

# FACILITIES STANDARDS MANUAL

January 1, 2020 – 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](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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  - Revised, January 2020

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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**

Curries/ASSA Abloy Fiberglass Reinforced Polyester Door System (FRP) with Aluminum Frame or JEA approved equal

Features:

- FRP skin - 0.12" thick
- Class "C" exterior skin
- Uses Corbin Russwin ML2000 mortise lockset – JEA standard

Hinges – 4.5" butt, continuous and offset pivots

6063-T6 aluminum alloy door perimeter extrusions

Frame – 6063 -T6 hardened aluminum alloy

Options – fire rated and hurricane resistant

Core – water blown polyurethane foam

**08 71 00 – Door Hinges**

ANSI A 156.1 Compliant full mortise type hinges

ANSI A5111 (Stainless steel) For use on heavy weight doors and doors requiring high frequency service.

ANSI A5112 (Stainless steel) For use on medium weight doors and doors requiring medium frequency service.

ANSI A5133 (Stainless steel) For use on medium weight doors or door requiring low frequency service.

US32D Satin finished

Stainless steel fasteners

**08 71 20 – Corbin Russwin Locksets**

*LOCKSET:*

Mortise: Corbin Russwin, ML2000 Series-Heavy duty for medium to light used door

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:*

Mortise: Lustra Lever Design Handle (LWA) for mortise lockset

Satin Stainless Steel US32D (BHMA 630) finish

Cylindrical: Newport lever handle (NZD)

Satin chrome plated (626) finish

**CORE:**

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:**

Patented Corbin Russwin Master Keying System

**NON-KEYED LOCKSET:**

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.

All remodeled buildings and buildings slated for demolition shall have all locksets, cylinders, and keys returned to Facilities.

**08 71 53 – Electrified Locksets****LOCKSET:**

Mortise: Corbin Russwin, ML20606 NAC Series Electrified Mortise Lock with High Security Monitoring, Full model No. ML20606 PSM NAC SEC RO4 630 CL6

Cylindrical: Corbin Russwin, CL33905 Electrified Lockset – Fail Secure, Full Model No. CL33905 PZD 626 M92 SEC CL6

Corbin Russwin, CL33903 Electrified Lockset – Fail Safe, Full RIM Exit Device with Electric Trim:

Corbin Russwin, ED5200S Panic- Listed SecureBolt Exit Device, Full Model No. ED5200S PR9905 M92 630 CL6 M54

RIM Exit Device with Electric Latch Retraction:

Corbin Russwin, ED5200S Panic-Listed SecureBolt Exit Device, Full Model No. ED5200S P955 M95 M94 630 CL6 M54

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

ARMSTRONG – square Lay-in “Cortega” ceiling tile.

Material – Wet-formed mineral fiber

Surface Finish – Factory-applied latex paint

Color – White

Light Reflectance – White – 0.82 (rating per ASTM E1477)

Weight – .69 lbs/SF depending on size of tile

Size - 24”x 24”x 5/8”

NRC – 0.55

CAC – minimum 33

Fire Performance - ASTM E84 and CAN/ULC S102 surface burning characteristics. Flame Spread Index or less. Smoke Developed Index 50 or less (UL labeled)

Anti-Mold/Mildew Bacteria – Standard

Insulation Value - Average R factor is 1.5 BTU units 0.26 (Watt units)

Sag Resistance – Standard

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.

ASTM E1264 Classification – Type III, Form 2, Pattern c D; Fire Class A

**09 51 13 – Acoustical Ceiling Tiles (Moisture Resistant)**

ARMSTRONG - Square lay-in “Ceramaguard Fine Fissured” ceiling tile.

Material – Ceramic and mineral fiber composite

Surface Finish – Scrubbable factory-applied plastic finish

Color – White

Light Reflectance – White – 0.82 (rating per ASTM E1477)

Weight – 1.40 lbs/SF depending on size of tile

Size - 24”x 24”x 5/8”

NRC – 0.55

CAC – minimum 40

Surface Burning Characteristics – Class A (Flame Spread 25 or under) UL Labeled

Fire Resistance Rating – Fire Guard: A fire resistive ceiling when used in applicable UL assemblies

Anti-Mold & Mildew – Totally inorganic product

Insulation Value - Average R factor is 1.4 (BTU units) 0.25 (Watt units)

Sag Resistance – HumiGuard Max – maximum humidity resistance, including outdoor applications

