

**MAINTENANCE AND OPERATIONS STANDARDS  
(AS OF 18 NOVEMBER 2013)**

**PART 1 GENERAL****1.1 DESCRIPTION**

- A. This section specifies the engineering, furnishing and installation of equipment, utilities, appliances and any other related work requiring maintenance and upkeep by Maintenance and Operations (M&O) at the Carl T. Hayden Veterans.
- B. This is not a complete listing, however listed items have been reoccurring issues that need to be corrected in future projects by Contractors. Items listed in the singular apply to entire facility except where noted.
- C. Substitutions are subject to COR, and shop personnel approval. Substitutions and deviations must be specifically noted and addressed per spec 01 60 00. If a submittal is approved without a being addressed per spec 01 60 00 it shall be considered non-compliant and shall require a new submittal and replacement as required.
- D. The final payment on any construction component may be up to 10% of the original contract amount.
- E. Items listed and detailed here are to be considered as in addition to the specifications and drawings by the contractor. When this document is found to be in contradiction to the specification or drawings, this document will take precedence.

**PART 2 - PRODUCTS****2.1 GENERAL ITEMS**

The following items will apply to all project locations.

- A. Remove all abandoned wiring, conduit, tubing and piping back to the source. Contractor shall be responsible for planning any outages required for removal. Coordinate with COR for removing existing terminations.
- B. All buildings and facilities on this site shall be considered Occupancy Category IV. Compartmentalization to decrease the category is not allowed. All areas shall be treated as patient care areas. All exam rooms in inpatient areas shall be treated as patient bed locations. When hospital grade products are available, they shall be utilized.
- C. Prior to any core drilling the contractor shall be required to x-ray and scan the walls and floors as required to assure clearance through existing in wall infrastructure to include post tension cabling and utilities. Building 1 C,D and E-Wings utilize post tension cabling construction.
- D. Contractors shall ensure that any subcontractors bid the complete set of contract documents, drawings and specifications. The contractor is responsible for ensuring coordination of all materials and equipment, and clearances between all subcontractors.
- E. Maricopa County Air Quality Control requirements shall be followed for all construction activities. Contractor shall obtain and submit any applicable permits (This includes NESHP, dust control permit, etc.)
- F. All demolition or modification of an existing component shall be preceded by testing for asbestos and lead. The contractor shall assume that the following items contain asbestos within the facility: Insulation of any kind, drywall, drywall tape, floor mastic, caulking, glues, and any other materials noted in the drawings, specifications or included asbestos survey.
- G. All systems installed shall be approved prior to use. System shall be listed and designed for the intended purpose. Modifying systems for purposes other than listed shall be considered non-

compliant, or must be accompanied with engineer stamped shop drawings detailing modification of listing and relisting.

- H. Data sheets of standard items have been compiled in a folder database. The contractor is responsible for ensuring receipt of this database and coordinating as required during design and construction.
- I. All designs, to include shop drawings, shall meet ADA guidelines and all current national codes and regulations at a minimum. It is the contractor's responsibility to verify dimensions prior to submittal of shop drawings and installation. Coordinate with all trades as required.
- J. The following items need to be installed by contractors for all projects where applicable. Contractor shall provide VA with at a minimum 30 days' notice prior to date to install dispensers (if VA is providing equipment). Coordinate as required to ensure appropriate systems are ordered and are compatible with supplied equipment. It is the contractors' responsibility to ensure this is completed. Note: Contractor shall NOT use adhesive strips or tape to mount wall dispensers.
  - 1) Soap dispensers (supplied by EMS) – dispensers should be attached to a stud, or with an approved anchor appropriate to the wall type.
  - 2) Paper towel dispensers (supplied by EMS) - dispensers should be attached to a stud, or with an approved anchor appropriate to the wall type.
  - 3) Toilet paper dispensers (supplied by EMS) - dispensers should be attached to a stud, or with an approved anchor appropriate to the wall type.
  - 4) Foam dispensers (supplied by EMS) – dispensers should be attached to a stud, or with an approved anchor appropriate to the wall type.
  - 5) Glove box holders (supplied by SPD) – dispensers should be attached to a stud, or with an approved anchor appropriate to the wall type.
  - 6) Sharps brackets (Coordinate with COR) – dispensers should be attached to a stud, or with an approved anchor appropriate to the wall type, and be mounted between 51" and 54".
- K. For new buildings parapet walls on roof need to be 42 inches or an equivalent means of guard railing must be provided to an equal or greater degree of safety for employees than the methods, materials or designs specified in the standard for guard railing. Reference: OSHA Instruction STD 1-1.10, 29CFR 1910.23(e) (1), 29 CFR 1910.23(c) (1), 29 CFR 1926.502(b) (1). Additionally, any and all installations shall permanently meet the requirements of general and construction OSHA guidelines. Shop drawings shall include sufficient information to determine that barriers will meet guidelines, to include information such as structural calculations supporting fall requirements as required.
- L. Contractor shall be responsible for surveying all new areas where bird control may be required and shall install spikes, shockstrip, polyethylene bird nets, or tension wire. Bird control shall be completed by a company providing bird control solutions for a minimum of 10 years and shall provide a 20 year warranty on the bird control solution provided.
- M. Utility outages: Request for utility outages shall be submitted a minimum 14 days prior to the intended date. Utility outage notifications shall be in accordance with the facility utility outage SOP. Engineering will work diligently to accommodate any request but will ultimately determine the scheduling date. Engineering reserves the right to cancel any outage at any time to ensure the safety of the facility and personnel.
- N. Design and construction shall follow system separation requirements per code and per facility requirements. The following systems shall not be installed in the same room or space and shall be enclosed in separate secure rooms or spaces.
  - a. Data: To include all Lynx, OI&T, and Security equipment
  - b. Special Systems: To include Fire Alarm, Nurse Call, Code Blue, Telemetry, Building Management Systems and other special systems.
  - c. Electrical: Electrical Systems and Controls related to electrical systems
- O. If a product listed in this document is unavailable for some reason the contractor shall be allowed to submit a substitute product. See 1.1.C.

