MissionCriticalPartners
Because the Mission Matters

Public Safety Communications Center
Call Floor and Radio Room Considerations

Report

PREPARED JULY 31, 2020 FOR
DISTRICT OF COLUMBIA – OFFICE OF UNIFIED COMMUNICATIONS

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Project Overview

The District of Columbia's Office of Unified Communications (OUC) is updating its Public Safety Communications Center (PSCC) 911 public safety answering point (PSAP) and 311 call center at 310 McMillan Drive, NW, Washington, DC 20001. The update will include new 24 hours a day, 7 days a week, 365 days a year (24 x 7 x 365) console furniture and raised-floor modifications.

As part of this project, OUC will be updating the PSCC's operational floor layout and technologies. Extensive work will be required to make improvements to access flooring, the electrical and grounding systems, and the structured cabling systems (data), and to, at a minimum, bring all systems into compliance with National Fire Protection Association (NFPA) standards 70, 101, 110, 780 , and 1221, and grounding into compliance with Motorola R56®, *Standards and Guidelines for Communication Sites*. The latter includes references to NFPA 70 and 780; Telecommunications Industry Association TIA-607-D, *Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises*; Institute of Electrical and Electronics Engineers (IEEE) standards; and other grounding standards.

Critical Success Factors

OUC identified the following critical success factors:

- The 911 call-taker, 311 call-taker, and emergency dispatch functions remain operational 24 x 7 x 365
- Positions are fully functional
- Space needs are met

Console Furniture and Call Floor Layout

Console Furniture

Each console is approximately 12 to 15 years old and at the end of its lifecycle. The current consoles were not designed for 24 x 7 x 365 usage. Consoles are worn out and broken, with many of their sit-to-stand features nonfunctional. Current consoles are not grounded according to currently recognized national standards for 911 centers.

Procurement for the consoles was completed in Spring 2019. OUC staff selected Watson Console's Mercury Pro consoles. This console furniture already is installed at PSCC's PSAP. Each console is equipped with:

- Height-adjustable monitor array with individual-monitor focal-depth adjustment
- Work-surface depth adjustment
- Environment control package – includes forced-air heat, light-emitting diode (LED) ambient lighting, LED task lighting, technology bridge – under primaries for small-format personal computers (PCs)
- Technology cabinet with active ventilation for PC storage

- Two rack-mounted power-distribution units (PDUs); one rack-mounted, 16-port data patch panel; and one grounding bar per station (the 311 system has no patch panel)
- Array-mounted status light (red/yellow/green/blue), 12-inch-tall pole
- Eight technology ports to include one powered USB[1] insert with two ports (remaining ports to be determined)

New consoles are telecommunicator-centered to promote comfort, reduce stress, and contribute to general health and well-being. The new consoles are engineered to integrate cutting-edge hardware solutions and to optimize the information technology (IT) experience. Additionally, the consoles are designed for 15-plus years of active 24 x 7 365 duty.

Call Floor Layout

The renovation will allow the call floor to be reorganized to assist with communication between different agencies, sectors, and personnel. Prior call floor layout had open areas where communication during critical incidents could be a challenge. The new layout allows better communication during incidents, such as with American Medical Response (AMR), nurse triage line (NTL), the District of Columbia Fire and Emergency Medical Services Department (FEMS), EMS and Fire Liaison Officers (ELO/FLO), and Metropolitan Police (MPD) dispatchers.

The call floor design will enhance the supervisor's ability to monitor operations because the new layout provides a single floor with raised areas for supervisors. Also, the new call floor layout for 311 provides additional space for supervisors.

The desired console count was reviewed with PSCC's operational staff. The call floor layout was divided according to position category, position type, and the number of positions required. Furthermore, the number of central-processing units (CPUs) and monitors required by each position type was established, as indicated in the table below.

Table 1: CPU and Monitor Count

Position Category	Position Type	Position Count	CPU	Monitors
911	911 call-takers	20	2	3
311	311 call-takers	45	1	2
Dispatch	MPD	16	3	4
	FEMS	9	3	4
	ELO	1	4	4
	FLO	1	4	4
	AMR	2	1	4
	NTL	1	1	4

[1] Universal Serial Bus.

Position Category	Position Type	Position Count	CPU	Monitors
Supervisor	Supervisors – 911	4	3	4
	Supervisors – 311	3	2	3
	Total	102		

MCP worked with Watson Consoles to design the call floor layout to meet the requirements; related information can be found in Appendix A.

Radio Room

A full survey of radio room needs and staffing remains to be completed. However, MCP identified that the current 311 consoles located in the medcom room could possibly reutilized for the radio room, as they would meet the needs of the workspace as well as provide additional outlets that are connected to the uninterruptible power supply (UPS) system and generator power.

Electrical and Grounding

Call Floor Electrical Considerations

Many of the current consoles' sit-to-stand features are nonfunctional. The PSCC facility has experienced failures related to the current configuration of OUC's UPS system. The UPS system has limited capacity to deliver short-circuit current, and the electric motors that control the sit-to-stand function become strained—and tend to fail—from not receiving the in-rush current required for startup. The evidence for this is the shorter lifespan of the UPS system batteries, and console lift motors.

Each new console will require:

- One 120-volt, 20-ampere non-UPS system circuit connected to a backup generator
- Two 20-ampere UPS system circuits

Call Floor Power Distribution

Each console position shall be equipped with two PDUs as follows:

- PDUs shall provide a minimum of 12 outlets per PDU.
- Each PDU shall connect to a dedicated power circuit associated with each individual workstation.
- Two PDUs shall be equipped with 20-ampere, 120-volt NEMA[2] L6-20 plugs connected to separate circuits from the facility's UPS system.

[2] National Electrical Manufacturers Association

- PDUs will be used to connect all mission-critical monitors, computer equipment, radios, and 911 dispatch equipment at the individual workstation. An example of the PDU layout is provided in the figure below.
- Operator comfort lighting, heating/ventilation systems, sit-to-stand motors and controls, activity alarm systems, convenience receptacles, and any other nonessential connectivity will be connected to one 120-volt, 20-ampere non-UPS system circuit connected to the backup generator.