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 97 35 – Marker Board Paint**

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

**DIVISION 10 – SPECIALTIES****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 mounted 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**

**Hand Dryer:** High Speed, energy efficient, electric hand dryer; surface mounted; entire dryer internally grounded.

**Warranty Period:** 5 years; limited warranty

**Manufacturing** - MADE IN USA Certified, verify certification number

**Sound Level** – Operational sound level less than 80 dB

**Provide** 1.1" noise reduction nozzle

**Motor and Blower:** 5/8 HP, 20,000 RPM. Air flow rate: 19,000 linear feet per minute

**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

**Performance Criteria:** Certified and labeled by Underwriters Laboratory, Inc.

**Power Source:** 110/120 volt, 12.5 amp, 50 Hz or 60 Hz, 1500 Watts

**Controls:** Completely sealed control board and optics, automatic operation, activated by infrared optical sensor

**Size:** 11-3/4" wide by 12-11/16" high by 6-11/16" deep

**Green:** GreenSpec Listed, Qualifies for LEED Credits

**Finish:** White painted

**Optional** – Stainless steel brushed Model XL-SB finishes for high abuse environments

**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**

Tork Elevation Matic Model 5510282

#### **10 28 13 – Soap Dispenser**

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

#### **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 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

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DIVISION 13 – SPECIAL CONSTRUCTION

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DIVISION 14 – CONVEYING EQUIPMENT

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DIVISION 21 – FIRE SUPPRESSION

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**DIVISION 22 – PLUMBING****22 05 53 – Identification for Plumbing & Equipment (Pipe Labels)**

Installation of labels (ANSI/ASME A13.1 standard) 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.

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

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.

All reduce pressure assemblies shall be mounted above grade.

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.

All other backflows min height 12 inches from ground to bottom of Backflow body.

Refer to Water / Waste Standards for maximum installation height allowed by JEA.

JEA approved device manufacturers are Wilkens, Apollo and Watts.

Back flow devices shall have freeze valves and stainless steel valves handles.

JEA approved Freeze Protection Device is Dole SP35 or Dole SP45.

Refer to Water/Waste Water 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:**

JEA Cross Connection Control Policy

Rules and Regulations for Water and Wastewater Services manual

Florida Administrative Code Chapter 62-555

**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 – Floor Mounted Back Outlet Toilet Bowl**

Zurn 5645-bwl, Elongated toilet bowl

American Standard Huron 3312.001, elongated toilet bowl

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

American Standard – Champion 4; Model 2002.014

Kohler – Cimarron; Model K-3589

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**

American Standard - Madera; Model 3043

Kohler – Highline; Model K-4405

Zurn – Z-HET; Model Z5565-K

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.

Construction - Vitreous china, glazed trap way

Height – Must meet ADA minimum rim dimension of 16.125"

Flow Rating – 1.6 gallons per flush.

Color - White

Performance Score – 1,000 grams or more MaP

Codes – ASME A112.19.2 for vitreous china, ADA/ICC/ANSI 117.1.

Installation – Floor outlet centerline shall be 12" or less from the finished wall

Availability – repair parts locally available in Jacksonville.

Design – Smooth contours, easy to clean

**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**

BRASSCRAFT - ¼ TURN BALL STOP (KT SERIES)

MCGUIRE MFG. - CONVERTIBLE ¼ TURN BRASS BALL VALVE (LFBV SERIES)

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 45 33 – Combination Emergency Fixture Unit**

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 50 – Corrosion Coating Specifications for HVAC Units (Est. March 2015, Rev. June 2019)****a. 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 09 13 – Thermostats**

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)**

STRUXUREWARE

AUTOMATED LOGIC

ALERTON

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

Struxureware Building Operations system (SBO)

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

Aerovent Model HD53, Size 42L232

21,800 CFM @ .25" SP

All Aluminum Construction

FRP Hood

316 SS Hardware

Severe Duty Motor

a. 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:

American Air Filter

Fanders

Purolator

or approved equal

**23 64 21 – Scroll Chillers (Air Cooled)**

Approved Manufacturers for Scroll Chiller (Air Cooled):

Carrier

Trane

no substitutions

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

The Bard models that are approved are as follows:

Air Conditioners

W18AA (1.5 tons) thru W60AA (5.0 tons)

Heat Pumps

W18HA (1.5 tons) thru W60HA (5.0 tons)

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):

American Standard

Carrier

Trane

**23 81 26 – Mini Split**

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

Mitsubishi; no other brands will be accepted.

