

FACILITIES STANDARDS MANUAL

April 25, 2024 Edition

Disclaimer: The Facilities Standards Manual is updated annually and published the first of the year. As the standards manual is a living document, with ongoing updates made throughout the year, please refer to the on-line manual at

https://www.jea.com/Working_With_JEA/Engineering_and_Construction/Reference_Materials/Shared_Services_Standards.aspx to be apprised of any modifications to the manual.

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DIVISION 7 – THERMAL AND MOISTURE PROTECTION**07 52 16 – SBS Modified Bituminous Membrane Roofing**

The standard low slope roof system shall be a mineral surfaced SBS modified bitumen roof assembly with materials manufactured by:

Johns Manville, Siplast, or Soprema.

DIVISION 8 – OPENINGS**08 16 13 – Fiberglass Doors with Aluminum Frame** (Revised June 2020)

Special Lite Fiberglass Reinforced Polyester Door System (FRP) with Aluminum Frame or JEA approved equal

Features:

1. FRP skin - 0.12" thick
2. Class "C" exterior skin
3. Uses Corbin Russwin ML2000 mortise lockset – JEA standard
4. Hinges – 4.5" butt, continuous and offset pivots
5. 6063-T6 aluminum alloy door perimeter extrusions
6. Frame – 6063 -T6 hardened aluminum alloy
7. Options – fire rated and hurricane resistant
8. Core – water blown polyurethane foam

08 71 00 – Door Hinges

1. ANSI A 156.1 Compliant full mortise type hinges
2. ANSI A5111 (Stainless steel) For use on heavy weight doors and doors requiring high frequency service.
3. ANSI A5112 (Stainless steel) For use on medium weight doors and doors requiring medium frequency service.
4. ANSI A5133 (Stainless steel) For use on medium weight doors or door requiring low frequency service.
5. US32D Satin finished
6. Stainless steel fasteners

08 71 20 – Corbin Russwin Locksets*LOCKSET:*

1. Mortise: Corbin Russwin, ML2000 Series-Heavy duty for medium to light used door
2. Cylindrical: Corbin Russwin, CL3300 Series-Extra heavy duty for highly used door or Corbin Russwin, CL3500 Series-Heavy duty for medium to lightly used door

HANDLE AND TRIM:

1. Mortise: Lustra Lever Design Handle (LWA) for mortise lockset
 - i. Satin Stainless Steel US32D (BHMA 630) finish
2. Cylindrical: Newport lever handle (NZD)
 - i. Satin chrome plated (626) finish

CORE:

1. Satin plated chromium (626), Complete Large Format Interchangeable Core (LFIC), 6-Pin high security, keyed to existing Corbin Russwin 60-70 series restricted system with construction control key.

KEY:

1. Patented Corbin Russwin Master Keying System

NON-KEYED LOCKSET:

1. Unless otherwise specified by the designer or architect and approved by the standard committee, any brand may be used that matches the Corbin Russwin style.
2. All remodeled buildings and buildings slated for demolition shall have all locksets, cylinders, and keys returned to Facilities.

08 71 20 - Door Hardware – Restroom Occupancy Lockset (Est June 2020) (Rev. Aug 2021)

PRIVACY LOCK FOR SINGLE OCCUPANCY INTERIOR RESTROOM: This lock will be used in lieu of standard upper deadbolt same opening.

Approved vendors are Yale or Schlage.

Approved Models are:

1. Yale: D292 x 626, Master model Chrome D- series occupancy lock
2. Schlage Corp.: B571 626 B580, Occupancy INDX Thumb Turn 626, Satin Chrome
3. Schlage Corp.: D271 626 D200, Occupancy Grade 2 Non-Handed Med. Duty Satin Chrome

Handle and Trim:

Interior restroom doors are either push or pull to open, simple Satin Chrome Handle, and Push Plate Set on doors.

EXTERNAL RESTROOM USE – See Security Standards for Medeco Lock Sets.

Requested Standardization: (Rev. Aug 2021)

Recommended Manufacturers and models, that meet Facilities standards are:

1. Falcon Mdl# SC-61A
2. Yale 2721T x 689
3. Corbin Russwin DC3210

| Brand | Falcon | Yale | Corbin Russwin | Dynasty Hardware | Ryobi |
|------------------|-------------|-------------|----------------|------------------|----------|
| Model | Mdl# SC-61A | 2721T x 689 | DC3210 | 3000-ALUM | DM104ULS |
| Max door weight | 200 lbs | 250 lbs | 250 lbs | 143 lbs | 176 lbs |
| Warranty | 10 years | 10 years | 15 years | 5 years | 5 years |
| Adjustable sizes | 1 - 6 | 1 – 6 | 1 – 6 | 1 – 3 | 1 - 3 |
| Max open | 180° | 180° | 180° | 180° | 180° |

| | | | | | |
|-------|-------|-------|-------|------|------|
| Price | \$101 | \$152 | \$180 | \$38 | \$40 |
|-------|-------|-------|-------|------|------|

Equivalents that meet the standard specifications may be substituted when approved by the JEA stakeholder.

Standard Specifications:

1. Adjustable to Door Sizes 1 -6
2. Heavy Duty Parallel Arm w/Stop & Holder
3. Single piece cast aluminum body
4. Non-handed for left or right swinging doors
5. Heat-treated steel piston & pinion

Compliance and Warranty:

1. Meets ANSI A117.1
2. ANSI/BHMA A156.4, grade 1
3. UL listed and compliant to UL10C and UBC 7-2 (1997)
4. Cover is UL approved for use in fire rated assemblies
5. 10-year warranty

Justification for Standardization:

1. This item is the most cost-effective means to safely maintain the highest level of system availability & reliability. The item is used in large numbers throughout the JEA system. There are many new restroom, breakroom and admin building projects occurring all the time and to help project managers / architects expedite the plans a door closer standard should be implemented as a JEA standard; will also help new techs. The costs of these closers range from \$130 - \$180 but are backed with a ten-year commercial manufacturer warranty. The durability and construction of these closers should be considered a cost savings over a period; not requiring piston other part replacements like inferior brands. Other brands, Dynasty Hardware and Ryobi, costs more than half the price but only come with a five-year commercial manufacturer warranty. The closure model will vary on door type and size; the manufactures mentioned are based on good warranties and past experience by our technicians.

08 71 53 – Electrified Locksets

LOCKSET:

- Mortise: Corbin Russwin, ML20606 NAC Series Electrified Mortise Lock
 Full Model No. ML20606 PSM NAC SEC 630 CT6R
The above unit replaces current standard:
 Corbin Russwin, ML20606 NAC Series Electrified Mortise Lock
 Full model No. ML20606 PSM NAC SEC RO4 630 CL6
- Cylindrical: Corbin Russwin, CLX33905 Electrified Lockset – Fail Secure:
 Full Model No. CLX33905 PZD 626 M92 CT6R

Panic Device: Corbin Russwin, Narrow Stile Rim Device:
Full Model No. ED4200S MELR M51 M92 PR859 630 CT6R M107

Rim Device - Corbin Russwin, ED5200S Panic Device
Full Model No. ED5200S M99 PR9905 M92 630 M51 CT6R M107, M54
The above unit replaces current standard:
Corbin Russwin, ED5200S Panic-Listed SecureBolt Exit Device
Full Model No. ED5200S P955 M95 M94 630 CL6 M54

Corbin Russwin, Surface Vertical Rod:
Full Model No. ED5470 M99 PR9905 M92 630 M51 CT6R M107

Corbin Russwin, Panic with Mortise Device:
Full Model No. ED5600L SEC M51 M92 M99 PR957 630 CT6R

08 83 00 – Convex Safety Mirrors

Zoro Select - DCVO-30T-SSB-VT, Indoor/Outdoor Convex Mirror, 160° Viewing Angle, 30" dia.

SE-KURE - 916188-1, Indoor/Outdoor Convex Mirror, 160° Viewing Angle, 36" dia.

Condor - CVO-26Z-GB, Indoor/Outdoor Convex Mirror, 160° Viewing Angle, 26" dia.

Specs:

Zoro Select #DCVO-30T-SSB-VT Specifications

Approx. Viewing Distance: 30 ft
Rim Type: Vinyl Coated Aluminum
Includes Mounting Hardware: Yes
Lens Material: Acrylic
Viewing Angle: 160 Degrees
Includes: Double Telescope Mounting Brackets
Item: Outdoor Convex Mirror

Backing: Stainless Steel
Mirror Environment: Indoor/Outdoor
Backing Material: Steel
Diameter: 30"
Safety Mirror Item: Convex Mirror
Mirror Shape: Circular
Shape: Circular

SE-KURE - 916188-1 Specifications

Mfg Part Number SCVO-36Z-PB
Approx. Viewing Distance: 36 ft
Rim Type: Aluminum
Includes Mounting Hardware: Unk
Lens Material: Acrylic
Viewing Angle: 160 Degrees
Includes: Mounting Z Bracket
Item: Outdoor Convex Mirror

Backing: ABS Plastic
Mirror Environment: Outdoor
Backing Material: ABS Plastic
Diameter: 36"
Safety Mirror Item: Convex Mirror
Mirror Shape: Circular
Shape: Circular

Condor - CVO-26Z-GB Specifications

Mfg Part Number SCVO-26Z-GB

Approx. Viewing Distance: 26 ft
Rim Type: Aluminum
Includes Mounting Hardware: Yes
Lens Material: Acrylic
Viewing Angle: 160 Degrees
Includes: Mounting Bracket
Item: Outdoor Convex Mirror

Backing: Galvanized Steel
Mirror Environment: Outdoor
Backing Material: Steel
Diameter: 30"
Safety Mirror Item: Convex Mirror
Mirror Shape: Circular
Shape: Circular

08 91 19 – Fixed Louvers - Aluminum

Request Standardization:

Construction Specialists: Model DC-5304

Greenheck: Model EVH 501D

Quality Assurance: Miami -Dade Dept of Regulatory & Economic Resources (RER)

Construction: Will consist of the following:

- A. Aluminum Extrusions: ASTM B 221, Alloy 6063-T5
 - a. Furnish louvers with frames and blades fabricated of not less than 0.125-inch-thick extruded aluminum of profile depth
- B. Provide sills of 4-inch high by full depth sill flashing formed from minimum 0.050-inch-thick aluminum; sill flashings to have welded side panels for indoor or outdoor installation Construction.
- C. Assemble louvers and provide all supports, anchorages, and accessories for a complete installation.
- D. Provide drainable, impact-resistant fixed blade extruded aluminum exterior louvers
- E. Fastenings: Fasteners may be stainless steel or aluminum. Provide types, gauges, and lengths to suite unit installation conditions. Use Phillips flat-head machine screws for exposed fasteners, unless otherwise shown, with finish to match louver.
- F. Anchor and Inserts: Use stainless-steel for anchors and inserts. Use steel expansion bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete and masonry work. Provide method to separate dissimilar metals.

Screens:

- A. Provide removable screens for all exterior louvers.
- B. Fabricate bird screen frames of 1/4 inch square mesh, 16-gauge aluminum wire with finish to match the louvers to which secured. Provide frames of extruded aluminum for permanently securing screen mesh.
- C. Locate screens on inside face louvers, unless shown otherwise. Secure screens to louver frames with clips or sheet metal screws, spaced at each corner and at 12 inches o.c. between

Code:

Must meet the Florida Building Code (FBC) 2017 edition

Submittals:

- A. Manufacturer's Data: Submit manufacturer's technical data, anchor details and installation instructions; Dade County approval data.

- B. Test Reports per FBC TAS 201-94, TAS 202-94, & 203-94
AMCA 550-09 - High Velocity Wind Driven Rain resistance report

Justification for Standardization:

1. This item is the most cost-effective means to safely maintain the highest level of system availability & reliability. Items requested have better availability & reliability. The item requested will provide documented long reliable service life at a lower life-cycle cost. The item requested has better availability and delivery time, which is necessary for the particular application.

2. The replacement of fans and louvers at several wastewater and water treatment plants caused Facilities to create a fixed louver standard. Additionally, the construction of new buildings at Nocatee, Buckman, etc. showed a need for a common standard. Dave Gillard, Rick Collin, and Gary Gillis discussed the problem with coated/painted steel, galvanized steel, and sometimes stainless-steel louvers that corroded in these environments. These discussions revealed a need for a louver that will have a longer corrosion resistant life. Therefore, the louver requirements were developed to provide a basis of the design for the following:
 - A. Use aluminum since it is resistance to corrosion from sulfur and chlorine byproducts
 - B. Use the Miami-Dade testing protocol for hurricane rated products
 - C. High velocity impact resistance
 - D. Meeting all current Florida Building Codes

DIVISION 9 – FINISHES**09 50 00 – Ceiling Tiles**

1. ARMSTRONG – square Lay-in “Cortega” ceiling tile.
 - a. Material – Wet-formed mineral fiber
 - b. Surface Finish – Factory-applied latex paint
 - c. Color – White
 - d. Light Reflectance – White – 0.82 (rating per ASTM E1477)
 - e. Weight – .69 lbs/SF depending on size of tile
 - f. Size - 24”x 24”x 5/8”
 - g. NRC – 0.55
 - h. CAC – minimum 33
 - i. Fire Performance - ASTM E84 and CAN/ULC S102 surface burning characteristics. Flame Spread Index or less. Smoke Developed Index 50 or less (UL labeled)
 - j. Anti-Mold/Mildew Bacteria – Standard
 - k. Insulation Value - Average R factor is 1.5 BTU units 0.26 (Watt units)
 - l. Sag Resistance – Standard
 - m. VOC Emissions – Meets CA Dept. of Health Services Standard Practice for the testing of VOC Emissions and is listed on CHPS High Performance Products Database for Low-Emitting Materials.
 - n. ASTM E1264 Classification – Type III, Form 2, Pattern c D; Fire Class A

09 51 13 – ACOUSTICAL CEILING TILES (MOISTURE RESISTANT)

1. ARMSTRONG - Square lay-in "Ceramaguard Fine Fissured" ceiling tile.
 - a. Material – Ceramic and mineral fiber composite
 - b. Surface Finish – Scrubbable factory-applied plastic finish
 - c. Color – White
 - d. Light Reflectance – White – 0.82 (rating per ASTM E1477)
 - e. Weight – 1.40 lbs/SF depending on size of tile
 - f. Size - 24”x 24”x 5/8”
 - g. NRC – 0.55
 - h. CAC – minimum 40
 - i. Surface Burning Characteristics – Class A (Flame Spread 25 or under) UL Labeled
 - j. Fire Resistance Rating – Fire Guard: A fire resistive ceiling when used in applicable UL assemblies
 - k. Anti-Mold & Mildew – Totally inorganic product
 - l. Insulation Value - Average R factor is 1.4 (BTU units) 0.25 (Watt units)
 - m. Sag Resistance – HumiGuard Max – maximum humidity resistance, including outdoor applications
 - n. ASTM E1264 Classification – Type XX (high density ceramic-like composition with scrubbable finish), Pattern C E

09 90 00 – Painting & Coating (Sherwin Williams)

Sherwin Williams brand paint: finish and color to be determined by site conditions/requirements

09 96 56 – Water Based Epoxy Paint

Sherwin Williams Pro Industrial Water Based Catalyzed Epoxy, finish and color to be determined by site conditions/requirements. Application to be in high use/abuse locations: substation restrooms, lab facilities (if not covered under other standards/specifications), walls subject to impact (cart and chair storage areas, for example), and other areas as determined on a case-by-case basis.

09 96 56 – Epoxy Floor Coating

Sherwin-Williams Resufloor Deco Quartz BC23 is a 1/8" system that uses decorative colored quartz aggregates, high-solids epoxy resins, and chemical resistant grout and topcoats to form a protective surface that is aesthetically pleasing, durable and slip, wear, and stain resistant. Other floor coatings may be standardized and utilized for other process areas including warehouse and treatment plant functions that this product may not warrant use on.

Application intended use to be in high usage/abuse locations: substation restrooms, water and or wastewater treatment restrooms, industrial shops, storage, and maintenance areas or other restrooms concrete floors would be applicable.

09 97 35 – Marker Board Paint

Rust-Oleum Dry Erase Paint; color: white; item number: 241140

DIVISION 10 – SPECIALTIES**10 16 16 – Dry Erase Board for Conference Room (Est June 2020)**

The Quartet Infinity marker board – Glass, 4' x 8'

10 11 23 – Restroom Janitorial Log Sheet Holder (Substation restrooms) Est. July 10, 2019

Clear acrylic wall mount sign holder, Vertical, for single sided 8.5" x 11" sheets. An example is the Deflecto Classic Image Wall Mount Sign Holder (68201).

Mounting: The holders will be attached using 2 drywall screws at the top of the holder for drywall walls, or 2 tapcons at the top of the holder for block walls.

The holder will be mounted @52" AFF 6" from door light switch or most convenient accessible location if space at door light switch is not available.

10 14 16 – Bathroom Signage (Est. March 6, 2019)

Provide visual, tactile and Grade 3 Braille information to assist all employees and visitors.

1. Design to meet Federal ADA / ADAAG Guideline for content, symbol design, text style, Braille translation and color contrast
2. Braille dots must meet ADA requirements for size, shape and spacing
3. All signs will have blue background with white lettering and symbols
4. Matte finish required to reduce glare and reflections for better visibility
5. Signs will be 9" h x 6" w, made of 1/16 blue acrylic substrate with 1/32 white tactile layer
6. If Family, signs require they will be 9" h x 9" w

Mounting signage

1. All signs will mount on wall with double back tape
2. Signs shall be mounted per Section 703.4.1 and ANSI A117.1 703.3.10
 - a. Tactile characters on signs shall be located 48 inches minimum above the finished floor or ground surface, measured from the baseline of the lowest tactile character and 60 inches maximum above the finished floor or ground surface, measured from the baseline of the highest tactile character.
 - b. Signs should be mounted to the wall on the latch side or the door.

10 21 00 – Cubicle Systems

Manufacturer: HON

System: Abound

The panel is a frame and tile style that is stackable. Tiles will be fabric covered for most locations with the ability to have laminate or metal depending on placement. Fabric panel will be acoustical grade. Work surface will be high density laminate. Panel width will be 36" wide, 50" tall and 2-5/8" thick. Power supply will have the capability to be at work surface level.

10 21 13 – Plastic Toilet Compartments HDPE (Est. September 2019)

Brand

Scranton – Solid Plastic; High Density Polyethylene (HDPE)

Global – Color thru phenolic

Compartment style: Floor mounted, overhead braced

Warranty: 15 Years

Construction:

1. Doors, panels, and pilasters shall be 1 inch thick with all edges rounded to a 1/4-inch radius.
2. Doors and dividing panels shall be 55 inch high and mounted at 14 inch above the finished floor.
3. Pilasters shall be 82 inch high (standard) and fastened into a 3-inch-high pilaster shoe with a stainless-steel tamper resistant torx head sex bolt.
4. Door dimensions to meet ADA.
5. Color: To be selected from Manufacturer's full line of textures and colors
6. Door Hardware
 - a. Hinges shall be 8 inch and fabricated from heavy-duty extruded aluminum (6463-T5 alloy) with bright dip anodized finish with wrap-around flanges, through bolted to doors and pilasters with stainless steel, torx head sex bolts. Hinges operate with field adjustable nylon cams. Cams can be field set in 30-degree increments OR, hinges shall be integral, fabricated from the door and pilaster with no exposed metal parts.
 - b. Door strike/keeper shall be 6 inch long and made of heavy-duty extruded aluminum (6436-T5 alloy) with a bright dip anodized finish and secured to the pilasters with stainless steel tamper resistant torx head sex bolts. Bumper shall be made of extruded black vinyl.
 - c. Latch and housing shall be made of heavy-duty extruded aluminum (6463-T5 alloy). The latch housing shall have a bright dip anodized finish, and the slide bolt and button shall have a black anodized finish.
 - d. Each door shall be supplied with one coat hook/bumper and door pull made of chrome plated zamak. Handicapped doors shall be supplied with a second door pull and out swing doors with one door stop made of chrome plated zamak.
7. Pilaster shoes shall be 3 inch high (type 304, 20 gauge) stainless steel. Pilaster shoes shall be secured to the pilaster with a stainless-steel tamper resistant torx head hex bolt.
8. Wall brackets shall be 1 1/2-inch stirrup type made of heavy-duty aluminum (6463-T5 alloy) with a bright dip anodized finish. Stirrup brackets shall be fastened to pilasters and panels with stainless steel tamper resistant torx head hex bolts.
9. Head rail shall be made of heavy-duty extruded aluminum (6463-T5 alloy) with anti-grip design and integrated curtain track. The head rail shall have a clear anodized finish and shall be fastened to the head rail bracket by a stainless-steel tamper resistant torx head hex bolt and fastened at the top of the pilaster with stainless steel tamper resistant torx head screws.
10. Head rail brackets shall be 20-gauge stainless steel with a satin finish and secured to the wall with a stainless-steel tamper resistant torx head screws.

10 28 13 – Electric Hand Dryer**Excel Dryer Inc. Model Xlerator XL-W**

1. **Hand Dryer:** High Speed, energy efficient, electric hand dryer; surface mounted; entire dryer internally grounded.
2. **Warranty Period:** 5 years; limited warranty
3. **Manufacturing** - MADE IN USA Certified, verify certification number
4. **Sound Level** – Operational sound level less than 80 dB
5. **Provide** 1.1” noise reduction nozzle
6. **Motor and Blower:** 5/8 HP, 20,000 RPM. Air flow rate: 19,000 linear feet per minute
7. **Heater:** 970 watts mounted inside blower housing to be vandal proof with Air Temperature of 135 degrees F measured at average hand position of 4 inches below air outlet
8. **Performance Criteria:** Certified and labeled by Underwriters Laboratory, Inc.
9. **Power Source:** 110/120-volt, 12.5-amp, 50 Hz or 60 Hz, 1500 Watts
10. **Controls:** Completely sealed control board and optics, automatic operation, activated by infrared optical sensor
11. **Size:** 11-3/4" wide by 12-11/16" high by 6-11/16" deep
12. **Green:** GreenSpec Listed, Qualifies for LEED Credits
13. **Finish:** White painted
14. **Optional** – Stainless steel brushed Model XL-SB finishes for high abuse environments
15. **Mounting Height:** Distance from floor to bottom of dryer. Men’s 45 inches (1,143 mm); Ladies’ 43 inches (1,092 mm); Handicapped 37 inches (940 mm)

10 28 13 – Hand Towel Dispenser (Rev. Sep. 2021 Hand Towel Dispenser – ADA Compliant)

~~Tork Elevation Matic Model 5510282~~

Requested Standardization:

Tork PeakServe Continuous Hand Towel dispensers, are to be installed in ADA toilet compartments when needed to comply with ADA clearance dimension requirements.

Where PeakServe dispensers are specified for installation, all paper towel dispensers in that building should be upgraded to the PeakServe model for consolidation of paper towel stocking. This would require that the site or building towel dispensers in all restrooms, breakrooms, and hand wash areas must be upgraded to the PeakServe model to eliminate the need to stock multiple varieties of refill stock.

Equivalent products that meet the specifications below may be substituted when approved by the JEA stakeholder.”

Specifications:

Article: 552528

System: H5 – Tork PeakServe Continuous Hand Towel Dispenser

Material: Plastic

Length: 4 in.

Height: 29 in.
Width: 15 in.
Color: Black

Justification for Standardization:

1. For use in ADA required design/renovation project and retrofits where ADA clearances require narrower dispenser. Facilities Capital Group continues to serve our Stakeholders thru remodeling efforts and has had challenges for ADA toilet compartments getting the standard Tork 5510282 model to comply with ADA clearance dimension requirements. At the new Buckman Administration Building the Tork 552528 was installed to meet the ADA standard. This unit has also now been specified for the renovation at New Kings Road Fleet facility. The unit requires a different paper towel stock number of which Facilities O&M has already incorporated into Janitorial operations at Buckman.

10 28 13 – Soap Dispenser

Manual GOJO FMX-12 Dispenser – Black – SKU 5155-06

1. SKU: 5155-06
2. Fully ADA compliant - one-handed push operation
3. Sight window makes it easy to check refill level
4. Provide a black color unit unless Facilities approves otherwise
5. Compatible with GOJO® FMX-12 1250 mL refills, installer to supply one refill unit in dispenser.

Installation Locations: Place manual units only at unmanned facilities - i.e., Substations and Lift Stations.

Automatic Unit GOJO TFX Dispenser

1. SKU: 2730-12
2. Touch-free foam soap dispenser
3. Fully ADA compliant, UL/CE registered
4. Sight window makes it easy to check refill level
5. Provide a black color unit unless Facilities approves otherwise
6. Compatible with GOJO® TFX™ 1200 mL refills, installer to supply one refill unit in dispenser.
7. Uses “C” batteries for power – installer supplied with unit
8. Installation Locations: Place automatic units at all facilities except Substations and Lift Stations.

Construction:

1. Casing: Durable ABS Plastic with rugged polycarbonate view windows (both recycling code number 7)
2. Wall mounted only: Mounts to wall with included adhesive tape or optional hardware. Multiple hole pattern allows use of existing wall holes.
3. Mounting Clearance: 10" (25.4 cm) clearance from bottom of dispenser to surface

10 28 13 – Toilet Paper Dispenser

Tork Twin Jumbo Bath Tissue Roll Dispenser, Article 247549A, Color: Black, SCC: 10073286622393

10 28 13 – Toilet Seat Cover Dispenser

Tork Toilet Seat Cover Dispenser, Article 344080, Color: White, SCC: 7310791218403 This item will be deployed only in limited locations and by approval of Facilities Manager.

10 28 16 – Bathroom Mirror (Est. March 2019)

Non-ADA Compliance Facilities requiring a mirror without shelf, manufacturers shall be:

Bradex Standard Model Series 780
Brey - Krause
Model Series T-10XX-XX-SS or Bobrick B-165 series

Non-ADA Compliance Facilities requiring a mirror with shelf, manufacturers shall be:

Bradley - Bradex Standard Model Series 7805
Brey - Krause Model Series T-10XX-XX-SS with shelf option
Bobrick B-166 series

ADA Compliance Facilities, manufacturers shall be:

Bradex Standard Model Series 740
Bobrick B-293 series.

Equipment Description: Mirror with angled frame, welded corners.

Frame made of one piece formed stainless steel $\frac{3}{4}$ " x $\frac{3}{4}$ " corners welded with satin finish
Back of mirror is galvanized steel secured to frame with concealed screws
Mirror is $\frac{1}{4}$ " float glass, thermosetting infrared cured paint backing with poly glaze finish
manufactured to ASTM C 1036 and ASTM C 1503 standards. Mirror is protected by $\frac{1}{4}$ "
extruded polystyrene between mirror and galvanized steel.
Wall hanger is 18 gauge rolled steel all welded construction.

DIVISION 11 – EQUIPMENT**11 11 36 – DCFC LVLII 7 KW EV Charger (Est July 2020)**

The model shall be an ABB Terra DC Wallbox

- A. DC charger shall be suitable for outdoor or indoor installation with air temperature between - 40°C and +45°C (ambient temperature), without temperature de-rating
- B. Electrical:
 - 1. 1 phase: 200 - 240 VAC, 100Amps.
 - a. 1 phase 19.5 kW @208 V and 22.5 kW @240 V
 - 2. 3 phase: 200 - 240 VAC, 40Amps
 - a. 3 phase: 0 to 22.5 kW nominal 24 kW at peak
 - 3. Power factor: >96% at nominal output power
 - 4. DC output voltage range
 - a. CCS 150 - 920 VDC
 - b. CHAdeMO: 150 - 500 VDC
 - 5. Max. DC output current
 - a. 60 A
- C. Interface & Communications:
 - 1. DC charger shall support open protocol OPCC 1.6 for communication between Electric Vehicle, EV Charger, and charging central management system to balance load demand and reduce infrastructure costs.

11 11 36 – Level II, 7W, Alternating Current, Charger for Electric Vehicles (Est July 2020)

The model shall be a Novacharge 7000 or a PowerCharge E20SW which are identical units. Both are manufactured by Lite-On.

EV charger shall be suitable for outdoor or indoor installation with air temperature between - 40°C and +45°C (ambient temperature), without temperature de-rating

Electrical:

- 1 phase: 200 - 240 VAC, 32Amps.
- 1 phase 6.6 kW @208 V and 7.4 kW @240 V
- Power factor: >96% at nominal output power

Interface & Communications:

EV charger shall support open protocol OCPP 1.6 for communication between Electric Vehicle, EV Charger and charging central management system to balance load demand and reduce infrastructure costs.

11 41 13 – Foodservice Storage Equipment: Refrigerator (Est. Aug 2022)

Requested Standardization:

Recommended Manufactures:

- 1. Maytag #MSS25N4MKZ
- 2. Whirlpool WRS315SNHM
- 3. Whirlpool WRS312SNHM

Standard Specifications:

- Fingerprint Resistant Stainless Steel or black refrigerator > 25 cu ft
- Side-by-Side design; 1 freezer door, 1 refrigerator door
- LED interior lighting
- Adjustable gallon door bins
- Energy Consumption (kWh/year)

Compliance and Warranty:

- UL Listed
- 1 year limited and 5 year on Whirlpool compressor (10 years for Maytag)

Justification for Standardization:

- This item is the most cost effective means to safely maintain the highest level of system availability & reliability.