- P. The latest available code at the time of contract award shall be enforceable. Additionally, while the VA adopts new code sooner than local jurisdictions, Phoenix amendments will be enforced to the latest code, coordinate with COR for clarification if required. The COR shall act as the AHJ, and will consult with specific trade specialists at the facility and at the VISN and CFM to determine any judgments.
- Q. Coordination drawings are required for all trades and are subject to COR approval. Coordinate with COR and review MATOC contract requirements for specific requirements. Infrastructure routing is critical and unauthorized installations will be subject to removal and reinstallation at the contractors expense.
- R. Warranties: No pro-rating. Warranties start period shall be at receipt of Substantial Completion. Exceptions shall be allowed on a case by case basis. Contractor to submit individual requests to COR and CO for approval if warranty is to be started sooner.
- S. Design and A/E Submittals: Hard copies shall be submitted per contract requirements. Design submissions shall utilize Submittal Exchange for Design, a website service designed specifically for transmitting submittals between design team members. A/E shall include the full cost of Submittal Exchange project subscription in their proposal.
- T. Construction Submittals: Shop drawings, and product data submittals shall be transmitted to Architect and VA in electronic (pdf) format using Submittal Exchange, a website service designed specifically for transmitting submittals between construction team members. General contractor shall include the full cost of Submittal Exchange project subscription in their proposal. Hard copies of complicated items such as transfer switches, electrical switchgear, coordination studies, and items that utilize paper sizes larger than 8.5"x11" shall be provided upon request.
- U. O&M Manuals: COR shall receive two full sets of bound O&M manuals. Each set shall be bound utilizing ring binders, shall be indexed, sections separated with tabs dividers, and appropriate side and cover sheets. Two CD's (or DVDs) containing electronic soft copies shall be provided to the COR. Electronic soft copies shall be indexed in the same manner as the bound O&M manual. Electronic soft copies shall be original pdf files, scanned files are not acceptable. Shop drawings shall be provided in CAD format as well as original pdf format.
- V. As-Builts: Contractor is required to maintain two full size sets of As-Builts throughout the job, per spec. Contractor shall provide one of the original hard copy documents to the A/E for inclusion in the As-Builts. These shall include, but are not limited to, any changes made as the result of an Addendum, ASI, RFI, field correction and or those changes noted in submittals throughout the course of the project. The contractor shall provide electronic scanned copies of the redline documents to the A/E and the VA. The A/E shall produce As-Built CAD files. Any updates to redline documents after this action may be treated individually, and the contractor shall submit that sheet(s) per the instruction previously mentioned.
- W. Logs: Contractor shall develop and maintain all logs in excel format. The following logs are mandatory:
  - a. Submittals
  - b. RFIs
  - c. Equipment Provided (S/Ns, P/Ns, O/N, location, install date, reference to drawing and project number, general item info, etc.) (This shall reference any available shop drawings, installation manuals and maintenance manuals) EE Numbers shall be provided to the contractor throughout the project as requested. Coordinate with COR.
  - d. Equipment Removed (EE/Ns, S/Ns, P/Ns, O/N, location, general item info, etc.) (This shall reference any available shop drawings, installation manuals and maintenance manuals)
  - e. Warranty Log
  - f. Maintenance Log to include a maintenance schedule per manufacturer's guideline.

- g. Checklist showing compliance of installed equipment with submittals, M&O guidelines and specifications. Deviations should be noted and reference approval documentation per 01 60 00

## 2.1 LOCKSMITH PRODUCTS

- A. The following table dictates the type of hardware Phoenix VA will accept installed in the facility.

