safety systems shall be connected to emergency power. :
      1) As long as commercial power is available, the facility’s HVAC system shall operate normally.
      2) If commercial power is lost the EHPA systems listed above shall operate on emergency power.

2. Refer to the EHPA Design Criteria Manual for additional details and requirements.

D. Physical Integration:

1. The physical integration of the District wide EMS network shall facilitate the efficient performance control of prime energy users throughout the physical plant. The scope of this provision shall include all electrical and mechanical equipment, water heaters (“boilers”) and overall campus lighting; besides the status of critical alarm systems.

2. Specify a fully integrated EMS Web-enabled hardware and software package with high-speed, peer-to-peer network of Direct Digital Controller (DDC) controllers and operator workstations.

3. Specify that the EMS software shall be a complete Web enabled package including interactive graphics that shall support multiple users utilizing Internet Explorer or other M-DCPS accepted Web browser.

4. EMS wiring shall be installed in conduits separate from any other system.
5. In new schools the EMS design shall include the installation of a dedicated site KW meter to measure, track and record, in real time, the facility’s energy usage and transmit plots of the physical plant electricity consumption data for quantification, monitoring, tracking, and load shedding programs and display at the school’s EMS Center Performance Portal.

6. Exterior lighting circuits shall be interlocked with the EMS. The interlock shall provide for lighting circuits to remain energized (fail-safe) in case of total EMS failure. Full illumination shall be effected only during periods of scheduled evening occupancy. Control of “spot” illumination shall be provided for security purposes where required. Exterior perimeter illumination and artificial lighting of parking lots, and other open areas shall be activated by means of sunlight-exposed photocells and time-of-day controls wired in-series. All EMS outputs for lighting controls shall originate from EMS controllers that are located within 20-gauge panel enclosures wall mounted 54" AFF and located at electrical/mechanical rooms.

7. Exterior lighting circuits shall provide two (2) levels of illumination:
   a. Full illumination - shall be provided only during periods of scheduled evening occupancy.
   b. Reduced illumination - shall be provided for security reasons when the facility is un-occupied; provide for at least the minimum lighting levels set forth in FBC.

8. The on/off switching of buildings’ interior lights shall not be affected by pre-set EMS automatic timing.

9. Exhaust and ventilation fans shall be interlocked with corresponding air handling units.

E. Triad:

1. The EMS Triad is a computer / microprocessor based operational command signals network, comprised of solid state printed circuits components, subsystems, accessories and devices, electronically integrated for the quantification, control and reduction of energy consumption in M-DCPS facilities.

2. The Triad seeks as effective synergy by the complementary interaction of 1) District School Facilities, 2) Regional Maintenance Centers, and 3) M-DCPS Energy Management Network, to attain a cost effective physical plant operation, utilizing an EMS-LAN communication network. See M-DCPS Design Criteria – Appendix for additional EMS information.

F. Other Requirements:

1. The EMS design shall comply with Section 255.257. F.S.; with emphasis on the Energy/Star Program established by the U.S. Department of Energy, Department of Education and the Environmental Protection Agency (EPA).

2. The indoor ambient comfort level modulation range of sensible temperature shall be bounded to 68-78°F, throughout the year.

3. Prior to bidding, the EMS design documentation shall be submitted to M-DCPS DIOEM - Energy Management Staff, for review and acceptance.

4. Building Controller shall be appropriately located within the Main Telecommunication room at 4'-0" AFF. The PC portion of the school’s EMS Center Console equipment shall also be located within the Main Telecommunication room.

5. Specify that all EMS equipment shall be located in a manner that will permit easy access for performing routine maintenance.
6. Electrical Transient Protection (ETP) shall be provided for equipment according Division 16 of M-DCPS Master Specifications and Section 13810 - EMS.

7. The EMS Triad shall exhibit common sets of tandem graphical displays that provide real-time information on the operational status of the District’s EMS. See Design Criteria Appendix for additional information.

8. EMS design shall include all necessary power wiring to all DDC controllers including terminal box controllers and control valves.

9. EMS design shall include a minimum of one (1) 120V duplex outlet on a 20-Amp dedicated circuit, adjacent to each EMS AHU controller.

10. Critical alarms shall be sent via e-mail to the appropriate RMC serving the school, and to a designated maintenance printer. Critical alarms shall include but not be limited to the following:
   a. Chiller failure
   b. Pump failure
   c. AHU failure
   d. CO₂ over limit
   e. Variable Speed Drive Failure
   f. Cooling tower water Alarm
   g. EHPA activation

11. Control points shall include, but not limited to:
   a. HVAC: chillers, pumps, cooling tower fans, and ventilation and exhaust fans.
   b. Boiler and water heaters.
   c. Interior and exterior lighting.

END OF DIVISION