Attach calculations/justification or other documentation for all items checked.

With more and more facilities requesting an upgrade to breakrooms with appliances, it would be good to have a standard for refrigerators that architects can choose from. The costs of these fridges range from \$1,499 - \$1,599. Due to the requirement of not having a water line or ice maker, the choices are limited but the selected models are usually readily available and have good warranties on the compressors. Depending on what is currently a black or stainless steel option is available.

11 44 05 – Food Cooking Equipment: Microwave**Requested Standardization:****Recommended Manufactures, PDF's attached:**

1. Whirlpool WMH31017HS
2. Whirlpool WMH32519HZ
3. Sharp ZSMC1842CS
4. GE JVM7195SKSS

Standard Specifications:

- Fingerprint resistant stainless-steel microwave
- Size 1.2 cu. ft. to 1.9 cu. ft
- Dishwasher-safe turntable plate for easy cleaning
- 1000-Watt cooking power to 1100-watt cooking power

Compliance and Warranty:

- Safety Listing UL

- 1 year limited Manufacturer Warranty

Justification for Standardization:

- This item is the most cost effective means to safely maintain the highest level of system availability & reliability

Attach calculations/justification or other documentation for all items checked.

With more and more facilities requesting an upgrade to breakrooms with appliances, it would be good to have a standard for microwaves that architects can choose from. The costs of these microwaves range from \$198 - \$328. Depending on size availability the smaller 1.2 cu ft microwave can be used or the larger 1.9 cu ft if the space allows.

11 46 83 – Bin Style High Volume Use Ice Machine

Approved Manufactures for ice machines used at JEA for high volume use are the bin style manufactured by:

Hoshizaki or Manitowoc

The equipment must have an external water filtering system recommended by the manufacturer. If, additional capacity of ice is required, multiple ice machines must be installed. Stackable ice bins are not acceptable.

11 46 83 – Dispenser Style Ice Machine

Approved Manufacturers for ice machine for office environment are the dispenser style (lever arm or touch-free) with nugget or cubelet size ice (no bigger than $\frac{3}{4}$ " cube) suited for cup, glass, pitcher, and water dispenser manufactured by:

Hoshizaki or Manitowoc

The equipment will have an external water filtering system recommended by the manufacturer.

11 53 13 – Laboratory Fume Hood (Low Exhaust Flow Laboratory Hood – Energy Saving)

Labconco Protector XStream Laboratory Hood

Model 110610000-28335 & Model 110614000-28335

DIVISION 12 – FURNISHINGS**12 24 13 – Roller Window Shades (Rev. May 2021)****Requested Standardization:**

MANUALLY OPERATED SHADES WITH SINGLE OR DOUBLE ROLLERS

- A. Available manufacturers include, but are not limited to:
 - a. Hunter Douglas Contract
 - b. MechoShade Systems, Inc.
- B. Equivalents that meet the standard specifications may be substituted when approved by the JEA stakeholder.
- C. Chain-and-Clutch Operating Mechanisms: with continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.
- D. Shade bands
 - a. Material to be either light-filtering or light-blocking, depending on location and application.
 - b. Include anti-static treatment on fabric.
 - c. Bottom Hem Bar: steel or extruded aluminum
 - d. Color to be selected from manufacturer's standard colors.
- E. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain motor-operated roller shades.
- F. Provide written instruction at turnover on appropriate cleaning (materials and frequency).

Justification for Standardization:

- 1. The item is used in large numbers throughout the JEA system. Roller shades provide better light filtering than horizontal blinds and require less janitorial upkeep.

12 41 00 – Retrofit Sit Stand Workstation Device (Est June 2020)

The Workrite Ergonomics - Solace Electric standing desk convertor will be utilized to retro fit workstations for FSR based height adjustable / sit stand request.

12 52 13 –Task-Chair for Accommodation Request (Est July 2020)

The Humanscale Freedom Chair, with head rest, is to be utilized for requesters that have submitted an accommodation request for a task chair with increased lumbar support.

12 52 13 –Task Chair for Harsh Environment Use (Est July 2020)

The AllSeating Chiroform- Ultra 24/7- High back Task chair will be utilized as the JEA standard harsh environment Task chair for use in plant and service center environments.

1. Specifications:

- a. MODEL CODE: 97111-T2-SE-BU-BN-KD-AS-F2-SIMPE
- b. CONTROLS: DELUXE TILTER HEAVY DUTY
- c. ARMS: TASK 2 ARM
- d. OPTIONS: SEAT SLIDER EXTENDED 3" RANGE
- e. BUMPER TRIM
- f. BALLISTIC NYLON BACK
- g. CASTERS: HEAVY DUTY CARPET STANDARD
- h. FABRIC: TRIUMPH; J ENNIS - IMPERIAL BLUE

12 52 13 – Task Chair for Standard Use (Est July 2020)

The AllSeating YOU HighBack Task chair will be utilized as the JEA standard Task chair for up to 8 hours of use in an office environment.

Dimensions

- * Overall [Deluxe Synchro Tilt]: 45" - 48.5" H | 28" W | 28" D
- * Seat [Deluxe Synchro Tilt]: 17" - 20.5" H | 20.25" W | 18.5" D
- * Back: 27" H | 17.5" W

Fabric

- * Open Mesh: Ebony, Cobalt, Silica, Sandstone, Herbal Green, Dark Grey, & Black Honeycomb
- * Closed Mesh: Black & White
- * 200+ textiles to choose from
- * COM – 0.75 yards

Warranty: 12-year comprehensive parts and labor, with weight limit of 350 lbs.

12 52 13 – Task Chair for Weight Specific Standard Use (Est July 2020)

The AllSeating Chiroform Big Task chair will be utilized as the JEA standard Task chair for up to 8 hours of use in an office environment. The highly durable Chiroform chair reinforced to support individuals weighing up to 500 pounds

Features

Memory foam seat, 6 ply Canadian maple seat pan, double curve backrest, t-nut construction, suitable for up to 500 lbs.

- Dimensions

Overall [Deluxe Tilter Heavy Duty]: 41" - 46.5" H | 27" W | 27" D

Seat [Deluxe Tilter Heavy Duty]: 17.75" - 23.25" H | 23.5" W | 21" D

Back: 22" H | 22.25" W

- Fabric

200+ textiles to choose from COM – 2.75 yards

Warranty: 12-year comprehensive parts and labor, with weight limit of 500 lbs. [click here to view details.](#)

DIVISION 13 – SPECIAL CONSTRUCTION

Place Holder – Intentionally Left Blank

DIVISION 14 – CONVEYING EQUIPMENT

Place Holder – Intentionally Left Blank

DIVISION 21 – FIRE SUPPRESSION

Place Holder – Intentionally Left Blank

DIVISION 22 – PLUMBING**22 05 53 – Abbreviations for Identification on Plumbing Piping Equipment (Est. Sep 2020)**

Plumbing Abbreviations for piping, equipment, and system labels or tags
Cross reference to JEA Standard 22 05 53 Plumbing, Piping, Equipment, and Systems
Identification and ASME/ANSI Standard Y14.38 -2019

| | |
|-------------------------------|---|
| AFF – Above finished floor | ID – Internal Diameter or Inside Dimension |
| AW - Acid waste | IE – Invert Elevation |
| AV – Acid vent | IW – Indirect Waste |
| BOP – Bottom of pipe | KW – Kilowatt |
| BF-VLV – Butterfly valve | KWH – Kilowatt hour |
| BL-VLV – Ball valve | LBS – Pounds |
| CA – Compressed air | LWT – Leaving Water Temperature |
| CB - Catch Basin | MA or A – Medical Air |
| CD - Condensate drain | MH – Manhole |
| CFH – Cubic foot per hour | MV or V – Medical Vacuum |
| CI - Cast iron | NC – Normally Closed |
| CO – Cleanout | NI or N – Nitrogen |
| CV or C-VLV – Control valve | N2O – Nitrous Oxide |
| CW – Cold Water | NO – Normally Open |
| DI - Deionized water | NP – Non-Potable Water |
| DN - Down | OD – Outside Diameter or Outside Dimension |
| DS – Downspout | OX or O – Oxygen |
| FCO - Floor Cleanout | PRV – Pressure Reducing Valve |
| FD – Floor drain | PRS – Pressure Reducing Station |
| FO – Fuel oil | PSI – Pounds per Square Inch |
| FOF – Fuel Oil fill | PVC – Polyvinyl Chloride |
| FOG – Fuel Oil Gauge | RD – Roof Drain |
| FOR – Fuel Oil Gauge | RPBP – Reduced Pressure Backflow Preventer |
| FOS – Fuel Oil supply | SD – Storm Drain |
| FOV – Fuel Oil vent | SF – Square Foot |
| FS – Floor Sink | SS or SSSL – Stainless Steel |
| G – Gas | ST – Storm |
| GA – Gage or gauge | STL – Steel |
| GB-VLV – Globe valve | STO – Overflow Storm Drain |
| GPH – Gallons per Hour | V – Vent |
| GPM – Gallons per Minute | VAC – Vacuum |
| GR – Grease | VTR – Vent thru Roof |
| GT-VLV – Gate Valve | WCO – Wall Cleanout |
| HB – Hose Bibb | WTR - Water |
| HD – Hub Drain | |
| HW – Hot Water | |
| HWR – Hot Water Recirculating | |

22 05 53 – Identification for Plumbing & Equipment (Pipe Labels) (Revised September 2020)

Installation of labels as detailed below, on all newly installed water lines. Labels are to denote temperature, direction, and type of water (chilled water, potable, irrigation, etc.). Requirements for labelling are to be included in all plumbing specifications for both new construction and upgrades.

EQUIPMENT LABELS**A. Metal Labels for Equipment:**

1. Material and Thickness: Brass, 0.032-inch, Stainless steel, 0.025-inch or anodized aluminum, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
3. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three fourths the size of principal lettering.
4. Fasteners: Stainless-steel rivets or self-tapping screws.
5. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Plastic Labels for Equipment:

1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
 2. Letter Color: White
 3. Background Color: Black
 4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
 5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
 6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
 7. Fasteners: Stainless-steel rivets or self-tapping screws.
 8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- C. Label Content: Include equipment's Drawing designation or unique equipment number, drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.
- D. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number

and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

WARNING SIGNS AND LABELS

- A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
- B. Letter Color: White
- C. Background Color: Red
- D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
- E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
- F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
- G. Fasteners: Stainless-steel rivets or self-tapping screws.
- H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- I. Label Content: Include caution and warning information, plus emergency notification instructions.

PIPE LABELS

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
- B. Pre-tensioned Pipe Labels: Pre-coiled, semi-rigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.
- C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.
 - 1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
 - 2. Lettering Size: At least 1-1/2 inches high.

STENCILS

- A. Stencils: Prepared with letter sizes according to ASME A13.1 for piping; minimum letter height of 1-1/4 inches for ducts; and minimum letter height of 3/4 inch for access panel and door labels, equipment labels, and similar operational instructions.
 - 1. Stencil Material: Aluminum, Brass, Fiberboard or metal.

2. Stencil Paint: Exterior, gloss, alkyd enamel or acrylic enamel (as appropriate for the material being painted) , black unless otherwise indicated. Paint may be in pressurized spray-can form.
3. Identification Paint: Exterior, alkyd enamel or acrylic enamel in colors according to ASME A13.1 unless otherwise indicated.

VALVE TAGS

- A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2inch numbers.
 1. Tag Material: Brass, 0.032-inch, Stainless steel, 0.025-inch or anodized aluminum, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
 2. Fasteners: Brass wire-link or beaded chain; or S-hook.
- B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.
 1. Valve-tag schedule shall be included in operation and maintenance data.

22 11 19 – Backflow Devices – Cross Connection Control Standard (Est June 2018)

1. The backflow prevention device shall be the type as listed in JEA’s “Rules and Regulations for Water and Wastewater Services” manual. Operation and maintenance of this cross-connection device shall comply with JEA’s cross connection control program and associated policies.
2. All reduce pressure assemblies shall be mounted above grade.
3. Minimum distance from the ground 12 inches measured from the ground to mid-way point of the BFP body for all units 3 inches and smaller.
4. All other backflows min height 12 inches from ground to bottom of Backflow body.
5. Refer to Water / Waste Standards for maximum installation height allowed by JEA.
6. JEA approved device manufacturers are Wilkens, Apollo and Watts.
7. Back flow devices shall have freeze valves and stainless-steel valves handles.
8. JEA approved Freeze Protection Device is Dole SP35 or Dole SP45.
9. Refer to Water/Wastewater Standards for backflow installation requirements.

Additional Requirements:

All Backflow preventers shall have a Freeze Protection Valve installed by a Licensed Plumber or state certified Backflow assembly tester.

For More Information:

1. JEA Cross Connection Control Policy
2. Rules and Regulations for Water and Wastewater Services manual
3. Florida Administrative Code Chapter 62-555

22 32 XX – Plumbing – Hose Bibb

Requested Standardization: *(Insert specification below.)*

- 1) Hose Bibb | Lead Free | Solid Brass:
 - 3/4" MNPT x 3/4" GHT No Lead Rough Brass Hose Bibb:
 - Low lead brass valves have NBR seal
 - Adjustable packing nut
 - Multi-turn handle
 - Working pressure: 125 psi
 - Max. temperature: 180°F
- 2) Hose Bibb Vacuum Breaker | Lead-Free | Solid Brass
 1. Lead free vacuum break is designed for use on yard hydrants, and hose bibbs to prevent back siphoning and contamination of the potable water supply.
 2. Protection of potential health risks and contamination in potable water.
 3. Breaking set screw, once set will break off to prevent tampering and removal.

General Information:

- Valves: 1 check valve
- Connection Type: FIP
- Inlet: 3/4" Female Garden Hose Thread
- Outlet: 3/4" Male Garden Hose Thread
- Max Pressure: 125 psi
- Max Temp: 180 Degrees (F)
- Material: Lead Free Solid Brass
- Comes equipped with a Tamper-Proof thread locking device
- Standards

- ASSE 1011 Certified
- CSA B64.2 Approved
- UPC Approved
- Vacuum Breaker Features

This standard applies only to those devices which are designed to be installed on the discharge side of the hose bibb, hydrant, or faucet which is fitted with hose threads. The design embraces a check valve member force loaded, or biased, to a closed position, and an atmospheric vent valve, force loaded, or biased, to an open position when the device is not under pressure. This device shall not be subjected to more than 12-hours of continuous water pressure. This device shall only be used on systems where the only source of low head back pressure comes from an elevated hose equal to or less than 10ft in height.

Justification for Standardization:

- The item is used in large numbers throughout JEA system.

22 41 13 – Toilet Seat – Plastic

Bemis 1655CT series

Construction - Injection molded solid plastic seat

Rating – Commercial Heavy Duty

Color - White

Performance – Fully rated for dead end service

Codes – IAMPO/ANSI Z124.5

Availability – locally available in Jacksonville.

Design – 300 series stainless steel hinge posts and pintles, open front without a cover, hold down bolts that do not loosen with normal use-

22 42 13 Commercial Urinals (Est June 2020) (Rev. June 2021)

Requested Standardization:

Recommended Manufacturers and models that meet Facilities standards are:

1. American Standard Allbrook FloWise Universal Urinal
2. Kohler K-5016-ET-0 Dexter Elongated Urinal
3. ProFlo FP1815WH

Equivalents that meet the standard specifications may be substituted when approved by the JEA stakeholder.

Basis of design: American Standard Allbrook FloWise Universal Urinal

Features:

- *Vitreous China
- *High efficiency operation range of 0.5 gpf - 1.0 gpf
- *Flushing rim
- *Siphon jet flush action
- *3/4" inlet spud
- *Outlet connection threaded 2" inside (NPTF)
- *Wall hanger
- *Meets ANSI flush requirements at 0.5 gpf and 1.0 gpf
- *Nominal dimensions: 14-15/16" x 14-15/16" x 21-1/2"

Justification for Standardization:

1. This item is the most cost-effective means to safely maintain the highest level of system availability & reliability. The item is used in large numbers throughout the JEA system. This urinal is most similar to existing urinals in JEA facilities in terms of size, easy cleaning, and durability. Most of the major plumbing supply houses carry American Standard, and other brands have a product similar enough to this standard to comply.

22 42 13 – Floor Mounted Back Outlet Toilet Bowl (Revised June 2022)

1. American Standard Huron 3312.001, elongated toilet bowl
Zurn - 5645 bowl, Elongated
Kohler - Anglesey K- 4352, elongated toilet bowl

These water closets can flush waste in buildings with sufficient water pressure (above 25 psi) to properly operate a flushometer unit such as the Sloan Royal Valve.

Specifications:

1. Construction - Vitreous **China**, glazed trap way
2. Height – Must meet ADA minimum rim dimension of 16.125”
3. Flow Rating – 1.6 gallons per flush.
4. Color – White
5. Performance Score – 1,000 grams or more MaP
6. Codes – ASME A112.19.2 for vitreous **China**, ADA/ICC/ANSI 117.1.
7. Installation – Back outlet clearance shall be 3” from the finished wall
8. Availability – repair parts locally available in Jacksonville.
9. Design – Smooth contours, easy to clean.

**** This Kohler unit submitted as ADA equivalent to existing Standard for elongated Bowl, back outlet & Flush Valve Connection. Two units to be installed at Royal Lakes WTP.**

KOHLER Components:

Features: Vitreous china, Elongated bowl, 1-1/2” top spud, 4” rough-in., 2-1/8” fully glazed trap way, 1.25 or 1.6 gpf depending on flushometer specified, Floor-mount rear outlet flushometer bowl.

ADA Codes/Standards: ASME A112.19.2/CSA B45.1, DOE – Energy Policy Act 1992, EPA WaterSense, ADA, ICC/ANSI A117.1, CSA B651, OBC.

Justification:

1. The item requested will provide documented long reliable service life at a lower life cycle cost. The item requested has better availability and delivery time, which is necessary for the application. Highly efficient toilet (HET), Low water consumption that operates in the range of 1.1 gpf to 1.6gpf (gallon per flush). Permanent anti-microbial surface with fully glazed trap way will improve sanitary condition. Eliminate wall and fixture damage due to stress. The above guidelines are to provide a general rational for the Standardization process but in no way shall they be interpreted as limiting either its provisions or applications. Each individual team holds the ultimate authority in determining justification for each item of standardization.

****All toilets are to be installed with the rim at ADA height, 17” – 19”.**

22 42 13 – Floor Mounted Floor Outlet Gravity Tank Toilet Bowl

1. American Standard – Champion 4; Model 2002.014

2. Kohler – Cimarron; Model K-3589
3. Zurn – Z-HPT; Model Z5551-K

These water closets are able to flush waste in buildings without enough water pressure (less than 30 psi) to properly operate a flushometer unit such as the Sloan Royal Valve.

22 42 13 – Floor Mounted Floor Outlet with Flush Valve Connection Elongated Water Closet

1. American Standard - Madera; Model 3043
2. Kohler – Highline; Model K-4405
3. Zurn – Z-HET; Model Z5565-K
4. These water closets are able to flush waste in buildings with sufficient water pressure (above 25 psi) to properly operate a flushometer unit such as the Sloan Royal Valve.
5. Construction - Vitreous china, glazed trap way
6. Height – Must meet ADA minimum rim dimension of 16.125"
7. Flow Rating – 1.6 gallons per flush.
8. Color - White
9. Performance Score – 1,000 grams or more MaP
10. Codes – ASME A112.19.2 for vitreous china, ADA/ICC/ANSI 117.1.
11. Installation – Floor outlet centerline shall be 12" or less from the finished wall
12. Availability – repair parts locally available in Jacksonville.
13. Design – Smooth contours, easy to clean

22 42 16 – Wall-Hung Lavatory**Requested Standardization:**

American Standard: Model 0346.041

Kohler: Models K-2031 or K-2007

Zurn: Model Z5361

1. Wall-hung sink
2. Vitreous china
3. Front overflow
4. D-shaped bowl
5. Self-draining deck area with contoured back and side splash shields
6. Faucet ledge
7. Single center faucet hole
8. Exposed bracket support

Nominal Dimensions: 521 x 464mm (20-1/2" x 18-1/4")

Bowl sizes: 381mm (15") wide 254mm (10") front to back 165mm (6-1/2") deep

Compliance Certifications - Meets or Exceeds the Following Specifications:

1. ASME A112.19.2 / CSA B45.1 for Vitreous China Fixtures

2. ADA Compliance

Justification for Standardization:

1. The item is used in large numbers throughout the JEA system. The item requested has better availability and delivery time, which is necessary for the application. Facilities supports water and wastewater operations by maintaining and replacing the existing Plumbing Fixtures at all JEA Buildings. The above standard is limiting the number of different items acceptable to reduce maintenance and replacement cost.

22 42 23 – ADA Commercial Shower Enclosure (Est. September 2020)

1. There are two standard sizes for modular ADA shower enclosures at JEA sites which must be pre-approved by facilities during design. The preferred standard is the larger enclosure. When space is limited, and with facilities' approval, the compact version can be installed.

Approved manufacturers and models:

1. Aquatic 1363BFSCST - 38" W x 38 1/4" D x 77" H
2. Freedom Showers APF3838BF4P.5 - ADA Compliant 38 5/8" x 38 7/16" x 79"
3. Comfort Designs XST 3838 BF - 38.5 x 37.125 x 78.875
4. Aquatic 16030BFSC - 62 3/8 x 32 3/4 x 78 1/2
5. Freedom ADA Roll-In Shower APFQ6233BFF875 62" x 33"
6. Comfort Designs XST6030TR 1.125 - 62 1/4 x 32 1/8 x 78 3/4

Required Accessories:

1. Grab Bars
2. Folding shower seat
3. Shower curtain rod
4. Slide bar with handheld shower
5. Soap dish or shelf
6. Pressure balance valve
7. Caulkless drain

Commercial Code Compliance:

1. Each shower contains a threshold at least 2" wide and 1/2" above finish floor height to meet ADA requirements
2. ADA Accessibility Guidelines for Buildings and Facilities
3. IPC International Plumbing Code

4. UPC Uniform Plumbing Code
5. ANSI Z124.2 Standards for Plastic Showers
6. ANSI A117.1 Accessible and Useable Buildings and Facilities
7. NAHB, HUD, FHA
8. Mixing Valve to meet ASSE 1016 High Temperature Rotational limit stop requirement
9. ADA compliant handheld showerhead

Justification for Standardization:

1. This item is the most cost-effective means to safely maintain the highest level of system availability & reliability. More sites are needing an ADA shower enclosure. Due to more and more facilities requesting an ADA shower enclosure, it would be good to have a standard for architects to choose from. The costs of these showers range from \$2,500 - \$4,000, but they come with a 30-year warranty. The durability and construction of these enclosures should be considered a cost savings over a period; some enclosures at similar pricing or slightly less only come with 10-year warranties and would probably break down in a shorter period of time.

22 42 39 – Lavatory Single Lever Faucet

Chicago (420-ABCP) deck mounted 4" - single lever Hot and Cold-water mixing faucet with 0.5 GPM non-aerating spray and ceramic cartridge.

22 42 39 – Quarter Turn Stop Valve

1. BRASSCRAFT - ¼ TURN BALL STOP (KT SERIES)
2. MCGUIRE MFG. - CONVERTIBLE ¼ TURN BRASS BALL VALVE (LFBV SERIES)
3. KEENEY MFG. QUARTER TURN VALVE (PCLF SERIES)

Lead-free, brass ball, stem and body construction, chrome plated for corrosion protection

22 42 39 – Sloan Royal Flush Valve

Sloan Royal Flush Valve

22 42 39 – Shower Mixing Valve**Requested Standardization:**

Recommended Manufacturers and models that meet Facilities standards are:

1. Delta R10000-UNWSHF
2. Symmons 261XBODY
3. Moen 2590

Equivalent products that meet the standard specifications below may be substituted when approved by the JEA stakeholder.

Standard Specifications:

1. Brass body
2. 3 or 4 port valve body
3. Inlets: 1/2" IPS and 1/2" sweat
4. Outlet: 1/2" IPS and 1/2" sweat
5. Replaceable cartridge

Compliance and Warranty:

1. Third party certified to meet ASME A112.18.1/CSA B125.1
2. ASSE 1016
3. Buy American Act Compliant
4. 5-year limited warranty when used in a commercial installation

Justification for Standardization:

1. This item is the most cost-effective means to safely maintain the highest level of system availability & reliability. With more and more facilities requesting an upgrade to locker rooms with showers, it would be good to have a standard for shower valves that architects can choose from. The costs of these shower mixing valves range from \$100 - \$150, but they come with a 5-year commercial warranty. The durability and construction of these valves should be considered a cost savings over a period; not requiring cartridge or other part replacements like inferior brands.

22 45 33 – Combination Emergency Fixture Unit

1. Combination Safety Shower with Stainless Steel Round Eyewash and Stainless-Steel Showerhead System: Speakman SE 693-SSH

DIVISION 23 – HEATING, VENTILATION, AND AIR CONDITIONING (HVAC)**23 05 53 – Abbreviations for Identification of HVAC Pipes (Est. September 2020)**

HVAC Abbreviations for piping, equipment, and system labels or tags

Cross reference to JEA Standard 23 05 53 HVAC, Piping, Equipment, and Systems Identification and ASME/ANSI Standard Y14.38 -2019

| | |
|---------------------------------|--|
| AFF – Above finished floor | GA – Gage or gauge |
| AHU – Air handler unit | GB-VLV – Globe valve |
| AP – Access Panel | GPM – Gallons per minute |
| BOP – Bottom of pipe | GT-VLV – Gate Valve |
| BHP – Brake horsepower | ID – Internal diameter or inside dimension |
| BTU – British thermal unit | HW – Hot water |
| BF-VLV – Butterfly valve | MOD – Motor operated control damper |
| BL-VLV – Ball valve | KW – Kilowatt |
| CA – Compressed air | KWH – Kilowatt hour |
| CAV – Constant air volume | LAT – Leaving water temperature |
| CD – Ceiling diffuser | LWT – Leaving water temperature |
| CF – Cubic foot | NC – Normally closed |
| CFM – Cubic foot per minute | NO – Normally open |
| CI - Cast iron | OAL – Outside air louver |
| CHW – Chilled Water | OD – Outside diameter or outside dimension |
| COMPR – Compressor | PRV - Pressure reducing valve |
| CT - Cooling tower | PRS – Pressure reducing station |
| CU – Condensing unit or copper | PTAC – Packaged terminal air conditioner |
| CV or C-VLV – Control valve | PVC – Polyvinyl chloride |
| CW – Cold Water | RHC – Reheat coil |
| EA – Exhaust air | RHP – Rooftop heat pump |
| FCU – Fan coil unit | RTU – Rooftop unit |
| FD - Fire damper | SF – Square foot |
| FPM – Feet per minute | SS or SSSL – Stainless steel |
| FTU – Fan terminal unit | STL – Steel |
| EAT – Entering air temperature | VAV – Variable air volume |
| ESP - External static pressure | VENT – Ventilation |
| EWT –Entering water temperature | VFD – Variable frequency drive |
| FO – Fuel oil | |

23 05 53 – Identification on HVAC Piping and Equipment (Est. September 2020)**EQUIPMENT LABELS****A. Metal Labels for Equipment:**

1. Material and Thickness: Brass, 0.032-inch, Stainless steel, 0.025-inch or anodized aluminum, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.

2. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
3. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three fourths the size of principal lettering.
4. Fasteners: Stainless-steel rivets or self-tapping screws.
5. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Plastic Labels for Equipment:

1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
 2. Letter Color: White
 3. Background Color: Black
 4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
 5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
 6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
 7. Fasteners: Stainless-steel rivets or self-tapping screws.
 8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- C. Label Content: Include equipment's Drawing designation or unique equipment number, drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.
- D. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

WARNING SIGNS AND LABELS

- A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
- B. Letter Color: White
- C. Background Color: Red
- D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
- E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.

- F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
- G. Fasteners: Stainless-steel rivets or self-tapping screws.
- H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- I. Label Content: Include caution and warning information, plus emergency notification instructions.

PIPE LABELS

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
- B. Pre-tensioned Pipe Labels: Pre-coiled, semi-rigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.
- C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.
 - 1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
 - 2. Lettering Size: At least 1-1/2 inches high.

STENCILS

- A. Stencils: Prepared with letter sizes according to ASME A13.1 for piping; minimum letter height of 1-1/4 inches for ducts; and minimum letter height of 3/4 inch for access panel and door labels, equipment labels, and similar operational instructions.
 - 1. Stencil Material: Aluminum, Brass, Fiberboard or metal.
 - 2. Stencil Paint: Exterior, gloss, alkyd enamel or acrylic enamel (as appropriate for the material being painted), black unless otherwise indicated. Paint may be in pressurized spray-can form.
 - 3. Identification Paint: Exterior, alkyd enamel or acrylic enamel in colors according to ASME A13.1 unless otherwise indicated.