<b><i>PART/ EQUIPMENT</i></b>	<b><i>MANUFACTURER</i></b>	<b><i>REMARKS</i></b>
Lock cores	Medeco, 7 pin IC small format	No substitutes. VA will install cores purchased by contractor.
Lever sets	Best 9K or Marks locks	
Cipher Locks	Trilogy or Best	
Mortise Locks	Best oo Falcon	
Panic hardware	Von Duprin	
Restroom Door Lock – for single occupancy rooms	Schlage Indicator X Turn	B571 626, 12-287 latch, 10-094 strike, 1 ¾”dr – with occupied indicator flag.
Door push/pull plates	Don-Jo	
Door Kick Plates	Stainless Steel 16” High	Mounted flush with the bottom of the door
Automatic Door Openers	Horton or Stanley	
Hinges		Hospital Tip, patient rooms shall utilize swing clear type.
Deadbolts	Best	
Stops, Holders, Coordinators, Flush Bolts	Ives series bar for coordinators	
Intrusion System (Card Readers)	C-Cure	

- A. Gates shall utilize pad lock systems and shall be accessible from both sides, VA to provide any pad locks.

## 2.2 BUILDING PRODUCTS

- A. Doors: The following table dictates the manufactured products that are allowed to be installed in the facility. Contractor shall install handicapped door openers on all public bathrooms and exterior doors for new or renovated spaces. All heavy use doors should be plastic laminated similar to Acrovyn.

<b><i>PART/ EQUIPMENT</i></b>	<b><i>MANUFACTURER</i></b>	<b><i>REMARKS</i></b>
Door closers	LCN 4040XP	Use mounting hardware. Drywall screws are not acceptable. Self closing hinges should be used when chase can be reworked.
Handicapped operators	Stanley or Horton	Install on all public bathrooms and with ‘prior approval’ on all doors between clinics and waiting areas
Automatic slider or bi-fold doors	Stanley or Horton	Exterior clinic public entrances
Wainscoting or FRP	Construction	POC: Andy Moncher 480-208-1027

	Specialties INPRO, TL Services	800-222-5556 x.5241, TL Services 479-474-7222. (Note: For lab and other like areas, wainscoting or FRP shall be installed from floor to ceiling.)
Handrails	Construction Specialties, Acrovyn	
Ceiling Tiles (Standard)	USG 2310 2'x4'	Replaced tiles shall match color and texture of existing work area.
Ceiling Grid	USG 2555299	DX422 Cross Tees in Flat White
Ceiling Tiles (Washable)	USG 3270 (2'x4')	When in 'wet or damp areas' all tiles shall be replaced with washable ceiling tiles. This shall include restrooms, laboratories, dining areas,
Cove Base	Roppe 700 Series , 6" Camel	Rolls only (no 4' pieces). Inside corners shall be cut to allow for better wall contact.
Countertops	LG Hausys America or approved equal.	Solid Surface w/ rolled nose. If approved, all plastic laminate countertops to be on plywood substrate.
Cabinets		Shall be capable of accommodating Workrite keyboard trays for computers. Application specific. No fiber or particle board. No rollers for drawers. All cabinets shall have cam locks pre-installed, w/ 10 keys per lock provided to COR. Locks and keys shall be number coded, and include an excel log.
Cabinets, Woodwork and Millwork	1 Hour Fire Rating minimum	Architectural woodwork
Exterior Doors	Steelcraft or approved equal	18 GA, 1-3/4" Seamless flush w/ 16 GA metal frame. 5"x20" vision light.
Aluminum Entrances	Kawneer or approved equal	Dark Bronze, No. 28
Interior Doors	Hollow Metal Doors	
Roofing	Bituminous membrane roofing	See attachment A for baseline for incorporation into standard VA spec 075216.
Windows	Manko	Sealed double-glazed insulating panel, with a Low-Solar-Gain Low-E coating on the second surface from the exterior; integral blinds (alabaster); interior glazed panel; dark bronze anodized aluminum frame with thermal breaks.
Curtain Tracks	Construction Specialties	'On The Right Track Systems' w. associated curtains. (Contractor shall coordinate with facility COR and interior design for curtain selection.)
Bathroom Partitions		Floor to Ceiling support systems

- A. Install wall protection system (head board) in all patient rooms.
- B. Install wall protection in all storage rooms; 4' wainscoting, FRP, etc.