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 32 13 – Engine Generator – Diesel (Revised January 2020)****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 three preapproved vendors by purchasing are Ring Power (Caterpillar), Zabatt Power Systems (AKSA), Cummins and Generac.
  - d. 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 reconnectable 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 or Cummins Power Command HMI 220.
  - 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. Generator control section shall be 600 volt, 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 fual circuit.
- g. Emergency stop push button to shut the engine down regardless of the switch position.
- h. 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.
- i. Fuel pressure monitored by ECU/ control panel.
- j. Tachometer.
- k. Fuel leak detection.
- l. 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.
- m. All items shall be included on the control panel, assembled, wired, and tested in the supplier's shop.
  - n. The control panel shall have adequate clearance from the engine to permit engine maintenance without moving the control panel.
  - o. Automatic Exerciser:
    - i. Supplier will provide an Automatic Exerciser for each unit. This exerciser will automatically start, transfer load, run, transfer load back, and cool down unit on a weekly basis for a minimum of one hour for water treatment and waste water treatment facilities. Operating schedule must be fully adjustable both on length and frequency. The Automatic Exerciser must be provided by the same manufacturer who provides the controls and is a part of the controls package.
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. Contacts from the generator shall be prewired and labeled to the ET200S. Connect Greenleaf EFC-420.1 data converter and Transfer Switch contacts.
  - b. Digital Inputs to ET200S (Are to be connected in this order)
  - c. Generator Run (From Generator)
  - d. Generator Fault (From Generator)
  - e. Fuel Leak (From Greenleaf data converter)
  - f. Normal Power Available (From Transfer Switch)
  - g. Transfer Switch Normal (From Transfer Switch)
  - h. Transfer Switch Emergency (From Transfer Switch)
  - i. Analog Input to ET200S
  - j. 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 or S7-300 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. The Bill of Material below is the list of the devices to be provided and installed with each engine-generator only at Water Treatment Plants and Master Pump Stations.

Manufacturer	P/N	Description	Qty
Attabox	AH12106C	Enclosure, NEMA 4X, Polycarbonate, Clear cover	1
Attabox	BP1210A	Back Panel, 12ga., Aluminum, Unpainted	1
Phoenix Contact	2907562	Circuit Breaker, UL489 branch rated, C-Curve, 1-Pole, 5A	1
Siemens	6AG1 155-6AA01-7BN0	Interface Module, SIPLUS ET200SP IM155-6PN Standard	1
Siemens	6AG1 131-6BF01-7BA0	Digital Input Module, SIPLUS ET200SP DI 8x24VDC ST	3
Siemens	6AG1 134-6GD00-7BA1	Analog Input Module, SIPLUS ET200SP AI 4xI 2-/4-Wire ST	1
Siemens	6AG1 193-6BP00-7DA0	Base Module, White	4
Citel	DS220S-24DC	Surge Protector, 24VDC	1
Phoenix Contact	2313931	Profinet Network Isolator	1
WAGO	2002-1406	Terminal, Push-In, 1-Circuit, Yellow	2
WAGO	2002-1404	Terminal, Push-In, 1-Circuit, Blue	2
WAGO	2002-1407	Terminal, Push-In, 1-Circuit, Green/Yellow, Grounding	1
WAGO	2002-1492	Terminal End Plate, Orange	3
WAGO	2002-400	Adjacent Jumper, 2-Way Continuous	2
WAGO	249-116	End Anchor, 6mm, Gray	2
WAGO	210-112	Din Rail, Galvanized, Slotted, 2m	1
Square D	PK5GTA	Equipment Ground Bar Kit	1
Siemens	6XV1 840-2AH10	Profinet Cable, Fast Connect	1
Siemens	6AG1 901-1BB10-7AA0	Profinet Connector, SIPLUS	2

- 1.1. The PLC will be powered from the 24VDC supply from SCADA to the ET200SP in a separate ½" conduit from the generator to the RTU cabinet
- 1.2. Fourteen (14) #18 tinned MTW Blue SCADA digital input wires shall be provided for each unit and ran back to SCADA RTU cabinet.
- 1.3. Two (2) Profinet Cables from the I/O Panel to RTU shall be in ¾" 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
- 1.4. All field wiring shall connect directly to I/O base terminals using ferrules with end sleeves.
- 1.5. All mounting screws shall be drilled and tapped (no self-tapping screws are allowed).
- 1.6. All mounting screws shall be stainless steel.
- 1.7. Din rail shall be model 1492-DR9 or equivalent.
- 1.8. 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.
- 1.9. Communication wire from Generator to ATS AND the RTU shall 18ga Tin Coated MTW copper wire.
- 1.10. Grounding shall be done as per drawings in appendix (A). In the event there is no grounding loop,
- 1.11. Electrical conduits shall be installed as per drawing in appendix (A).

