

BUILDING SYSTEMS NARRATIVES

## TECHNOLOGY & SECURITY NARRATIVE

4.1.2 – 09g

# **Northeast Metropolitan Regional Vocational High School Wakefield, Massachusetts**

## **Technology and Security Building Systems Narrative**

### **I. Overview**

The technology and security scope of work for New Construction alternatives shall consist of the following systems.

- A. Tele/Data Infrastructure
- B. Wireless LAN
- C. Voice Infrastructure and Phone System
- D. PA/Intercom System
- E. Master Clock/Secondary Clock System
- F. Integrated Electronic Security System CCTV Video Surveillance
  - Access Control
  - Intrusion Detection
  - Vape Detection
  - Gunshot Detection
- G. Large Venue Live Sound Reinforcement Systems
- H. Large Venue Video Projection Systems
- I. Classroom Speech / Sound Reinforcement Systems
- J. Instructional Audiovisual Systems

Typical Room Design descriptions are presented in this document to provide details on Technology/Security systems and device quantities.

## **A. Tele/Data Infrastructure**

The Tel/Data infrastructure shall consist of Communications Equipment Rooms and two physically separate structured premises cabling systems. For security and logistical reasons, IP security and building system IP devices such as IP CCTV cameras, lighting control IP devices, and HVAC IP devices shall reside on a data network physically separate from the school Local Area Network

Communications Equipment Rooms will conform to BICSI standards.

Backbone and horizontal cabling shall be installed according to current EIA/TIA and BICSI industry standards.

### **Communications Equipment Rooms**

Communications Equipment Rooms included in the building design are designated as Main Distribution Frame (MDF) and Intermediate Distribution Frame (IDF).

The MDF shall be the Demark location for voice, CATV, and Wide Area Network services from the street.

The MDF and IDF rooms shall be the intermediate wire closets for termination of data and voice horizontal UTP cabling located within 290 cable feet of their locations.

They shall contain the following network cabling equipment:

- 2-post equipment racks and cabinet equipment enclosures
- Ladder rack/cable tray
- Vertical wire managers
- Horizontal wire managers
- Patch panels
- Backboards (one 4' x 8" minimum)
- Punch down blocks (110 style)

The MDF and IDF rooms shall be environmentally controlled for the quantity of active electronic equipment to reside in them.

All electrical receptacles shall be on an emergency/standby generator.

Cabling and passive equipment shall be included in the base contract.

Active equipment shall be purchased as part of the Technology FF&E equipment procurement process.

## Cable Pathways

Cable pathways and Work Area Outlets shall be as follows:

### Interior Pathways

- Ladder rack/cable tray in wire closets Multiple 2" sleeves from the corridors into rooms
- J-Hooks from ladder rack/cable tray and within rooms for station cabling
- 4" sleeves between floors

### Telecommunications Work Area Outlets (WAO)

#### Wall Outlets:

- 4" square or 2-gang back boxes with single-gang or dual-gang plaster rings as required

- Back boxes shall have 1 1/4" EMT conduit stubbed above the nearest accessible ceiling

#### Floor Boxes and Poke-Thru Devices:

- Typical floor boxes shall be a flush combination, low voltage/electrical, Wiremold RFB series, or equal-sized as required.

- Typical Poke-Thru devices shall be Wiremold Evolution series or equal shall be installed

The IDF closets shall be connected to the MDF via new 12-strand 50 micron OM4 multi-mode and 6-strand OS-2 single-mode fiber cables.

The fiber cabling between the IDF closets and the MDF shall be capable of 10GbE.

The IDF closets shall have open 2-post equipment racks with data switches sized according to the number of data drops served by the individual closets.

Category 6E cabling shall be installed in all instructional and office spaces. The Category 6E cabling will be run to the MDF or IDF locations and terminated on Category 6 Patch Panels.

Bandwidth from the IDF closets to the desktop shall be 10/100/1000 Mb/s.

Tel/Data cabling and associated wire closet termination equipment shall be included in the base contract.

Data switches and other active data equipment shall be purchased as part of the Technology FF&E equipment procurement process.

### **B. Wireless LAN**

The Tel/Data infrastructure will include Wireless LAN capabilities.