- C. Corner Guards: Stainless steel or plastic with metal mounts. Situational. Verify with building maintenance prior to selecting. These shall be assumed to be stainless steel, and floor to ceiling until told otherwise.
- D. Drywall shall be dent resistant.
- E. All cabinets, woodwork, and millwork to conform to AWI Custom Grade, flush overlay design.
- F. All cabinets, woodwork, and millwork that contacts the floor shall be solid lumber or marine grade plywood.
- G. All systems shall also be caulked at the perimeter.
- H. All horizontal cabinets, woodwork, and millwork below sinks or other plumbing fixtures shall have marine grade plywood cores; grade A-B to accept plastic laminate.
- I. All plastic laminate counter tops to be on plywood substrate.
- J. All upper cabinets that are not ceiling height are to have sloped tops.
- K. All upper cabinets are to be 14" deep.
- L. Drawers: Epoxy coated metal is acceptable if the bottom and all four sides are metal. Sides and back are to be full height of the drawer. Drawer slides are to be heavy duty with full extension.
- M. Adjustable shelf supports to be drilled and pegged. Shelf supports to be nylon lock clip type. No KV standards allowed.
- N. Hinges shall be concealed self-closing, reference Blum. Leaf/knuckle hinges are not allowed.
- O. Flashing & Sheet Metal – Light gauge metal for plaster trim: 26 ga.
- P. Fire/Smoke penetrations shall be completed in accordance with ASTM E2174-01 and E2393-04.
  - a. Contractor shall coordinate with Hilti, or an approved fire/smoke penetration specialist and the building maintenance shop for inspections.
  - b. Penetrations shall be documented in the as-built documents and reference a Quality Control document.
  - c. The contractor shall establish a sequential numbering system within boundaries dictated on red line drawings depicting the number of sealed penetrations, date of installation, type of penetration seal and UL system number.
  - d. Existing penetrations with no date information shall be marked accordingly.
  - e. The contractor shall perform 2% destructive testing of all new penetrations sealed, and 2% of existing penetrations (1 minimum and 5 maximum for existing). The contractor shall have existing installations inspected by a certified inspector.
  - f. Coordinate with COR and carpentry shop for all tasks relating to penetrations and fire stop.
  - g. Contractor shall utilize Hilti CP 653, CFS-SL and CFS-SL GP Ganplate for plenum rated cable management. As required. Coordinate with A/E and COTR.
- Q. Any installation found to contain hanging points or potential hanging points shall be corrected at the contractor's expense. This may include the purchase and installation of new partitions, etc. Installation guidelines shall be stricter in Mental Health wards and buildings.
- R. All doors shall come factory prepped with the capability to utilize both Best cores as noted in section 2.1 and the C-Cure 9000 card access system as noted in section 2.7.
- S. All walls shall require cross bracing.
- T. Flat Strap 6 inches wide X 10 feet long 16ga. Shall be installed where upper cabinets are and computer wall brackets.
- U. Flat Strap 6 inches X 10 feet 20 ga . shall be used for door stops and other misc. hardware.

## 2.3 PAINT AND WALL COVERINGS

- A. See Attachment B – VA Interior Finishes Standards

## 2.4 PLUMBING

- A. The following table dictates the manufactured products that are allowed to be installed in the facility.

<b><i>PART/ EQUIPMENT</i></b>	<b><i>MANUFACTURER</i></b>	<b><i>REMARKS</i></b>
Wall hung toilets	American Standard	2257.001 White Afwall
Urinals	American Standard	6590.001.020 White Washbrook
Flush Valves	Sloan Royal	#111 Toilet 1.6 gal #180 Urinal 1.5 gal
8" kitchen faucet	American Standard	6275.172H.002
8" kitchen faucet single lever	American Standard	4175.500
Wall mount foot pedal faucet	T&S	B0405
Floor mount foot pedal faucet	T&S	B0502
Service sink faucet	T&S	B0665 BSTP
4" Faucet(s)	American Standard	7400.172H.002
Wall hung lavatories	American Standard	0355.012.020 White Lucerne
Wall hung wheelchair lavatory	American Standard	9141.011.020 White
4" Lavatory faucet	American Standard	7400.172H.002
Shower valves	Symmons	C-96-300-B30-V
Med gas outlets	Chemtron	Quick disconnect
Ball valves (used exclusively unless approved)	Apollo or approved equal	3-Piece
Recirculation pumps	Grunfos or approved equal	1" maximum ½ hp
2692 Quad Close Trap Seal	Jay R Smith or approved equal	NO TRAP PRIMERS
Eye wash station	Haws 7612 or 7612 LH	No spout mounted eye wash stations shall be installed.
Wall mount foot pedal faucet	T&S	B 0405
Service sink faucet	T&S	B 0665 BSTP
Recirculating pumps	Grunfos	1" max, 1/2 hp
Mixing Valve at all faucets	Leonard	Model 270
<b>Thermostatic water temperature limiting device</b>	<b>Chicago Faucets part # 121-NF Set to 110°F</b>	Include on all faucets

- B. All toilet carriers are to be heavy duty and anchored to floor. Verify weight requirements.  
 C. Sensory faucets are not allowed.  
 D. All fire system drains are to be 2" minimum and terminate to the outside of facility.  
 E. For ANY DRAIN LINE, type L copper shall be used instead of DVW.  
 F. Contractor shall not install any floor cleanouts. All cleanouts shall be wall cleanouts at a minimum 24" above the floor.  
 G. No PVC or ABS allowed in interior building spaces.  
 H. All HACs shall have a mop sink installed  
 I. No trap primers. Jay R Smith 2692 quad close trap seal.