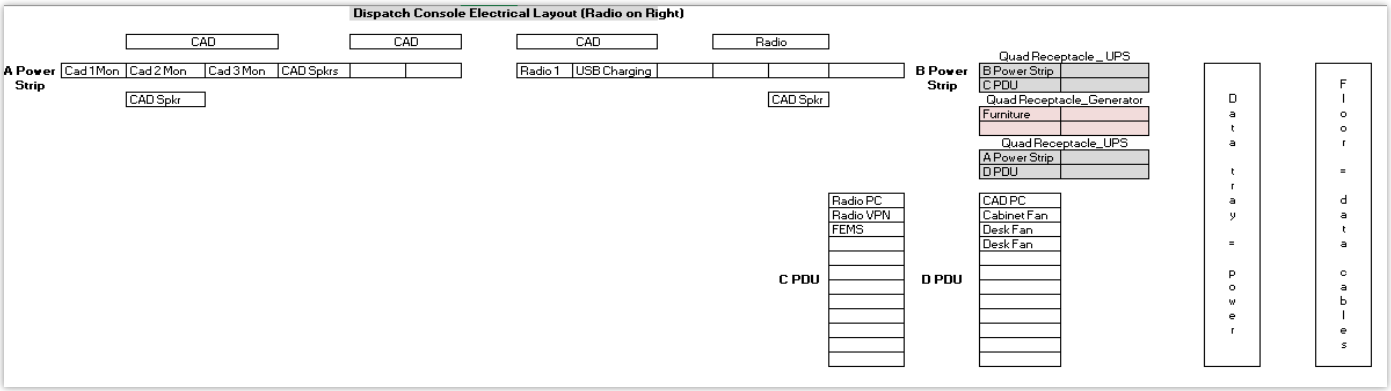


Figure 1: PDU Layout Example

Radio Room Power Distribution

The work area in the radio room depends on ample power distribution. Consideration should be given to the number of receptacles in this space. At least eight to ten circuits should be provided, with at least two connected to the UPS. All power should be surge-protected, because much of the equipment is mission-critical in nature, such as monitors, CPUs, and radios. While a full inventory of radio equipment technology is pending, MCP—based on industry experience—believes that it would be prudent to make concessions for this room, as much of the equipment stored in the room (i.e., multiple Motorola multi-unit chargers) will generate heat above normal office operations.

Grounding and Lightning Protection System (LPS)

Existing consoles are not grounded to industry best practices for 911 call centers. An in-depth grounding report was completed by MCP in June 2018; a copy is included as Appendix B.

A PSAP is a mission-critical facility, and such facilities require that the building, electrical, mechanical, and communications systems are held to a higher standard compared with commercial buildings in terms of design and engineering requirements. The requirements for PSAPs are described in numerous publications and standards—e.g., NFPA 1221, *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems*.

The survivability of the communications circuits and systems is paramount to the facility's efficacy during emergency events. Consequently, adequate facility grounding and lightning protection must be incorporated into the design and engineering of every PSAP and emergency operations center (EOC) facility, as well as the radio equipment and tower sites that serve such facilities. MCP strongly

recommends that grounding systems and lightning protection systems (LPS) meet the most stringent standards.

Grounding systems and LPS primarily are established as fire-protection systems. The systems are installed to provide protection for personnel, the facility, and equipment. There are five main components of facility-protection LPS:

- Strike termination
- Conductors
- Ground electrode system (i.e., grounding system)
- Bonding
- Surge protection

The degree of protection or amount of insurance provided for a facility is dependent upon the facility's risk assessment. Motorola R56 states, in Section 4.3.2 and Section 4.3.3, that a site with a tower, 911 dispatch center (i.e., PSAP), and/or mission-critical public safety facility be considered a "Type B or B2" site. Due to the personnel and/or mission-critical equipment located at them, and the greater risks involved, the criteria regarding grounding systems for such sites are more rigorous.

The LPS is an insurance policy for the safety of the building, as well as the personnel and equipment housed within. Lightning protection has a one-time initial cost and a low maintenance cost throughout its life.

A single-point grounding system is required by NFPA 70, *National Electrical Code® (NEC)*, while NFPA 1221 requires that the communications center's mission-critical equipment be bonded to the single-point facility grounding system in accordance with NFPA 70, Article 647.

Proper bonding and grounding techniques should be applied during installation. This will give the grounding system longevity and inhibit untimely breakdown. TIA-607-D, *Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises*, recommends a maximum resistance value of 100 milliohms (0.1 ohm) between any point in the telecommunications grounding system and the building's electrical grounding electrode system.

Regarding surge-protection devices (SPDs), NFPA 1221 requires that they be installed per NFPA 70, Article 280, and on mission-critical equipment per Article 285.

SPDs shall be installed on all alternating current (AC) power, telephone, data, and communication cabling entry points after the cables enter the building. The SPDs shall be properly grounded to the facility's single-point grounding system.

Motorola R56 requires that Type 3 SPDs be installed on all AC power cabling, and that secondary SPDs be installed on the telephone, data, and communications cabling at every communications center operator's workstation. The SPDs shall be properly grounded to the facility's single-point grounding system.

Structured Cabling Systems (Data)

Call Floor Structured Cabling Systems

See Appendix C Structure Cabling Systems

Access Flooring

Electrostatic discharge (ESD) can cause intermittent or complete component failures of equipment. Redesign of the access flooring requires flooring to be recut and drilled to run cables. For the scope of this project MCP will assist and coordinate the access floor penetration layout.

Install ESD carpeting to create a safer work environment and protect personnel and electronic equipment. The ESD carpeting should conform to Motorola R56 requirements, i.e., having a resistance-to-ground measurement of between 10^6 and 10^{10}.

To provide proper safety, the ESD carpet shall be bonded to an effective grounding system. The raised-floor pedestals, floor tile, carpet-attachment method, and building grounding system work together to provide proper system and floor resistance values.

Technology

Call Floor

MCP identified the impact and needs of IT-related equipment.