VALVE TAGS

- B. A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.
 - 1. Tag Material: Brass, 0.032-inch, Stainless steel, 0.025-inch or anodized aluminum, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
 - 2. Fasteners: Brass wire-link or beaded chain; or S-hook.
- C. B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room

or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.

1. Valve-tag schedule shall be included in operation and maintenance data.

23 05 50 – Corrosion Coating Specifications for HVAC Units (Est. March 2015, Rev. June 2019)

Bronze Glow Coating

All coil(s) (condenser, evaporator, reheat, etc.) will have the refrigerant removed and stored for later installation.

All copper tubing will be capped and coil charged with 200 lbs. of nitrogen to insure no leaks develop in the coating process.

Coils are to be removed from the HVAC units and:

1. Cleaned with Bronz-Glow cleaners & hot treated water.
2. Spray primed with Bronz-Glow “Husky Gold Primer “.
3. Dip coated (submerged in tank) with Bronz-Glow “Husky Gold Protectant”.

All copper tubing, compressors, and metal components in the unit will be cleaned, primed and protective coated with Bronz-Glow “Component Coat”(Husky Gold can also be used for this function).

1. Components include: All metal devices attached to the copper tubing, such as filter dryers, receivers, reversing valves, compressors, solenoids, sensors, etc.
2. Condenser fan motor and blades – only when specifically approved by a JEA Facilities foreman.
3. Evaporator Blower assembly – only when specifically approved by a JEA Facilities foreman.
4. Interior Cabinetry – only when specifically approved by a JEA Facilities foreman.

All brazed soldered joints (due to their combination of metals) are very susceptible to corrosion and deteriorate faster than the rest of the copper. These joints will get extra cleaning to remove any patina, primer and double the normal amount of protectant coat.

Once treated, the coil(s) will be reinstalled into the unit, the unit will be evacuated, recharged with refrigerant, inspected, and readied for shipment.

23 05 66 UVC Fixture for HVAC (Est. August 2020)

The selected products are as follows:

A. Acceptable Manufacturers:

1. Steril-Aire DE
2. UVDI/UltraViolet Devices, Inc
3. UV Resources – RLM S/S

B. Quality Assurance:

4. Qualifications: UV-C products supplier shall provide proof of 100% inbound and outbound testing of equipment.

5. Fixturing: The UV Power Supply shall have been tested, Listed and labeled as compliant with UL, CSA and CE.
 6. Plenum Wiring Loom: The Loom shall meet UL Subject 13 and UL 1581, Article 725 of the NEC and meet UL VW-1 material ratings.
 7. Lamps: Each lamp shall contain no more than 5 milligrams of mercury consistent with current environmental practices. Lamps shall include an inner layer comprising of at least one element from the series formed by magnesium, aluminum, titanium, zirconium, and rare earths to repel alkali metals (e.g. mercury) thereby extending lamp life. Lamps shall not produce ozone and shall have the option of being hermetically sealed within a layer of UV-C transmissible FTP to protect against lamp breakage and to contain lamp contents should breakage occur.
- C. Warranty:
1. Power supply and fixturing shall be warranted to be free from defects for a period of five (5) years.
 2. Lamps shall be warranted to be free from defects for a period of two (1) year.
- D. Design Requirements
1. Irradiation: Lamps shall be installed in sufficient quantity and in such a manner so as to provide an equal distribution of UV-C energy. When installed, the UV-C energy produced shall be of the lowest possible reflected and shadowed-losses and shall produce 360-degree UV-C irradiance from the lamps within the UV cavity.
 2. Intensity: Fixture modeling shall be included in the submittal and must contain the necessary calculations to demonstrate that a minimum of 7.5 lamp watts, as recommended by ASHRAE, are distributed equally to each square foot of coil surface area, and a minimum of 100 microwatts per square centimeter equally distributed to the surfaces at the plenum sides, top and bottom. All calculations are to be at 55 degrees F and 500 fpm air velocity, no exceptions.
 3. Installation: The power supply housing shall be capable of installation within the air stream, secondary compartment or NEMA enclosure. Lamps shall be mounted to irradiate the intended surfaces as well as all of the available line of sight airstream through proper placement, 360° irradiation and incident angle reflection.
 4. Safety: To protect personnel, all access panels and doors to the UV-C assembly and/or within view of the UV-C assembly shall include mechanical interlock switches to insure that the UV-C assembly will be de-energized when any of these accesses are opened. A redundant disconnect service switch is to be installed on the AHU's exterior, in plain sight, to provide a method to more specifically de-energize the UV-C lamp circuits prior to entering the lamp plenum.
- E. Equipment
1. Power Supply: Power supply shall be UL Listed, 120-277Vac - 50/60Hz, SO type. They shall be High Power Factor, Low THD, Class P, Sound Rated "A", Type 1 Outdoor designs with inherent Thermal Protection, no PCB's and labeled for field wiring. They shall be capable of operating at temperatures of from 1-90 degrees C while producing the specified output and organism destruction at no more than 10 Watts of power consumption for each square foot of treated, cross sectional plane. The power supply shall be capable of ensuring a minimum of 9000 hours of lamp life, and with greater than 80% of its initial

output at end of lamp life. Power supply shall be protected against “end of lamp life” conditions and warranted for 5 years.

2. Plenum Wiring: Shall be of sufficient length to facilitate lamp connection to a remotely mounted power supply. The lamp wiring shall be capable of being mounted anywhere in the system and/or as shown on the plans. The wiring shall meet UL Subject 13 and UL 1581, Article 725 of the NEC and meet UL VW-1 material ratings, as Plenum Rated. The wiring and wireway shall be constructed of ozone and UV-C resistant materials.
3. Lamp Plug & Holder: Shall be UL listed, 4 - pin type capable of accommodating a single-ended or a double-ended lamp. The holder shall be constructed of UV resistant materials and designed to connect the lamp to the plug, holder and plenum wiring to protect against electrical shock, moisture and separation.
4. Lamp Clamp: Each lamp plug and plenum rated wire connection shall have a UVC resistant, adjustable clamp to ensure a tight connection and seal between the lamp, lamp socket, lamp plug, and wiring to prevent electrical shock, connection shorts and/or lamp or ballast failure from lamp pin oxidation or arcing.
5. Lamps: Each lamp shall contain less than 5 milligrams of mercury, consistent with current environmental practices. Lamps shall include an inner layer comprising of at least one element from the series formed by magnesium, aluminum, titanium, zirconium, and rare earths to repel alkali metals (e.g. mercury) to extending lamp life. Lamp life shall be a minimum of 9,000 hours with no more than a 20% output loss at the end of the lamps life (12 months of continuous use). Lamps shall be constructed with UV-C resistant bases and shall not produce ozone. Lamps shall produce the specified output in moving air of up to 1000 fpm and temperatures of 0-90° C. Lamps shall have an option to be hermetically sealed within a layer of UV-C transmissible FEP to provide protection against lamp breakage and to ensure lamp contents from a broken Lamp, are contained.

23 09 13 – Thermostats

1. The Honeywell T6 Pro series HP/Conventional, non-programmable and 7 day programmable digital thermostat to replace the discontinued Honeywell Models 5000, 6000, & 8000

23 09 23 – Building Automation System (BAS)

1. STRUXUREWARE
2. AUTOMATED LOGIC
3. ALERTON

23 09 23 – Small HVAC Control System Web-Based (Est. July 2021)

When directed by JEA Facilities, new single unit HVAC systems under 12 tons can be equipped with web-based digital control packages when located at remote sites that are critical to JEA operations. Examples of these critical sites include substation control houses, radio towers and wastewater lift station electrical buildings.

The generic BACNET products, or their approved equals, that are acceptable components of the remote digital control package are as follows:

| | Item | Part | Manufacturer |
|----|-----------------------|--------------------|--------------------|
| a. | Enclosure | RET1-18ULTN-P | Saginaw Controls |
| b. | Transformer | TR5VA005 | RIB Functional Dev |
| c. | Terminal Block | 105SP - 5 position | KELE |
| d. | Terminal Block | 120SP- 20 Position | KELE |
| e. | BACNET Router | BASRT-B | Contemporary |
| f. | Thermostat | SE8650U0B11 | Schneider Electric |
| g. | Temperature Sensor | TDBDR00 | Veris Industries |
| h. | Differential Pressure | EPP301LCD | Schneider Electric |
| i. | Current Switch | H600 | Veris Industries |

The primary focus of the above list is on cost. Multiple equivalent products and brands are available.

Justification for Standardization:

1. The item requested will provide documented long reliable service life at a lower life-cycle cost. The item requested has better availability and delivery time, which is necessary for the application.
2. The small HVAC system has typically been unmonitored remotely by a central digital control system because the first cost exceeded the value of the equipment. The Design as a standard meets a list of departmental goals for use at sites with small DX systems (<~12tons) that serve important areas. Thus (Via this standard) JEA is able to economically monitor 12 ton or smaller HVAC systems in locations with critical infrastructure such radio towers, substation control rooms, and wastewater lift station electrical buildings. Over the years the practicality of remote digital monitoring has been hampered by the lack of a payback. The list below shows the history of 1st cost vs system cost.

| YR | CONT\$ | SYST\$ | TONS | BRAND | LOCATION |
|------|---------|---------|------|-------------------|--|
| 1990 | ~\$40K | ~\$20K | 10 | JCI | 1 st & Mn St Ofc demolished |
| 2000 | ~\$30K | ~\$ 17K | 10 | JCI | Water Plant removed controls |
| 2010 | ~\$25 K | ~\$ 35K | 30 | Auto Logic | NS Bldg 33 – Ofc/Lab |
| 2018 | ~\$ 7K | ~\$ 5K | 5 | Andover | Fac.Auto.Prop. - not installed |
| 2018 | ~\$ 7K | ~\$ 5K | 5 | Auto Logic | Cert.Cont.Prop.- not installed |
| 2018 | ~\$ 6K | ~\$ 5K | 5 | Delta Cont. | Proposal T-12 test site |
| 2019 | ~\$ 3K | ~\$ 5K | 5 | Various BACNET | Robinwood Substation |

3. With the Robinwood installation, controls became less expensive than HVAC equipment for systems under 10 tons. These controls allow Facility techs to schedule site visits on an as necessary basis vs a quarterly basis. Assuming each tech and truck has a \$100/hr basis, eliminating a site visit saves \$200. Eliminating unnecessary quarterly visits, would pay for the \$3K investments in ~5 years.

List of Open Source BACNET Control Goals

Robinwood and Firestone have been successfully operating with their generic controls package. The two installations have been meeting the Facility Operations goals in these areas:

1. Diagnosing a system remotely
2. Monitoring maintenance items – i.e., filters
3. Reducing site visits
4. Cost/value ~\$3K
5. Ease of use
6. Ease of installation by JEA personnel
7. Parts availability – Kele, Galco, Johnstone, etc.
8. Specifications can be met by multiple brands

Product Part List - Available from Online Sources

| Item | Part | Manufacturer | Supplier | Cost |
|--------------------------|--------------------|--------------------|----------|--------|
| a. Enclosure | RET1-18ULTN-P | Saginaw Controls | KELE | \$ 235 |
| b. Transformer | TR5VA005 | RIB Functional Dev | GALCO | \$ 30 |
| c. Terminal Block | 105SP - 5 position | KELE | KELE | \$ 10 |
| d. Terminal Block | 120SP– 20 Position | KELE | KELE | \$ 15 |
| e. BACNET Router | BASRT-B | Contemporary Cont. | KELE | \$ 535 |
| f. Thermostat | SE8650U0B11 | Schneider Electric | GALCO | \$ 450 |
| g. Temperature Sensor | TDBDR00 | Veris Industries | KELE | \$ 30 |
| h. Differential Pressure | EPP301LCD | Schneider Electric | KELE | \$ 250 |
| i. Current Switch | H600 | Veris Industries | GALCO | \$ 400 |
| j. Misc Parts | | NA | NA | \$ 400 |
| k. Installation Labor | 8 hours | \$100/hr | JEA | \$ 800 |
| l. Programming | 2 hours | \$100/hr | JEA | \$ 200 |
| m. Total \$3.0K | | | | |

23 09 23 – Struxureware Building Operations System (SBO) (For JEA Plaza I, II & III)

Struxureware Building Operations system (SBO)

23 21 23 - Hydronic Air-Dirt Separator (Est August 2020)

The selected products are as follows:

- A. Acceptable Manufacturers:
 - a. Elbi.

- b. Spirotherm.
- c. Taco 4900, Inc.
- B. Tank:
 - a. Air and dirt removal device shall be constructed of steel. It shall be designed, fabricated, and stamped per ASME Section VIII Division 1 with a maximum working pressure of 125 psi at 270°F.
 - b. Manufacturer shall be holder of ASME U stamp.
 - c. Manufacturer to have optional 150 psi and 250 psi ASME units available.
- C. Connections:
 - a. Units up to three 3-inch in size shall be provided with threaded connections as standard. Units four 4-inch and larger shall be provided with flanged system connections as standard. Inlet and outlet connections to be in line with piping system. Both inlet and outlet to be in the same horizontal and vertical planes.
- D. Venting:
 - a. Each air and dirt removal device shall be equipped with a brass conical shaped air venting chamber designed to minimize system fluid from fouling the venting assembly. The air vent shall be able to be closed to allow flushing and purging of dirt via side port without dirt passing through vent on initial system fill.
- E. Flushing:
 - a. A brass flushing cock shall be located on the side of each separator to facilitate system fast-fill and removal of the floating impurities from the air system interface within the separator.
- F. Blow Down
 - a. A blow down valve shall be provided by the unit manufacturer on the bottom of each unit to allow blow down and cleaning. On units 2 ½" and smaller the valve and all of its fittings shall be 1". On units three 3" and larger the valve and all openings shall be 2".
- G. Air/dirt removal
 - a. The air and dirt removal device shall remove air down to 18 microns and shall remove dirt/debris down to 35 microns. The unit shall be 100% efficient at removing dirt down to 90microns in 100 passes or less.
- H. Certification
 - a. The unit manufacturer shall provide the owner and design engineer third party independent test data certifying that their unit performs to the above standards. Suppliers not providing these independent performance test results will not be acceptable.
- I. Internal Construction

- a. The air and dirt separator shall employ a microbubble coalescing and dirt removal technology that achieves optimal separation of air and dirt with minimal pressure drop. Stainless steel will be the only acceptable material used for suppressing turbulence and increasing surface area for high efficiency air and dirt removal. Inferior materials of construction such as copper for the straining medium will not be acceptable.
- J. Experience
 - a. Manufacturer must have at least 15 years of experience.
- K. OPTIONAL
 - a. The unit shall be manufactured with a removable cover to facilitate removal, inspection, and cleaning of the pall ring basket. The entire pall ring basket shall be constructed of stainless steel. For safety and ease of service the unit shall be accessed from the top and the pall ring basket shall be accessed as one complete assembly housed in a stainless-steel cage.

23 34 24 – Propeller Fan, Ventilation and Exhaust, Corrosive Environment (Est. September 2019)

1. Aerovent Model HD53, Size 42L232
 - a. 21,800 CFM @ .25" SP
 - b. All Aluminum Construction
 - c. FRP Hood
 - d. 316 SS Hardware
 - e. Severe Duty Motor
2. Totally enclosed fan cooled (TEFC)

23 37 13 – Fan Terminal Unit Filter Grill

Price 80 Eggcrate Filter Grill

Construction - Shall be constructed of extruded aluminum with @H paint finish

Rating – ANSI/ASHRAE Standard 70 performance.

Warranty - 1 year warranty

Codes – ASTM D610, ASTM 714, ASTM 1308, ASTM D1654, ASTM D4752

Installation – Mounts into 2'x4' or 2'x2' ceiling grid or with an adapter into a sheetrock ceiling without major modifications.

23 41 13 – Air Filters

Approved Manufacturers:

1. American Air Filter
2. Fanders
3. Purolator

4. or approved equal

23 42 13 – Gas Filter Corrosive Environment (Est. September 2020)

The selected products are as follows:

1. Bioclimatic
2. Freudenberg
3. Purafil
4. PureAir

Warranty:

1. A warranty shall be provided for a period of one year from date of start-up or eighteen months from ship date; whichever occurs first.

Quality Assurance:

1. The manufacturer shall have a minimum of twenty (20) years experiences in the design, fabrication and testing of systems that are 99.95% efficient in the removal of these gases:
 - a. Hydrogen Sulfide (H₂S) 5 ppm v/v
 - b. Methyl Mercaptan (MeSH) 1 ppm v/v
 - c. Dimethyl Sulfide (OMS) 1 ppm v/v
 - d. Dimethyl Disulfide (DMDS) 1 ppm v/v

Construction:

1. Blower Section Unit to be furnished with a TEFC motor and a blower with a direct drive airfoil wheel to assure even, quiet airflow. The unit shall contain an enclosed blower assembly for outdoor operation.

Filters:

1. The pre-filter shall be a woven MERV 8 particulate filter, 100% synthetic media and does not support microbial growth. Filters shall be metal free and fully incinerable to reduce landfill waste. It meets or exceeds dust spot efficiency for ASHRAE standard 52.2. It is classified UL900 standard.
2. The final filter shall be a MERV 14 filter with 98% arrestance and 90-95% dust spot efficiency. It is classified UL900 standard.
3. Chemical Media Section(s)
 - a. The media module must be dimensionally 12"x12"x12" with a nonproprietary fit.
 - i. The supplier shall provide chemical analysis software or chemical analysis of the media to ensure the quality of chemical removal or exhaustion of the media.
4. The media module shall be completely recyclable and/or disposable. It shall be preloaded with chemical media as needed for the application or contaminant removal.
5. The media module shall be factory-filled with an engineered and manufactured chemical media. The module must be factory-filled and vibrated to eliminate bypass.

6. Pressure drop at maximum air velocity through each chemical media section shall not exceed 1.30 iwg (324 Pa) for a module. Maximum air velocity through chemical media section shall be 250 ft./min (1.27 m/sec) for a module with a depth of 12 inches or 305mm or 500 ft./min (2.54 m/sec) for a module measuring 6 inches or 152mm in depth.

23 42 19 – Bipolar Ionization System (Est. August 2020)**The product shall be the following:**

1. Atmos Air Solutions – Matterhorn
2. Atmos Air Solutions – FC
3. Atmos Air Solutions – 508FC

Description

1. Each bi-polar ionization air purifier shall be capable of effectively reducing and/or agglomerating microorganisms throughout the ductwork and interior occupied spaces served by the bipolar system (including mold, bacteria, vapors, viruses, and other airborne particulates), controlling gas-phase contaminants including Volatile Organic Compounds (VOC's) generated from human occupants, building structure and furnishings, and reducing static space charges.
2. Laboratory Testing Performance. Each bi polar ionization manufacturer must have third party laboratory testing results proving contaminant reductions against MS2, Staph, E. Coli, Dust, Mold, and C. Dificile.
3. Each bi polar ionization system must have a dynamic ion switch giving the owner the ability to increase or decrease bi polar ionization levels.
4. Field Performance. The Bi Polar Ionization system manufacturer shall produce five documented installation references including client contact information with the following criteria.
 - a. Systems shall have operated continuously for a minimum of 3 years.
 - b. Installations must be greater than 10,000 CFM serving office or healthcare spaces
 - c. Systems shall have a documented ability to reduce volatile organic compound (TVOC levels), particulate (PM) levels, and not increase ozone (O3) in both before and after installation results from air testing completed within the occupied space. Results must include real-time performance results on Particulate Matter 2.5 (PM2.5), Total Volatile Organic Compounds (TVOC), and ozone (O3).
5. Ionization tubes must be constructed from durable, shatterproof material, not glass.
6. Tube Quantity. A 21" bi polar ionization tube must meet certain CFM requirements for different building descriptions.

- a. One (1) 21" bi polar ionization per 1,875 CFM of supply air in Residences, Airports, Office Spaces, Day Care Centers and Schools.
 - b. One (1) 21" bi polar ionization tube per 938 CFM of supply air in Nursing Homes, Locker Rooms, Manufacturing, Food Processing, and Restaurants
 - c. One (1) 21" bi polar ionization per 625 CFM of supply air in Beauty Salons, Casinos, Waste Water Applications, Industrial Facilities, Garbage Rooms, Kennels
7. Manufacturer to provide third party ozone testing from 10 locations where technology is installed. Manufacturer must provide third party proof that there is no measurable increase in ozone levels within the space.
 8. Relative humidity from 0% to 99% shall not cause damage, deterioration or dangerous conditions within the purification system.
 9. Operation of the electrodes or bi-polar generator unit shall conform to ASHRAE Standard 62 and UL867 with respect to ozone generation.
 10. The generator unit shall provide a minimum of 86% reduction of PM0.3 smaller particles. Independent testing performance criteria shall be provided within the submittal.
 11. Real time IAQ controllers must be included that measure at a minimum CO₂, Temperature, RH, ozone, Pm 2.5, and TVOC. IAQ controller must be placed in return duct to measure air quality contaminants and communicate measurements to the BMS. Ionization system should be able to be controlled by the IAQ controller.
 12. Each unit shall include the required number of composite tubes sized to the scheduled capacity of the duct and/or air handling unit. The tube shall be installed into a tube base with suitable bonding material and be hermetically sealed to prevent moisture penetration. The tube base shall include an external molded ring, which seals the tube base to the socket which shall be water/moisture proof. Glass tubes are not permitted due to potential of shatter caused by vibration.
 13. The bi-polar ionization system shall operate in a manner such that equal amounts of positive and negative ions are produced. Uni-polar ion devices shall not be acceptable.
 14. The bipolar ionization system shall be designed to increase ionization levels in the areas served by the handlers, ducts and/or plenums where Bi-Polar Ionization systems are installed. The acceptable ionization level increase in such areas shall be between 500 and 1,500 ions per cubic centimeter as measured by an Alpha Labs air ion counter model AIC 2.
 15. The operation of the air purification system shall be through bi-polar ionization utilizing association/disassociation process. It shall operate in such a manner so that agglomeration or precipitation of airborne particulates shall not be permitted to collect on occupants, walls, or furnishings by virtue of its operation.
 16. Variations in the quantity of air exchange shall not be increased due to requirements of the bi-polar ionization air purifiers.

23 51 13 – Barometric Damper (Est. July 2020)

The product shall be supplied by one of the following:

1. Greenheck Fan Corporation
2. Nailor Industries Inc.
3. Prefco (Basis of Design)
4. Ruskin Company.

Description

1. Gravity balanced.
2. Maximum Air Velocity: 3000 fpm.
3. Maximum System Pressure: 2-inch wg.
4. Frame: 0.052-inch- thick, galvanized sheet steel, with welded corners.
5. Blades: Multiple single-piece blades, maximum 6-inch width with sealed edges.
 - a. Blade Action: Parallel.
6. Return Spring: Adjustable tension.
7. Bearings: Provide end bearings on all dampers. On multiple blade dampers bearing shall be oil-impregnated nylon or sintered bronze.

Accessories:

1. Adjustment device to permit setting for varying differential static pressure.
2. Counterweights and spring-assist kits for vertical airflow installations.
3. Electric actuators.
4. Chain pulls.
 - a. Screen Material: Galvanized steel.
 - b. Screen Type: Bird.
 - c. 90-degree stops.

23 64 21 – Scroll Chillers (Air Cooled)

Approved Manufacturers for Scroll Chiller (Air Cooled):

1. Carrier
2. Trane
3. no substitutions

23 74 00 – Packaged Outdoor HVAC Equipment/140 Ton AAON Packaged Unit (Est. 10/2023)

Requested Standardization:

Recommended Manufactures, PDF's attached:

1. Air-cooled or water-cooled condenser, with unit capacities from 2-140 tons, available as a chilled water or non-compressorized DX air handling unit, from 800-49,100 cfm.

Standard Specifications:

Qty (1) AAON Packaged Unit complete with the following:

- R410A Refrigeration System

- Painted cabinet finish on G-90 galvanized steel casing. 2500 hr salt spray paint
- Hinged access doors to allow easy access to internal components for maintenance personnel
- Stainless Steel drain pan
- Double wall panels with 2" foam insulation, R value 13
- Vertical Supply/Discharge
- OA Hood for 100% OA.
- Direct Drive Plenum Fan with Factory mounted VFD
- 2" Pleated MERV 8 Filter
- On/Off Compressors
- Electric Heat
- ECM Condenser Fan for Head Pressure Control
- 460V, 3-phase power
- Non-fused Disconnect Switch
- Factory wired 115V Convenience Outlet
- Phase and Brownout Protection

Compliance and Warranty:

- 1-year parts warranty, 5-year compressor warranty
- Bronz-Glow Coating on interior Surface
- Bronze Glow Coating on all Exposed Copper Pipe
- Bronz-Glow Coating on Condenser

Justification for Standardization:

- The item requested must be obtained from the Original Equipment Manufacturer (OEM) due to the criticality of the item or compatibility with existing equipment currently in operation or use within the JEA system.
- The item requested is only available from one source.
- This item is the most cost effective means to safely maintain the highest level of system availability & reliability.

Attach calculations/justification or other documentation for all items checked. *(Insert below.)*

For lab facilities the HVAC requires a 100% outside air system, AAON is designed for this application. JEA's O&M has tried different brands (Daikin) to accomplish the desired results, with no success. The AAON units are used as well at WTP's for the chlorine building which require 100% outside air. Replacing existing AAON units with new AAON units will also provide cost savings with curb adapters matching and not require additional expensive metal fabrication.

23 81 13 – Packaged Terminal Air Conditioner, Exterior Wall Mount Unit (Est. June 2019)

The Bard models that are approved are as follows:

1. Air Conditioners
2. W18AA (1.5 tons) thru W60AA (5.0 tons)

3. Heat Pumps
4. W18HA (1.5 tons) thru W60HA (5.0 tons)
5. Units will be coated with Bronz Glow dipped Platinum Coating when installed at Water and Wastewater sites.

23 81 23 – DX Split System up to 60 tons

Approved Manufacturers for DX Split Systems (Air Cooled):

1. American Standard
2. Carrier
3. Trane

23 81 26 – Mini Split

Approved Manufacturers for Mini-Split (Air Cooled) Systems:

1. Mitsubishi: no other brands will be accepted.
 - a. The focus is to provide a HVAC solution in using a mini-split system where no other installation option exists. Shared Services shall determine the feasibility of the installation choice between a standard DX unit, a PTAC, a window unit, a wall unit (i.e., Bard) or a mini split

DIVISION 25 – INTEGRATED AUTOMATION

Place Holder – Intentionally Left Blank

DIVISION 26 – ELECTRICAL**26 09 23 – Electric Timer Switch at Restroom Light and Fan** (Est. March 2019)

Intermatic FF30MCMX spring wound timer with stainless steel plate

26 09 23 – Occupancy Dimmer Switches (Est. April 2019)**LED 0 - 10VLED Dimmer Switch**

LED 0 - 10V Dimmer control, Interior Locations, control room, offices, and conference rooms

1. Wattstopper - DCLV2 with Power Pack BZ-200
2. Lutron – DDTV with Power Pack RMJ-5T-DV-B
 - a. 120v – 277 v 50/60 HZ
 - b. 250ma at 24VDC to power sensors

Reference:

UL 2043 plenum rated for cost-effective installation

UL listed for control of lighting and plug loads

Tested to NEMA 410 criteria for electronic ballast and driver inrush current

The product meets the materials restrictions of RoHS

BAA/TAA-compliant models available

LED Occupancy Sensor and Dimmer Switch – Dimming wall switch with occupancy sensor can be used in classrooms, auditoriums, and conference rooms

1. Watt Stopper DW-311 or PW-311
2. Lutron – MS_Z101
 - a. 120/277VAC; 50/60Hz
 - b. Time delays: 3, 5, 15 or 30 minutes, walk-through, test-mode
 - c. Coverage: Major motion, PIR 35' x 30', Ultrasonic 20' x 20'

Reference:

UL and cUL listed (E101196)

Occupancy and Daylight Sensors – Occupancy and daylight sensors use in open classrooms, hallways and other common areas.

1. Lutron – FCJ-Sensor with 0-10 V Control Module FJC-010
2. Wattstopper LS-301 used with occupancy sensors
 - a. DW-311
 - b. LMPC-100

Reference:

UL and cUL listed

LED Occupancy Sensor – Dimming wall switch with occupancy sensor can be used in offices / restrooms, copy/print rooms, lounges and locker rooms

1. Watt Stopper WSP200 series
2. Lutron – MS-OP600m series

- a. 120/277VAC; 50/60Hz
- b. Time delays: 3, 5, 15 or 30 minutes, walk-through, test-mode
- c. Coverage: Major motion, PIR 35' x 30', Ultrasonic 20' x 20' Dimmer control

26 29 23 – Variable Frequency Drive for HVAC (Est. August 2020)

A. Acceptable Manufacturers:

2. ABB (Electrification Products Division).
3. Danfoss Inc.

B. Quality Assurance:

1. Testing: Test and inspect VFCs according to requirements in NEMA ICS 61800-2
 - a. Test each VFC while connected to its specified motor
 - b. Verification of Performance: Rate VFCs according to operation of functions and features specified.
2. VFCs will be considered defective if they do not pass tests and inspections.
3. Prepare test and inspection reports.