Access Point enclosures (wall and ceiling mounted) shall be installed in the Gymnasium and Vocational Shop areas as part of the base contract.

The school's existing newer Ruckus 802.11ac Access points shall be re-used. Additional new Ruckus Access Points shall be purchased to provide full building coverage.

Required data cabling shall be included under the Tel/Data Infrastructure scope of work.

Access Points shall be procured as part of the Technology FF&E equipment procurement process.

### **C. Voice Infrastructure and Voice System**

The phone system shall be a Voice over IP system. For life safety purposes, handsets will be located at all administrative desks, in all classrooms, and in all common spaces to provide internal and external communications for all spaces.

Required data cabling shall be included under the Tel/Data Infrastructure scope of work.

VoIP equipment shall be purchased as part of the technology FF&E equipment procurement process.

### **D. Public Address/Intercom System**

An addressable Public Address system and cabling shall be installed. Speakers shall be lay-in speakers on the ceilings or recessed wall speakers.

For life safety and mass notifications capabilities, PA speakers shall be installed in all corridors, classrooms, offices, and common spaces.

The PA system shall be zoned to allow for announcements to be made to groups of speakers in specific areas and individual speakers.

The PA system shall be interfaced with the VoIP voice system to provide the capability for PA and emergency notification announcements to be made from any phone handset.

The PA system shall be interfaced with the Fire Alarm system to interrupt PA announcements during a fire alarm.

The PA system shall be interfaced with all local sound systems so that local sound systems are interrupted during PA announcements and mass notifications.

The PA system equipment and wiring shall be included in the base contract.

#### **E. Master Clock/Secondary Clock System**

The clock system shall be a low voltage wired clock system. The Master Clock/Transmitter shall be located in the MDF.

The Master Clock system shall be interfaced with the PA system to provide for scheduled bell tones to specific zones or throughout the building.

Secondary clocks in large areas (Student Commons, Gymnasium, and Learning Common) shall be 16" in diameter. Gymnasium clocks shall have protective wire grilles.

The Clock system equipment and wiring shall be included in the base contract.

#### **F. Integrated Electronic Security**

Electronic Security shall be accomplished by the integration of the following systems.

- Video Surveillance

- Access Control

- Intrusion Detection

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## **CCTV Video Surveillance System**

The existing Genetec Video Management system shall be upgraded to the latest Genetec Security Center version so that CCTV and Access Control are fully integrated. Additional licenses, new hardware, and additional storage shall be installed.

New single and multiple sensor IP cameras shall be installed. The IP Video Surveillance cameras shall be installed at key locations to provide for full coverage of parking lots, walkways, entrances and exits, interior building corridors, and gathering areas.

The CCTV system shall be a physically separate security network with separate racks and fiber run to each IDF for the network. Required data cabling shall be included in the Tel/Data Infrastructure scope of work.

CCTV equipment and licenses shall be included in the base bid.

## **Access Control System**

### **Proximity / Card Readers**

The school's existing Access Control database system shall be replaced with the latest version of Genetec's Security Center to provide full integration with the CCTV Surveillance system. Licenses and upgrades to the computer hardware are included in the design.

Proximity / Card Readers shall be installed at all staff entry doors.

The Access Control system IP devices shall be on the physically separate security network.

Access Control equipment and low voltage wiring shall be included in the base bid.

Electrified door hardware is included in the design.

## **Exterior Door Audio / Video Intercom**

IP-based door audio-video stations shall be installed at the main visitor doors.

Master stations for door release after a visitor is challenged shall be located at the welcome/security desk and in the main office and principal's office.

The system IP devices shall be cabled to the physically separate security network. Required data cabling shall be included in the Tel/Data scope of work.

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### **Intrusion Detection System**

An addressable Intrusion Detection system shall be installed. The system shall have door contacts on all exterior doors and motion sensors in all spaces with exterior access including classrooms and offices on grade with windows.

The systems shall be programmed as required by the Owner to allow for zones to be independently armed or disarmed.

The Intrusion Detection system shall include a dialer for notification to an alarm monitoring Service Company,

The Intrusion Detection equipment and low voltage wiring shall be included in the base bid.

### **Vape Detection System**

The school's existing (16) FlySense Vape Detectors by Soter Technologies shall be re-used. Additional Vape Detectors shall be installed to ensure coverage of all gang toilets and locker rooms.