- Specifically, OUC IT has identified the following technology components for this project:
  - Supervisor mound equipment
  - Cabling
  - Audio/visual (A/V) requirements
  - Logging recorders
  - Network
  - Servers
  - 911 customer premises equipment (CPE)
  - 311 phone system
  - Radio
  - Time-synchronization device (NetClock)
  - Wide-area network/local-area network (WAN/LAN)
  - CPUs, monitors, headsets, keyboards and mice

- Miscellaneous technology costs (e.g., HDMI[3] cables, patch cables, USB extension cables)

Prior to construction, removal and storage of all IT equipment must be completed. This includes all CPUs, monitors, headsets, keyboards, mice, chairs, and personal items, as well as power, phone, data, and any other cabling attached to the furniture.

Radio Room

Prior to construction, removal and storage of all IT equipment must be completed. This includes all CPUs, monitors, headsets, keyboards, mice, chairs, and personal items, as well as power, phone, data, and any other cabling attached to the furniture.

MCP will continue to work with OUC to identify technology needs for the radio room

Operational Impacts

Call Floor

The PSCC serves as the backup center to OUC. It is an essential building. It is staffed daily with 911 call-takers and dispatchers, and 311 call-takers. As the project progresses, a site must be identified that will allow operations to remain fluid and functioning at the current staffing level that is in place today.

Operationally, 911 and 311 call-taking, and emergency dispatch must be able to function 24 x 7 365. MCP recommends that an operational plan be developed to address:

- Transition
  - Which staff will report where: OUC, PSCC, or THOR[4]
- Logistics
  - Storage of equipment while under remodel
  - Parking
  - Dumpster locations
- Acceptance Testing
  - Consoles are functioning (e.g., sit-to-stand, lights, power outlets)
  - IT equipment operational, 911 phone system, 311 phone system, CAD system, radio system
- Continuity of Operations Plan (COOP)
  - Ensuring that, if there is a critical failure at OUC, the 911, 311, and emergency dispatch are able to function

Radio Room

[3] High-Definition Multimedia Interface
[4] Tactical Homeland Operations Response (THOR) is Washington D.C.'s mobile 911 command center.

An identified space for relocation of work areas for the radio room will need to be established.

Items for Consideration
MCP suggests the following additional items for consideration:

- Develop an operational plan
- Conduct and complete a survey assessment of radio room needs

Rough Order of Magnitude (ROM) Pricing

This is a rough order of magnitude for the operational call floor only.

Item	Cost
Console Furniture	$1,660,046
Access flooring penetrations	$100,000
Grounding system modifications	$150,000
Structured Cabling Systems (SCS)	$338,000
TOTAL	**$2,248,046**