C. Warranty:

1. Unit shall be warranted to be free from defects for a period of up to five (5) years.

D. General Requirements for VFCs:

1. VFCs and Accessories:
 - a. Listed and labeled as defined in NFPA70, by a qualified testing agency, and marked for intended location and application.
 - b. Comply with NEMA ICS-7, NEMA ICS-61800-2, and UL508A, UL508C.
2. Application: Constant torque and variable torque
3. VFC Description: Variable-frequency motor controller, consisting of power converter that employs pulse-width-modulated inverter, factory built and tested in an enclosure, with integral disconnecting means and overcurrent and overload protection; listed and labeled by an NRTL as a complete unit; arranged to provide self-protection, protection, and variable-speed control of one or more three-phase induction motors by adjusting output voltage and frequency.
 - a. Units suitable for operation of NEMA MG1, Design A and Design B motors, as defined by NEMA MG1, Section IV, Part 30, "Application Considerations for Constant Speed Motors Used on a Sinusoidal Bus with Harmonic Content and General Purpose Motors Used with Adjustable-Voltage or Adjustable-Frequency Controls or Both."
 - b. Units suitable for operation of inverter-duty motors as defined by NEMA MG1, Section IV, Part31, "Definite-Purpose Inverter-Fed Polyphase Motors."
 - c. Listed and labeled for integrated short-circuit current (withstand) rating by an NRTL acceptable to authorities having jurisdiction.

4. Design and Rating: Match load type, such as fans, blowers, and pumps; and type of connection used between motor and load such as direct or through a power-transmission connection.
5. Output Rating: Three phase; 10 to 60 Hz, with voltage proportional to frequency throughout voltage range, 66 Hz, with torque constant as speed changes; maximum voltage equals input voltage.
6. Unit Operating Requirements:
 - a. Input AC Voltage Tolerance: Plus 10 and minus 15 percent of VFC input voltage rating.
 - b. Input AC Voltage Unbalance: Not exceeding 5 percent.
 - c. Input Frequency Tolerance: Plus or minus 3 percent of VFC frequency rating.
 - d. Minimum Efficiency: 97percent at 60 Hz, full load.
 - e. Minimum Displacement Primary-Side Power Factor: 98 percent under any load or speed condition.
 - f. Minimum Short-Circuit Current (Withstand) Rating: 35 kA, or as indicated on drawings.
 - g. Ambient Temperature Rating: Not less than 32 degF (0 degC) and not exceeding 104 degF (40 degC).
 - h. Humidity Rating: Less than 95 percent (noncondensing).
 - i. Altitude Rating: Not exceeding 3300 feet (1000m).
 - j. Vibration Withstand: Comply with NEMA ICS 61800-2.
 - k. Overload Capability: 1.5 times the base load current for 60 seconds; minimum of 1.8 times the base load current for three seconds.
 - l. Starting Torque: Minimum 100 percent of rated torque from 3 to 60 Hz.
 - m. Speed Regulation: Plus, or minus 10 percent.
 - n. Output Carrier Frequency: Selectable; 0.5 to 15 kHz.
 - o. Stop Modes: Programmable; includes fast, free-wheel, and dc injection braking
7. Inverter Logic: Microprocessor based, 32 bits, isolated from all power circuits.
8. Isolated Control Interface: Allows VFCs to follow remote-control signal over a minimum 40:1 speed range.
 - a. Signal: Electrical.
9. Internal Adjustability Capabilities:
 - a. Minimum Speed: 5 to 25 percent of maximum rpm.
 - b. Maximum Speed: 80 to 100 percent of maximum rpm.
 - c. Acceleration: 0.1 to 999.9 seconds.
 - d. Deceleration: 0.1 to 999.9 seconds.
 - e. Current Limit: 30 to minimum of 150 percent of maximum rating.
10. Self-Protection and Reliability Features:
 - a. Surge Suppression: Factory installed as an integral part of the VFC, complying with UL1449 SPD, Type1 or Type2.
 - b. Surge Suppression: Field-mounted surge suppressors complying with UL1449 SPD, Type2.

- c. Loss of Input Signal Protection: Selectable response strategy, including speed default to a percent of the most recent speed, a preset speed, or stop; with alarm.
 - d. Under-and overvoltage trips.
 - e. Inverter overcurrent trips.
 - f. VFC and Motor-Overload/Overtemperature Protection: Microprocessor-based thermal protection system for monitoring VFCs and motor thermal characteristics, and for providing VFC overtemperature and motor-overload alarm and trip; settings selectable via the keypad.
 - g. Critical frequency rejection, with three selectable, adjustable deadbands.
 - h. Instantaneous line-to-line and line-to-ground overcurrent trips.
 - i. Loss-of-phase protection.
 - j. Reverse-phase protection.
 - k. Short-circuit protection.
 - l. Motor-over temperature fault.
11. Automatic Reset/Restart: Attempt three restarts after drive fault or on return of power after an interruption and before shutting down for manual reset or fault correction; adjustable delay time between restart attempts.
 12. Power-Interruption Protection: To prevent motor from re-energizing after a power interruption until motor has stopped, unless "Bidirectional Autospeed Search" feature is available and engaged.
 13. Bidirectional Autospeed Search: Capable of starting VFC into rotating loads spinning in either direction and returning motor to set speed in proper direction, without causing damage to drive, motor, or load.
 14. Torque Boost: Automatically varies starting and continuous torque to at least 1.5 times the minimum torque to ensure high-starting torque and increased torque at slow speeds.

E. ENCLOSURES

1. VFC Enclosures: NEMA250, to comply with environmental conditions at installed location.
 - a. Dry and Clean Indoor Locations: Type1
 - b. Outdoor Locations: Type3R
 - c. Kitchen or Wash-Down Areas: Type4X.
 - d. Other Wet or Damp Indoor Locations: Type4
 - e. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: Type12.
2. Plenum Rating: UL1995; NRTL certification label on enclosure, clearly identifying VFC as "Plenum Rated." Equipment

26 32 13 – Engine Generator – Diesel (Revised July 2021)

Equipment Description

1. Self-contained diesel engine-generator set
 - a. Complete skid mounted genset package unit consisting of the following for a complete and operating system
 - i. Engine
 - ii. Generator
 - iii. Auxiliary systems
 - iv. Unit control panel
 - v. Sound attenuated aluminum enclosure
 - vi. Stainless Steel Silencer
 - vii. Sub Base UL 2085 listed fuel storage tank
2. Manufacturers:
 - a. Diesel engine-generators shall be the specified model of the latest commercial design with all necessary controls.
 - b. The manufacturing facility shall be ISO 9001 certified
 - c. The four preapproved Manufacturers are:
 1. Caterpillar
 2. AKSA
 3. Cummins
 4. Generac.
 - d. The four preapproved vendors are:
 1. Ring Power Corporation
 2. Zabatt Power Systems
 3. Cummins Power South
 4. ACF Standby Systems, LLC
 - e. Engine-generators shall meet all EPA regulations.

Size

1. 40 kW to 3,000 kW

Generator Requirements

1. Rating
 - a. Each engine-generator set shall be capable of producing rated output at rated generator RPM when equipped with necessary operating accessories such as air cleaners, lubricating oil pump, fuel transfer pump, radiator fan, jacket water pump, governor, alternating current generator and exciter.
 - b. Standby duty rated at (40 to 3,000) EKW, KVA,
 - c. Generator shall be brushless type, rated at .8PF, three phase, 60 Hertz, 480 volt, or 240 Volt (if required), delta connected, 4 wire, 1800 RPM.
 - i. 0.8 lagging power factor.
 - ii. Delta 240v connected
 - iii. 4 wire

- iv. 480 volts standby duty for 480-volt service, or 240 volt standby duty for 240 volt service.
- v. Engine-generators shall have re-connectable leads to enable JEA to get a variety of voltages from the equipment.
- d. Unit shall be sized to operate Plant or Station at 110%, started in sequence unless specified otherwise. Unit shall be rated such that each pump, upon start-up, will not experience greater than 20% instantaneous voltage dip, also considering auxiliary power requirements. Responsibility for sizing generator shall lie with the generator supplier or as provided by JEA designated Electrical Engineer.
- e. Operating ambient temperature range of 7 °F to 105 °F
- f. Directly connected to the engine flywheel housing with flex coupling.
- g. Unit shall be in compliant to UL 2200 labeled.
- h. Unit shall be in compliant to NFPA 110.
- i. Generator shall be engine driven, single bearing, continuous duty, salient pole, and synchronous type with amortisseur windings. It shall be of the drip-proof type, entirely self-contained with only line leads brought out for loading connections. Generator insulation used shall be NEMA Class H such that generator life will match that of the prime mover. Generator shall be designed so all components are accessible with a minimum amount of labor. Generator shall be engine driven, single bearing, continuous duty, salient pole, and synchronous type with amortisseur windings. It shall be of the drip-proof type, entirely self-contained with only line leads brought out for loading connections. Generator insulation used shall be NEMA Class H such that generator life will match that of the prime mover. Generator shall be designed so all components are accessible with a minimum amount of labor. The maximum voltage dip (including any instantaneous voltage dip) during starting shall be 20%.
- j. A vacuum pressure impregnation (VPI) process shall be utilized on form wound stator windings.
- k. The Supplier shall provide a stator coil pitch, coil distribution, and skew to minimize the total harmonic distortion (THD) to less than 5 percent.
- l. Stator winding shall be 2/3 pitch (67 percent).
- m. An automatic voltage regulator with 3-phase sensing shall be provided. The regulator shall have over excitation protection. A static voltage adjuster shall be provided to use with automatic synchronizer.
 - i. Voltage regulator shall be modular construction, replaceable as an assembly and shall provide regulation for single unit operation within plus or minus 2 percent from rated voltage at any steady state load between "no load" and "full load."
- n. Generator shall have static excitation systems, which shall incorporate silicon control rectifiers to provide alternator field excitation. Static excitation system shall have capacity to provide 150 percent of required excitation at rated load and rated voltage. Static excitation system shall incorporate circuitry to permit voltage build-up from residual magnetism. Field flashing from a separate source is not acceptable.

- o. Voltage level and voltage gain control shall be provided and easily accessible for normal operating adjustments. Voltage level control shall have a minimum range of plus or minus 5 percent from rated voltage. Provide voltage adjustment instruction and generator schematic wiring diagram permanently attached on inside of exciter assembly.
 - p. Certain applications may require the use of a permanent magnet generator. The generator supplier shall be responsible for recommending this type of alternator where circumstances warrant its use.
 - q. Generator drive shall be free from critical torsional vibration within the operating speed range.
 - r. Generator neutral shall be closed.
2. Generator Control Panel
- a. Automatic generator starting electronic modular control panel in a metal enclosure. Starting section shall automatically start engine upon failure of normal source through starting contacts in automatic transfer switch. Transfer unit shall serve to operate as follows: Failure of normal supply shall cause its voltage sensitive relay to close a normally open contact initiating starting cycle of diesel engine. Closing of this contact shall cause power to be fed to a throttle solenoid, which picks up, opening fuel rack and energizing starting motor through one of its contacts. As generator voltage approaches normal, relay coil in the cranking panel shall pick up, opening starting circuit through one of its contacts, thereby disconnecting starting motor from the rest of the circuit. Lack of oil pressure or over-temperature of cooling system will cause second relay in cranking panel to be energized, as normal alternator voltage is approached, causing starting cycle to be terminated immediately. Should engine fail to start for any reason, a time delay relay in cranking panel limits its cranking period to 30 seconds. A push-button switch mounted on cranking panel shall allow engine to be further cranked at the operator's discretion. Resumption of normal power shall open engine contacts in transfer switch and shall cause engine to shut down after 5 minute delay. Each engine-generator shall have a digital type generator-mounted control panel and shall be supplied with vibration isolators of the type suitable to isolate the control panel from the engine-generator vibration.
 - b. Panels will be Cat 4.2, DSE 7310, Generac H100 or Cummins Power Command HMI 220 or newer revision. The DSE Panels are the preferred panel to be installed on all new units.
 - c. The control system features shall include the following:
 - i. Automatic generator loading and unloading for open load transfer.
 - ii. Automatic synchronizing – The automatic synchronizing scheme shall be designed to select and synchronize the engine-generator unit across each switch.
 - iii. Dead bus closing system
 - iv. VAR/PF control
 - v. Engine Speed Control
 - vi. Isochronous or droop mode

- vii. Automatic/Manual Start-Stop with the following safety shutdowns
 - 1. Over-speed protection and indicator
 - 2. Low lube oil pressure protection and indicator
 - 3. High coolant temperature protection and indicator
 - 4. Over-crank protection and indicator
 - 5. Low coolant level protection
 - 6. Engine Control Switch (Three-Position: Stop - Manual - Auto)
 - 7. Indicator/ Display Test Switch
 - 8. Digital Voltage Adjust Required (plus 10 percent - 25 percent Range)
- viii. AC METERING
 - 1. AC Volt Meter
 - 2. AC Amp Meter
 - 3. Frequency Meter:
 - 4. Ammeter/Voltmeter Phase Selector Switch Four Position (Phase 1,2,3, and off)
- d. All engine-generator units shall be capable of interfacing with JEA SCADA equipment.
- e. Two normally open dry contacts that will close when the engine is running and open when engine is stopped.
- f. Interface modules/expansion boards shall be installed by manufacturer to provide a minimum of 16 digital signals to be relayed to the Siemens interface panel to JEA SCADA.
- g. Generator control section shall be 600 volts, with amperage sized to match pump station service and shall include a 3 pole generator circuit breaker with shunt trip. Shunt trip shall be actuated by any of the engine safety devices. Shunt trip indication must be provided to Generator panel fault circuit.
- h. Emergency stop push button to shut the engine down regardless of the switch position.
- i. A remote emergency stop push button to shut the engine down regardless of the switch position shall be placed by pump control panel. Emergency Stop shall be in a Stainless Steel Nema4 Enclosure, mushroom handle with a clear cover. No "Break Glass" Estops will be permitted.
- j. Fuel pressure monitored by ECU/ control panel.
- k. Tachometer.
- l. Fuel leak detection.
- m. Dry contacts rated 120 volts, AC, 5 amps shall be provided for annunciation of all safety shutdowns, and all control panels mounted visual indicators. Safety shutdowns and control panel visual indicators shall include all items required by FPA 110 Level 1. Dry contacts shall close on safety shutdown or when visual indicators are illuminated and open when the condition is cleared. In addition, a common alarm (generator

alarm) contact shall be provided that closes when any of the above-mentioned contacts close. The common alarm contact shall open when all conditions are cleared. In accordance with the NFPA requirements, alarm module shall be a dc system. A normally closed dry contact shall be provided to send gen fault signal to SCADA.

- n. All items shall be included on the control panel, assembled, wired, and tested in the supplier's shop.
 - o. The control panel shall have adequate clearance from the engine to permit engine maintenance without moving the control panel.
 - p. Automatic Exerciser is not required if exercising of unit is controlled by the ATS.
3. Engine-Generator Interface to JEA SCADA system with ET200S
- a. The following Inputs for each engine-generator set shall be set up for the interface to a Siemens ET200S Distributed I/O Module. The ET200S module will feed the generator status information to the SCADA equipment over Profibus or ProfiNet. Contacts from the generator shall be prewired and labeled to the ET200S. Connect Greenleaf EFC-420.1 data converter and Transfer Switch contacts.
 - b. Interface modules/expansion boards shall be installed by manufacturer to provide a minimum of 16 digital signals to be relayed to the Siemens interface panel to JEA SCADA
 - c. Digital Inputs to ET200S (Are to be connected in this order)
 - d. Generator Run (From Generator)
 - e. Generator Fault (From Generator)
 - f. Fuel Leak (From Greenleaf data converter)
 - g. Normal Power Available (From Transfer Switch)
 - h. Transfer Switch Normal (From Transfer Switch)
 - i. Transfer Switch Emergency (From Transfer Switch)
 - j. Analog Input to ET200S
 - k. Fuel Level (From Greenleaf data converter.
4. Engine-Generator Interface to JEA SCADA system with PLC S7-1200 or S7-300
- a. The following Inputs for each engine-generator set shall be set up for the interface to a Siemens S7-1200 (ProfiNet) or S7-300 (ProfiBus) Distributed I/O Module in SCADA via Ethernet cable. The modules will feed the generator status information from the ST 200SP distributed I/O in the Generator to the SCADA equipment over Profibus. Contacts from the generator landed in the ET200SP per drawings in Appendix A. The ET 200SP Distributed I/O will communicate with SCADA via a Shielded Ethernet Cable. Connect Greenleaf EFC-420.1 data converter and Transfer Switch contacts.
 - b. Digital Inputs to ET200SP (Are to be connected per attached drawings in Appendix A)
 - c. Analog Input to ET200SP
 - i. Fuel Level (From Greenleaf data converter)

- d. Siemens Interface panels and cables shall be installed as per Appendix A
- e. The PLC will be powered from the 24VDC supply from SCADA to the ET200SP in a separate 1/2" conduit from the generator to the RTU cabinet
- f. Fourteen (14) #18 tinned MTW Blue SCADA digital input wires shall be provided for each unit and ran back to SCADA RTU cabinet.
- g. Two (2) Profinet Cables from the I/O Panel to RTU shall be in 3/4" conduit from the generator to the RTU. Cable shall be Siemens 6XV 840-2AH10 with connector Siemens 6AG1 901-1BB10-7AA0 on each end of cable
- h. All field wiring shall connect directly to I/O base terminals using ferrules with end sleeves.
- i. All mounting screws shall be drilled and tapped (no self-tapping screws are allowed).
- j. All mounting screws shall be stainless steel.
- k. Din rail shall be model 1492-DR9 or equivalent.
- l. Two (2) TSP #18 shielded pair of analog inputs shall be provided for each and ran back to SCADA RTU cabinet. TSP wire shall be Belden 3072 Twinax.
- m. Communication wire from Generator to ATS AND the RTU shall 18ga Tin Coated MTW copper wire.
- n. When grounding loop exists, grounding shall be done as per drawings in Appendix (D). In the event there is no grounding loop, grounding shall be done as per drawing in Appendix (C).A
- o. Electrical conduits shall be installed as per drawing in Appendix (B).
- p. The (14) #18 tinned MTW Blue SCADA wire shall be labeled as per drawing in Appendix (A).
- q. Generator Installation and wiring reference JEA Water and Sewer Standards.
- r. In the event of a standalone fuel tank, add one 1/2-inch conduit from Fuel tank to Generator Control Panel for Greenleaf.
- s. All electrical runs shall be in either rigid or non-metallic liquid tight conduit for on exterior of enclosure. All electrical runs shall be Aluminum EMT or non-metallic liquid tight conduit for interior of enclosure.
- t. All cables, conduits and panels will be install regardless of SCADA system on site to accommodate future installs.

Engine Requirements:

1. Diesel engine design shall be heavy-duty type to meet EPA Regulation.
2. Arranged for direct connection to an alternating current generator and shall be the product of a manufacturer regularly engaged in the building of full diesel engines. Engine shall be a current model which has been in regular production for at least three years. Engine shall develop sufficient brake horsepower, net at rated RPM, corrected to sea level barometric pressure (29.92 in. HG) and 110 degrees F, to operate generator or wear. Diesel engine shall be water-

- cooled four-cycle compression ignition diesel. The engine exhaust manifold shall have an expanded metal guard spread sufficiently away from hot parts
3. Engine shall meet the required capacity when operating on ultra-low-sulfur no. 2 diesel fuel
 4. Engine shall be supplied with electronic governor capable of .25 percent speed regulation from no load to full rated load for isochronous regulation of engine speed. Belt-driven or velocity governors are not acceptable.
 5. Engine shall be equipped with a pressure lubrication system supplying oil to all surfaces requiring lubrication. Circulation shall be by a positive displacement pump. Lubrication system shall include a full flow strainer, oil filter, and an oil cooler of sufficient capacity to properly cool all lubrication oil circulated, and level indicator or dipstick.
 6. Engine shall have an individual mechanical injection pump and injection valve for each cylinder, any one of which may be removed and replaced from parts stock. Injection pumps and injection valves shall not require adjustment in service. Fuel injection pumps shall be positive action, constant-stroke pumps, actuated by a cam driven by gears from the engine crankshaft.
 7. Fuel lines between injection pump and valves shall be heavy seamless tubing; and, to eliminate irregularity of fuel injections, shall be of the same length for all cylinders.
 8. Fuel system shall be equipped with replaceable fuel filter elements which may be easily removed without breaking any fuel line connections or disturbing the fuel pumps or any other part of the engine. Provide easily serviceable fuel/water separator/filter ahead of other fuel filters. A fuel check valve shall be at the tank fuel supply port before the generator fuel water separator.
 9. All fuel filters shall be conveniently located in accessible housing, ahead of injection pumps so that fuel will have been thoroughly filtered before it reaches the pumps. No screens or filters requiring cleaning or replacement shall be used in injection pump or injection valve assemblies.
 10. Engine shall be equipped with a built-in gear-type engine-driven fuel transfer pump, capable of lifting fuel against a head of twelve feet, for supplying fuel through filters to injection pump at constant pressure.
 11. Engine shall be provided with suitable safety controls to automatically stop the unit when low oil pressure, water temperature or engine speed exceeds safe limits. Pilot lights shall be provided to visually indicate the cause of engine shut down. Pilot lights shall operate off battery circuit and shall be on engine generator control panel. Provide contacts for remote engine failure annunciation.
 12. Engine shall be equipped with radiator and blower fan of sufficient capacity for cooling engine when diesel electric set is delivering full rated load in an ambient temperature of 122 degrees F. Air flow restriction from radiator shall not exceed 0.5 inches H₂O. Engine shall have a thermostat internal with jacket water circuit to maintain water at proper operating temperature. Engine shall have a belt driven centrifugal type water circulating pump for circulating water through cooling system.
 13. Provide one or more engine mounted dry type air cleaners of sufficient capacity to protect working parts of the engine from dust and grit.

14. Engine shall be equipped with an oil/ vapor recovery container or box that meets EPA regulations. The intent of the recovery system is to not allow the blow by waste to escape into the atmosphere or soak the radiator coils, as well as be a possible housekeeping issue around the engine-generator.
15. Water cooled diesel engine, sized for generator set.
16. All engine exhaust emissions shall meet EPA requirements for standby power generation.
17. Engine starting system shall include an electric motor start system including dc starting motor, required voltage battery pack and rack, cables, and battery charger.
 - a. For engine-generator sets rated 750 kW and above, a redundant electric starting motor shall be provided.
18. The batteries shall be of the lead acid type. The battery shall be sized to provide the specified number of starts, cranking time at firing speed (five 10 second cranks) at any ambient between minimum (7 °F) and maximum (105 °F) design ambient temperatures, with final discharge voltage, exceeding minimum control power supply voltage requirements. Batteries shall be lead acid type complete with cables and rack. Battery shall be rated in accordance with requirements of engine manufacturer. Batteries shall be located for easy removal and servicing. Battery shall be from Group 31, 4D, or 8D. All batteries shall be installed in a battery box.
19. Battery Charger:
 - a. Current limiting battery charger to automatically charge batteries.
 - b. Charger shall be dual charge rate with automatic switching to boost rate when required.
 - c. Charger shall be mounted at rear of engine-generator set inside the enclosure.
 - d. Control wire connection between starting and safety circuits shall be pre-connected before arriving at job site.
 - e. The service powered battery charger shall float charge the battery pack and shall be solid-state, full wave bridge rectified type, using silicon-controlled rectifiers for power control. The battery charger shall be suitable for the required voltage, and current, battery pack type, shall have a dc output circuit breaker, floating voltage equalization, equalizing timer, a ground detection system, a voltage relay to activate low battery voltage alarms at the engine-generator control panel, and battery charger failure which shall alarm at the engine-generator control panel.
 - i. SENS NRG, SENS Micro, Lamarche or as approved by JEA Facilities Inspector.
20. Cooling System:
 - a. Engine shall be cooled with a unit-mounted radiator cooling system complete with:
 - i. radiator
 - ii. expansion tank
 - iii. coolant overflow tank (plastic)
 - iv. water pump

- v. belt-driven fan
 - vi. fan guard
 - vii. thermostatic temperature control
 - viii. high water temperature cutout
 - ix. electric jacket water heater
- b. The jacket water heater shall be sized for Northeast Florida climate and shall maintain jacket water at 90 F in an ambient temperature of 30 degrees F.
 - c. The jacket water heater shall be thermostatically controlled, if “acorn” type heaters with nonadjustable thermostats are provided then they shall not be oversized to waste energy or burn up hoses and shall be single phase, 60 Hertz, and applicable voltage.
 - d. All jacket water heaters hoses shall be silicone type.
 - e. All jacket water heaters hoses shall have shut off valves at engine, supply and return as to allow maintenance personnel to swap out hoses without draining all the fluids.
 - f. The radiator shall be sized to handle the cooling of the engine and all other accessories required for proper operation in the North Florida Region.
 - g. Radiator shall have ball valve isolation at radiator drain point.
 - h. The fan shall draw air over the engine and discharge through the radiator.
 - i. The radiator and oil cooler coils shall be 100% dipped in Bronze-Glow (Husky Gold Protectant) to provide additional protection on coils for all units due to the corrosive atmosphere at JEA water and waste water facilities.
 - j. The cooling system shall be filled with a permanent antifreeze mixture of 50 percent ethylene glycol type with rust inhibitor.

Enclosure/ Silencer:

- 1. Complete diesel engine generator set including control panel, engine starting batteries and fuel oil tank shall be enclosed in a factory assembled water protective, sound attenuated aluminum enclosure.
 - a. Enclosure for units with greater than 250 kW nominal capacities shall be of the walk-in type and shall be of the drop over configuration, suitable for pad mounting or on base fuel storage tanks. Minimum distance from engine-generator and generator to end wall shall not be less than 3'-0" for walk in type enclosures. The complete engine-generator set shall be enclosed in a modular, walk-in type,
 - b. Weatherproof enclosure. The enclosure shall provide 6 ft. minimum head clearance and 24 inches minimum walk around clearance on sides not including radiator. The enclosure will consist of two sidewalls, two end walls, louvers, and roof.
 - c. The enclosure for units with nominal capacity of 250 kW or less shall be of the non-walk-in type and shall be attached to the skid rails or sub base fuel tank at the supplier's shop. The enclosure will consist of two sidewalls, two end walls, louvers, and roof. Light controls shall be accessible from exterior door entry.
 - d. All walk around enclosures shall have a spill containment system in weatherproof storage container large enough to encompass fuel tank perimeter.

- e. The enclosure shall be made of marine grade aluminum and painted Padmount Green.
- f. Paint Specification is Paint color: Padmount Green, Paint type: Steel-Master 9500 30% Silicone Alkyd Enamel Ultra deep/Clear tint base distributed by Sherwin-Williams.
- g. Doors shall be lockable by padlock with stainless steel hardware for access to the engine-generator, controls, and accessories. Doors shall also provide easy accessibility for maintenance. Enclosures shall be polished. Supplier will remove all advertising and labels on the exterior of any enclosure. Drop over type enclosures shall have a rubber gasket under it with a rubber cement type adhesive to keep gasket in place to prevent water intrusion into enclosure as well as keep engine fluids from leaking out.
- h. The enclosure shall be constructed of removable side panels and end panels.
- i. All fasteners and hardware used in construction of the enclosure shall be ~~304~~ 316 stainless-steel. The enclosure shall be braced as necessary to support the silencer and designed to withstand 150-mph wind without damage. All bracing and reinforcing members shall be integral to the enclosure. Roof penetrations for the installation of the silencer shall have a gasket to prevent the entrance of rain. The unit shall have continuous hinged side doors each side and continuous hinged doors at control end, equipped with pad lockable hardware for ease of engine maintenance and a three-point latch system. Doors shall be a minimum of 36". There shall be an expanded metal grating, or a punched louvered radiator core guard installed - flush with the enclosure panels in front for the radiator grill, and fixed, punched louvered air intake ports on the enclosure sides and rear for proper air circulation within the housing provide lifting eyes and spreader bar reinforcement for crane unloading. A stainless-steel handle mounted at the control panel entry door.
- j. The louvers shall be screened from the inside to prevent the entry of insects. The enclosure shall have all penetrations gasketed or sealed to prevent the entry of rodents. "Rain Resistant" louvers, as manufactured by Ruskin or Cesco, vertical air turning plenums, or equal shall be provided to prevent the entrance of rain when the unit is operating, and the wind direction is at 90 degrees to the air intake at 120 mph. The entire enclosure, except for the louvered openings, shall be provided with noise suppression insulation mechanically secured and fastened.
- k. Enclosures shall be provided with noise suppression insulation and air plenums designed to provide a sound level of mechanical noise of 86 dB (A) at 15 feet from any point of the enclosure. A minimum of two industrial LED fixtures from Columbia Lighting Model LXEM4-40ML-RFA-EDU or equivalent approved by JEA, spring wound timer light switch, prewired distribution circuit, power panel, and duplex receptacles shall be conveniently provided in the enclosure. The light switch and receptacles shall be provided near generator control panel. Provisions shall be made for mounting batteries and rack inside the enclosure. The generator breaker, generator control panel, distribution (lights, jacket water heater, etc.) power breaker panel, batteries and accessories shall be located in the enclosure. When a voltage reduction is required to supply primary panel voltage, Engine-generator supplier shall provide and install a 480/240V transformer adequately sized to handle all enclosure loads from service voltage. No transformer is required if station supplies 240V or 208V. Transformer shall

feed off of load side of auto transfer switch via a fused or breaker contact located inside ATS.