Required data cabling shall be included in the Tel/Data Infrastructure scope of work.

The additional required Vape detectors and licenses shall be included in the base bid.

### **Gunshot Detection System**

The existing Guardian Gunshot Detection system sensors by Shooter Detection Systems LLC (SDS) shall be re-used. The existing and additional sensors shall be installed in all corridors and common spaces in the new building but not in classrooms.

### **Visitor Management System**

The school's existing Hall Pass Visitor Management system consisting of the software database, computer, license scanner, and badge printer shall be re-used.

The system shall be located in the main office.

## **G. Live Sound Reinforcement Systems**

Live Sound Reinforcement systems shall be installed in the Auditorium, Gymnasium, Student Commons, Fitness Center, and Weight Room.

The systems shall include:

- Equipment cabinet

- Mixers

- Digital Processors Amplifiers Speakers



- CD / iPod player
- Wired and wireless microphones
- Audio level feedback sensing microphones
- Assistive listening transmitter and receivers
- Remote control touch panels
- Engraved wall plates
- Wiring

Each Live Sound Reinforcement system shall be interfaced to the Fire Alarm and PA systems for interrupt.

The Live Sound Reinforcement system racks, equipment, and wiring shall be included in the base bid.

#### **H. Large Venue Video Projection System**

A Large Venue Video Projection System shall be installed in the Auditorium.

The system shall include:

- Equipment cabinet
- Audio/Video Mixer
- Processors
- Blu-ray player
- Remote control touch panels
- Engraved wall plates
- Wiring

The Video Projection system shall be interfaced to its associated Large Venue Live Sound Reinforcement system.

#### **I. Classroom Speech / Sound Reinforcement Systems**

Classrooms shall include All-in-One speech/sound reinforcement systems to provide for enhancement and uniform distribution of speech and sound within the spaces to improve intelligibility for the students.

Each system shall consist of a 2x4 ceiling panel which includes an integrated amplifier, speakers, and wireless audio receiver/transmitter.

The All-in-One panels shall be hard-wired for 120V electrical service.

The systems shall be interfaced to the PA and FA systems for interrupt.

The systems shall have wireless microphones for teachers and students.

The systems shall also include a wireless multimedia connector device located at the teacher location for connection of the teacher computer to

the ceiling panel. This device will also allow for the connection of student personal hearing aid systems.

The Speech / Sound Reinforcement systems shall also be utilized as sound systems for the instructional audiovisual presentation systems installed in these spaces

The Classroom Speech / Sound Reinforcement systems shall be included in the base bid.

## **J. Instructional Audiovisual Systems**

All classrooms and the learning commons/media center shall be designed with provisions for Interactive Flat Panel systems.

Each location shall have a "Low" (18" A.F.F.) A-V outlet and a "High" A-V Outlet.

The "High" A-V outlet shall be a 2-gang back box on the teaching wall.

Each "Low" A-V outlet shall have an HDMI, VGA, 3.5mm, and an RJ-45 connector cabled to the "High" A-V outlet.

The "High" A-V outlet shall have three Cat 6E data cables to provide networking capabilities for the Interactive Flat Panel, for the computer interface, and touch control.

Each A-V outlet location shall have an adjacent associated quad electrical receptacle.

The back boxes for the "Low" and "High" A-V outlets shall have 1 ¼" conduits stubbed above the ceiling to provide pathways for the A-V cabling.

Interactive Flat Panel equipment shall include:

- 75-inch Interactive Flat Panel displays

- Active USB Extender

Audiovisual cabling between the teacher/presentation "Low" A-V outlet and the "High" A-V projector outlet shall include:

- HDMI

- 3.5 mm Audio Cat. 6E control cable

The Interactive Flat Panel, USB Extender, and A-V cabling shall be included in the base bid.

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## Typical Technology Designs

### Typical Academic Classrooms

Typical academic classrooms shall have the following design.