Appendix A: Call Floor Layout

See Attached

Appendix B: Grounding Report

See Attached

Appendix C: Structured Cabling System

See Attached

Appendix D: Common Work Results

See Attached

Appendix E: Pathway for Communications Systems

See Attached

Appendix F: Structured Cabling

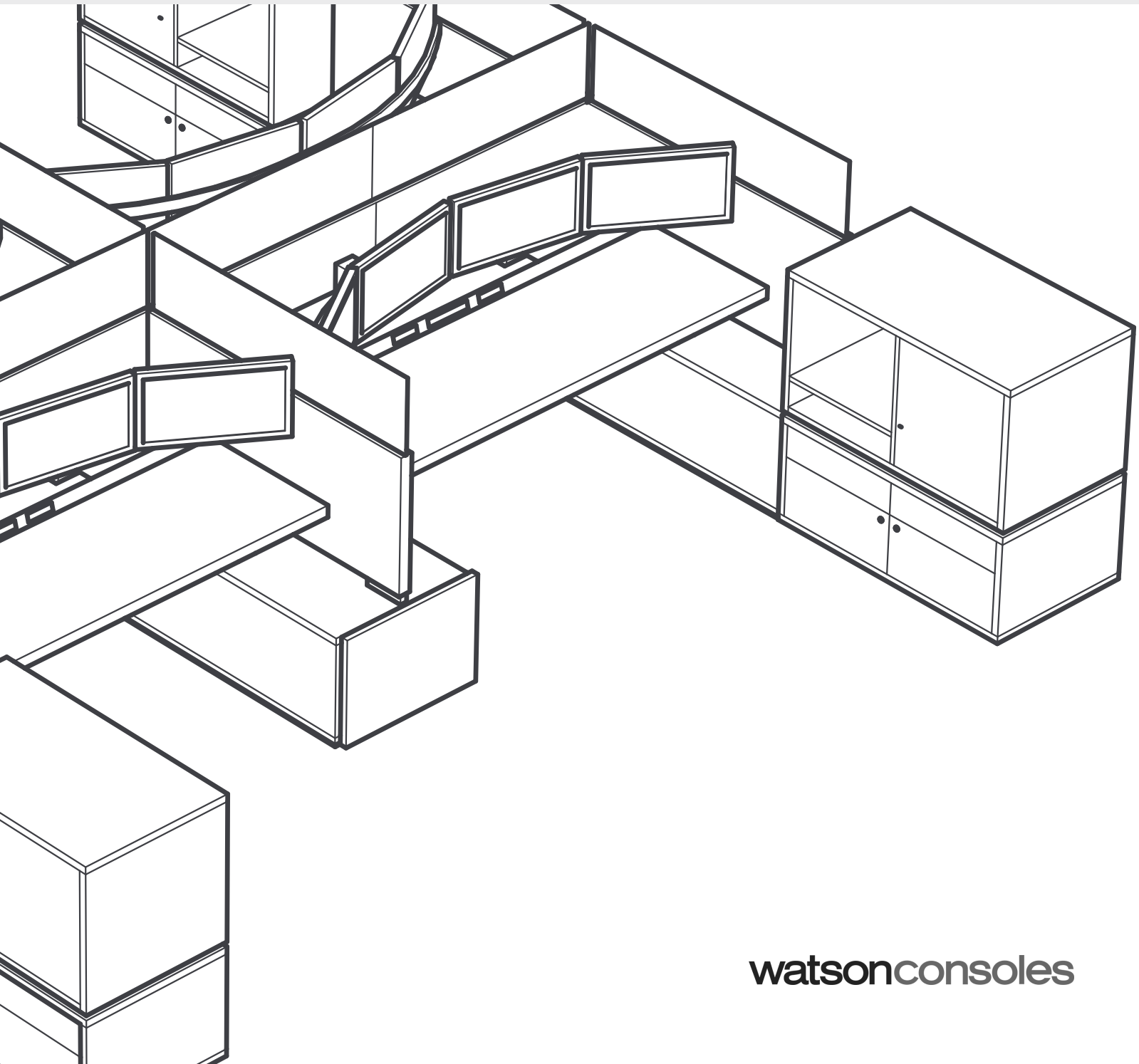
See Attached

Appendix G: Equipment Rooms and Fitting

See Attached

MERCURY

FACILITY REQUIREMENTS



watsonconsoles

MERCURY FACILITY REQUIREMENTS

CONSOLE POWER REQUIREMENTS

Building Power Connection

Watson Dispatch Consoles are connected either to NEMA 15/20R outlets located beneath the raised floor, on the wall, or by running conduit into the console and mounting junction boxes inside the console Hubs. There are dedicated cut-out locations in each console Hub and available mounting locations for junction boxes.

Lifting System

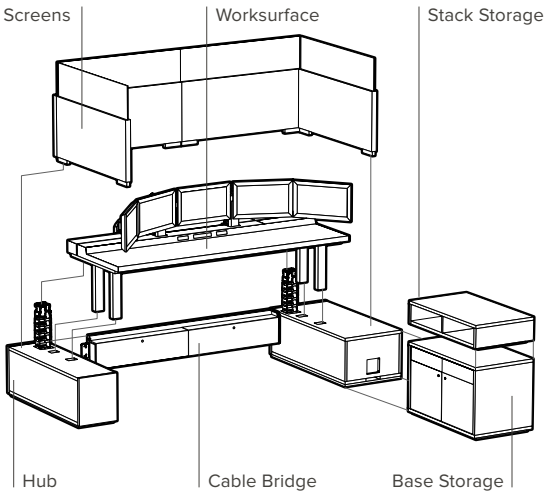
The console requires 120 VAC, 13.3A, 60Hz. The maximum weight capacity is 200 lbs which includes the monitors. The Mercury console is ETL Listed per UL 962 Standard for Household and Commercial Furnishings.

Total Console Power Requirements

Total system draw for a console with all environment and ergonomic features in simultaneous operation requires 13.3 amps at 120 VAC. This is a maximum draw for all components operating at full capacity. This includes the Environmental Control system which consumes 50-60 Hz at 120 VAC. Total Environmental Control System power draw during simultaneous operation at maximum load is 7 amps at 120 VAC. This system is UL 962 listed and CSA certified.

Technology Storage Unit Power Requirements

The Technology Storage unit includes integrated cooling fans which will add to the Total Console Power draw. The number of fans vary by storage type and quantity and will be determined by the final furniture configuration. Each fan adds an additional 80mA, with total power draw of 360mA for the largest furnishing. Typical layout allows power connection to a PDU found in the adjacent Hub unit.



Cooling Fans —
- Electrical
  - 12 VDC Rated voltage
  - 285 mA rated current
  - 3.4 W rated power consumption
  - -10-70°C operating temperature
- Performance
  - 2700 RPM rated speed
  - 97 CFM airflow
  - 40.5 dB(A) acoustic noise

Personal Heater —
- Electrical
  - 120 VAC rated voltage
  - 400 W power consumption

Task Lighting —
- Electrical
  - 12 VDC rated voltage
  - 135 mA rated current
  - 135 mA approx. draw

Ambient Lighting —
- Electrical
  - 12 VDC rated voltage
  - 180 mA rated current
  - 2.16 W / 180 mA power consumption

USER POWER RECOMMENDATION

Building Power Connection

A typical console has two Power Distribution Units. A single PDU is rackmounted within each Hub. Each PDU requires its own 20A uninterrupted power source (UPS) circuit.

20 AMP Unit —
Output
- 50/60 Hz compatibility
- Nominal output voltage
- 100-122V nominal, single phase
- 20A overload protection
- (13) NEMA 5-15/20R

Input
- PDU input voltage 100V; 120V; 127V
- 20 amp maximum input
- NEMA 5-20P
- 15 ft. input cord
- 120 VAC compatibility
- Phase single-phase

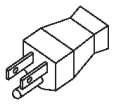
Input
- PDU input voltage 100V; 120V; 127V
- 20 amp maximum input
- NEMA L5-20P
- 15 ft. input cord
- 120 VAC compatibility
- Phase single-phase

Physical
- 1.75”(1U) x17.5”x4.5” / IU Rackmount
- Sheet metal construction
- 30.2mm outlets (center-center)

Special Features
- TVSS grounding back panel nut and bolt grounding lug

Certifications
- UL962 (USA)
- SCS Indoor Air Advantage Gold (USA)
- CSA-C22.2 Canada)

NEMA OUTLET REQUIREMENTS

	NEMA PLUG	NO. OF OUTLETS	RATED CURRENT
CONSOLE (NON-UPS) **HEIGHT-ADJ WORKSURFACE** **HEIGHT-ADJ MONITOR ARRAY** **OPTIONAL ENVIRONMENTAL SYSTEM**	5-15P 	These three features are pre-plugged; one (1) cord exits the console and plugs into a single outlet.	13.3A
TOTAL CONSOLE		1	
POWER ACCESSORIES			
(2) MULTI-OUTLET POWER STRIPS FOR MONITORS (UPS)	5-15P	1 PER	15A
(2) PDU WITH (13) NEMA 5-15R OUTPUT (UPS) ** Optional Twist-lock L5-20P NEMA Plug* 	5-20P Actual plug type varies and is selected by the customer.	1 PER	20A
(OPTIONAL) SURFACE MINITAP, MODEL TXXTECH2PWR	5-15P	1	15A
TECHNOLOGY UNIT ** May be plugged into nearby PDU.*	5-15P	1-2 PER	160 - 320 mA

CALCULATING POWER NEEDS

When planning for your power needs, you must calculate the amperage requirements of all your electrical components so you can provide sufficient electricity to power them. The amperage, also known as current ratings, are found on product labels or specification sheets from the manufacturer.