- 1.12. The (14) #18 tinned MTW Blue SCADA wire shall be labeled as per drawing in appendix (A).
- 1.13. Generator Installation and wiring reference JEA Water and Sewer Standards.
- 1.14. In the event of a standalone fuel tank, add one ½-inch conduit from Fuel tank to Generator Control Panel for Greenleaf.
- 1.15. 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.
- 1.16. 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 H<sub>2</sub>O. 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.
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.

20. 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.
- b. 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.
- c. All jacket water heaters hoses shall be silicone type.
- d. 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.
- e. 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.
- f. Radiator shall have ball valve isolation at radiator drain point.
- g. The fan shall draw air over the engine and discharge through the radiator.
- h. 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 do to the corrosive atmosphere at JEA water and waste water 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. 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. 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.
- i. 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.

- j. 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. Engine-generator supplier shall provide and install a 240/120V transformer adequately sized to handle all enclosure loads from service voltage. Transformer shall feed off of load side of auto transfer switch via a fused or breaker contact located inside ATS.
- k. 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.
- l. Enclosure shall be Phoenix Products, Advanced Manufacturing & Power Systems Inc. or Fidelity Manufacturing.
- m. Power Supply:
  - i. Each engine-generator set will be provided with a single 480V 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.
- n. 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.



- o. 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.
  - p. 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.
  - q. 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.
  - r. 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.
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 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.
4. There shall be no shutoff valves on any fuel return line.
5. 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.
6. 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.
7. 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 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.
8. 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.
9. 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.
10. 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 rain water 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.
11. 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.

12. All above ground fuel storage tanks shall meet or exceed UL2085 standards.
13. Rupture basin with 110% capacity.
14. 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.
15. 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.
16. 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
17. 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
  - 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.
18. 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 unistrute 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.
19. 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
20. 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.
21. 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.
22. Primary vent shall not exceed height of enclosure per sub base tank and not block engine exhaust pipe.
23. 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".
24. 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. As an alternative, flanged fittings with petroleum grade gasket may be used in lieu of a union.
25. Above ground fuel storage tanks that have fill box openings over 60 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 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.

26. 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 ac 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 certification 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 to 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. Prelubrication 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 Aftercooler 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 23 – Automatic Transfer Switches** (Revised April 2019)

Facilities' standard are identified as Zenith Model ZTS-D/L, or ZBTS, ASCO Series 4000/7000 or Russelectric RTS-3 type delayed transition transfer switch with microprocessor controls. The transfer switch shall be enclosed in a weatherproof NEMA 3RX stainless steel enclosure. 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.

**Brands:** Transfer switch shall be Zenith Model ZTS-D/L or ZBTS, ASCO Series 4000/7000, Russelectric RTS-3 type delayed transition transfer switch with microprocessor controls (with exception class III / IV stations shall be No Load-Break Bypass-isolation).

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.

**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. The control panel will be housed inside of the cabinet on an inner full height door/panel away from vandalism and the corrosive environment.
3. All electrical penetrations into ATS shall be from the bottom side of the enclosure.
4. Lifting bracket(s) should be welded to sides of cabinet alleviating cabinet penetrations.
5. Pad mounts should extend out in order to allow perpendicular drilling through mounting holes once unit is placed on pad.
6. There should be attached eyelets to allow mounting to electrical rack as required.
7. 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.
8. Supplier will provide 100 W powered strip heaters in all ATS enclosures with finger safe fuse pullers.

**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.

**Service:** ATS Supplier must have a factory authorized service technician within 50 miles of Jacksonville for warranty repairs. Emergency warranty repair service shall be available 24/7. 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.