- J. All new buildings shall include a water softener system. Remodels or new buildings that are incorporated into an existing water softener system must include upgrades to existing system, as required.
- K. All new buildings shall include a Copper Silver Ionization System. Enrich Products: Tarn CU-EPI-3 with EC-EPI3x Cells or as supported by calculations. Remodels or new buildings that are incorporated into an ionization system must include upgrades to existing system, as required.
- L. All ice and water dispensers require a drain line and water line. See 2.14 for ice and water dispenser requirements.

## 2.5 HEATING, VENTILATION & AIR CONDITIONING

- A. In order to meet the energy guidelines, the following design criteria will need to be implemented for designing renovated or new HVAC systems:

<i><b>DESCRIPTION</b></i>	<i><b>DESIGN CRITERIA</b></i>
Cooling coil face velocity	350 FPM
Cooling coil copper tube minimum wall thickness	0.024" -8 row minimum
Max height between drain pans	24" -Use multiple coils if necessary
WB temperature minimum	67 degrees
Chilled water supply temperature	48 degrees
Delta temperature change	20 degrees
Chilled Water pressure	Design for a 12PSI delta AT THE CENTRAL PLANT
Heating Hot Water Supply	130 degrees
Delta temperature change	20 degrees
*Blow through designs should be used not draw through *12 fins per inch with MERV 14 pre-filters *No unsupported coil lengths of greater than 60 inches	

- B. Fan Coils: Trane
- C. Terminal Units: Compatible with existing systems
- D. Supply Diffusers: Titus Square Model TMS
- E. Return Diffusers: Titus 350RL Louvered, w/ optional Model AG-15 Opposed Blade Damper
- F. Variable Frequency Drive – ABB with BACnet
- G. Controls – See 23 09 23 for specification
- H. Mechanical contractor shall ensure coordination with all other trades.
- I. Package units shall be Trane or American Standard.
- J. Heat pumps shall be utilized where hot water heating is not possible
- K. All fire dampers shall be rated for use in minimum 2 hour fire separations. Ward Fire Damper, Curtain Style Fire Damper. See HVAC data sheet folder.
- L. In line fans shall be Airzone TT Silent fans. Fans shall be selected individually per application.
- M. Chilled water piping insulation aluminum jacket shall be white powder coat. Every 50 feet or within 5 feet of a 90 the contractor shall provide a two foot section of hardened insulation and identify it with yellow striping.



- N. Hot water piping insulation aluminum jacket shall be white powder coat. Every 50 feet or within 5 feet of a 90 the contractor shall provide a two foot section of hardened insulation and identify it with yellow striping.
- O. All hallways, warehouses, mechanical, electrical and other rooms not requiring control shall contain thermostat sensors only. Stainless steel to match existing make and model. Coordinate with HVAC shop.
- P. All offices and other areas requiring user control shall utilize TR71 thermostats.

<b><i>DESCRIPTION</i></b>	<b><i>DESIGN CRITERIA</i></b>
BACnet Controller	Honeywell
Jace	Honeywell WEB 700

## 2.6 ELECTRICAL

- A. Inspection Reports: Provide polarity test of receptacles in report (reference NFPA 99).
- B. Cable Trays: Ladder style, Aluminum, 6" Deep, 12" wide, 6" spacing.
- C. Other utilities and systems will not be allowed to be installed in electrical rooms. Special systems and communications shall utilize separate rooms or closets as required. Building management systems are considered communications.
- D. Conduit Systems

Building Management Systems	Blue Colored Conduits
Fire Alarm	Red Colored Conduits. All boxes and covers shall be red.
Security Systems	Purple Conduits
Nurse Call/Code Blue	Green Conduits
Paging	White Conduits
Communications	Orange (When required for protection and cable tray or J-Hooks deemed unfeasable)

1. All conduits to be a minimum of ¾" dia.
2. Copper shall be utilized for all electrical components including but not limited to transformers, panelboards, switchgear, switchboards, busduct, etc.
3. All rough in conduit to have plaster rings and pull cords (Telecom, Data, Nurse Call, etc.)
4. No armored (MC or AC) cable allowed.
5. No Multi-Branch Circuits Allowed.
6. Junction boxes shall be installed on pre-manufactured brackets that span the back of the box from stud to stud. Erico Telescoping Screw Gun Bracket or equal.
7. Conduits shall be supported using screw type fasteners.
8. Any location where an emergency power receptacle is installed, a normal power receptacle shall be located within 2', and be within the same room.
9. All receptacles shall be hospital grade. Tamper proof hospital grade outlets shall be required in public spaces such as waiting rooms, and hallways.
10. All receptacles in wet or damp areas shall be GFCI.
11. Corridors shall have a dedicated outlet every 50 ft. for use by EMS. This outlet shall utilize a special plug for floor cleaners, etc. Coordinate with the electric shop for details at this time.
12. Use of flexible metal conduit for connections to motors and vibrating equipment shall be limited to 24 inches.