If your usage is not known in advance:

The National Electrical Code (NEC) allows a maximum of 13 receptacles on each 20-amp circuit. Most electrical engineers write their specifications more conservatively than the NEC. Consult your project electrical engineer. All receptacles are duplex and include two outlets.

If your usage is known in advance:

Add up the amperage used by each piece of equipment in the workstation. To prevent overloading circuits, the capacity is "de-rated" by 20 percent. As a result, for every 16 amps used, an additional circuit is required. For example, if the sum is equal to 36 amps, the workstation would require 3 circuits.

To calculate amperage (current) when the wattage of a device is known, divide watts by 110.

Some appliances, such as large copiers or space heaters require most of the current available on a 20-amp circuit. It is strongly suggested that such devices be supplied with their own receptacle/circuit directly from the building.

Space heaters must not be connected to any relocatable power taps (power strips, PDU, or surface convenience outlets).

Electrical codes vary by region. Consult a qualified electrical contractor or engineer for the proper planning of electrical circuits in your locale.

Requirements of Office Equipment in Amps (estimated typical requirements):

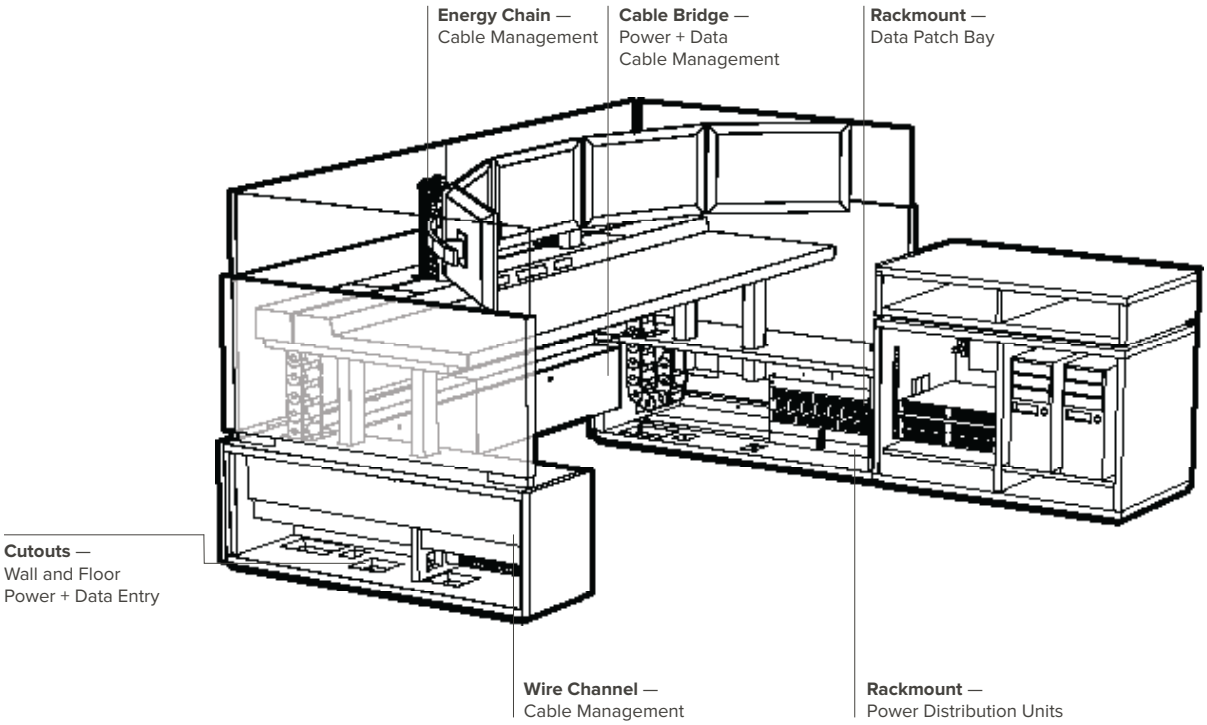
General Equipment

A.C. adapter	0.05
Copy machine	15.00
Mercury console	13.30
Fan	0.50
Space heater, 1000 watts	8.50
Space heater, 1500 watts	12.50
Stand-alone copiers	15.00

Electronic Equipment

Desk-top printers	1.20 to 2.00
Flat-panel monitors	0.70 to 3.50
Laptops	3.50 to 5.00
Stand-alone printers	1.50 to 2.50
PCs	0.08 to 4.80

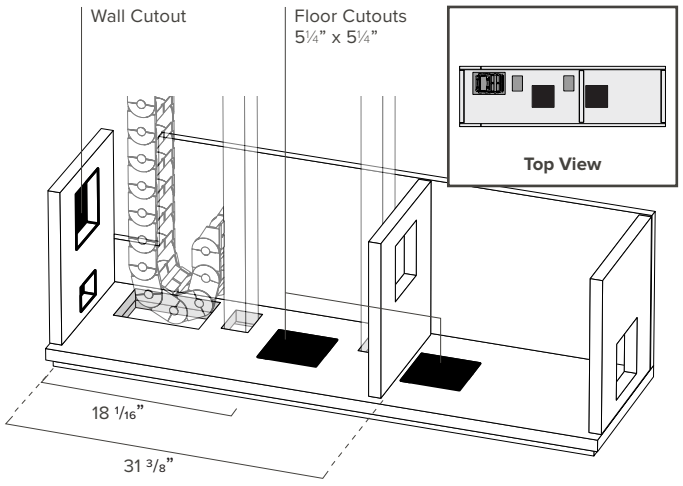
TECHNOLOGY LOCATION TYPICAL



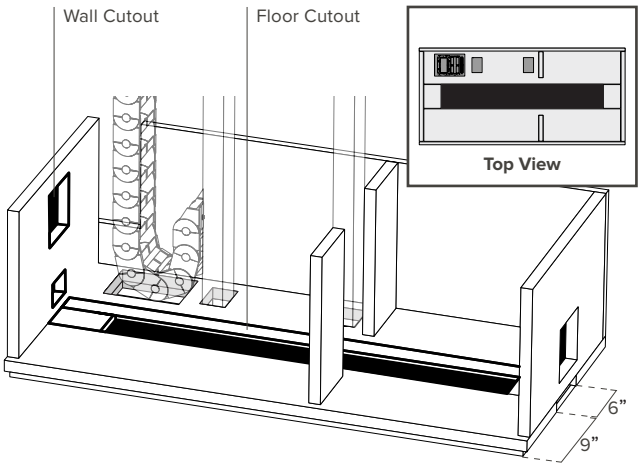
Facility Cutouts

Facility connection is dependent on specification. Mercury consoles are designed to accommodate facility power from wall and/or floor outlets. Facility power must only be routed through the hub cutouts shown.