- I. All engine oil and coolant drains shall be piped to outside of enclosure with shutoff valves and shall have threaded stainless steel or aluminum caps. The threaded drain lines shall be labeled on the outside of the enclosure with an aluminum label with aluminum or stainless rivets.
- m. Enclosure shall be Phoenix Products, Advanced Manufacturing & Power Systems Inc. or Fidelity Manufacturing.
- n. Power Supply:
 - i. Each engine-generator set will be provided with a single 480V, 240V or 208V ac power supply capable of being rewired for lower voltages.
 - ii. Each engine-generator shall be provided with a power panel sized to power the required loads inside the enclosure by the Supplier as specified herein. The engine starting and controls will operate from the dc-powered batteries specified herein.
 - iii. Each engine-generator unit shall have a 120V ac, single phase, 60 Hz, panel, and shall be mounted inside the enclosure and shall be isolated from engine-generator vibration. The Supplier shall determine the number of branch circuit breakers required and furnish additional of 10% spares. Circuits must be labeled in panel. The power panel shall be prewired to all engine-generator accessories, including but not limited to the following:
 1. Enclosure intake and exhaust louvers.
 2. Engine-generator starting system (battery charger).
 3. Engine electric jacket water heater.
 4. Enclosure lights and receptacles.
- o. Each engine-generator unit shall be furnished with complete exhaust system including a stainless-steel exhaust silencer, all-stainless-steel piping, all-stainless expansion joints and accessories as required for a complete operating system.
- p. The exhaust silencer shall be chamber type, of all-welded Type 304L stainless steel construction with all stainless-steel hardware and fasteners.
 - i. The silencer shall be of the side inlet type
 - ii. Secured in position at no less than 4 points
 - iii. The silencer shall be supported by a welded 304 or 316 stainless angle iron cradle; silencer shall be bolted or strapped to cradle and then bolted to the roof with horizontal mounting external on top of the enclosure. Additional support members shall be mounted inside the roof of the enclosure as required.
- q. The silencer shall be sized so that the backpressure at rated capacity of the engine does not exceed one half the supplier's maximum allowable backpressure. The silencer shall be suitable for critical type silencing and shall be a Maxim "Model M51" or equal.

- r. All exhaust piping shall be Type 304L, Schedule 10S stainless steel, and the exhaust shall discharge horizontally at the silencer outlet, with 45-degree bevel cut with a stainless expanded metal bird screen.
 - s. The intake of the silencer shall connect to the flexible exhaust connection by stainless steel pipe. Size as required by engine manufacturer. A flexible stainless steel exhaust adapter, 18-inch minimum length, shall be furnished for mounting between the engine and silencer. The flexible exhaust connection as specified shall mount directly on exhaust manifold and shall be mounted so that no weight is exerted on the manifold at any time.
 - t. Ships ladder and hand hold rail shall be installed on both sides of unit under doors when entry is between 12" and 36" from top of slab.
 - u. Stainless-steel or Aluminum stairs with one continuous platform under doors shall be installed on both sides of unit over 36" in height. If existing pavement does not exist, a 6" concrete slab shall be installed to allow stair system to be anchored at ground level. All hardware shall be 316 SS.
2. Instrument transformers, instruments, and associated devices:
- a. Current Transformers. Current transformer mechanical and thermal limits shall be coordinated with the momentary and short time ratings of the switching device with which JEA utilizes. The thermal ratings shall be based on a short-circuit duration of 1 second or greater. The minimum current transformer accuracy rating shall be C200.
 - b. Voltage Transformers. Voltage transformer shall have a rating of not less than 500 volt-amperes on a thermal basis and a capability of withstanding a secondary short-circuit for not less than 1 second. Each transformer shall be provided primary and secondary fuses. The primary fuses shall be adequately rated for the transformer inrush and load current, and they shall have an interrupting capacity equal to or greater than the maximum short-circuit momentary current rating required. The connections from the main buses to primary of the voltage transformer shall be capable of carrying the rated short-circuit current for a minimum of 1 second.

Fuel System / Tank:

- 1. Each engine-generator unit shall be furnished with a complete fuel system, including engine-driven fuel pump, fuel filter/ water separator, engine supply and return line, all stainless-steel flexible connections, manual fire-safe shutoff valves, and manual anti-siphon valve on all tanks. All items shall be suitable for the specified fuel. The engine-driven fuel pump shall transfer the fuel from the fuel storage tank to the engine-generator. The fuel system shall be furnished with any equipment required for the engine to supply or return any unused portion of fuel back to the fuel storage tank with any level in the tank.
 - a. JEA Maintenance and Environmental Departments including the JEA Project Manager must be notified by supplier between 45 days and 30 days, and again between 72 hours and 48 hours in advance of above ground fuel storage tank shipments greater than 550 gallons. DEP's Chapter 62-762 for Aboveground Storage Tank Systems must be followed

2. All manual stainless-steel fire-safe shutoff valves and a filter/ water separator shall be provided on the fuel supply line. The shutoff valve and the filter/ water separator shall be located upstream from the flexible connection at the engine-generator.
3. All fuel tanks shall be base tanks unless restricted by size and height of installation location as approved by JEA Facilities inspector
4. All manual stainless-steel fire-safe shutoff valves on separate standalone fuel storage tanks shall be mounted in the vertical direction on the outside of the generator enclosure before any solenoid or anti-siphon valve and shall be welded.
5. There shall be no shutoff valves on any fuel return line.
6. There shall be an anti-siphon valve above the manual stainless-steel fire-safe shutoff valve on all fuel tanks per FDEP. All anti-siphon valves must be adjustable and sized for exact rise and run of fuel piping per the site conditions.
7. Fuel system shall be equipped with replaceable fuel filter elements, which may be easily removed without breaking any fuel line connections or disturbing the fuel pumps or any other part of the engine.
8. All fuel filters shall be conveniently located, ahead of injection pumps so that fuel will have been thoroughly filtered before it reaches the pumps. No screens or filters requiring cleaning or replacement shall be used in injection pump or injection valve assemblies. The combination fuel filter/bypass water separator shall be a manifold unit with shutoff valves and shall be installed on the fuel supply line between the fuel storage tank and the engine driven pump and shall as manufactured by RACOR or approved equal.
9. The manual fire safe shutoff shall be ball valve of three-piece design, with stainless steel body and end caps, stainless steel ball and stem, reinforced Teflon seats and seals, and socket welding ends. Valves shall be of fire safe design and shall utilize secondary metal seating surfaces to ensure shutoff if the primary seats are destroyed by fire. Fire safe ball valves shall be Contromatics, Jamesbury or JEA Approved equivalent.
10. Fuel oil cooler shall be supplied if the engine fuel system absorbs heat from the unit injectors and surrounding jacket water. The fuel cooler shall be radiator mounted, air-cooled to cool the return fuel as required to maintain proper fuel operating temperature. The cooler shall utilize the airflow from the radiator fan for cooling. Any coils shall be 100% dipped in Bronze Glow (Husky Gold Protectant) to protect against corrosion.
11. Storage tanks shall be insulated secondary containment aboveground storage tank system for flammable and combustible liquids shall be vehicle impact protected and projectile resistant and must meet UL 2085 standards. Tank shall be a steel tank housed in a double containment concrete vault/tank and supplied by Phoenix Products, ConVault, AMPS or Fidelity Manufacturing.
 - a. The tank shall be tested to and listed (and carry UL/ULC labels) for the following:
 - i. UL – 2085, two-hour furnace fire test and two hour simulated pool fire test for insulated tank.
 - ii. UL – 2085, insulated and protected secondary containment aboveground tanks for flammable and combustible liquids.
 - iii. UL – 2085 ballistic and vehicle impact test for protected tank.

- iv. The tank shall withstand bullet resistance tests in compliance with UFC Section (79-7)
 - v. The tank shall be supplied with flood resistant tie-down brackets/hurricane hold-down restraints.
- b. Steel Tank Construction:
- i. Steel tank shall be made of 3/16-inch-thick steel. The steel tank shall hold the liquid fuel. The tank shall be made in accordance with UL Standard 2085 and ULC Standard S601 covering all aspects of tank fabrication including material specification, fabrication, welding and testing. The steel tank's exterior shall be coated with primer and paint for protection against corrosion.
 - ii. At the fabrication shop, the tank shall undergo a 24-hour pressure test at 5 psig.
 - iii. Secondary Containment:
 - 1. The steel tank shall be wrapped with a minimum of ¼ inch thick Styrofoam (foam) insulation and an impervious barrier of 30 MIL high density polyethylene membrane (poly). The 30 MIL poly shall provide containment for a fuel leak through the steel tank. A leak detector pipe terminating in the secondary containment shall provide positive proof that the tank is not leaking.
 - 2. The 30 MIL poly shall shield and protect the steel tank exterior from coming in direct contact with the concrete and thus minimize the potential of tank external corrosion.
 - iv. Concrete Vault:
 - 1. The tank and secondary containment shall then be encased in a 6-inch-thick reinforced concrete vault. The 6 inches of concrete shall be poured on all sides, bottom and top of the tank in one step and be monolithic. This process assures that there are no joints and no heat sinks in the concrete to carry heat from a fire into the primary containment.
 - v. All double wall sub-base and standalone tanks coatings shall be approved by a JEA representative.
- c. The double wall sub-base tank shall have a sloped top if exposed to weather conditions as to allow rainwater to run off. All sub-base tanks and standalone tanks if mounts are available shall be secured to concrete slab with stainless steel anchor bolts and washers.
- d. All tanks must have 2 inches of ground clearance to accommodate visual inspections required by FDEP.
12. Engine-generators with nominal capacity of 150 kW and less shall be furnished with a complete fuel system including double wall sub-base type fuel storage tank unless stated otherwise. The tank shall be UL2085 listed, vented, and shall normally be used to store the specified petroleum product at atmospheric pressure.
13. All above ground fuel storage tanks shall meet or exceed UL2085 standards.

14. Rupture basin with 110% capacity.
15. The sub-base fuel storage tank shall have a minimum capacity to provide 75 hours continuous operation of the engine-generator at 100 percent load, up to 500 gallons maximum capacity. The sub-base tank shall be of welded steel construction throughout and shall be constructed to permit access to the electrical stub up area.
 - a. 75-hour capacity at 100% at full load up to 150kW gensets.
16. Engine-generator greater than 150kW capacity may be furnished with an approved above ground fuel storage tank with a minimum storage capacity to provide 60 hours continuous operation of the engine-generator at 100 percent load.
 - a. 60-hour capacity at 100% at full load above 151kW gensets.
17. The fuel storage tank shall be provided with the following items:
 - a. Vent cap
 - b. Primary Vent shall not exceed height of enclosure per sub base tanks.
 - c. Emergency vents
 - d. EFG-8000I Greenleaf fuel level gauge
 - e. EFC-420.1 4-20mA data converter
 - f. Manual fuel stick with gallons to inch laminated conversion chart
18. The fuel storage tank shall be provided with the following connections:
 - a. Fuel supply
 - b. Fuel return
 - c. Fill with camlock fitting and cap with aluminum or Stainless-Steel fittings and 5 GL minimum overspill containment box welded to AST.
 - d. Vent
 - e. Primary tank emergency vent
 - f. Low level switch
 - g. Leak detection with 2" opening with camlock fitting and cap, aluminum or stainless-steel.
 - h. Secondary tank emergency vent
 - i. Placard set stating size, fuel fill, vent, emergency vent, combustible, No smoking and Diesel on two sides and near fuel fill.
19. The fuel storage tank shall have controls that include but not limited to the following:
 - a. Greenleaf Solar Gauge EFG-8000-I with EFC -420.1 4-20 mA data converter. The gauge shall monitor fuel level in gallons, interstitial leak, hi, and low fuel level.
 - i. The EFC-420.1 4-20 mA data converter shall be mounted inside the generator control panel and shall be wired to the EFG-800I gauge and output feeds to SCADA shall include two sets of twisted pairs wires (TSP#18 Belden 3072F Twinax).
 - ii. All electrical runs shall be in either rigid or non-metallic liquid tight conduit.

- iii. The EFG-8000-I gauge shall be mounted on the outside of the enclosure if on a base tank less than 500 gallons and at fuel fill end. All penetrations through enclosure shall be weather tight. For no or low light conditions EFG-12V is required for the EFG-8000-1I gauge.
 - iv. For all standalone fuel storage tanks, the EFG-8000-I gauge shall be mounted at eye level on the end of the fuel tank. All conduits going from the EFG-8000-I gauge to the EFC-420.1 data converter in the generator control panel shall be aluminum grade with aluminum or stainless unistrut with clamps securely attached to the concrete slab. No penetrations shall be made in to the above ground fuel storage tank.
 - b. Level gauge, capable of measuring the fuel level without the engine running.
20. Tank fill connection and level gauge shall be accessible for personnel at ground level through a lockable door in or outside the enclosure. A pad lockable fill spill containment box shall be sized for 5 – 10 gallons and provided for containment of spillage during tank fill when located outside of enclosure.
- a. Overflow fuel fill port and caps with stainless steel hasp.
 - b. Spring type plunger fuel fill port drain
 - c. Fuel containment box must be part of the manufactured tank welded to AST. No threaded containment boxes will be allowed.
21. Tank fill connection enclosures that are independent of fuel tank shall be made of stainless steel or white powder coated marine grade aluminum. The pad lockable fill spill containment enclosure shall be sized for 5 – 10 gallons and provided for containment of spillage during tank filling operations.
- a. 3" Drylock Fuel Break Male Coupling with Cap/Plug
 - b. Isolation Valve inside enclosure between fueling connection and fuel tank.
 - c. Manual operated fuel return hand pump with cut off valve.
 - d. Drain port with isolation valve located on bottom of enclosure.
 - e. All associated piping and hardware from remote fill enclosure to fuel tank shall be 316 stainless steel.
22. A suitable sized vent connection and vent cover shall be provided for the storage tank vent. The vent cover shall be installed outside the enclosure. The cover shall have an aluminum body, screen over the outlet, and shall prevent rain from entering the vent line.
23. A suitable sized emergency vent connection and emergency vent shall be provided for the primary and secondary fuel storage tank. Each emergency vent shall be installed outside the enclosure and shall be designed as required to relieve excessive internal pressure caused by fire exposure.
24. Primary vent shall not exceed height of enclosure per subbase tank and not block engine exhaust pipe.
25. All flexible diesel fuel piping inside enclosure or at engine-generator shall meet SAE 100R17 hose with stainless connections to prevent against rupture, corrosion and fire. All threaded connections shall utilize Hercules Chemical Company Inc. Multipurpose heavy Teflon "Tape Dope" and "Megaloc and or Real-tuff".

26. The diesel fuel piping shall be standard weight (Schedule 40) 316 stainless steel with socket welded fittings per ASTM standards. At the option of the supplier, use Schedule 40 316 stainless steel with welded fittings. All piping shall be welded and done by a certified pipe welder. Where threaded union is required use Hercules Chemical Co. "Megaloc or Real-tuff" all-purpose pipe dope on all stainless-steel threaded connections. Vendor/ Contractor must warranty all piping connections to be free of any leaks, drips or weeping for one year. Any break in fuel piping shall be joined only with Flanged fitting with a petroleum grade gasket.
27. All fuel piping shall be installed above ground. Any piping installed at ground level must have diamond deck ramp or steps covering to prevent tripping hazard on walkways. All piping shall be strapped to 316SS unistrut that is fastened to pavement.
28. Above ground fuel storage tanks that have fill box openings over 48 inches above grade shall have aluminum or stainless-steel stairs and platform at the fuel port. Larger base tanks/ enclosures that have a walk-in type of enclosure shall have access stairs or ladders that are located on two sides of the enclosure / base tank made of aluminum or stainless steel. The stairs/ platform shall be secured to concrete slab using stainless anchor bolts and washers.
29. Supplier shall provide 90% of fuel for rated tank capacity for any and all turnkey installations by supplier. Fuel shall be number 2 off road ultra-low sulfur diesel. Fuel delivery shall take place prior to load bank test. Supplier shall treat fuel with Hydro Clean made by Gulf Select.

Shop Painting:

1. All components of each engine-generator unit, including engine, fuel storage tank (if applicable), alternator, piping, and valves shall be shop primed and finish painted prior to shipment to the site. The paint shall be suitable to an outdoor environment and shall be approved by JEA. Stainless steel, nonferrous, and nonmetallic surfaces shall not be painted.
 - a. One quart of finish paint and brush shall be provided with each equipment package for field touchup painting.
 - b. Fuel storage tank with ferrous metal (base tanks) shall be surface prepared to protect all surfaces from corrosive environment at JEA facilities. Metal shall be solvent cleaned on all surfaces to be coated utilizing approved system by JEA Facilities Operations. The entire pipefittings and nipples on the tank shall be powder-coated to protect them from corrosion. Coating will not be required when 304 or 316 stainless steel penetrations are used.

Shop Testing:

1. The drive and generator shall be completely factory assembled and tested by the Supplier to prove that they are assembled correctly, and capable of meeting the net generator output kVA rating. All other components and support systems shall be thoroughly inspected by the Supplier prior to shipment. All control system shall be tested to verify correctness of assembly and operation, applicable high potential test before and after load runs, and applicable standard tests. The integrity and proper connection of all electrical circuits shall be verified.
2. The tests shall consist of specified capacity loading changes (25 percent, 50 percent, 75 percent and 100 percent of primary duty kW) under a .8 power factor reactive testing to be performed at the factory for a minimum of 4 continuous hours total, and demonstrate that each

safety shutdown device is working properly. The Supplier shall submit copies of the onsite tests prior to start of warranty. Shop tests shall be performed at manufacturer's facility.

3. The Supplier shall notify JEA at least one week prior to the shop test. JEA reserves the right to witness the shop test.
4. If such tests indicate specified performance has not been met, the Supplier shall pay the cost of all corrective measures and additional tests until such time as tests demonstrate that specified performance has been met.

Operating Conditions:

1. Each engine-generator unit will be used as a power unit when the utility-supplied power fails and shall provide the specified minimum nominal standby capacity for the duration of 60 - 75 hours minimum at full load.
2. The unit shall be capable of being started, synchronized to the system, and loaded to the full rating of the unit without dependence upon an auxiliary power for a minimum of five minutes. The voltage shall remain +/-10% unless stated otherwise.
3. Each engine-generator unit shall be suitable for "black start" conditions and shall automatically start and connect to electrical loads when initiated from an automatic transfer switch.
4. Each engine-generator shall be supplied with monitoring the following: generator run, generator fault, generator main breaker trip, normal power available, emergency power available, fuel level, and leak alarm.
5. Fuel tanks for the engine-generators with nominal output capacity of greater than 150 kW can be furnished from an approved above ground tank supplier UL 2085. Fuel for engine-generators with nominal output capacity of 150 kW and less will be supplied fuel from a sub-base type fuel storage tank UL 2085.

Start Up and Testing:

1. Prior to acceptance of the installation, each unit shall be tested at the job site to show it is free of any defects and will start automatically and be subjected to full resistive load test at rated capacity, 1 power factor, with enclosure using dry type load banks. Supplier shall provide startup personnel to train personnel and witness the tests. Testing by Supplier shall be for a period of four continuous hours and shall be done in the presence of the JEA representative.
 - a. The supplier shall furnish the services of one or more technical service representatives to assist in the installation of new engine-generators. The service representatives shall be technically competent; factory trained; experienced in the installation and operation of the equipment; and authorized by the supplier to perform the work stipulated.
 - b. Supplier will start up and service the engine-generators utilizing its own technicians and will not subcontract any start up work out.
 - c. For new engine-generators, the Supplier shall also furnish the field services of direct representatives of the manufacturers of auxiliary equipment which has rotating parts, or which may require field inspection and adjustment to assure proper operation.
 - d. The technical service representatives shall furnish written certification to JEA that equipment has been inspected, adjusted, and passed load bank test by them or under direction and that it is ready for service. All written certifications must be duplicated

and one copy left onsite in the Manual-Pak maintenance folder and the other electronically sent to the JEA Project Manager in Facilities Operation and Maintenance.

- e. The duties of technical service representatives may include, but may not be limited to the followings:
 - i. Providing technical advice to assist a contractor in installing the equipment.
 - ii. Inspection and testing the equipment after installation and directing any changes or adjustments required to assure proper operation. The engine-generator unit shall be field tested by the field service representative(s) for compliance with the specified requirements. The tests shall include but not necessarily limited to the followings:
 - 1. Ability to start and synchronized to an energized bus.
 - 2. Ability to start connects to and brings up a dead bus.
 - 3. Net output at design conditions.
 - iii. Providing technical direction during startup and initial operation of the equipment.
 - iv. Directing the correction of any design or manufacturing errors.
 - v. Instructing JEA's personnel in the operation and maintenance of the equipment.
 - vi. Providing services required as a condition to providing warranties and guarantees specified.
- f. Service Representatives and Technicians required for installation and start-up are included in the initial engine-generator pricing.
 - i. Technical Service Representative includes all expenses including, but not limited to, small tools and consumables, travel, meals, per diem, salaries, benefits, overheads, etc.
- g. The load bank will be capable of definite and precise incremental loading and shall not be dependent on the generator control instrumentation to read amperage and voltage of each phase. Rather, the test instrumentation will serve as a check of the generator set meters.
- h. Correct amount and grade of crank case oil, coolant, and other fluids necessary for initial testing and operations shall be supplied with each unit.
- i. On completion of the installation, the initial inspection for correct installation and start-up shall be performed by a factory-trained representative of manufacturer. At the time of start-up, operating instructions and maintenance procedures shall be thoroughly explained to the operating personnel.
 - i. In addition to equipment specified, each generator shall be equipped with all standard equipment as specified by the manufacturer for this model and shall include but not be limited to the following necessary items:
 - 1. Initial filling of oil and antifreeze.
 - 2. Shrink wrap applied to the product to ensure a clean finish.

3. During the start-up, the technician shall record the following information and provide to the owner for his records:
 - i. Operating Voltage
 - ii. Hz
 - iii. Phase
 - iv. kW
 - v. KVA
 - vi. Connected load (Amperage)
 - vii. Package information consisting of:
 1. Generator & Engine Make
 2. Generator & Engine Model
 3. Generator & Engine Serial Number
 4. Start-up date
 - j. Prior to acceptance, any defects, which become evident during this test, shall be corrected by Supplier at no additional expense to JEA.
 - k. Vendor must coordinate all start up and testing activities with the engineer and owner. After installation is completed by others and normal power is available, the vendor must perform a one (1) day start-up including the use of building load. The start-up technician will instruct all necessary personnel how to operate and maintain the equipment in accordance with the manufacturer's requirements.
 - l. The Supplier's representative shall provide training as required for JEA in the proper operation of the equipment. The supplier shall provide at no additional cost to JEA any and all software and data ports to communicate with engine-generator EMC panels.

Warranty:

1. Two (2) year standard standby generator warranty and an additional Three (3) year comprehensive (parts and labor) standby generator warranty. Labor, materials, and travel for the warranty period repair will be paid by manufacturer during normal business hours. Comprehensive warranty shall cover the following:
 - a. Cooling System
 - b. Thermostat Housing
 - c. Water Manifold Housing
 - d. Jacket Water Precooler
 - e. Jacket Water Pump
 - f. Thermostat
 - g. Radiator & Fan
 - h. Fuel System
 - i. Steel Fuel Lines
 - j. Fuel Shutoff Solenoid

- k. Fuel Injectors
- l. Fuel Transfer Pump & Housing
- m. Fuel Priming Pump
- n. Fuel Transfer Pump
- o. Lubrication System
- p. Pan, Pump Cooler
- q. Crankcase Breather
- r. Engine Oil Pump Drive
- s. Pre-lubrication Pump
- t. Electric System
- u. Battery Charger
- v. Control Module (ECM)
- w. Sensors: All Engine Sensors
- x. Wiring Harness & Connectors
- y. Starter
- z. Engine Alternator
- aa. Alternator End
- bb. Alternator, including Rotor, Stator, and Exciter
- cc. Generator Controls
- dd. Power Center
- ee. Air Induction & Exhaust
- ff. Exhaust Manifolds, Studs & Gaskets
- gg. Inlet Air Heater Relay
- hh. Intake Manifold
- ii. Turbocharger(s)
- jj. Air-to-Air After Cooler Cores
- kk. Muffler/Exhaust System
- ll. Exhaust Guards
- mm. Diesel Oxidation Catalyst
- nn. Short Block
- oo. Cylinder Block Casting
- pp. Crankshaft
- qq. Connecting Rod Assembly
- rr. Piston, Wrist Pin, Retainer Clip & Piston Rings
- ss. Idler and Timing Gears

- tt. Accessory Drive
- uu. Cylinder Head
- vv. Cylinder Head
- ww. Intake & Exhaust Valves
- xx. Valve Mechanism
- yy. Camshaft, Camshaft Bearings, Key, Gear
- zz. Front & Rear Covers
- aaa. Front Cover/Plate/Housing/Gears & Gaskets
- bbb. Vibration Damper
- ccc. Flywheel Housing & Gasket
- ddd. Crankshaft Front & Rear Seal
- eee. Optional After treatment Coverage
- fff. Diesel Particulate Filter
- ggg. Selective Catalytic Reduction
- hhh. Any additional manufactured components, having a manufacturer's part number, installed by an authorized dealer.
- iii. 5-year warranty coverage also covers all authorized dealer overtime for warranty repairs and all rental equipment for equipment down longer than 48 hours.
- jjj. Tank manufacturer shall provide its standard 30-year warranty.

26 36 XX – Electrical Generator Docking Station

Requested Standardization: *(Insert specification below.)*

JEA has multiple units over 500 KW that could take several hours to disconnect load bank in the event of an emergency. This unit would also provide ease of hooking an emergency generator set in the event a permanent unit fails or needs to be down for long term maintenance or repairs.

PART 1 GENERAL

1.1. GENERAL

1.2. QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. ETL/UL LISTED to 1008 Standards
- C. UL 50 LISTED

1.3. COORDINATION

- A. Coordinate layout and installation of Generator Docking Station, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels

1.4. GUARANTEE/WARRANTY

- A. Manufacturer Warranty shall be provided for a minimum of 1 Year,
 - 1. Extended Warranty of 48 months will be required in conjunction with manufacture 1 year warranty for a total of 5-year warranty.
- B. The equipment installed under this contract shall be left in proper working order
- C. New materials and equipment shall be guaranteed against defects in composition, design, or workmanship. Guarantee certificates shall be furnished.

PART 2 PRODUCTS

2.1. DOCKING STATION

- 1. Manufacturers: Subject to compliance with requirements, provide products by the following or Approved Equal by JEA Facilities O&M Department
 - a. Dual Purpose Docking Station
 - b. TRYSTAR Model No.: DBDS-5 Padmount Dual Purpose 100A to 3000A
 - c. ASCO 300 Series – 3QC

2.2. GENERAL REQUIREMENTS

- A. Enclosure
 - 1. NEMA 3RX or 4X Rain-Tight Aluminum Enclosure
 - i. Pad-lockable front door shall include a hinged access plate at the bottom for entry of temporary cabling that prevents unauthorized tampering while in use.
 - ii. NEMA 3R Integrity shall be maintained while temporary cabling is connected during use
 - iii. Front and Side shall be accessible for maintenance
 - 2. Powder coat on aluminum enclosure only
 - i. Paint after fabrication shall be Padmount Green.
- B. Phase, Neutral, and Ground Busbar
 - 1. Material: Silver-plated Copper
 - 2. Equipment Ground Bus: bonded to box.