13. Submit all panel schedules, including updated panel schedules in pdf and Microsoft Excel format. Coordinate with COR for existing files if available.
14. Submit all panel labels in pdf and Microsoft Word format. Coordinate with COR for existing files if available.
15. External Lighting. Distribution and pole heights will vary.

Wall Packs	McGraw Edison #IST-A02-LED-E1-BL3	Bronze
Light Pole	Kim Warp9 LED	Dark Bronze
Light Pole	Architectural Area Lighting	INDA, Type S, 30" Round, Dark Bronze
Other specialty lights to be reviewed based on application		

16. Interior lighting shall be LED as base bid. Columbia LEPC, LLHP, LLT, LSER or similar if applicable. Lighting designer to select and present option. Deduct alternate shall be premium T8 or T5 lighting, and other applicable non-LED systems.
17. All lighting shall be Multi-voltage (120-277V).
18. Lighting Controls: nLight. All lighting shall utilize occupancy sensors and controls. Coordinate with COR for specifics.
19. Oil Filled Transformer – Cooper, Loop Feed Option, Envirotemp FR3. Contractor shall install 2-2 inch conduits spare and 1 set of matching spare conduits on both primary and secondary sides of the transformer. Spare conduits shall be capped and labeled appropriately. Coordinate with COTR.
20. Labeling:
  - a) Provide cable and conduit identification tags, on all raceways, 30' on center and within 24" of all terminations, bends, and penetrations. Labels shall identify feeder source and load served (to and from), and voltage. Letter size shall be as large as practical per raceway size. Tags shall be permanent, self-adhesive with clear laminate.
  - b) Essential System Power feeders or circuit labels shall be red with white letters.
  - c) Normal System Power feeders or circuit labels shall be blue with white letters
  - d) Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.
  - e) All new panels shall have SCCR labeling, to include any calculations.
  - f) Arc Flash and Shock Hazard: Install adhesive arc flash warning labels on all equipment as required by NFPA 70E. Label shall indicate the arc hazard boundary (inches), working distance (inches), arc flash incident energy at the working distance (calories/cm<sup>2</sup>), required PPE category and description including the glove rating, voltage rating of the equipment, limited approach distance (inches), restricted approach distance (inches), prohibited approach distance (inches), equipment/bus name, date prepared, and manufacturer name and address. IEEE Std 1584a shall apply. Contractor shall study completed prior to ordering equipment. Equipment shall not be permitted to be energized without a new or updated label.

#### E. Wiring Devices

1. Normal Power Devices & Wall Plate: Ivory, White or Light Almond. Engraved with panel and circuit number in ¼" high black letters at the top of each plate. In electrical rooms, data closets, mechanical rooms, etc. wall plates shall be stainless steel.
2. Emergency Power Devices Wall Plate: Red smooth nylon. Engraved with "EMERGENCY" at the top of each plate and the panel and circuit number at the bottom of the plate. Use ¼" high white letters.