Half Hub Facility Cutouts



Full Hub



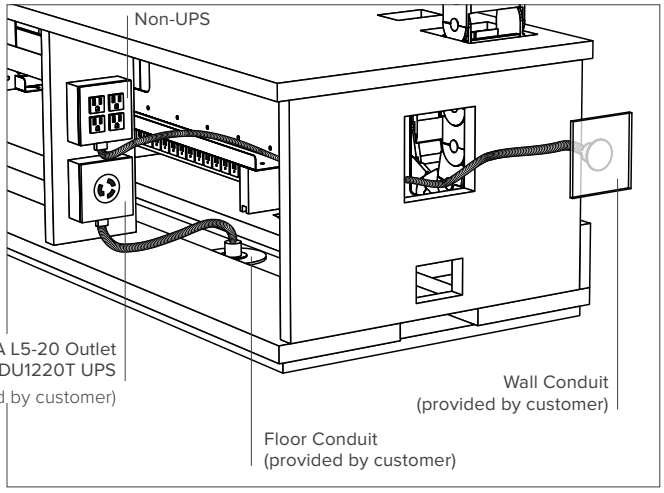
FACILITY WIRING ILLUSTRATIONS

Integrate Mercury and Facility Power

The illustrations below show examples of Mercury integrated with facility provided power and accessories.

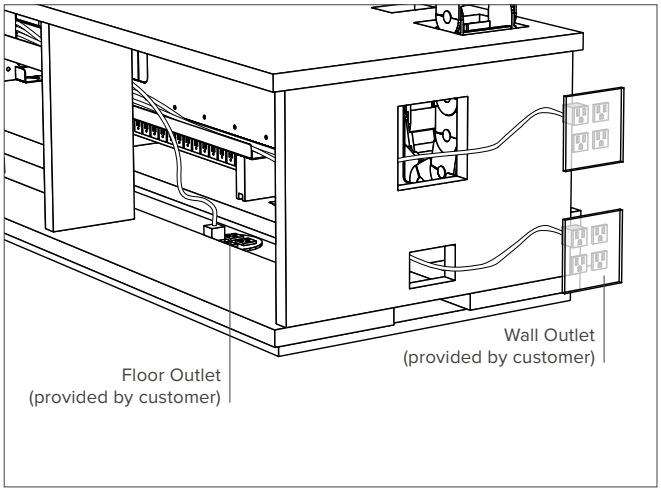
Hardwire

Directly wire one 4-plex plug for the Mercury console power cord. Directly wire one 5-20R junction box (not included) to the inside of the Hub for the Rackmount PDU; this should match the rackmount style you order with your console.



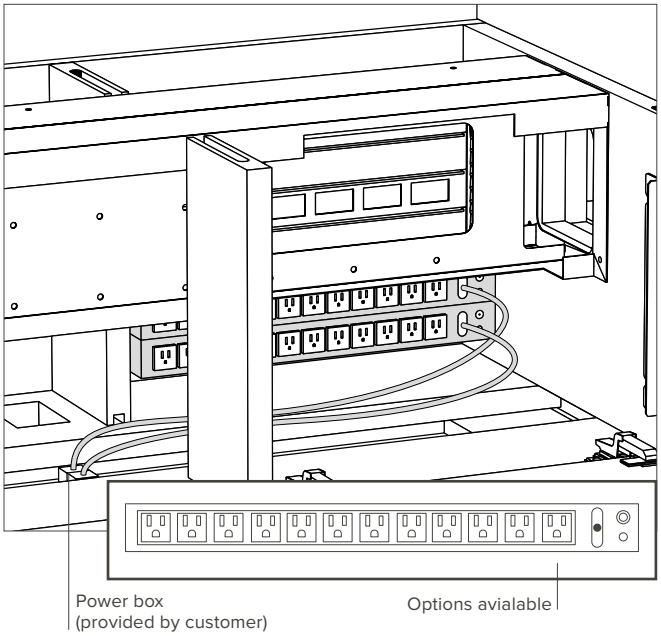
Facility Outlet Options

Connect the main power cord directly to wall or floor outlets. A 20A outlet is recommended for the main power cord. Additionally, use a floor or wall outlet that corresponds to the Rackmount PDU specified for each Hub. Options include 15A, 20A, and 20A Twist Lock. Position facility outlets to align with console power access points.



PDU's

For extended capacity, install additional rack mount PDU(s) to pre-installed rack inside the Hub. If a Tripplite surge protector is provided, plug into facility power and place component on floor of Hub.

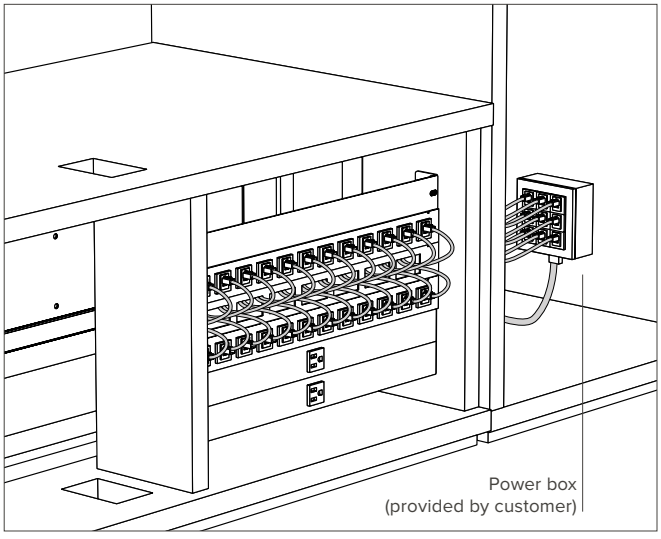


Network Switches

Similarly, network switches (not included) can be installed two ways:

A. Mount junction boxes to inside of technology cabinet.

B. Use rack mounted switchboards.



Statement of Work

Structured Cabling System

DC-OUC
PSCC Console Replacement Project

District of Columbia

Issue Date: July 31, 2020

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SECTION 1. TECHNICAL REQUIREMENTS

The District of Columbia Office of Unified Communications (DC-OUC) is updating their Public Safety Communications Center (PSCC) 911 Public Safety Answering Point (PSAP) and 311 Call Center at 310 McMillan Dr NW, Washington, DC 20001. The update will include new 24x7 console furniture and raised floor modifications.