3. Isolated Ground Bus: insulated from box.
 4. Ground Bus: 50% of phase size.
 5. Neutral Bus: Neutral bus rated 100 percent of phase bus.
- C. Temporary generator and Load Bank connectors shall be Camlok style mounted on gland plate.
1. Camlok shall be 16 Series model and color coded according to system voltage requirements.
 2. Camlok connections shall be Bus Bar Style, Cabling or Double Set Screw is not acceptable
 3. Camlok connection shall be protected against accidental contact while not in use
- D. Permanent Connection shall be factory installed broad range set-screw mechanical type, located behind a physical barrier
- E. Generator Lockout and Isolation Configurations
1. Manual Transfer Switch (MTS)
 - i. UL1008 listed Manual Transfer Switch to select between the permanent generator and portable generator inlet receptacles.
 - ii. MTSs are subject to all JEA Facility Standard ATS requirements, notwithstanding automatic operation.
 2. Single or Double Breaker Generator Disconnect System
 - i. Quick connect panel shall have an integrated generator isolation disconnect that is interlocked with access to inlet receptacles. Closure of the generator isolation disconnect shall preclude the ability to energize the system from a portable generator.
 - ii. Interlocked disconnects shall be located behind pad lockable door to prevent any tampering by unauthorized personnel.
 3. Alternate Interlocking Means (subject to JEA approval)
 - i. At a minimum, any alternate interlocking scheme must prevent back-feeding of any portion of a facility permanent generator assembly.
- F. Short Circuit & Withstand Rating
1. Shall be sized to withstand available fault current that the generator can provide.
- G. Voltage & Amperage
1. 240/480V & 800A to 4000A
- H. Factory Installed Phase Rotation Monitor Device and Disconnects:
1. Phase rotation monitoring relay shall provide positive confirmation when phase rotation is correct.

2. Disconnects must be UL listed.
3. Disconnects shall be removable for service and maintenance

PART 3 EXECUTION**3.1. EXAMINATION**

- A. Examine elements and surfaces to receive the Docking Station for compliance with installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected

3.2. INSTALLATION

- A. Surface, Flush or Base Mounted: Determined by Application
 1. Install anchor bolts to elevations required for proper attachment to Generator Docking Station.

3.3. IDENTIFICATION

- A. Comply with JEA facility requirements for "Identification for Electrical Systems."
- B. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
- C. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.4. FACTORY COMMISSIONING

- A. Upon completion of the installation, the docking station shall be commissioned by the Manufacturer's factory authorized technician.
- B. SCOPE OF WORK SHALL INCLUDE:
 1. Review and verify the installation of all Manufactures components and verify the correct electrical flow as depicted on the one-line drawings.
 2. Factory training for on-site personnel to educate them on how to connect the Docking Station to a portable generator / Load Bank system.
 3. Any issue that is found during the start-up that is determined at that time to be a warranty issue will be covered by Manufacturer. Any issues that are specific to the scope for the electrical installing contractor are the sole responsibility of the installing contractor

Justification for Standardization:

1. The item is used in large numbers throughout the JEA system.
2. The item requested has better availability and delivery time, which is necessary for the application.

26 36 23 – Automatic Transfer Switches (Revised May 2021)

JEA Facilities' standard Automatic Transfer Switch (ATS) is either ASCO Series 300/7000 or Russelectric RTS-3 type delayed transition transfer switch with microprocessor controls. The ATS is to be enclosed in a weatherproof stainless-steel enclosure. Each ATS is to be installed with specific criteria, including model and enclosure, based on the type of JEA facility at which it is being installed as detailed below. In addition, each ATS must meet the common Service, Warranty and UL ratings and criteria provided within this standard.

Service: ATS Supplier must have a factory authorized service technician within 50 miles of Jacksonville for warranty repairs.

1. Emergency warranty repair service shall be available 24/7.
2. Startup service provided by a factory authorized service technician shall be included with any new ATS.

Warranty: 5 years coverage for parts, labor and travel cost for a factory authorized service technician to remedy manufacturing defects.

UL1008 Ratings: ATS must have a 50ms" Any Breaker" withstand and closing rating of at least 42,000A at 480VAC and a 200ms short time rating of at least 7,500A.

The three specific facility types are:

- A. **Lift Stations and Waste Water Treatment Plants**
- B. **Water Treatment Plants and Reuse Booster Stations**
- C. **Communication Tower sites**

A. Lift Stations and Waste Water Treatment Plants

Transfer Switch Brand: ASCO Series 300/7000 or Russelectric RTS-3 type delayed transition transfer switch with microprocessor controls. **All Class III / IV lift stations shall have a No Load-Break Bypass Switch.**

1. Delayed Transition, 3-pole, double throw type, rated 480 volts A.C. amperage (or 240 Volts A.C. amps if indicated) to match service size as indicated on drawings.
2. Switch shall be electrically operated, mechanically held type switch and shall have 130kA per phase or greater Transient Voltage Surge Suppressor (TVSS) protection.
3. Switch shall be equipped with full relay protection and shall transfer load to emergency source when one or more of the 3-phase voltage falls below 85 percent.
4. It shall automatically return load to normal when all normal line voltages have been restored to 90 percent or more.
5. Auto transfer switch shall be equipped with an engine starting contact and with an emergency lockout relay to prevent switch from closing load on emergency generator until proper voltage and frequency have been reached.
6. Switch shall be equipped with one time delay, adjustable from 1/6 to 180 seconds in the engine starting contact circuit to prevent contact from closing until a predetermined delay has occurred.

7. Switch shall be equipped with another time delay relay adjustable from 1/6 to 180 seconds which will, after a predetermined time, allow the emergency generator circuit to remain closed after normal power has been restored to at least 90 percent voltage.
8. Switch shall be equipped with a time delay, to run engine for 5 minutes at no load on retransfer to normal power source.
9. Provide two additional auxiliary contact switches, 1 normally open and 1 normally closed.
10. All fuse blocks shall have Safety shields installed to allow ease of changing fuses and prevent electrical shock to JEA and ATS Maintenance technicians.

Bypass Transfer Switch Brand: Bypass transfer switch shall be ASCO Series 7000, Russelectric RTS-3 type delayed transition transfer switch with microprocessor controls. **All class III/IV lift stations will have additional requirements.**

1. A two-way bypass-isolation switch shall provide manual bypass of the load to either source and permit isolation of the automatic transfer switch from all source and load power conductors.
2. Bypass to the load-carrying source shall be accomplished with no interruption of power.
3. The bypass handle shall have three operating modes: "Bypass to Normal," "Automatic," and "Bypass to Emergency."
4. The "Open" mode shall completely isolate the automatic transfer switch from all source and load power conductors.
5. When in the "Open" mode, it shall be possible to completely withdraw the automatic transfer switch for inspection or maintenance to conform to code requirements without removal of power conductors or the use of any tools.
6. When the isolation switch is in the "Test" or "Open" mode, the bypass switch shall function as a manual transfer switch.

Enclosure: Transfer switch enclosures shall be available in UL NEMA 1, NEMA 3R, and NEMA 3RX

1. For exterior applications of the ATS, a UL Type Secure NEMA 3RX (316 Grade Stainless Steel) enclosure shall be of the secured type.
2. For interior applications of the ATS, a UL NEMA 1 or NEMA3R shall be installed.
3. The control panel will be housed inside of the cabinet on an inner full height door/panel away from vandalism and the corrosive environment.
4. All electrical penetrations into ATS shall be from the bottom side of the enclosure.
5. Lifting bracket(s) should be welded to sides of cabinet alleviating cabinet penetrations.
6. Pad mounts should extend out in order to allow perpendicular drilling through mounting holes once unit is placed on pad.
7. There should be attached eyelets to allow mounting to electrical rack as required.
8. The outer weather-tight full height secured door shall be constructed with a closed cell gasket door, a three-point pad lockable latch exterior door arrangement, and a continuous hinge the full height of the door.
9. Supplier will provide 100 W powered strip heaters in all ATS enclosures with finger safe fuse pullers.

B. Water Treatment Plants and Reuse Booster Stations

Brand: Transfer switch shall be ASCO Series 7000, Russelectric RTS-3 type delayed transition transfer switch with microprocessor controls. All Water Treatment Plants and Reuse Booster Stations shall be No Load-Break Bypass-isolation with the following:

1. Where an ASCO 7000 series is specified or equal, a two-way bypass-isolation switch shall provide manual bypass of the load to either source and permit isolation of the automatic transfer switch from all source and load power conductors.
2. Bypass to the load-carrying source shall be accomplished with no interruption of power.
3. The bypass handle shall have three operating modes: "Bypass to Normal," "Automatic," and "Bypass to Emergency."
4. The "Open" mode shall completely isolate the automatic transfer switch from all source and load power conductors.
5. When in the "Open" mode, it shall be possible to completely withdraw the automatic transfer switch for inspection or maintenance to conform to code requirements without removal of power conductors or the use of any tools.
6. When the isolation switch is in the "Test" or "Open" mode, the bypass switch shall function as a manual transfer switch.
7. All fuse blocks shall have Safety shields installed to allow ease of changing fuses and prevent electrical shock to JEA and ATS Maintenance technicians.
8. Switch shall be electrically operated, mechanically held type switch and shall have 130kA per phase or greater Transient Voltage Surge Suppressor (TVSS / SPD) protection on both Normal and Emergency.
9. TDI Tech Package with Ethernet
10. PQM Tech Package with Ethernet

Enclosure: Transfer switch enclosures shall be available in UL NEMA 1, NEMA 3R, and NEMA 3RX

1. For exterior applications of the ATS, a UL Type Secure NEMA 3RX (316 Grade Stainless Steel) enclosure shall be of the secured type.
2. For interior applications of the ATS, a UL NEMA 1 or NEMA3R shall be installed.
3. The control panel will be housed inside of the cabinet on an inner full height door/panel away from vandalism and the corrosive environment.
4. All electrical penetrations into ATS shall be from the bottom side of the enclosure.
5. Lifting bracket(s) should be welded to sides of cabinet alleviating cabinet penetrations.
6. Pad mounts should extend out in order to allow perpendicular drilling through mounting holes once unit is placed on pad.
7. There should be attached eyelets to allow mounting to electrical rack as required.
8. The outer weather-tight full height secured door shall be constructed with a closed cell gasket door, a three-point pad lockable latch exterior door arrangement, and a continuous hinge the full height of the door.
9. Supplier will provide 100 W powered strip heaters in all ATS enclosures with finger safe fuse pullers.

C. JEA Communication Tower Sites.

Brand: Transfer Switch shall be ASCO Series 300/7000 type delayed transition transfer switch with microprocessor controls. The transfer switch shall be enclosed in a weatherproof NEMA 1 or NEMA 4 stainless steel enclosure. This is for all JEA communications towers

1. Delayed Transition, 2-pole, double throw type, rated 240 volts A.C. amperage to match service size as indicated on drawings.
2. Switch shall be electrically operated, mechanically held type switch and

shall have 130 kA per phase or greater Transient Voltage Surge Suppressor (TVSS) protection.

3. Switch shall be equipped with full relay protection and shall transfer load to emergency source when one or more of the 3-phase voltage falls below 85 percent.
4. It shall automatically return load to normal when the normal line voltage has been restored to 90 percent or more.
5. Auto transfer switch shall be equipped with an engine starting contact and with an emergency lockout relay to prevent switch from closing load on emergency generator until proper voltage and frequency have been reached.
6. Switch shall be equipped with one time delay, adjustable from 1/6 to 180 seconds in the engine starting contact circuit to prevent contact from closing until a predetermined delay has occurred.
7. Switch shall be equipped with another time delay relay adjustable from 1/6 to 180 seconds which will, after a predetermined time, allow the emergency generator circuit to remain closed after normal power has been restored to at least 90 percent voltage.
8. Switch shall be equipped with a time delay, to run engine for 5 minutes at no load on retransfer to normal power source.
9. Provide two additional auxiliary contact switches, 1 normally open and 1 normally closed.

Enclosure: Transfer switch enclosures shall be available in UL NEMA 1 or NEMA 4.

1. The control panel will be housed inside of the cabinet on an inner full height door/panel away from vandalism and the corrosive environment.
2. All electrical penetrations into ATS shall be from the bottom side of the enclosure.
3. Lifting bracket(s) should be welded to sides of cabinet alleviating cabinet penetrations.
4. Pad mounts should extend out in order to allow perpendicular drilling through mounting holes once unit is placed on pad.
5. There should be attached eyelets to allow mounting to electrical rack as required.
6. The outer weather-tight full height secured door shall be constructed with a closed cell gasket door, a three-point pad lockable latch exterior door arrangement, and a continuous hinge the full height of the door.
7. Supplier will provide 100 W powered strip heaters in all ATS enclosures with finger safe fuse pullers.

26 51 19 – LED Light Fixture, Bay Lighting, Interior Location, Non-Corrosive Environment

Lithonia – Model JCBL High Bay LED Lighting for a non-corrosive environment

LED Light Fixture, Interior Location – The committee has reviewed it as a suitable upgrade/replacement of conventional lighting systems such as 400W metal halide warehouse light fixture. Applications include manufacturing, warehousing, and other large indoor spaces with mounting heights ranging from 10'-40' to the bottom of the luminaire. The luminaire shall be a suspended mount only.

Construction – JCBL features an aluminum heat sink to maximize heat dissipation and extend the life of the luminaire by maximizing contact with the LEDs. A glass optical enclosure (IP65 rated) protects the LEDs from dust and other air contaminants. The prismatic acrylic reflector is the preferred option which will mount to the heatsink.

Optics - Reflector and lens options provide maximum versatility and uniformity including up to 8% up light with reflectors alone. Conical, flat or acrylic drop lenses offer enhanced aesthetics, minimize glare at lower mounting heights and maximize up light (13%) when paired with acrylic reflectors.

Electrical - L70 at 55,000 hours. Provide a thermally protected driver standard with 0-10V dimming. The input watts are 200W for the 25,926-lumen unit that would replace a 400W metal halide luminaire.

Installation – Mounting options include cast hook and cord factory installed or ¾" NPT threaded hub to accommodate stem or hook options.

Listings - UL1598/C SA C22 .2 250, Buy American Act, Damp location listed. Suitable for use in ambient temperatures from 32°F (0°C) to 122°F (50°C). Design Lights Consortium® (DLC) qualified product.

Warranty – 5-year limited warranty

Size: 16.3" long by 16.3" wide by 14.3" high

26 51 19 – LED Light Fixture, Ceiling Grid, Interior Location

Acceptable Fixtures:

1. Columbia TCAT
2. Columbia LCAT
3. Lithonia 2RTL-60
4. Lithonia 2GTL4

The above units were evaluated by the Facilities team

26 51 19 – LED Interior Light Fixture, Recessed Downlight, Non-Corrosive Environment (Est. July 2020)

The selected products are as follows:

1. Lithonia Juno IC22 LED G4 14LM 40K
2. Hubbell Prescolite LC6SL 6LCSL10L40K8

Approximate Equivalency

1. Fluorescent (compact twin tube) - 17W LED = 32 W
2. Incandescent - 17W LED = 120W Par
3. Metal Halide (MH) 17W LED = 50W MH

Note that efficiency improvements in LED fixtures are providing lower wattage units

Optics:

The light engine shall be a 4000K configuration

Construction:

Galvanized steel housing with a prewired junction box.

Electrical:

1. Unit life (L70/50,000 hrs at 25°C).
2. The electronic driver has a power factor of >90%, THD <20%, and
3. Mounts on any horizontal ceiling with up 2" thickness.

Listings:

1. UL listed for wet locations.
2. Rated for -20°C minimum ambient.

26 51 19 – LED Light Fixture, Ceiling/Surface Pendant Mount for Interior Location (Est. March 2024)

Requested Standardization:

Lighting Design Standard for ceiling/surface pendant mount for Interior Location, **excluding wet locations.**

Recommended products as follows, cut sheets attached:

- Columbia LXEM4-40ML-RFA-EU 40K
- Lithonia FEM L48 6000LM IMAFL MD MVOLT GZ10 40K 80CRI
- Lithonia CSVT L48 ALO3 MVOLT SWW3 80CRI
- Metalux 4VT3-LD5-6-G-UNV-L850-CD1-U

Justification for Standardization:

This item is the most cost-effective means to safely maintain the highest level of system availability & reliability. The item requested will provide documented long reliable service life at a lower life-cycle cost. This standard is being created to provide an LED fixture for use in Interior Location.

26 52 13 – LED Exit Light Fixture, Non-Corrosive Environment (Rev. Sept 2021)

Requested Standardization:

Recommended Manufacturers and models, that meet Facilities standards are:

1. Lithonia ECBR LED M6

2. Mule Alliance AL IR WWL
3. Hubbell Compass CE
4. Lithonia ECRG

Equivalents that meet the standard specifications may be substituted when approved by the JEA stakeholder.

Approximate Equivalency:

Fluorescent (compact twin tube) - 3W LED = 9 W

Incandescent - 3W LED = 30W

***Note that efficiency improvements in LED fixtures are providing lower wattage units**

Optics:

White LEDs are in series providing redundant light sources to ensure emergency lighting performance.

Construction:

Injection-molded, flame-retardant, high-impact, thermoplastic housing with snap-fit design components. Universal J-box pattern. Universal chevrons for directional indication. Fully assembled single face with extra faceplate for easy field-conversion to double face. Integrated LED emergency light bar swivels to allow for full range of light adjustment. Letters 6" high with 3/4" stroke, with 100 ft viewing distance rating, based on UL924 standards

Electrical:

1. Dual-voltage input 120V or 277V AC; 9.6V output.
2. Emergency combo provided with test switch, status indicator and rechargeable battery.
3. Maintenance-free nickel cadmium high-output battery standard provides 90 minutes of emergency power and provides up to 3W of LED remote capacity
4. Unit life: The typical life of the exit LED lamp is 10 years. 1.5W per face.

Listings:

1. UL Listed. Meets UL 924
2. NFPA 101 (current Life Safety Code)
3. NFPA 70-
4. NEC and OSHA illumination standards.
5. Indoor damp location 0°C to 50°C (32°F to 122 °F) listed standard

Justification for Standardization:

1. This item is the most cost-effective means to safely maintain the highest level of system availability & reliability. The item requested will provide documented long reliable service life at a lower life-cycle cost. The item requested has better availability and delivery time, which is necessary for the application. Currently, there is no JEA standard for LED signs that are equivalent to 18W fluorescent units. In working with Smith/McCrary Architects on the Buckman office project, it was decided to create a written exit light standard. The units were compared to the typical 18W fluorescent units. The working foremen team has reviewed the layout for both sites and found it a suitable, cost-effective LED, upgrade to the typical

fluorescent fixtures. The LED units will save over 18W per fixture (~83% energy reduction) for an annual energy savings of \$19/yr (less than 4yr payback) on a 3W LED unit replacement of a 18W fluorescent unit. Over the last few years Lithonia and Hubbell fixtures have been installed at Main St Lab, Buckman WWTP, Mandarin WWTP, and other sites. In all cases these units have operated satisfactorily per D. Gillard and S. Hargis. These two working foremen maintain the lighting at most of the JEA sites.

2. As of 8/31/21 the ECC R model is no longer being offered and the ECRG is now specified as the replacement. The slim line design and ease of installation are also desired features. Recommendation is that Facilities Standardize on using the RED lens color in all EXIT signs.
3. A comparison of the fixtures is listed below.

Product Comparison of 10W FL Equivalent LED Fixtures

| Brand | Model | Efficiency | Power | Output | Cost |
|---------------|------------------|------------|-------|--------|------|
| Lithonia | EBCR LED M6 | 100 lm/W | 3 W | 300 lm | \$66 |
| Hubbell | LBP6 6LBP11L 40K | 110 lm/W | 3 W | 330 lm | \$65 |
| Mule Alliance | AL IR WWL | 107 lm/W | 3 W | 321 lm | \$68 |
| Lithonia | ECRG | 113lm/W | 3 W | 339 lm | \$68 |

26 56 19 – LED Exterior Lighting, Canopy Surface Mounted, Non-Corrosive Environment (Est. September 2019)

Acceptable fixtures:

3. Lithonia CNY P1 40K (4,500 lumens, 35W)
4. Hubbell LSQ1-40 (4,600 lumens, 40W)
5. EIKO SCSS-1C (4,800 lumens, 40W)

Approximate Equivalency

3. High Pressure Sodium (HPS) - 32W LED = 150W HPS
4. Metal Halide (MH) 40W LED = 150W MH

*Note that efficiency improvements in LED fixtures are providing lower wattage units.

Optics: The light engine shall be a 4000K configuration

Construction: Die-cast aluminum housing with an impact-resistant, tempered glass lens that is fully gasketed.

Electrical:

1. Unit life (L70/50,000 hrs at 25°C).
2. The electronic driver has a power factor of >90%, THD <20%, and a minimum 2.5 KV surge rating.
3. Mounts on any horizontal or vertical surface.

Listings:

1. UL listed for wet locations.

2. Rated for -40°C minimum ambient.
3. Luminaire is IP65 rated.
4. Design Lights Consortium® (DLC) qualified product.

26 56 19 – LED Exterior Lighting, Large Area LED Light Fixture, Non-Corrosive Environment
(Est. August 2019)

Acceptable fixtures:

1. Lithonia RSX3 LED P2 40K (30,183 lumens, 222W)
2. Hubbell RAR2 480L-210 4K7 (29,085 lumens, 198W)
3. RAB ALED 3T 260 (26,734 lumens, -253W)
4. Power Secure GL4 28 3M 740 (29,210 lumens, 254W)

Approximate Equivalency

1. High Pressure Sodium (HPS) 222W LED = 1,000W HPS
2. Metal Halide (MH) 260W LED = 1,000W MH

*Note that efficiency improvements in LED fixtures are providing lower wattage units

Optics: The light engine shall be a 4000K configuration

Construction: Die-cast aluminum housing with an impact-resistant, tempered glass lens that is fully gasketed.

Electrical:

1. Unit life (L70/50,000 hrs. at 25°C).
2. The electronic driver has a power factor of >90%, THD <20%, and a minimum 2.5 KV surge rating.
3. Mounts on any vertical surface or pole slip fitter.

Listings:

1. UL listed for wet locations.
2. Rated for -40°C minimum ambient.
3. Luminaire is IP65 rated.
4. Design Lights Consortium® (DLC) qualified product.

26 56 19 – LED Exterior Lighting, Large Floodlight LED Fixture, Non-Corrosive Environment
(Est. June 2019)

This JEA standard is created to select large LED floodlights that are equivalent to 1,000W metal halide flood lights. The energy saving is about 75 and will provide a 50,000 hour product with an expected life of 11 to 12 years.

Acceptable fixtures:

1. Lithonia HLF1 LED P2 (27,000 lumens, 195W)
2. Hubbell RFL5 190 (26,932, -190W)
3. RAB FXLED (30,989 lumens-202W)

Approximate Equivalency

1. High Pressure Sodium (HPS) 190W LED = 1,000W HPS
2. Metal Halide (MH) 220W LED = 1000W MH

* Note that efficiency improvements in LED fixtures are providing lower wattage units

Optics: The light engine shall be a 4000K configuration

Construction: Die-cast aluminum housing with an impact-resistant, tempered glass lens that is fully gasketed.

Electrical:

1. Unit life (L70/50,000 hrs. at 25°C).
2. The electronic driver has a power factor of >90%, THD <20%, and a minimum 2.5 KV surge rating.
3. Mounts on any vertical surface or pole slip fitter.

Listings:

1. UL listed for wet locations.
2. Rated for -40°C minimum ambient.
3. Luminaire is IP65 rated.
4. Design Lights Consortium® (DLC) qualified product

26 56 19 – LED Exterior Lighting, LED Floodlight Fixture 400 MH Equivalent

RAB FXLED – 150 LED Floodlight

Construction – Shall be die cast aluminum with tempered glass lens, high temperature silicone gasket, and a specular reflector

Rating – L80 fixture life of 100,000 hours

Warranty – 5-year warranty

Total Harmonic Distortion – less than 5% at 120V

Codes – IESNA LM-78, IENSA LM-80 & UL listed for wet locations

Installation - Fits on a standard slip fitter or trunion mounting, without physically modifying the existing light pole or its electrical connections.

Availability – repair parts locally available in Jacksonville.

26 56 19 – LED Exterior Lighting, LED Type IV Street Light, 400 MH Equivalent

Beacon Viper S VPS 60L-136 4K7 4 (Note: JEA only buys Type III fixtures for streetlights)

Construction - Shall be die cast aluminum with acrylic diffuser lens, silicone/urethane gasket, and a specular reflector

Rating – L95 fixture life of 60,000 hours.

Warranty - 5-year warranty

Total Harmonic Distortion – not mentioned on spec sheet; assumption less than 20% THD

Codes – IENSA TM-21, UL 1598 listed for wet locations, UL8750, ASTM B117, ASTM D522

Installation – Mounts on a round or square pole, without physically modifying the existing pole or its electrical connections.

Availability – repair parts locally available in Jacksonville.

26 56 19 – LED Exterior Lighting, LED Wall Cutoff Fixture (no up light) 75 MH Equivalent

Hubbell LNC2 12LU 4K, Lithonia WST-LED-P2-40K

Construction - Shall be die cast aluminum with acrylic diffuser lens, and a specular reflector

Rating – L96 fixture life of 60,000 hours.

Warranty - 5-year warranty

Total Harmonic Distortion – not mentioned on spec sheet; assumption less than 20% THD

Codes – IENSA TM-21, UL 1598 listed for wet locations

Installation – Mounts on a wall, without physically modifying the existing wall or its electrical connections.

Availability – repair parts locally available in Jacksonville.

26 56 19 – LED Exterior Lighting, LED Wall Pack Fixture 400 MH Equivalent

Hubbell Perimaliter PGM3 180L

Construction - Shall be die cast aluminum with tempered glass lens, high temperature silicone gasket, and a specular reflector

Rating – L80 fixture life of 60,000 hours.

Warranty - 5-year warranty

Total Harmonic Distortion – less than 20%

Codes – UL 1598 listed for wet locations

Installation – Mounts on a wall, without physically modifying the existing wall or its electrical connections.

26 56 19 – LED Light Fixture, Wall Pack, Exterior Location, Non Corrosive Environment
(Revised May 2021)

Approved products are as follows:

1. Atlas WSG4L, WM5L, WD7L, & WD10L (31W-82W)
2. Cooper (Lumark) WPSLED, WPMLLED, WPLLED (40W-121W)
3. EIKO WGM1C thru WGM5C (30W-120W)
4. Hubbell WGH 81L thru 225L (29W-110W)
5. Keystone WPLED20 thru WPLED120 (20W-120W)
6. Lithonia TWX1 thru TWX3 (11W-108W)
7. RAB W34-30L to W34-150 thru WP3 (29W-136W)
8. Topaz F-WP (28W thru 120W)

Equivalency - High Pressure Sodium (HPS)

1. 14W LED = 70W HPS
2. 29W LED = 150W HPS
3. 54W LED = 250W HPS
4. 89W LED = 400W HPS

Equivalency – Metal Halide (MH)

1. 18W LED = 70W MH
2. 35W LED = 150W MH
3. 64W LED = 250W MH
4. 104W LED = 400W MH

Optics:

The light engine shall be a 4000K or 5000K configuration

Construction:

Die-cast aluminum housing with an impact-resistant, tempered glass lens that is fully gasketed.

Electrical:

- Unit life (L70/50,000 hrs at 25°C).
- The electronic driver has a power factor of >90%, THD <20%, and a minimum 2.5 KV surge rating.
- Mounts on any vertical surface.

Listings - UL listed for wet locations. Rated for -40°C minimum ambient. Luminaire is IP55 rated. DesignLights Consortium® (DLC) qualified product.

26 56 19 – LED Light Fixture, Wet Location, Ambient Conditions (Revised July 2021)**Requested Standardization:**

Shared Services Lighting Design Standard for Wet Location and Temperatures < 105F

Acceptable Fixtures are:

1. Beghelli BS100LED
2. Columbia LXEM
3. Cooper/Metalux 4VRVT3
4. Lithonia DMW2
5. Lithonia CVST L48

Justification for Standardization: This item is the most cost-effective means to safely maintain the highest level of system availability & reliability. The item requested will provide documented long reliable service life at a lower life-cycle cost.

This standard is being created to provide an LED fixture for use in unconditioned damp and wet areas. Some examples are pump rooms, master lift stations, and weather exposed locations. The evaluation criteria were as follows:

1. All plastic construction in a two (2) foot or four (4) foot unit

2. Provide the light equivalence of two, cool white (4,000K), T-8 bulbs or ~5,000 lumens
3. Provide a wet environment rating with a moisture gasket for vapor tight sealing
4. Have a temperature rating of 100F+
5. NSF listed for splash zone II
6. Provide a 5-year warranty

The team reviewed the online specifications for four brand and multiple models as follows:

1. Beghelli BS100LED; 5,512 lumens, -41 to 104F rating; Eff. 110 lumens/watt
2. Columbia LXEM; 5,168 lumens, -4 to 122F rating; Eff. 123 lumens/watt
3. Lithonia FEM-LED; 4,257 lumens; -31 to 104F rating; Eff. 95 lumens/watt
4. Lithonia DMW2; 4,855 lumens; -40 to 104F rating; Eff. 121 lumens/watt
5. Lithonia CSVT; 4,949 Lumens; -40 to 104F rating; Eff. 118 lumens/watt
6. Metalux 4VRVT3; 5,404 lumens; -4 to 131F rating; Eff. 124 lumens/watt

Only fixtures # 1, 2, 4, 5, & 6 were judged acceptable to provide lighting in a moderately hot and damp working environment. Fixture 3 is not acceptable due to its inefficiency of 95 watts/lumen. This above list was approved on August 1, 2021, by the working foreman, D. Gillard, who is the subject matter expert (SME) for the Shared Services Department.