3. Switches shall be 52" where 48" wainscot is indicated or exists.
- F. Power Monitoring System: Siemens WinPM Net central monitoring system
- G. Metering: Switchgear and Switchboards: Siemens 9610 or 9360 Meters
- H. All programming, cabling, and appurtenances to be included.
- I. Switchgear: Siemens WL Low Voltage Switchgear, copper fully rated bussing
- J. Switchboards: Siemens SB3, copper fully rated bussing
- K. Panelboards: Siemens, copper fully rated bussing
- L. Automatic Transfer Switches: ASCO, match existing controls. Contractor shall ensure programming and installation is done in accordance with all applicable regulations and requirements, to include Joint Commission requirements.
- M. Breakers:
  1. Breakers shall be Siemens. When replacing breakers in existing equipment, breakers shall be of the same manufacture of the existing equipment.
  2. Switchgear and Switchboard breakers shall have the ability to show status open/closed/trip.
  3. Low-Voltage Switchgear shall utilize Siemens Type WL breakers
  4. Distribution Switchboards shall utilize Siemens Type VL or WL breakers, unless otherwise specified in the drawings.
- N. Panelboards – Main Breaker. MLO shall not be allowed. Verify with engineer for allowances due to selective coordination.
- O. Selective Coordination Study:
  1. Coordination study shall be required to be completed prior to final approval of electrical submittals. Normal distribution systems shall be required to coordinate to 0.1. Essential systems shall be selectively coordinated (0.01).
  2. Contractor shall provide coordination study in SKS, pdf and hard copy report formats.
- P. Hospital grade is required for all devices
  1. Emergency Circuits - Red
  2. Normal – Ivory
  3. Isolated – Orange
- Q. All receptacles in areas with children present shall be GFCI and tamperproof.
- R. All receptacles shall be Leviton 8300-SGI, or approved equal, 125-volt rated, 20-amp (minimum) as required. See 2.6.Q for colors.
- S. A Normal outlet should always be located within 12" of every emergency outlet. Electrical, Mechanical, and IT rooms and closets should contain an equal amount of normal and emergency circuits.
- T. All new feeders and branch circuit wiring shall be copper.
- U. Conduit shall not be considered to be an adequate EGC.
- V. Branch circuit conductors serving general-purpose 120-volt receptacles and miscellaneous equipment circuits in finished areas shall be 12 AWG and 3/4" conduit, minimum.
- W. Conductors serving 120-volt, 20-amp, branch circuits exceeding 100'-0" from source to furthest electrical outlet or device shall be minimum 10 AWG copper.
- X. Branch circuit ratings shall not be less than the noncontinuous load plus 125% of the continuous load.
- Y. All equipment specified shall be Underwriters Laboratories (UL) labeled and listed when available.
- Z. Flexible conduit, minimum 3/4" trade size and 6' maximum length shall be used for all motor connections.
- AA. Electrical metallic tubing (EMT) with compression type couplings and fittings (up to 53mm (2")) shall be used generally for concealed applications, interior partition walls and above the 8 foot demarcation as noted above.
- BB. Conductor insulation shall be code grade type THHN/XHHW-2/THWN-2, rated 90 degrees Celsius.

- CC. New fusible safety switches shall be heavy duty and shall be provided at the new HVAC unit locations to provide motor disconnecting means as well as motor overload protection.
- DD. All toggle switches shall be specification grade, silent acting, 125/277-volt rated, 20-amp, single-pole, 3-way, or 4-way as required.
- EE. Fuses in new fusible safety switches shall be dual element, time-delay
- FF. External enclosures shall be rated for the environment that they are subjected to. External enclosures shall be protected against windblown dust, and rain at a minimum and shall utilize NEMA 3 enclosures vs. NEMA 3R. Enclosure type subject to review during submittal process.
- GG. **All work described herein shall conform to the current editions of the National Electrical Code (NEC), the International Building Code, NFPA 99, NFPA 101, NFPA 70E and VA Design Guidelines.**

## 2.7 SPECIAL SYSTEMS

- A. All special systems shall be installed in minimum ¾" conduit. See 2.6 10 for labeling requirement.
- B. Special systems wire labeling shall be per section 2.10
- C. Wiring shall be in accordance with all national standards and installation quality shall be monitored by the contractor.
- D. Fire alarm system is to be Edwards EST-3 and fully networked and controllable from room D06-1 of the main hospital.
- a. Contractor shall provide services from Climatec to update FireWorks as required for any changes or additions made to the fire alarm system.
- E. Nurse call to be used is Westcom Novice Nurse Call (which is in the process of being networked to incorporate the code blue system with PBX for detailed room location).
- a. Nurse call shall be included at all nurses stations, all exam rooms, all patient bed locations and all restrooms.
- b. Nurse call shall include Code Blue linked into the server in D06-1 for telephone operator monitoring. Complete programming and
- F. Paging system shall be Dukane StarCall, 70v paging system.
- G. C-Cure 9000 software shall be used for both the card access and intrusion control systems. The existing system will be monitoring both access and intrusion control.
- H. Lynx system shall be modified/or installed as required to provide Panic and Duress alarms throughout the areas being modified or constructed. Points shall be added for any work stations in the area.
- I. Existing intrusion system is a Securitron system that allows the police to monitor, lock and unlock external doors from the police station, located in D106-1. If intrusion systems is not to be upgraded to a different system, being C-Cure 9000, we will need to keep all external doors on the Securitron system for the police.
- J. All TV drops shall be included as a part of the contract. To include cabling as required. Coordinate with Cox and the Special Systems shop to identify locations of cox utility drops. Upgrades to the system s to accommodate additional TV's and drops shall be included.
- K. All communications rooms shall have ¾" painted fire rated plywood covering the drywalls from floor to ceiling. Rated shall be indicated on a label attached to the plywood in a visible location.
- L. Equipment racks shall include a quad outlet at the base.
- M. Exposed cabling wall penetrations shall utilize Hilti CP 653 Speed Sleeves or approved equal system.