1.1 GENERAL

The new console furniture will be installed in a multi-phased approach to maintain uninterrupted operation and service. Each phase of installation will require removal of computer systems; disconnection of electrical and telecommunications services; disassembly of existing console furniture; modification of the raised flooring system; assembly of the new console furniture; installation of power, grounding and telecommunications services; reinstallation of all computer systems; testing and return to service.

This scope of work will address specifically the Structured Cabling System (SCS) system work, here after referred to as work, and coordination with other trades.

The work of this project shall include all labor and materials necessary for completion of the project, regardless of whether the work and labor are specifically described in this document.

The SCS and any equipment listed in the following sections represents the design basis for establishing the minimum quality and performance required by the systems. Other products that provide similar or higher levels of service and quality may be substituted with prior approval.

The SCS designer reserves the right to select the solution that proposes equipment that best meets its needs and expectations of the client regarding system performance and quality.

1.1.1 Existing Condition

Existing SCS components are Category 5 (Cat. 5) unshielded twisted pair (UTP) horizontal cabling sub-system. These cables are home run to existing IDF closets for termination and interconnection.

In many cases the outlets are patched with a Category 6 (Cat. 6) patch cords.

The existing SCS has a primary and redundant horizontal distribution cabling for both voice and data communications. Radio network cabling is run separately in the current SCS.

The voice communications cable (blue jacket color), both primary and redundant are terminated on 110-style Cat. 5, wall mounted block cross-connect field. Cross-connections are made to Avaya digital telephone stations, and analog phone services.

The data communications cable (white jacket color), both primary and redundant are terminated on Ortronics Cat.5 patch panels. From here network connections are made for CAD, Intrado Viper 911 phone system, SNOM IP phone system

Number of existing SCS cable runs per position are as follows:

- 911 Call Taker Position
  - 1 for CAD workstation
  - 2 for A9C Viper 911
  - 1 for SNOM IP Phone
  - 1 for Avaya digital phone

- Dispatcher Position
  - 1 for CAD workstation
  - 1 for Avaya digital phone
  - 2 for Motorola radio network
  - 1 Motorola 7-conductor cable (not part of SCS)

- 311 Position
  - 1 for IT workstation
  - 1 for Avaya digital phone

The existing consoles are provided with three circuits derived from the uninterrupted power supply (UPS).

1.1.2 Work Area

All work shall take place in the existing PSCC 911/ 311 Call Center, and the data equipment room located directly adjacent to the Call Center

Existing pathways, and spaces shall be used to install and terminate the new SCS to replace the existing. Reuse or replace the fire stopping materials.

All work shall be performed in coordination with the furniture installer, raised floor installer, electrician, mechanical contractor, and the owner.

All work shall be performed during normal business hours (8 a.m. – 5 p.m., Monday through Friday), with up to eight smaller areas modified individually as a phase.

1.2 STRUCTURED CABLING SYSTEM REQUIREMENTS

1.2.1 Standards, Guidelines, Best Practices, and References

The SCS shall be installed in accordance with the latest releases of industry standards including, but not limited to:

- Building Industry Consulting Service International (BICSI) 002-2014 – Data Center Design and Implementation Best Practices
- BICSI - Telecommunications Distribution Methods Manual (TDMM), 13th Edition
- American National Standards Institute/Telecommunications Industry Association (ANSI/TIA)-568 set (series) Commercial Building Telecommunications Cabling Standard set (Contains: TIA-568.0-D, TIA-568.1-D, TIA-568.2-D, TIA-568.3-D AND TIA-568.4-D - with addenda and errata)
- ANSI/TIA-569-D Commercial Building Standard for Telecommunications Pathways and Spaces
- ANSI/TIA-606-C Administration Standard for Telecommunications Infrastructure
- ANSI/TIA-607-D Generic Telecommunications Grounding (Earthing) and Bonding for Customer Premises
- ANSI/TIA-942-B – Telecommunications Infrastructure Standard for Data Centers
- Institute of Electrical and Electronics Engineers (IEEE) - 2017 National Electrical Safety Code (NESC)
- Underwriters Laboratories (UL) - UL 60950-1 Information Technology Equipment – Safety – Part 1: General Requirements
- Americans with Disabilities Act (ADA)
- International Building Code (IBC)
- National Fire Protection Association (NFPA) 70 – 2017 National Electrical Code (NEC)
- NFPA 72 – National Fire Alarm and Signaling Code (2016)
- NFPA 75 – Standard for the Fire Protection of Information Technology Equipment (2017)
- NFPA 76 – Standard for the Fire Protection of Information Telecommunications Facilities (2016)
- NFPA 110 – Standard for Emergency and Standby Power Systems (2016)
- NFPA 1221 – Standard for the Installation, Maintenance and Use of Emergency Services Communications Systems (2019)