26 61 23 – LED Lamp Upgrade for HID Fixtures (Est. May 2021)

Approved products ranging from 12 watts to 120 watts are as follows:

| Brand | Model | Range |
|--------------|--------------------------|-------------|
| EIKO | LED15 WPT to LED150WPT | 15W to 150W |
| Keystone | KTLED12 to KTLED100` | 12W to 100W |
| Phillips | 18CCLED to 120CCLED | 18W to 120W |
| RAB | HID18 E26 to HID100 EX39 | 18W to 100W |
| Satco | S39390 to S39397 | 18W to 120W |
| Westinghouse | 16T19 to 120T38 | 16W to 120W |

Equivalency - High Pressure Sodium (HPS)

1. 14W LED = 70W HPS
2. 29W LED = 150W HPS
3. 54W LED = 250W HPS
4. 89W LED = 400W HPS

Equivalency – Metal Halide (MH)

1. 18W LED = 70W MH
2. 35W LED = 150W MH
3. 64W LED = 250W MH
4. 104W LED = 400W MH

Optics: The light engine shall be a 4000K or 5000K configuration

Electrical:

1. Unit life (L70/50,000 hrs. at 25°C).
2. The electronic driver has a power factor of >90%, THD <20%, and a minimum 2.5 KV surge rating.

Listings:

1. UL listed for damp locations.
2. Rated for -25C to 45°C ambient.
3. Lamp is IP64 rated.
4. Design Lights Consortium® (DLC) approved product

DIVISION 27 – COMMUNICATIONS

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DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

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DIVISION 31 – EARTHWORK

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DIVISION 32 – EXTERIOR IMPROVEMENTS**32 01 00 – Operation & Maintenance of Exterior Improvements (Asphalt Pavement)**

General Standards for Replacement or installation of Asphalt Pavement.

I. GENERAL:

Work under this section includes the furnishing of all labor, material and equipment required to provide replacement asphalt pavement as required for the work as specified hereinafter.

II. GENERAL REQUIREMENTS:

1. Where construction requires removing pavement or where existing paving is damaged by the Contractor's operation, it is the intent of these specifications that due care be exercised in cutting pavement, backfilling trenches, and replacing pavement so that where no further settlement of trenches will occur and the paved surfaces will be restored to a condition equal to that existing before construction began.
2. Except as otherwise provided herein, materials & methods of operations required to install new and replacement pavement shall be in accordance with the applicable requirements of the Florida Department of Transportation, Standard Specifications for Road & Bridge Construction, Current Edition.
3. No paving work shall be accomplished until all heavy construction equipment is permanently removed from the site.
4. Where construction work requires removal of the brick pavement, it shall be replaced with asphalt pavement as shown on the drawings and as specified hereinafter.

III. TRENCH SURFACE:

1. The surface of backfilled trenches when dry shall be finished without needless delay. The surface of trenches in unpaved roadways and unpaved sidewalk areas shall conform to the adjacent surfaces and shall be in every respect be equal in quality, character, materials, and workmanship to the surface existing immediately previous to making the excavation. The surface of backfilled trenches in paved areas shall be finished with Type S-I or Type II Asphaltic Concrete, or 3000 PSI Portland Cement Concrete as specified hereinafter.
2. All surfaces which have been injured by the Contractor's operations shall be restored to a condition at least equal to that in which they were found immediately before the work was begun. Suitable materials and methods shall be used in such restoration.
3. The Contractor shall be responsible for controlling the widths of excavation for installing underground pipelines and appurtenant work. Unauthorized removal of pavement, curbs, etc., will not be included for payment under the Contract but shall be replaced in accordance with these specifications at no expense to the Owner.
4. Trench repairs shall be made in accordance with FDOT Standard Plans Index 125-001.

IV. REMOVAL OF PAVEMENT, WALKS & DRIVEWAYS:

1. Bituminous Pavement shall be removed to clean continuous straight lines by saw cutting. Where bituminous pavement adjoins a trench, the edges adjacent to the trench shall be trimmed to neat straight lines before pavement repair to ensure that all areas to be repaired are accessible to rollers used to compact the subgrade or paving materials.

V. PAVEMENT SUBGRAPHS:

1. STABILIZATION:

Roadbed stabilization, when authorized by the Engineer in writing or shown on the Contract Plan/Profile Drawing, shall extend to a depth of twelve (12) inches below the bottom of the base. All stabilized areas shall have a minimum lime rock bearing ratio (LBR) of 30. All materials, equipment and workmanship shall be in accordance with Section 160 of the Florida Department of Transportation Standard Specifications for Road & Bridge Construction, Current Edition, except that paragraph 160-12 and 160-13 shall be omitted. Type B stabilization, as specified in paragraphs 160-6 of the D.O.T. Specifications, shall be used.

2. BASE COURSE:

The base course for the paved areas shall be lime rock constructed to the thickness shown on the drawings for the case involved. All materials, equipment and workmanship shall be in accordance with the Section 200 of the Florida Department of Transportation, Standard Specifications, Current Edition, except that paragraph 200-12 and 200-13 shall be omitted.

VI. ASPHALT PAVEMENT:

Provide asphalt pavement where indicated on the drawings, or where new work has required removal of existing asphalt pavement.

1. PRIME COAT:

A prime coat consisting of a bituminous material hereinafter specified shall be applied at the rate of fifteen hundredths (0.15) gallons per square yard to the previously prepared base course. All materials, equipment and workmanship shall be in accordance with Section 300 of the Florida Department of Transportation Standard Specifications, Current Edition, except that paragraph 300-8 and 300-9 shall be omitted.

2. ASPHALTIC CONCRETE SURFACE COURSE:

The paving shall have a wearing surface of either Type SP-12.5 or SP-9.5 Asphaltic Concrete with a thickness of two (2) inches or equal to the thickness of the existing surface course, whichever is greater. All equipment, materials, workmanship, and methods employed in construction of the wearing surface shall be in accordance with Section 320, 330, 331, and 332 of the aforementioned Florida Department of Transportation Standard Specifications, Current Edition, except that paragraph 331-6 and 332-5 shall be omitted.

3. ORDER OF WORK:

Work shall be accomplished in the following order:

- a) Stabilizing and compacting of sub-base, when required.
- b) Lime rock Base Course
- c) Prime coat.

d) Asphaltic concrete surface course.

VII. TESTS:

1. Where reference is made to the Florida Department of Transportation Standard Specifications for design mixes, tests of materials, or work performed, or where in the opinion of the Engineer, tests are required to ascertain compliance with the Specifications, the Contractor will have such tests made by an independent testing laboratory. All testing expenses shall be borne by the Contractor as specified in the section of the specifications entitled, General Conditions.

32 16 00 – Curbs, Gutters, Sidewalks & Driveways (Concrete)

General Standards for Replacement or installation of Concrete Pavement, Sidewalks and Driveways

I. GENERAL:

1. Work under this section includes the furnishing of all labor, material and equipment required to provide replacement pavement, curb & gutter, walkways, and driveways as required for the work as specified hereinafter. Where construction requires removing pavement or where existing paving is damaged by the Contractor's operation, it is the intent of these specifications that due care be exercised in cutting pavement, backfilling trenches, and replacing pavement so that where no further settlement of trenches will occur and the paved surfaces will be restored to a condition minimum to six inches or greater to equal to that existing before construction began.
2. Except as otherwise provided herein, materials & methods of operations required to install new and replacement pavement shall be in accordance with the applicable requirements of the Florida Department of Transportation, Standard Specifications for Road & Bridge Construction, Current Edition.
3. No paving work shall be accomplished until all heavy construction equipment is permanently removed from the site.
4. Where construction work requires removal of the brick pavement, it can be replaced with either concrete or asphalt pavement as shown on the drawings and as specified hereinafter.

II. TRENCH SURFACE:

1. The surface of backfilled trenches when dry shall be finished without needless delay. The surface of trenches in unpaved roadways and unpaved sidewalk areas shall conform to the adjacent surfaces and shall be in every respect be equal in quality, character, materials, and workmanship to the surface existing immediately previous to making the excavation. The surface of backfilled trenches in paved areas shall be finished with Type SP-12.5 or SP-9.5 Asphaltic Concrete, or Portland Cement Concrete as specified hereinafter.
2. All surfaces which have been injured by the Contractor's operations shall be restored to a condition at least equal to that in which they were found immediately before the work was begun. Suitable materials and methods shall be used in such restoration.

3. The Contractor shall be responsible for controlling the widths of excavation for installing underground pipelines and appurtenant work. Unauthorized removal of pavement, curbs, etc., will not be included for payment under the Contract but shall be replaced in accordance with these specifications at no expense to the Owner.
4. Trench repairs shall be made in accordance with FDOT Standard Plans Index 125-001.

III. REMOVAL OF CONCRETE PAVEMENT, WALKS & DRIVEWAYS:

1. Concrete Pavement shall be removed to clean continuous straight lines by saw cutting. Where concrete pavement adjoins a trench, the edges adjacent to the trench shall be trimmed to neat straight lines before pavement repair to ensure that all areas to be repaired are accessible compact the subgrade or paving materials.
2. Concrete Pavement shall be removed to neatly sawed edges. Saw cuts shall be made to a minimum depth of one and one-half (4) inches. If a saw cut in concrete pavement falls within three (3) feet (10 feet for state & federal highways) of a construction joint, expansion joint or edge, the concrete shall be removed to the joint or edge. The edges of existing concrete pavement adjacent to trenches, where damaged subsequent to saw cutting or the pavement, shall again be saw cut to neat straight lines for the purpose of removing the damaged pavement areas. Such saw cuts shall be parallel to the original saw cuts or shall be cut on an angle which departs from the original saw cut not more than one (1) inch in each six (6) inches.
3. Concrete Curb, Walkways, Gutters & Driveways shall be removed to neatly sawed edges with saw cuts to a minimum depth of one and one-half (1-1/2) inches. Concrete sidewalk or driveway to be removed shall be neatly sawed in straight lines parallel to the curb or at right angles to the alignment of the sidewalk. No section to be replaced shall be smaller than thirty (30) inches in either length or width. If saw cut in walkway or driveway would fall within 30 inches of a construction joint, expansion joint, or edge, the concrete shall be removed to the joint or edge except where the saw cut would fall with twelve (12) inches of a score mark, the saw cut shall be made in an along the score mark. Where a paved concrete driveway return apron is cut, the complete return apron shall be replaced from the street roadway back to the approved cut furthest from the roadway beyond the tangent point of the return radius. The finished return radius shall be at least as large as that on the original driveway apron. Curb & gutter shall be sawed to a depth of one and one-half (1-1/2) inches on a neat line at right angles to the curb face.

IV. CONCRETE PAVEMENT:

1. Provide replacement concrete pavement in roadways where shown on the drawings and as required where new work necessitates cutting existing concrete pavement. Concrete pavement shall conform to the requirements of Section 350 of the Florida Department of Transportation Standard Specifications, Current Edition, with specific applicability of the requirements of paragraph 350-312 for paving of small or narrow areas, except that paragraphs 350-20 and 350-21 shall be omitted.
2. Concrete pavement for driveways shall be six (6) inches 3000 PSI concrete.
3. Contraction, expansion and construction joints shall be formed and installed in conformance with Florida Department of Transportation Standard Specifications for Road and Bridge Construction, Current Edition, Section 350.12.

4. Newly placed concrete pavement sections shall be properly barricaded and lighted by the Contractor to exclude traffic during the curing period.

V. CURB AND GUTTER:

1. Existing curbs and curb & gutter sections shall be cut out as necessary to permit construction of the work as authorized by the Engineer.
2. Replacement curbs or curb & gutter shall be constructed of cast-in-place 3,000 PSI concrete, as specified under Section 130, Portland Cement Concrete and shall conform to the existing type of construction unless directed otherwise. If the limits of the area to be repaired fall within thirty (30) inches of the nearest joint, replacement shall be made to such joint.
3. Where Florida Department of Transportation Standard Curb & Gutter has been removed, such shall be replaced with similar construction in accordance with Florida Department of Transportation Standard Specifications, Current Edition.
4. All curbs & gutters outside the limit of construction which are willfully or negligently destroyed, broken or otherwise defaced shall be removed, disposed of and replaced in accordance with these specifications at no additional cost to the Owner.

VI. REPLACEMENT WALKWAYS & DRIVEWAYS:

1. Where damaged or required to be cut by the Contractor's operations, walkways & driveways shall be repaired to conform to the existing type of construction. Walkways & driveways other than concrete shall be restored by approved methods and materials, equal to or better than original condition.
2. For the restoration of concrete walkways & driveways, the existing adjacent concrete shall be cut back with a masonry saw or removed to the nearest dummy expansion joint, to remove undermined concrete and provide square edges, per paragraph III.3, this Section.
3. The area over which the concrete is to be placed shall be filled to the proper grading and width. The bed shall be thoroughly compacted by approved mechanical compaction equipment to 100 percent of maximum density as determined by the Laboratory Standard Compaction Test (ASTM Designation D698-70). In all cases where fill is required to bring the subgrade to the required elevation, the filling shall be made in layers not to exceed six (6) inches in depth before tamping and each layer shall be thoroughly compacted. Filling shall be at +/- two (2) percent of optimum moisture content at the time of compaction. A tolerance of minus two (2) percent (-2%) will be allowed in the compaction effort.
4. An approved type of expansion joint shall be inserted across walkways at intervals not exceeding eighteen (18) feet with dummy groove joints at six (6) foot intervals. Where walkways & driveways must be replaced where they intersect, expansion joints shall be provided on all four (4) sides of the repair.
5. The thickness of concrete walkways & driveways shall be equal to or greater than existing, but not less than four (4) inches for walkways and six (6) inches for driveways. Concrete walkways & driveways shall be monolithic construction and shall be 3,000 PSI Concrete as specified under Section 130, Portland Cement Concrete.
6. When the subgrade has been prepared it shall be moistened sufficiently to prevent rapid leaching of water from the concrete and the concrete spread on the moist subgrade for

the full width and depth. No wire mesh shall be used in drives or walkways. It shall be brought to the required grade and thoroughly compacted and finished by floating and troweling until the surface is dense and smooth, true to grade, free from lumps and depressions, and then given a broom finish.

7. Where walks are poured against walls or structures, approved type expansion joints shall be installed between the walks and the wall or structure.
8. All surfaces which have been injured by the Contractor's operations shall be restored to a condition at least equal to that in which they were found immediately before the work was begun. Suitable materials and methods shall be used in such restoration.

32 17 23 – Pavement Markings: EV Paint Striping

Requested Standardization:

With the increased amount of EV vehicles being used within JEA, a standard for EV paint striping is needed to ensure all service centers and facilities are similar to ensure the ease of locating the chargers for the end user. Sherwin-Williams' HOTLINE® TM2320 Fast Dry Waterborne Traffic Marking Paint, White (Long-Line) is tinted to Electric Lime Green color to give the bright color selection. The below stencil is painted with the Electric Lime Green color after painting a white box with glass reflective beads painted on surface.



Justification for Standardization:

- The item requested is only available from one source.
- The item is used in large numbers throughout the JEA system.
- The item requested will provide documented long reliable service life at a lower life-cycle cost.

Attach calculations/justification or other documentation for all items checked.

Sherwin-Williams is a currently the paint striping specification that is being facilitated at all striping projects. The traffic rated paint has been chosen from the Sherwin-Williams line to ensure long

lasting durability at high traffic areas. Sherwin-Williams products are readily available in the service territory, and multiple subcontractors are available to complete the stripping installations. Areas are designated for JEA vehicles or JEA EV paying employees.

32 90 00 – Lift Station Landscaping

Savannah Holly (East Palatka) trees

Indian Hawthorne & Shilling shrub

Argentine Bahia grass (St. Augustine as alternative)

DIVISION 33 – UTILITIES**33 01 50 – Diesel Engine Fuel Treatment (Est. Sept. 2016, Revised)**

Requested Standardization: Standby Emergency Generator Fuel Tank Treatment.

a. HydroClean - HI Tech Treatment and Conditioner for Diesel Fuel

- i. All-Season Treatment to Improve Fuel Efficiency, Increase Power, Reduce Emissions, Reduce Engine Wear, Stabilize Fuel, and Eliminate the Harmful Effects of both dissolved and free Water in Hydrocarbon Fuels.

Justification for Standardization:

1. Facilities / Facilities support water and wastewater operations by maintaining and replacing the existing emergency diesel engine driven generators. The above standard is the collection of previous water and sewer standards, Facilities specifications, and industry standards for portable generators.
2. The above guidelines are to provide a general rationale for the Standardization process but in no way shall they be interpreted as limiting either its provisions or applications. Each individual committee holds the ultimate authority in determining justification for each item standardization.

DIVISION 34 – TRANSPORTATION**34 71 13 – Bollard Vehicle Barrier**

Pipe: The pipe shall be a nominal 6" diameter and schedule 40 made of black iron. The pipe shall be filled with concrete.

Hole: Drill or dig an 18" diameter hole by 3'-3" deep

Concrete: Provide 2,500 psi concrete to fill the foundation for the pole and to fill the pole. The concrete shall be vibrated or rodded to remove any voids.

Sleeve: Provide a nominal 6" x 48" Buchman or approved equal sleeve cover. Secure the cover at the base of the pipe with a 1/4" or larger stainless steel hexagonal bolt.

Color: Provide a safety yellow sleeve

Mounting Height: Install the pipe in the foundation sufficiently to have 4 feet of the bollard exposed above the ground level and 3 foot of the pipe encased in the foundation.

DIVISION 35 – -WATERWAY AND MARINE CONSTRUCTION-

Place Holder – Intentionally Left Blank

DIVISION 40 – PROCESS INTERCONNECTIONS

Place Holder – Intentionally Left Blank

DIVISION 41 – MATERIAL PROCESS AND HANDLING EQUIPMENT**41 65 16 – Diesel -Engine-Driven Portable Generator Sets** (Revised April 2022)**Equipment Description**

1. Self-contained diesel engine-generator set
 - a. Complete mounted genset package unit consisting of the following for a complete and operating system
 - i. Engine
 - ii. Generator
 - iii. Auxiliary systems
 - iv. Unit control panel
 - v. Sound attenuated aluminum enclosure
 - vi. Stainless Steel Silencer
 - vii. Sub Base UL 142 listed fuel storage tank
 2. Manufacturers:
 - a. Diesel engine-generators shall be the specified model of the latest commercial design with all necessary controls.
 - b. The manufacturing facility shall be ISO 9001 certified
 - c. Engine-generators shall meet all EPA regulations

Size

1. 40 kW to 500 kW

Generator Requirements

1. Rating
 - a. Each engine-generator set shall be capable of producing rated output at rated generator RPM when equipped with necessary operating accessories such as air cleaners, lubricating oil pump, fuel transfer pump, radiator fan, jacket water pump, governor, alternating current generator and exciter.
 - b. Standby duty rated at (40 to 500) EKW, KVA,
 - c. Generator shall be brushless type, rated at .8PF, three phase, 60 Hertz, 480 volt, or 240 Volt (if required), delta connected, 4 wire, 1800 RPM.
 - i. 0.8 lagging power factor.
 - ii. Delta 240v connected
 - iii. 4 wire
 - iv. Voltage Selector Switch: 480 v, 240 v, 208 v and 120 v services.
 - v. Engine-generators shall have reconnectable leads to enable JEA tie into external equipment being supplied with emergency power.
 - d. Operating ambient temperature range of 7 OF to 105 OF
 - e. Directly connected to the engine flywheel housing with flex coupling.
 - f. Unit shall be in compliant to UL 2200 labeled.
 - g. Unit shall be in compliant to NFPA 110.
 - h. Generator shall be engine driven, single bearing, continuous duty, salient pole, and synchronous type with amortisseur windings. It shall be of the drip-proof type, entirely

self-contained with only line leads brought out for loading connections. Generator insulation used shall be NEMA Class H such that generator life will match that of the prime mover. Generator shall be designed so all components are accessible with a minimum amount of labor. Generator shall be engine driven, single bearing, continuous duty, salient pole, and synchronous type with amortisseur windings. It shall be of the drip-proof type, entirely self-contained with only line leads brought out for loading connections. Generator insulation used shall be NEMA Class H such that generator life will match that of the prime mover. Generator shall be designed so all components are accessible with a minimum amount of labor. The maximum voltage dip (including any instantaneous voltage dip) during starting shall be 20%.

- i. A vacuum pressure impregnation (VPI) process shall be utilized on form wound stator windings.
 - j. The Supplier shall provide a stator coil pitch, coil distribution, and skew to minimize the total harmonic distortion (THD) to less than 5 percent.
 - k. Stator winding shall be 2/3 pitch (67 percent).
 - l. An automatic voltage regulator with 3-phase sensing shall be provided. The regulator shall have over excitation protection. A static voltage adjuster shall be provided to use with automatic synchronizer.
 - i. Voltage regulator shall be modular construction, replaceable as an assembly and shall provide regulation for single unit operation within plus or minus 2 percent from rated voltage at any steady state load between "no load" and "full load."
 - m. Generator shall have static excitation systems, which shall incorporate silicon control rectifiers to provide alternator field excitation. Static excitation system shall have capacity to provide 150 percent of required excitation at rated load and rated voltage. Static excitation system shall incorporate circuitry to permit voltage build-up from residual magnetism. Field flashing from a separate source is not acceptable.
 - n. Voltage level and voltage gain control shall be provided and easily accessible for normal operating adjustments. Voltage level control shall have a minimum range of plus or minus 5 percent from rated voltage. Provide voltage adjustment instruction and generator schematic wiring diagram permanently attached on inside of exciter assembly.
 - o. Certain applications may require the use of a permanent magnet generator. The generator supplier shall be responsible for recommending this type of alternator where circumstances warrant its use.
 - p. Generator drive shall be free from critical torsional vibration within the operating speed range.
 - q. Generator neutral shall be closed.
2. Generator Control Panel
- a. Once unit is started, a contact shall cause power to be fed to a throttle solenoid, which picks up, opening fuel rack and energizing starting motor through one of its contacts. As generator voltage approaches normal, relay coil in the cranking panel shall pick up, opening starting circuit through one of its contacts, thereby disconnecting starting motor from the rest of the circuit. Lack of oil pressure or over-temperature of cooling system will cause second relay in cranking panel to be energized, as normal alternator voltage is approached, causing starting cycle to be terminated immediately. Should engine fail to start for any reason, a time delay relay in cranking panel limits its cranking period to 30 seconds. A push-button switch mounted on cranking panel shall allow engine to be further

cranked at the operator's discretion. Resumption of normal power shall open engine contacts in transfer switch and shall cause engine to shut down after 5-minute delay. Each engine-generator shall have a digital type of generator-mounted control panel and shall be supplied with vibration isolators of the type suitable to isolate the control panel from the engine-generator vibration.

- b. All sensors will have digital signals to Control Panel to included fuel level, coolant temp, coolant level, battery voltage and oil pressure. Control panel shall be DSE or JEA approved nonproprietary panel.
- c. The control system features shall include the following:
 - vi. Automatic generator loading and unloading for open load transfer.
 - vii. Automatic synchronizing – The automatic synchronizing scheme shall be designed to select and synchronize the engine-generator unit across each switch.
 - viii. Dead bus closing system
 - ix. VAR/PF control
 - x. Engine Speed Control
 - xi. Isochronous or droop mode
 - xii. Automatic/Manual Start-Stop with the following safety shutdowns
 - 1. Over-speed protection and indicator
 - 2. Low lube oil pressure protection and indicator
 - 3. High coolant temperature protection and indicator
 - 4. Over-crank protection and indicator
 - 5. Low coolant level protection
 - 6. Engine Control Switch (Three-Position: Stop - Manual - Auto)
 - 7. Indicator/ Display Test Switch
 - 8. Digital Voltage Adjust Required (plus 10 percent - 25 percent Range)
 - xiii. AC METERING
 - 9. AC Volt Meter
 - 10. AC Amp Meter
 - 11. Frequency Meter:
 - 12. Ammeter/Voltmeter Phase Selector Switch Four Position (Phase 1,2,3, and off)
- a. Two normally open dry contacts that will close when the engine is running and open when engine is stopped.
- b. Generator breaker shall be 600 volt, with amperage sized to match generator max output and shall include a 3 pole generator circuit breaker with shunt trip. Shunt trip shall be actuated by any of the engine safety devices.
- c. Emergency stop push button to shut the engine down regardless of the switch position.
- d. Fuel pressure monitored by ECU/ control panel.
- e. Tachometer.

- f. Dry contacts rated 120 volts, AC, 5 amps shall be provided for annunciation of all safety shutdowns, and all control panels mounted visual indicators. Safety shutdowns and control panel visual indicators shall include all items required by NFPA 110 Level 1. Dry contacts shall close on safety shutdown or when visual indicators are illuminated and open when the condition is cleared. All items shall be included on the control panel, assembled, wired, and tested in the supplier's shop.
- g. The control panel shall have adequate clearance from the engine to permit engine maintenance without moving the control panel.
- h. Generators must be equipped and support the ability for 3rd party Telematics/AVL/GPS to connect to open and standard ports/protocols to gather information about the health of the generator. The generator must have standard physical connectors with either J1939, J1708, OBDII or DB9 serial out. The generator must also have standard communication protocol in either J1939 or RS232. RS485 or ModBus last option if the manufacture is willing to work with the 3rd Party AVL vendor on these protocols and cabling for the AVL to gather information on the generator. A nonproprietary control panel with expansion models such as Basler DGC-220, DSE 7310 or other JEA approved unit.

Engine Requirements:

1. Diesel engine design shall be heavy-duty type to meet EPA Regulation.
2. Arranged for direct connection to an alternating current generator and shall be the product of a manufacturer regularly engaged in the building of full diesel engines. Engine shall be a current model which has been in regular production for at least three years. Engine shall develop sufficient brake horsepower, net at rated RPM, corrected to sea level barometric pressure (29.92 in. HG) and 110 degrees F, to operate generator or wear. Diesel engine shall be water-cooled four-cycle compression ignition diesel. The engine exhaust manifold shall have an expanded metal guard spread sufficiently away from hot parts
3. Engine shall meet the required capacity when operating on ultra-low-sulfur no. 2 diesel fuel
4. Engine shall be supplied with electronic governor capable of .25 percent speed regulation from no load to full rated load for isochronous regulation of engine speed. Belt-driven or velocity governors are not acceptable.
5. Engine shall be equipped with a pressure lubrication system supplying oil to all surfaces requiring lubrication. Circulation shall be by a positive displacement pump. Lubrication system shall include a full flow strainer, oil filter, and an oil cooler of sufficient capacity to properly cool all lubrication oil circulated, and level indicator or dipstick.
6. Engine shall have an individual mechanical injection pump and injection valve for each cylinder, any one of which may be removed and replaced from parts stock. Injection pumps and injection valves shall not require adjustment in service. Fuel injection pumps shall be positive action, constant-stroke pumps, actuated by a cam driven by gears from the engine crankshaft.
7. Fuel lines between injection pump and valves shall be heavy seamless tubing; and, to eliminate irregularity of fuel injections, shall be of the same length for all cylinders.

8. Fuel system shall be equipped with replaceable fuel filter elements which may be easily removed without breaking any fuel line connections or disturbing the fuel pumps or any other part of the engine. Provide easily serviceable bypass fuel/water separator/filter ahead of other fuel filters with a clear bowl.
9. All fuel filters shall be conveniently located in accessible housing, ahead of injection pumps so that fuel will have been thoroughly filtered before it reaches the pumps. No screens or filters requiring cleaning or replacement shall be used in injection pump or injection valve assemblies.
10. Engine shall be equipped with a built-in gear-type engine-driven fuel transfer pump, capable of lifting fuel against a head of twelve feet, for supplying fuel through filters to injection pump at constant pressure.
11. Engine shall be provided with suitable safety controls to automatically stop the unit when low oil pressure, water temperature or engine speed exceeds safe limits. Pilot lights shall be provided to visually indicate the cause of engine shut down. Pilot lights shall operate off battery circuit and shall be on engine generator control panel. Provide contacts for remote engine failure annunciation.
12. Engine shall be equipped with radiator and blower fan of sufficient capacity for cooling engine when diesel electric set is delivering full rated load in an ambient temperature of 122 degrees F. Air flow restriction from radiator shall not exceed 0.5 inches H₂O. Engine shall have a thermostat internal with jacket water circuit to maintain water at proper operating temperature. Engine shall have a belt driven centrifugal type water circulating pump for circulating water through cooling system.
13. Provide one or more engine mounted dry type air cleaners of sufficient capacity to protect working parts of the engine from dust and grit.
14. Engine shall be equipped with an oil/ vapor recovery container or box that meets EPA regulations. The intent of the recovery system is to not allow the blow by waste to escape into the atmosphere or soak the radiator coils, as well as be a possible housekeeping issue around the engine-generator.
15. Water cooled diesel engine, sized for generator set.
16. All engine exhaust emissions shall meet EPA requirements for standby power generation.
17. The batteries shall be of the lead acid type. The battery shall be sized to provide the specified number of starts, cranking time at firing speed (five 10 second cranks) at any ambient between minimum (7 OF) and maximum (105 OF) design ambient temperatures, with final discharge voltage, exceeding minimum control power supply voltage requirements. Batteries shall be lead acid type complete with cables and rack. Battery shall be rated in accordance with requirements of engine manufacturer. Batteries shall be located for easy removal and servicing.
18. Battery Charger:
 - a. Current limiting battery charger to automatically charge batteries.
 - b. Charger shall be dual charge rate with automatic switching to boost rate when required.
 - c. Charger shall be mounted at rear of engine-generator set inside the enclosure.
 - d. Control wire connection between starting and safety circuits shall be pre-connected before arriving at job site.