## 2.8 ELEVATORS

1. Overhead Geared Traction:
  - a. Elevator controller shall be Motion Control 4000
  - b. Hollister Whitney Traction Machine
  - c. Hollister Whitney Overspeed Governors
  - d. Hollister Whitney Rope Gripper
  - e. Hollister Whitney Sheaves
2. Hydraulic
  - a. Elevator controller shall be Motion Control 2000
  - b. EECO Power Units
  - c. EECO Jack Units
  - d. EECO Valves
3. Universal
  - a. Controls shall incorporate with Motion Control Engineering iMonitor, iReport and BMS-LINK to include monitoring by the existing Tridium Niagara AX BMS.
  - b. Hallway and cab fixtures shall be Innovative Industries, match existing facility fixtures.
  - c. All cabs shall contain primary and auxiliary car station fixtures.
  - d. Door operation systems shall be GAL manufacturing.
  - e. All lighting shall be LED.
  - f. Entryways shall utilize VA standard detail SD142100-04-Example of Radius
  - g. Cab interiors shall match existing elevators S-1, 2, 3, 4, 5, 6, 7, 8 and 9. The submittals for these cabs will be provided upon request.

## 2.9 EXTERIOR METALS

1. All exterior metals to include railings, sign posts, and similar items shall be powder coated galvanized steel. Coating shall meet ASTM A123-09

## 2.10 COMMUNICATIONS AND DATA

1. All communications cabling shall be CAT6. Color designations are as follows: White – Voice, Blue – IT/Data
2. All data outlets shall utilize 4 ports. Data 1, Data 2, Phone 1, and Spare.
3. All IT/Data, electrical, mechanical, elevator rooms shall contain at a minimum one 4 port data outlet.
4. Wall face plates and patch panels shall conform to the following model numbers:

Black D2 Jack	NK688MBL
Ivory Voice Jack	NK688EIY
Orange D1 Jack	NK688MOR
Black D2 Jack	NK688MBL
Spare	NKBMEI-X
4 Port Face Plate	NK4FEIY
48 Port, CAT6, Patch Panel	DP48688TGY
4 PR CLIPS	110C-4
110 Punch Down Block	P110KB1004Y

w/ Clips	
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\*Manufacturer of face plates is Panduit

5. Fiber optics shall utilize Corning Fiber Panels, Corning Unicam connectors, and OM3 fiber patch cables with ST Type connectors.
6. Labeling shall be per ANSI/TIA-606-B. Coordinate with COR, special systems and IT for specific labeling.
7. Contractor shall develop cable running lists and provide pdf and excel copies to COR. Running lists shall be developed in coordination with the COR, electronics shop and IT. The contractor is responsible for getting all final documentation developed and approved. Additionally, all information shall be incorporated into facility DCIM.
8. All communications rooms shall have ¾" painted fire rated plywood covering the drywalls from floor to ceiling. Rated shall be indicated on a label attached to the plywood in a visible location.
9. Equipment racks shall include a quad outlet at the base.
10. Wall penetrations shall utilize Hilti CP 653 Speed Sleeves or approved equal system.

## 2.11 SIGNS AND WAYFINDING

1. Interior and exterior architectural signage shall be in accordance with VA Phoenix Standards. Guidelines shall be provided upon request.

## 2.12 BIOMEDICAL EQUIPMENT

1. Patient lift systems shall be ARJO Maxi Sky system. Rails shall utilize continuous charging system.

## 2.14 MISCELLANEOUS FACILITY EQUIPMENT

1. Ice Machine: Follet Corporation Model No.

	Manufacturere	Model No.	Additional Information
Ice & Water Dispenser	Follet Corporation	110FB400A-S Symphony	Freestanding, SensorSAFE dispense, ice machine in base, automatic load, nugget style, air-cooled condenser, 400 lb. production/24 hours, 90 lb storage capacity, stainless steel exterior with plastic trim, 6" adjustable legs
Ice & Water Dispenser Water Filter System	Follet Corporation	00130229	Water filter system(one per ice machine) for Maestro 400 Series ice machines and Symphony ice and water dispensers, 3,000 gallons capacity. Contractor to provide 10 filters per machine installed.


**PART 3 - EXECUTION****3.1 SPARES**

- A. Typical NTC specified extra stock quantity is approximately 5-10% of material quantity used on project. This includes the following work categories:

Specification	Description
08 80 00	Glazing
09 30 13	Ceramic/Porcelain Tiling
09 51 00	Acoustical Ceilings
09 54 23	Linear Metal Ceilings
09 65 13	Resilient Base and Accessories
09 65 16	Resilient Sheet Flooring
09 65 19	Resilient Tile Flooring
09 68 00	Carpeting
09 72 16	Vinyl-Coated Fabric Wall Coverings
09 72 31	Polypropylene Fabric Wall Covering
09 84 33	Sound-Absorbing Wall Units
09 91 00	Painting
09 94 19	Multicolor Interior Finishing
10 21 23	Cubicle Curtain Tracks

**Change Document:**

Changed 18 Nov 2013 – Supersedes 8 Nov 2013 version – Thermostatic water mixing valve changed.