- NFPA 1600 – Standard on Disaster/Emergency Management and Business Continuity /Continuity of Operations Programs (2016)
- Lightning Protection Institute (LPI) - LPI-175 Standard for the Design – Installation – Inspection of Lightning Protection Systems (2014)
- Motorola R56 Standards and Guidelines for Communications Sites (Grounding System) 2017
- National Emergency Number Association (NENA) 03 series, Standards for E9-1-1 Networking, 2007/01/17
- NENA 04 series, Recommended Generic Standards for E9-1-1 PSAP Equipment, 2000/08/23
- NENA Generic E9-1-1 Requirements Technical Information Document
- NENA 75-001, Security for Next Generation 9-1-1 (NG-SEC), Version 1, dated February 6, 2010
- NENA 75-502, Next Generation 9-1-1 Security (NG-SEC) Audit Checklist, Version 1, dated December 14, 2011
- Federal Emergency Management Agency (FEMA) 361- Design and Construction Guidance for Community Shelters
- National Institute for Occupational Safety and Health (NIOSH) – Guidance for Protecting Building Environments from Airborne Chemical, Biological, or Radiological Attacks

1.2.2 New Call Center Configuration

The new Call Center configuration (shown below) will be support the current and future staff based on the type of position. The quantity of each position type is as follows:

- 911 Call Takers - 42 positions
- Dispatchers - 45 positions
- Supervisor - 6 positions
- 311 Position - 63 positions

COUNTS TO BE DETERMINED

1.2.3 Structured Cabling System

The SCS shall be comprised of components certified with Cat. 6 performance. No mixing of category ratings in the communications channel. Demolish all Cat. 5 components, based on the project phasing, and dispose of properly. Each connection shall be certified with an approved tester (approved during submittal phase by the designer) and the results submitted.

The new Cat. 6 communications cables shall be terminated at the WAO in a multi-port surface mount box, with jacks matching the color code shown below. This surface mounted box will be mounted inside the system cabinet of the console furniture.

Provide a protective pathway for the cables as they exit the raised floor, enter the furniture, up to the point of termination. This will provide physical protection from abrasion, pinching, cutting, etc. This protection may be innerduct, spiral cable, liquid tight conduit or the like.

Provide 'J' hooks to support the cables at minimum of 4'-5'.

Provided additional communications blocks, patch panels and cabinets as required for the SCS as described here in. Provide submittal of each component to be used to obtain approval, prior to purchase, or installation.

During later phases of the installation, communications cabinet spaces, horizontal and vertical cable management, and pathways may be reclaimed and re-used.

Color code the SCS hall match the existing to reduce confusion of the staff as they migrate to the new SCS and for easy identification of applications that may be transported on the cabling system. Therefore, data cabling components (cable jackets, patch panel icons or jacks, and WAO jacks) shall be white, and voice cabling components (cable jackets, 110-style block labels, and WAO jacks) shall be blue.

The new SCS will incorporate additional horizontal distribution cables to allow for growth and system migration.

Provide Cat. 6 SCS cabling as follows:

- 911 Call Taker Positions - eight cables total
    - 2 for CAD workstation (white)
    - 2 for A9C Viper 911 (white)
    - 1 for SNOM IP Phone (white)
    - 1 spare (white)
    - 1 for Avaya digital phone (blue)
    - 1 spare (blue)

- Dispatcher Positions - eight cables total
    - 2 for CAD workstation (white)
    - 1 spare (white)
    - 1 for Avaya digital phone (blue)

  - 1 spare (blue)
  - 2 for Motorola radio network (grey)
  - 1 Motorola 7-conductor cable (not part of SCS)

- Supervisor Positions - twelve cables total
  - 2 for CAD workstation (white)
  - 2 for A9C Viper 911 (white)
  - 1 for SNOM IP Phone (white)
  - 2 spare (white)
  - 1 for Avaya digital phone (blue)
  - 1 spare (blue)
  - 2 for Motorola radio network (grey)
  - 1 Motorola 7-conductor cable (not part of SCS)

- 311 Positions - four cables total
  - 1 for IT workstation (white)
  - 1 spare (white)
  - 1 for Avaya digital phone (blue)
  - 1 spare (blue)

The patch cords and equipment cords shall also be color coded, based on the user applications as follows:

  - Voice applications - primary connection, Avaya digital phone, fax, TDD, voice logger, etc. (white)
  - Voice applications - redundant connection, Avaya digital phone, fax, TDD, voice logger, etc. (grey)
  - Data networks - primary connection, CAD, IP Phone (blue)
  - Data networks - primary connection, CAD, IP Phone (green)

For 911 Call Takers, Dispatcher positions, and 311 Call Takers positions provide one patch cord of each color per WAO, with 50% at 5', 25% at 7', and 25% at 10'.

For 911 Call Takers, Dispatcher, and 311 Call Takers positions provide one equipment cord of each color per WAO, with 50% at 5', 40% at 7', and 10% at 10'.

All cables, pathways, racks, patch panel, patch panel ports, jacks, faceplates, equipment cords and patch cords shall be labelled in accordance with standards. Submit labeling plan for approval during submittal process.

All labels shall be machine made (printed or engraved), no handwritten labels permitted.

1.3 SYSTEM TESTING AND CERTIFICATION

The Installer shall test 100% of the installed SCS. Only 'Pass' tests will be accepted, any test that is 'Fail' or '* Pass' must be resolved and re-tested to achieve a 'Pass' result.

The Installer shall coordinate system testing with the Owner or their Agent to witness testing.

The SCS shall be registered with the manufacturer and an extended manufacturer's warranty shall be issued for a minimum of 15 - 20 years.

1.4 SYSTEM DOCUMENTATION

The SCS shall be documented in AutoCAD drawings to show cabling numbers and pathways in the as-built package. Submit three hard copies and one electronic copy.

Electronic copies of the test results and warranty information shall be provided to the Owner in the as-built package. Submit three hard copies and one electronic copy

Provide contact information of the project team members at time of submittals, these contacts (name, telephone, email address) shall include the sales team, installation team and service support team. Installers shall work under the direct supervision of a Registered Communications Distribution Designer (RCDD) and shall be factory trained and certified on the SCS installed.

1.5 SERVICE AGREEMENT

The Installer shall provide troubleshooting, repair, and service during the first ninety days at no cost to the Owner. Based on the mission critical environment of this facility, the Installer commits to a two-hour response time for the first ninety days.

During the extended warranty period, the manufacturer will warrant the products, and the Installer will provide service in support of that warranty, with a four-hour emergency response time, or next business day response for non-emergency dispatches.

1.6 NEW CALL CENTER FLOOR PLAN