- e. The service powered battery charger shall float charge the battery pack and shall be solid-state, full wave bridge rectified type, using silicon-controlled rectifiers for power control. The battery charger shall be suitable for the required voltage, and current, battery pack type, shall have a dc output circuit breaker, floating voltage equalization, equalizing timer, a ground detection system, a voltage relay to activate low battery voltage alarms at the engine-generator control panel, and battery charger failure which shall alarm at the engine-generator control panel.
 - f. Solar panel system shall be roof mounted to allow trickle charge of batteries while unit not in use.
1. Cooling System:
- a. Engine shall be cooled with a unit-mounted radiator cooling system complete with:
 - i. radiator
 - ii. expansion tank
 - iii. water pump
 - iv. belt-driven fan
 - v. fan guard
 - vi. thermostatic temperature control
 - vii. high water temperature cutout
 - viii. electric jacket water heater
 - b. The jacket water heater shall be sized for Northeast Florida climate and shall maintain jacket water at 90 F in an ambient temperature of 30 degrees F.
 - c. The jacket water heater shall be thermostatically controlled, if "acorn" type heaters with nonadjustable thermostats are provided then they shall not be oversized to waste energy or burn up hoses and shall be single phase, 60 Hertz, and applicable voltage.
 - d. All jacket water heaters hoses shall be silicone type.
 - e. All jacket water heaters hoses shall have shut off valves at engine, supply and return as to allow maintenance personnel to swap out hoses without draining all the fluids.
 - f. The radiator shall be sized to handle the cooling of the engine and all other accessories required for proper operation in the North Florida Region.
 - g. The fan shall draw air over the engine and discharge through the radiator.
 - h. The radiator coils shall be 100% dipped in Bronze-Glow (husky coil coat) to provide additional protection on coils for all units due to the corrosive atmosphere at JEA water and wastewater facilities.
 - i. The cooling system shall be filled with a permanent antifreeze mixture of 50 percent ethylene glycol type with rust inhibitor.

Enclosure/ Silencer:

1. Complete diesel engine generator set including control panel, engine starting batteries and fuel oil tank shall be enclosed in a factory assembled water protective, sound attenuated aluminum enclosure.
- a. The enclosure for units with nominal capacity of 500 kW shall be of the non-walk in type and shall be attached to the skid rails or sub base fuel tank at the supplier's shop. The enclosure will consist of two sidewalls, two end walls, louvers, and roof.
 - b. The enclosure shall be made of marine grade aluminum white panels. Doors shall be lockable by padlock with stainless steel hardware for access to the engine-generator,

controls, and accessories. Doors shall also provide easy accessibility for maintenance. Supplier will remove all advertising and labels on the exterior of any enclosure. Drop over type enclosures shall have a rubber gasket under it with a rubber cement type adhesive to keep gasket in place to prevent water intrusion into enclosure as well as keep engine fluids from leaking out.

- c. The enclosure shall be constructed of removable side panels and end panels. All fasteners and hardware used in construction of the enclosure shall be 304 or 316 stainless steel. The enclosure shall be braced as necessary to support the silencer and designed to withstand 150-mph wind without damage. All bracing and reinforcing members shall be integral to the enclosure. The unit shall have continuous hinged side doors each side and continuous hinged doors at control end, equipped with pad lockable hardware for ease of engine maintenance and a three-point latch system. Doors shall be a minimum of 36". There shall be an expanded metal grating or a punched louvered radiator core guard installed - flush with the enclosure panels in front for the radiator grill, and fixed, punched louvered air intake ports on the enclosure sides and rear for proper air circulation. A stainless steel handle mounted at the control panel entry door.
- d. Enclosures shall be provided with noise suppression insulation and air plenums designed to provide a sound level of mechanical noise of 86 dB (A) at 15 feet from any point of the enclosure. Provisions shall be made for mounting batteries, battery box and rack inside the enclosure. The generator breaker, generator control panel, distribution (lights, jacket water heater, etc.) power breaker panel, batteries and accessories shall be located in the enclosure.
- e. All engine oil and coolant drains shall be piped to outside of enclosure with shutoff valves and shall have threaded stainless steel or aluminum caps. The threaded drain lines shall be labeled on the outside of the enclosure with an aluminum label with aluminum or stainless rivets.
- f. Interior drainage for water removal. Drain port to outside of enclosure with SS Cap.
- g. Power Supply:
 - i. Each engine-generator shall be provided with a power panel sized to power the required loads inside the enclosure by the Supplier as specified herein. The engine starting and controls will operate from the dc-powered batteries specified herein.
 - ii. Each engine-generator unit shall have a 120V ac, single phase, 60 Hz, breakers. The Supplier shall determine the number of branch circuit breakers required, and furnish additional of 10% spares. Circuits must be labeled by breaker. The power panel shall be prewired to all engine-generator accessories, including but not limited to the following:
 - 1. Enclosure intake and exhaust louvers.
 - 2. Engine-generator starting system (battery charger).
 - 3. Engine electric jacket water heater.
 - 4. Enclosure lights and receptacles (If applicable).
- h. Each engine-generator unit shall be furnished with complete exhaust system including a stainless steel exhaust silencer, all-stainless steel piping, all-stainless expansion joints and accessories as required for a complete operating system.

- i. The exhaust silencer shall be chamber type, of all-welded Type 304L stainless steel construction with all stainless steel hardware and fasteners.
 - i. The silencer shall be of the side inlet type
 - ii. Secured in position at no less than 4 points
 - iii. The silencer shall be supported by a welded 304 or 316 stainless angle iron cradle.
- j. The silencer shall be sized so that the backpressure at rated capacity of the engine does not exceed one half the supplier's maximum allowable backpressure. The silencer shall be suitable for critical type silencing and shall be a Maxim "Model M51" or equal.
- k. All exhaust piping shall be Type 304L, Schedule 10S stainless steel, and the exhaust shall discharge horizontally at the silencer outlet, with stainless steel rain cap.
- l. The intake of the silencer shall connect to the flexible exhaust connection by stainless steel pipe. Size as required by engine manufacturer. A flexible stainless steel exhaust adapter, 18-inch minimum length, shall be furnished for mounting between the engine and silencer. The flexible exhaust connection as specified shall mount directly on exhaust manifold and shall be mounted so that no weight is exerted on the manifold at any time.

Fuel System / Tank:

1. Each engine-generator unit shall be furnished with a complete fuel system, including engine-driven fuel pump, fuel filter/ water separator, engine supply and return line, all stainless-steel flexible connections. All items shall be suitable for the specified fuel. The engine-driven fuel pump shall transfer the fuel from the fuel storage tank to the engine-generator. The fuel system shall be furnished with any equipment required for the engine to supply or return any unused portion of fuel back to the fuel storage tank with any level in the tank.
2. Filter/ water separator shall be provided on the fuel supply line. The shutoff valve and the filter/ water separator shall be located upstream from the flexible connection at the engine-generator.
3. There shall be no shutoff valves on any fuel return line.
4. Fuel system shall be equipped with replaceable fuel filter elements, which may be easily removed without breaking any fuel line connections or disturbing the fuel pumps or any other part of the engine.
5. All fuel filters shall be conveniently located, ahead of injection pumps so that fuel will have been thoroughly filtered before it reaches the pumps. No screens or filters requiring cleaning or replacement shall be used in injection pump or injection valve assemblies. The combination fuel filter/separator with bypass shall be a manifold unit with shutoff valves and shall be installed on the fuel supply line between the fuel storage tank and the engine driven pump, and shall as manufactured by RACOR or approved equal.
6. Fuel oil cooler shall be supplied if the engine fuel system absorbs heat from the unit injectors and surrounding jacket water. The fuel cooler shall be radiator mounted, air-cooled to cool the return fuel as required to maintain proper fuel operating temperature. The cooler shall utilize the airflow from the radiator fan for cooling. Any coils shall be 100% dipped in Bronze Glow (husky coil coat) to protect against corrosion.
7. Storage tanks shall be insulated secondary containment storage tank system for flammable and combustible liquids shall be vehicle impact protected and projectile resistant and must meet UL 142 standards. Tank shall be a steel tank housed in a double containment vault/tank.
 - a. The tank shall be tested to and listed (and carry UL/ULC labels) for the following:

- b. Steel Tank Construction:
 - i. Steel tank shall be made with 3/16-inch-thick steel. The steel tank shall hold the liquid fuel. The tank shall be made in accordance with UL Standard 142 and ULC Standard S601 covering all aspects of tank fabrication including material specification, fabrication, welding, and testing. The steel tank's exterior shall be coated with primer and paint for protection against corrosion.
 - ii. At the fabrication shop, the tank shall undergo a 24-hour pressure test at 5 psig.
 - iii. Secondary Containment:
 - 1. The steel tank shall be wrapped with a minimum of ¼ inch thick Styrofoam (foam) insulation and an impervious barrier of 30 MIL high density polyethylene membrane (poly). The 30 MIL poly shall provide containment for a fuel leak through the steel tank. A leak detector pipe terminating in the secondary containment shall provide positive proof that the tank is not leaking.
 - 2. The 30 MIL poly shall shield and protect the steel tank exterior from coming in direct contact with the concrete and thus minimize the potential of tank external corrosion.
 - iv. All double wall sub-base tank coatings must have primer PPG Amerlock 400/2 Multipurpose primer 6 -8 mils DFT, Topcoat must have one coat PPG DuraThane #95-3300 Series Aliphatic Urethane Mastic Finish 3 – 4 mils DFT as per manufacturer's instructions.
 - c. The double wall sub-base tank shall have a sloped top if exposed to weather conditions as to allow rainwater to run off.
8. Engine-generators shall be furnished with a complete fuel system including double wall sub-base type fuel storage tank unless stated otherwise. The tank shall be UL 142 listed, vented, and shall normally be used to store the specified petroleum product at atmospheric pressure.
9. Rupture basin
10. The sub-base fuel storage tank shall have a minimum capacity to provide 36 hours continuous operation of the engine-generator at 100 percent load. The sub-base tank shall be of welded steel construction throughout.
- a. 36-hour capacity at 100% at full load.
11. The fuel storage tank shall be provided with the following items:
- a. Vent cap
 - b. Primary Vent
 - c. Emergency vents
 - d. Krueger fuel gauge
 - e. Manual fuel stick with gallons to inch laminated conversion chart
12. The fuel storage tank shall be provided with the following connections:
- a. Fuel supply
 - b. Fuel return
 - c. Fill Aluminum or 304 SS Camlock cap and 2 GL minimum overspill containment box
 - d. Kruger fuel level gauge
 - e. Vent

- f. Primary tank emergency vent
 - g. Low level switch
 - h. Leak detection
 - i. Secondary tank emergency vent
13. The fuel storage tank shall have controls that include but not limited to the following:
 - a. Level gauge, capable of measuring the fuel level without the engine running.
 - b. Kruger style gauge is preferred unless digital gauge provided.
 14. Tank fill connection and level gauge shall be accessible for personnel at ground level through a lockable door in or outside the enclosure. A fill spill containment box shall be sized for 2 gallons and provided for containment of spillage during tank fill.
 - a. 2" fill neck required inside unit or accessible from outside via fill neck.
 - b. Internal fill shall have aluminum of 304 SS or Aluminum fitting on fill neck with camlock cap.
 15. A suitable sized vent connection and vent cover shall be provided for the storage tank vent. The vent cover shall be installed inside the enclosure. The cover shall have an aluminum body, screen over the outlet, and shall prevent rain from entering the vent line.
 16. A suitable sized emergency vent connection and emergency vent shall be provided for the primary and secondary fuel storage tank. Each emergency vent shall be installed inside the enclosure and shall be designed as required to relieve excessive internal pressure caused by fire exposure.
 17. Primary vent shall not block engine exhaust pipe.
 18. All flexible diesel fuel piping inside enclosure or at engine-generator shall meet SAE 100R17 hose with stainless connections to prevent against rupture, corrosion and fire. All threaded connections shall utilize Hercules Chemical Company Inc. Multipurpose heavy Teflon "Tape Dope" and "Megaloc and or Real-tuff".

Shop Painting:

1. All components of each engine-generator unit, including engine, fuel storage tank (if applicable), alternator, piping, and valves shall be shop primed and finish painted prior to shipment to the site. The paint shall be suitable to an outdoor environment and shall be approved by JEA. Stainless steel, nonferrous, and nonmetallic surfaces shall not be painted.
 - a. One pint of finish paint and brush shall be provided with each equipment package for field touchup painting.
 - b. Fuel storage tank with ferrous metal (base tanks) shall be surface prepared to protect all surfaces from corrosive environment at JEA facilities. Metal shall be solvent cleaned on all surfaces to be coated utilizing approved system by JEA Facilities Operations. The entire pipefittings and nipples on the tank shall be powder-coated to protect them from corrosion. Coating will not be required when 304 or 316 stainless steel penetrations are used.

Shop Testing:

1. The drive and generator shall be completely factory assembled and tested by the Supplier to prove that they are assembled correctly, and capable of meeting the net generator output kVA rating. All other components and support systems shall be thoroughly inspected by the Supplier prior to shipment. All control system shall be tested to verify correctness of assembly and operation, applicable high potential test before and after load runs, and applicable standard tests. The integrity and proper connection of all electrical circuits shall be verified.

2. The tests shall consist of specified capacity loading changes (25 percent, 50 percent, 75 percent and 100 percent of primary duty kW) under a .8 power factor reactive testing to be performed at the factory for a minimum of 4 continuous hours total, and demonstrate that each safety shutdown device is working properly. The Supplier shall submit copies of the onsite tests prior to start of warranty. Shop tests shall be performed in northeast Florida at manufacturer's facility.
3. The Supplier shall notify JEA at least one week prior to the shop test. JEA reserves the right to witness the shop test.
4. If such tests indicate specified performance has not been met, the Supplier shall pay the cost of all corrective measures and additional tests until such time as tests demonstrate that specified performance has been met.

Operating Conditions:

1. Each engine-generator unit will be used as a power unit when the utility-supplied power fails and shall provide the specified minimum nominal standby capacity for the duration of 72 hours minimum at 75% load.
2. The unit shall be capable of being started, synchronized to the system and loaded to the full rating of the unit without dependence upon an auxiliary power for a minimum of five minutes. The voltage shall remain +/-10% unless stated otherwise.
3. Each engine-generator unit shall be suitable for "black start" conditions and shall automatically start and connect to electrical loads when interfaced with the automatic transfer switch.
4. Each engine-generator shall be supplied with monitoring the following: generator run, generator fault, generator main breaker trip, normal power available, emergency power available, fuel level, and leak alarm.

Start Up and Testing:

1. Prior to acceptance of the installation, each unit shall be tested at the job site to show it is free of any defects and will start automatically and be subjected to full resistive load test at rated capacity, 1 power factor, with enclosure using dry type load banks. Supplier shall provide startup personnel to train personnel and witness the tests. Testing by Supplier shall be for a period of four continuous hours and shall be done in the presence of the JEA representative.
 - a. The supplier shall furnish the services of one or more technical service representatives to assist in the installation of new engine-generators. The service representatives shall be technically competent; factory trained; experienced in the installation and operation of the equipment; and authorized by the supplier to perform the work stipulated.
 - b. Supplier will start up and service the engine-generators utilizing its own technicians and will not subcontract any start up work out.
 - c. For new engine-generators, the Supplier shall also furnish the field services of direct representatives of the manufacturers of auxiliary equipment which has rotating parts, or which may require field inspection and adjustment to assure proper operation.
 - d. The technical service representatives shall furnish written certification to JEA that equipment has been inspected, adjusted, and passed load bank test by them or under direction and that it is ready for service. All written certifications must be duplicated, and one copy left onsite in the Manual-Pak maintenance folder and the other electronically sent to the JEA Project Manager in Facilities Operation and Maintenance.
 - e. The duties of technical service representatives may include, but may not be limited to the followings:

- i. Providing technical advice to assist a contractor in installing the equipment.
 - ii. Inspection and testing the equipment after installation and directing any changes or adjustments required to assure proper operation. The engine-generator unit shall be field tested by the field service representative(s) for compliance with the specified requirements. The tests shall include but not necessarily limited to the followings:
 1. Ability to start and synchronized to an energized bus.
 2. Ability to start connects to and brings up a dead bus.
 3. Net output at design conditions.
 - iii. Providing technical direction during startup and initial operation of the equipment.
 - iv. Directing the correction of any design or manufacturing errors.
 - v. Instructing JEA's personnel in the operation and maintenance of the equipment.
 - vi. Providing services required as a condition to providing warranties and guarantees specified.
- f. Service Representatives and Technicians required for installation and start-up are included in the initial engine-generator pricing.
- g. Technical Service Representative includes all expenses including, but not limited to, small tools and consumables, travel, meals, per diem, salaries, benefits, overheads, etc.
- h. The load bank will be capable of definite and precise incremental loading and shall not be dependent on the generator control instrumentation to read amperage and voltage of each phase. Rather, the test instrumentation will serve as a check of the generator set meters.
- i. Correct amount and grade of crank case oil, coolant, and other fluids necessary for initial testing and operations shall be supplied with each unit.
- j. On completion of the installation, the initial inspection for correct installation and start-up shall be performed by a factory-trained representative of manufacturer. At the time of start-up, operating instructions and maintenance procedures shall be thoroughly explained to the operating personnel.
- i. In addition to equipment specified, each generator shall be equipped with all standard equipment as specified by the manufacturer for this model and shall include but not be limited to the following necessary items:
 1. Initial filling of oil and antifreeze.
 2. Shrink wrap applied to the product to ensure a clean finish.
 3. During the start-up, the technician shall record the following information and provide to the owner for his records:
 - i. Operating Voltage
 - ii. Hz
 - iii. Phase
 - iv. kW
 - v. KVA
 - vi. Connected load (Amperage)
 - vii. Package information consisting of:

1. Generator & Engine Make
 2. Generator & Engine Model
 3. Generator & Engine Serial Number
 4. Start-up date
- k. Prior to acceptance, any defects, which become evident during this test, shall be corrected by Supplier at no additional expense to JEA.
- l. Vendor must coordinate all start up and testing activities with the engineer and owner. After installation is completed by others and normal power is available, the vendor must perform a one (1) day start-up including the use of building load. The start-up technician will instruct all necessary personnel how to operate and maintain the equipment in accordance to the manufacturer's requirements.
- m. The Supplier's representative shall provide training as required for JEA in the proper operation of the equipment. The supplier shall provide at no additional cost to JEA any and all software and data ports to communicate with engine-generator EMC panels.
- n. The Supplier shall supply one set of cables with 5-foot pigtails to handle max load of unit. Cables and Pigtails shall have camlocks on both ends.
1. MODEL: Current, new production model / year, trailer with Integrated Fuel Tank with 36-hour run time.
 2. CAPACITIES (GVWR & FUEL CAPACITY): GVWR Rated to accommodate All Attachments (Generator & Accessories). Fuel Capacity to accommodate 36 Hours Continuous Generator Run Time at 70% Generator Capacity
 3. DIMENSIONS: Overall width not to exceed 8 Feet 6 Inches. (Measured from outside of left wheel to outside of right wheel)
 4. Axles/Brakes/Tires:
 - a. Axles: Must meet GVWR Capacity with Oil Bath Hubs / Wet Bearings.
 - b. Brakes: Hydraulic Surge Brakes Rated for GVWR (All Axles).
 - c. Tires: sized / rated to accommodate required trailer GVWR / Capacity.

Coupling:

1. Adjustable Lunette Eye / Pintle Hitch (Rated for Trailer GVWR) adjustable from 20 Inch Height to 26 Inch Height to accommodate Medium & Heavy-Duty JEA Trucks.
2. Expanded metal in floor of tongue (3/16 Inch minimum & welded to bottom / inside portion of tongue.
3. Jacks: (Right Rear & Left Rear CORNERS & Tong)
4. Rated for GVWR with spring loaded drop leg with minimum 6" X 6" base.

Lighting / Wiring:

1. All lighting shall be LED and meet FDOT vehicle requirements.
2. All wiring must be loomed & run through weatherproof conduit. (No Scotch Lock Connections)
3. Trailer Plug must be 7 Pin Round (JEA Standard)

Fenders:

1. Minimum 1/8 Inch Steel / Tread plate Fenders
2. Steps & Walking SURFACES must have nonskid paint applied.

REQUIRED EQUIPMENT:

1. Four (4) collapsible 3 Inch D-Rings: Two (2) welded on the outside rear of the trailer (One on right side & one on left side) & Two (2) welded on the outside front of the trailer (One on right side & one on left side). Weld the D-Rings to the structure / frame of the trailer.
2. All doors, lockable compartments & bins must be able to accept padlocks
3. Mechanical Fuel Gauges (Kruger Type)

COLOR / GRAPHICS / MANUFACTURER I.D. PLATE

1. Enclosure shall be painted white fuel tank black.
2. Delete all vendor and manufacturer identification decals.
3. Aluminum DOT Compliant I.D. Plate: Must be permanently attached to Left Side / Outside of Tong of Trailer & include model number, serial number, GVWR, dry / empty weight, tire size & manufacturer's name, address & contact number
4. Permanently stamp model number & serial number inside / right side of the tong frame

Additional Requirements:

1. Include a complete paper copy Specification / Build Sheet including Drawings with all units.
2. Install JEA provided Branding / Decals.
3. Current DOT Inspection / Certification with Decal installed RF Out-Side Tong of Trailer.
4. Must include/document the Vin Number, Make and Model on all invoices.
5. Equipment box located on tongue capable of holding one set of 50' cables required to run unit at full load and padlock compatible.

Purchase / Install CITY License Plates.

NOTE: All Units, Attachments, Products & Services must meet & comply with all applicable regulations and specifications including but not limited to Federal and State Laws, OSHA Regulations, ANSI Standards, DOT Regulations and ASTM Standards. All Units must be delivered to the JEA Fleet Facility with a minimum 1/4 tank of fuel. Contact Mark Murray at 904-328-8501 48 Hours prior to delivery. Delivery times are Monday through Friday 08:00 AM – 03:00 PM at 5717 New Kings Road Jacksonville Florida, 32209

Warranty:

1. Two (2) year standard standby generator warranty and an additional Three (3) year comprehensive (parts and labor) standby generator warranty. Labor, materials, and travel for the warranty period repair will be paid by manufacturer during normal business hours. Comprehensive warranty shall cover the following:
 - a. Cooling System
 - b. Thermostat Housing
 - c. Water Manifold Housing
 - d. Jacket Water Precooler
 - e. Jacket Water Pump
 - f. Thermostat
 - g. Radiator & Fan

- h. Fuel System
- i. Steel Fuel Lines
- j. Fuel Shutoff Solenoid
- k. Fuel Injectors
- l. Fuel Transfer Pump & Housing
- m. Fuel Priming Pump
- n. Fuel Transfer Pump
- o. Lubrication System
- p. Pan, Pump Cooler
- q. Crankcase Breather
- r. Engine Oil Pump Drive
- s. Prelubrication Pump
- t. Electric System
- u. Control Module (ECM)
- v. Sensors: All Engine Sensors
- w. Wiring Harness & Connectors
- x. Starter
- y. Engine Alternator
- z. Alternator End
- aa. Alternator, including Rotor, Stator, and Exciter
- bb. Generator Controls
- cc. Power Center
- dd. Air Induction & Exhaust
- ee. Exhaust Manifolds, Studs & Gaskets
- ff. Inlet Air Heater Relay
- gg. Intake Manifold
- hh. Turbocharger(s)
- ii. Air-to-Air Aftercooler Cores
- jj. Muffler/Exhaust System
- kk. Exhaust Guards
- ll. Diesel Oxidation Catalyst
- mm. Short Block
- nn. Cylinder Block Casting
- oo. Crankshaft
- pp. Connecting Rod Assembly

- qq. Piston, Wrist Pin, Retainer Clip & Piston Rings
- rr. Idler and Timing Gears
- ss. Accessory Drive
- tt. Cylinder Head
- uu. Cylinder Head
- vv. Intake & Exhaust Valves
- ww. Valve Mechanism
- xx. Camshaft, Camshaft Bearings, Key, Gear
- yy. Front & Rear Covers
- zz. Front Cover/Plate/Housing/Gears & Gaskets
- aaa. Vibration Damper
- bbb. Flywheel Housing & Gasket
- ccc. Crankshaft Front & Rear Seal
- ddd. Optional After treatment Coverage
- eee. Diesel Particulate Filter
- fff. Selective Catalytic Reduction
- ggg. Any additional manufacturer components, having a manufacturer's part number, installed by an authorized dealer.
- hhh. 5-year warranty coverage also covers all authorized dealer overtime for warranty repairs and all rental equipment for equipment down longer than 48 hours.

DIVISION 42 – PROCESS HEATING, COOLING, AND DRYING EQUIPMENT

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DIVISION 43 – PROCESS GAS AND LIQUID HANDLING, PURIFICATION, AND STORAGE EQUIPMENT

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DIVISION 44 – POLLUTION AND WASTE CONTROL EQUIPMENT

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DIVISION 45 – INDUSTRIAL-SPECIFIC MANUFACTURING EQUIPMENT

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DIVISION 46 – WATER AND WASTEWATER EQUIPMENT

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DIVISION 48 – ELECTRICAL POWER GENERATION**48 19 16 – Solar Power DC to AC Inverter – Grid Tie (Est. Feb 2020)****Requested Standardization:****The selected products are as follows:**

1. Fronius Primo
2. Models 3.8-1 to 15.0-1
3. Nominal Sizes 3KW to 15KW
4. SMA Sunny Boy
5. Models 3.0 to 10.0
6. Nominal Sizes 3KW to 12.5KW

Efficiency:

1. 96%+

Construction:

1. NEMA 4X enclosure offers ultimate protection from the elements - for indoor or outdoor installation Construction:

Electrical:

1. Operating Photovoltaic Circuit Voltage 100 to 600 Vdc
2. Operating Grid tied Voltage 208 to 480 Vac
3. AFCI protection shuts down the inverter in the event of an arc fault
4. Ground Fault Protection with Isolation Monitor Interrupter
5. DC Disconnect and DC reverse polarity protection
6. Dual MPPT allows for optimum productivity in designs with different roof orientations, shading of one or two strings, or the use of residual modules

Code:

1. NEC 2014 compliant

Listings:

1. UL 1741-2010, UL1998, IEEE 1547-2003, IEEE 1547.1-2003, ANSI/IEEE C62.41, FCC Prt 15 A & B, NEC Article 690, C22. 2 No. 107.1-01 (September 2001), UL1699B Issue 2 -2013, CSA TIL M-07 Issue 1 -2013 A. UL listed for wet locations.

Warranty:

1. 10 years

Harmonics:

1. Less than 2.5%C.

Justification for Standardization:

1. This item is the most cost-effective means to safely maintain the highest level of system availability & reliability. The item requested will provide documented long reliable service life at a lower life-cycle cost. The item requested has better availability and delivery time, which is necessary for the application.
2. In 1999, Black & Veach and JEA (L. Wagner & T. Lovelace) created the 1st inverter standard around the Trace/Xantrax 4048 unit. It served a 48Vdc solar panel bus and it was the basis of the design for 30 of the 36 JEA solar systems. In 2001, the design standard was revised to

use a 550Vdc solar panel bus with a 50000 series Xantrax inverter. The Trace/Xantrax company no longer exists, and the inverters had a high failure rate. These failures led to the gradual conversion from 2009 onward of solar arrays to a 550Vdc bus voltage. During this time frame the Fronius product was selected because of its 10-year warranty as the JEA de facto standard. At the request of J. Scarborough (Fac. Elect.) three additional inverter brands have been evaluated because the current Fronius product support is becoming problematic for service from a factory technician. The Solar Edge product was eliminated because its maximum bus voltage of 480Vdc was less than the bus voltage of most JEA solar panel arrays. The Solectria product was eliminated because only the COJ Fire Station and JIA airport array strings of 12 to 15KW are large enough to use the product.

3. A comparison of the inverters is listed below.

i. **Product Comparison of Solar Inverters**

| Brand | Model | DC Voltage | Power Output | 4 KW Cost |
|--------------|--------------|-------------------|---------------------|------------------|
| Fronius | Primo | 80 to 600Vdc | 3.8KW to 15KW | \$1,449 |
| SMA | Sunny Boy | 100 to 600Vdc | 3.0KW to 30KW | \$1,145 |
| Solar Edge | SE-H-HD | 120 to 480Vdc | 3.0 KW to 11.4KW | \$1,175 |
| Solectria | PVI-TL | 115 lm/W | 14.0KW to 28KW | \$Not Available |