- Two data drops at the teacher location
- A Low A-V outlet at the teacher location
- A High A-V Outlet at the Interactive Projector location above the teaching wall marker board
- A-V cabling between the Low and High A-V outlets shall consist of HDMI, 3.5mm audio, and Cat. 6E
- The High A-V outlet shall also have two data drops
- There shall be two data drops above the ceiling for a Wireless Access Point
- A wireless classroom speech/sound reinforcement system on the ceiling hard-wired for 120 VAC electrical service
- A 75-inch interactive Flat Panel Display system
- A VoIP desk phone handset
- PA lay-in speaker panel on the ceiling
- A twelve-inch wireless analog secondary clock at 8'-0" A.F.F.

Data cabling, A-V cabling, classroom speech/sound system, and the interactive flat panel shall be included in the base contract.

PA speaker and secondary clock shall be in the base contract.

VoIP handsets, access points, and computer equipment shall be in the Technology FF&E package.

### Typical Science Classroom

Typical science classrooms shall have the following design.

- Two data drops at the teacher location
- A Low A-V outlet at the teacher location
- A High Outlet at the Interactive Projector location above the teaching wall marker board
- A-V cabling between the Low and High A-V outlets shall consist of HDMI, 3.5mm audio, and Cat. 6E
- The High A-V outlet shall also have two data drops
- Two data drops above the ceiling for a Wireless Access Point
- Six dual data drop outlets at the above counter height at student work counters
- A wireless classroom speech/sound reinforcement system on the ceiling hard-wired for 120 VAC electrical service
- A 75-inch interactive Flat Panel system
- PA lay-in speaker panel on the ceiling
- A twelve-inch wireless analog secondary clock at 8'-0" A.F.F.

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Data cabling, A-V cabling, classroom speech/sound system, and the interactive flat panel shall be included in the base contract.

PA speaker and secondary clock shall be in the base contract.

VoIP handset, access points, and computer equipment shall be in the Technology FF&E package.

### **Typical Vocational Shops**

Typical Vocational Shops shall have the following design.

- Two Wireless Access points with two data drops each
- Two data drops for VoIP wall phones with handsets
- Data drops for specialized equipment such as CNC and auto shop diagnostic equipment systems
- Four PA horn speakers
- Two 16" wireless analog secondary clocks
- A Proximity / Card Reader at the exterior door
- Door contacts on the exterior door
- An Intrusion Detection keypad

Data cabling shall be included in the base contract.

PA speakers and secondary clocks shall be in the base contract.

Proximity / Card Reader, door contacts, and intrusion alarm keypad shall be in the base contract.

VoIP handsets, access points, and computer equipment shall be in the Technology FF&E package.

### **Typical Vocational Theory/Computer Labs**

Theory Classrooms are laid out similar to Academic Classrooms.

- Two data drops at the teacher location
- A Low A-V outlet at the teacher location

- A High Outlet at the Interactive Projector location above the teaching wall marker board
- A-V cabling between the Low and High A-V outlets shall consist of HDMI, 3.5mm audio, and Cat. 6E
- The High A-V outlet shall also have two data drops
- There shall be two data drops above the ceiling for a Wireless Access Point
- A wireless classroom speech/sound reinforcement system on the ceiling hard-wired for 120 VAC electrical service
- A 75-inch Interactive Flat Panel system
- A VoIP desk phone handset
- PA lay-in speaker panel on the ceiling.
- A twelve-inch wireless analog secondary clock at 8'-0" A.F.F.

Data cabling, A-V cabling, classroom speech/sound system, and the interactive flat panel shall be included in the base contract.

PA speaker and secondary clock shall be in the base contract.

VoIP handsets, access points, and computer equipment shall be in the Technology FF&E package.

Typical Vocational Shop Computer Labs shall have the following design.

- Two data drops at the teacher location
- A Low A-V outlet at the teacher location
- A High Outlet at the Interactive Flat Panel location on the teaching wall.
- A-V cabling between the Low and High A-V outlets shall consist of HDMI, 3.5mm audio, and Cat. 6E
- The High A-V outlet shall also have two data drops
- Data drops for (20) student computer stations
- There shall be two data drops above the ceiling for a Wireless Access Point
- A wireless classroom speech/sound reinforcement system on the ceiling hard-wired for 120 VAC electrical service
- A 75-inch interactive flat panel system
- A VoIP desk phone handset
- PA lay-in speaker panel on the ceiling.
- A twelve-inch wireless analog secondary clock at 8'-0" A.F.F.