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

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

**Approximate Equivalency**

1. High Pressure Sodium (HPS) - 32W LED = 150W HPS
2. 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:**

4. Lithonia HLF1 LED P2 (27,000 lumens, 195W)
5. Hubbell RFL5 190 (26,932,-190W)
6. 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 street lights)

**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 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% uplight with reflectors alone. Conical, flat or acrylic drop lenses offer enhanced aesthetics, minimize glare at lower mounting heights and maximize uplight (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).. DesignLights 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 56 19 – LED Light Fixture, Wall Pack, Exterior Location, Non Corrosive Environment**  
(Revised June 2019)

Lithonia - Model TWH LED Lighting for a non-corrosive environment or JEA approved equal LED Light Fixture, Exterior Location – The working foremen team has reviewed it as a suitable upgrade/replacement of conventional lighting systems up to 400W metal halide wall mount, light fixture. Applications include

**Construction** - Die-cast aluminum housing has an impact-resistant, tempered glass lens that is fully gasketed. Modular design allows for ease of maintenance. The LED driver is mounted to the front casting to thermally isolate it from the light engine for low operating temperature and long life. Housing is completely sealed against moisture and environmental contaminants

**Optics** - Protective glass lens covers the light engine's precision-molded proprietary acrylic lenses. The light engine shall be a 4000K configuration.

**Equivalency - High Pressure Sodium (HPS)**

- 39W LED = 150W HPS
- 72W LED = 250W HPS
- 104W LED = 400W HPS

**Equivalency – Metal Halide (MH)**

- 39W LED = 70W MH
- 72W LED = 150W MH
- 104W LED = 250W MH

**Electrical** - Light engine(s) consist of 10 or 30 high-efficacy LEDs mounted to a metal-core circuit board and integral aluminum heat sink to maximize heat dissipation and promote long life (L87/100,000 hrs at 25°C). The electronic driver has a power factor of >90%, THD <20%, and a minimum 2.5 KV surge rating.

**Installation** – Back housing is separated from front housing, eliminating ballast weight and promoting easy handling. Top 3/4" threaded wiring access. Back access is through a removable 3/4" knockout. Feed-thru wiring can be achieved by using a conduit tee. Mount on any vertical surface. Not recommended in applications where a sprayed stream of water can come in direct contact with glass lens.

**Listings** - UL listed for wet locations. Rated for -40°C minimum ambient. Luminaire is IP55 rated. DesignLights Consortium® (DLC) qualified 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 with a minimum of two inches or greater of S-1 to match 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.

**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 insure 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 paragraphs 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 paragraphs 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 paragraphs 300-8 and 300-9 shall be omitted.

2. **ASPHALTIC CONCRETE SURFACE COURSE:**

The paving shall have a wearing surface of either Type II or Type S-I 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 paragraphs 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) Limerock 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 S-I or Type II 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.



**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 insure 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 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. 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 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**

HydroClean - HI Tech Treatment and Conditioner for Diesel Fuel – 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

**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 ¼" or larger stainless steel hexagonal bolt.

Color: Provide a safety yellow sleeve

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

DIVISION 35 – -WATERWAY AND MARINE CONSTRUCTION-

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DIVISION 40 – PROCESS INTERCONNECTIONS

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**DIVISION 41 – MATERIAL PROCESS AND HANDLING EQUIPMENT****41 65 16 – Diesel -Engine-Driven Portable Generator Sets*****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 in to 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 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 non proprietary 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.

**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 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 H<sub>2</sub>O. 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:
- radiator
  - expansion tank
  - water pump
  - belt-driven fan
  - fan guard
  - thermostatic temperature control
  - high water temperature cutout
  - 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 do to the corrosive atmosphere at JEA water and waste water 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 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:





- 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 manufactures 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 ac 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 certification 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 manufacture 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 pigtailed 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. Light Emitting Diode (LED), all lights.

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 manufacturers 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 electrical cables and padlocks.

**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:
  - b. Cooling System
  - c. Thermostat Housing

- d. Water Manifold Housing
- e. Jacket Water Precooler
- f. Jacket Water Pump
- g. Thermostat
- h. Radiator & Fan
- i. Fuel System
- j. Steel Fuel Lines
- k. Fuel Shutoff Solenoid
- l. Fuel Injectors
- m. Fuel Transfer Pump & Housing
- n. Fuel Priming Pump
- o. Fuel Transfer Pump
- p. Lubrication System
- q. Pan, Pump Cooler
- r. Crankcase Breather
- s. Engine Oil Pump Drive
- t. Prelubrication Pump
- u. Electric System
- 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 Aftercooler 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 manufacture components, having a manufactures 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.

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

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