Data cabling, A-V cabling, classroom speech/sound system, and the interactive flat panel shall be included in the base contract.

PA speaker and secondary clock shall be in the base contract.

VoIP handsets, access points, and computer equipment shall be in the Technology FF&E package.

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## Learning Common

The Learning Common shall have the following design.

- Four data drops at the circulation desk
- Eight data drops for lookup computer locations
- One data drop on a wall for a digital signage monitor
- There shall be four Wireless Access Point enclosures on walls with two data drops in each
- A VoIP desk phone handset at the circulation desk
- Seven to nine PA lay-in speaker panels on the ceiling.
- Two 16" inch wireless analog secondary clocks at 8'-0" A.F.F.
- Instructional Area
  - Twenty data drops for computer locations
  - A Low A-V outlet
  - A High Outlet at the Interactive Projector location above a marker board
  - A-V cabling between the Low and High A-V outlets shall consist of HDMI, 3.5mm audio, and Cat. 6E
  - The High A-V outlet shall also have two data drops
  - Data drops for (20) student computer stations
  - A wireless classroom speech/sound reinforcement system on the ceiling hard-wired for 120 VAC electrical service
  - An interactive flat panel system

Data cabling, A-V cabling, classroom speech/sound system, digital signage monitor, interactive flat panel, PA speakers, and secondary clocks shall be in the base contract.

VoIP handset, access points, and computer equipment shall be in the Technology FF&E package.

## Common Areas – Auditorium, Gymnasium, and /Student Commons Area

The Auditorium shall have the following design.

- Four enclosures for Wireless Access Points with two data drops each
- One data drop for a VoIP wall phone
- Ceiling PA horn speakers
- Local sound speakers and Local Live Sound Reinforcement system equipment rack with sound system equipment
- Motorized projection screen
- Large Venue Video Projector system
- Recessed wall mounted Audiovisual Control Panel
- Equipment rack for A-V control equipment
- Multiple Video Source Digital Transmitter Outlets

Data cabling and sound system cabling, sound rack, and equipment shall be included in the base contract.

The projector system and A-V rack with control equipment shall be in the base contract.

PA speakers shall be in the base contract.

VoIP handset, access points shall be in the Technology FF&E package.

The Gymnasium shall have the following design.

- Four enclosures for Wireless Access Points with two data drops each
- One data drop for a VoIP wall phone
- Five recessed wall PA horn speakers
- Two 16" inch wireless analog secondary clocks with wire guards at 8'-0" A.F.F.
- Local sound speakers and Local Live Sound Reinforcement system equipment rack

Data cabling and sound system cabling, sound rack, and equipment shall be included in the base contract.

PA speakers and secondary clocks shall be in the base contract.

VoIP handset, access points, and computer equipment shall be in the Technology FF&E package.

The Student Commons Area shall have the following design.

- Four enclosures for Wireless Access Points with two data drops each
- One data drop for a VoIP wall phone
- Four data drops in two floor boxes for Point of Sales computer equipment
- Recessed wall PA horn speakers
- Two 16" inch wireless analog secondary clocks at 8'-0" A.F.F.
- Local sound speakers and Local Live Sound Reinforcement system equipment rack with sound system equipment
- Motorized projection screen
- Large Venue Video Projector system
- Recessed wall mounted Audiovisual Control Panel
- Equipment rack for A-V control equipment
- Three Video Source Digital Transmitter Outlets

Data cabling and sound system cabling, sound rack, and equipment shall be included in the base contract.

PA speakers and secondary clocks shall be in the base contract.

VoIP handset, access points, projector system, and A-V rack with control equipment shall be in the Technology FF&E package.

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### **Typical Administrative, Guidance, Nurse, and Teacher/Instructor Offices**

Typical offices shall have the following design.

- Two data drops at each desk location for VoIP desk phones and wired networked computer
- Two data drops above the ceiling for a Wireless Access Point
- A lay-in PA speaker on the ceiling
- A PA speaker volume control at the entry door
- A 12" wireless analog secondary clock at 8'-0" A.F.F.

Data cabling shall be in the base contract.

PA speakers, volume controls, and wiring shall be in the base contract.  
Clocks shall be in the base contract.

VoIP handsets, access points, and computer equipment shall be in the Technology FF&E package.