

# SINGLE LINE WIRING DIAGRAM

# GENERAL NOTES

- GENERAL: WORK SHALL BE DONE IN ACCORDANCE WITH NFPA 70 AS ADOPTED BY THE CITY OF KALAMA, COWLITZ COUNTY.
- LOCATIONS OF ELECTRICAL DEVICES, LIGHTING FIXTURES, ETC., INDICATED ON CIVIL / STRUCTURAL PLANS - INCLUDING SECTIONS, ELEVATIONS, NOTES, OR OTHER INDICATORS - TAKE PRECEDENCE OVER LOCATIONS SHOWN ON ELECTRICAL DRAWINGS.
- REFER TO CIVIL, STRUCTURAL, MECHANICAL, LANDSCAPE, ETC., DRAWINGS FOR WORK OUTSIDE OF DIVISIONS 16 & 17. INFORMATION CONVEYED WITHIN THE ELECTRICAL DRAWINGS ILLUSTRATING OR REFERENCING WORK OF OTHER DIVISIONS IS FOR REFERENCE ONLY. SPECIFICATION BY THE APPROPRIATE DIVISIONS SHALL APPLY
- GENERAL NOTES ARE SHOWN ON SHEETS MOST RELEVANT TO SPECIFIC NOTE: HOWEVER, GENERAL NOTES ON EACH SHEET SHALL APPLY IN PRACTICE TO ALL ELECTRICAL DRAWINGS.
- NOT ALL COMPONENTS OF THE ELECTRICAL SYSTEMS ARE SHOWN (FOR SIMPLICITY). PROVIDE MATERIALS AND LABOR NECESSARY FOR A COMPLETE AND OPERATIONAL SYSTEM.
- STAINLESS STEEL HARDWARE: MATERIALS USED FOR THE MOUNTING AND SUPPORT OF BOXES CABLES, RACEWAYS, LIGHT FIXTURES, OUTLETS, AND OTHER DIVISION 16 EQUIPMENT, SHALL BE 316 STAINLESS STEEL. THIS REQUIREMENT APPLIES TO THE AFOREMENTIONED COMPONENTS WHEN INSTALLED OUTSIDE
- ELECTRICAL DRAWINGS ARE DIAGRAMMATIC. EXACT LOCATIONS OF ELECTRICAL EQUIPMENT IS APPROXIMATE. CHANGES MADE BY THE OWNER IN LOCATING ELECTRICAL COMPONENTS OF UP TO TEN FEET HORIZONTALLY IS A PART OF THIS CONTRACT FOR FLOATS, THESE CHANGES MAY BE IMPLEMENTED, AT NO CHARGE TO THE OWNER, IF MADE PRIOR TO FINAL APPROVAL OF SHOP DRAWINGS.
- COORDINATE LOCATIONS OF ELECTRICAL AND COMMUNICATION CHASES AND CONDUITS WITH OTHER TRADES. ADJUST LOCATIONS AS NECESSARY TO AVOID CONFLICTS.

# SHEET NOTES

PROVIDE GROUND FAULT PROTECTION AS REQUIRED TO COMPLY WITH NEC ARTICLE 555.3.

COPPER FEEDER SCHEDULE											
CONDUIT AND WIRE						PORTABLE POWER CABLE					
FEEDER	CONDUITS (REMARKS 1,4)			CONDUCTOR F			FEEDER	'X' INDICATES NUMBER OF CONDUCTORS PER FEEDER CABLE (EXCLUDING GROUND CONDUCTORS).			
TAG	MET	SETS	RNC	PHASE/NEUTRAL	GROUND (REMARK 5)	REMARKS	TAG	APPROX. O.D. (3C/4C)	COND. AWG	REMARKS	
400.3	4.00"	1	4.00"	3 #500KCM	#6	-					
200.3	2.00"	1	3.00"	3 #3/0	#6	_	G 30.X		#10	MULTI CONDUCTOR TYPE 'SOW' CORD	
30.3	0.75"	1	1.00"	3 #10	#10	-	G 200.X	1.88"/2.04"	#3/0	MULTI CONDUCTOR PORTABLE POWER CABLE	

# **GENERAL SCHEDULE NOTES**

CONDUCTORS AND CONDUITS SHOWN IN THIS SCHEDULE ARE BASED ON COPPER CONDUCTORS WITH THHN/THWN INSULATION. THIS NOTE INDICATES THAT CONDUIT (LISTED IN SCHEDULE) IS SIZED BASED ON TYPE THEN THEN WIRE. USE WIRE TYPES AS SPECIFIED IN SECTION 16120 OR AS NOTED ELSEWHERE IN THE CONTRACT DOCUMENTS.

- PROVIDE NOTED SIZE GROUND CONDUCTOR IN EACH CONDUIT OF FEEDERS CONSISTING OF MULTIPLE SETS OF CONDUCTORS.
- NOT ALL FEEDERS ARE NECESSARILY USED ON THIS PROJECT.
- NOMINAL AMPACITIES GREATER THAN 100 AMPS ARE FOR 75^C
  - CONDUIT SIZES AND QUANTITIES ON PLANS TAKE PRECEDENCE OVER THOSE SHOWN IN SCHEDULE. PROVIDE CONDUITS INDICATED IN SCHEDULE FOR FEEDERS NOT SHOWN ON PLANS.

# 90% SUBMITTAL

E1.00

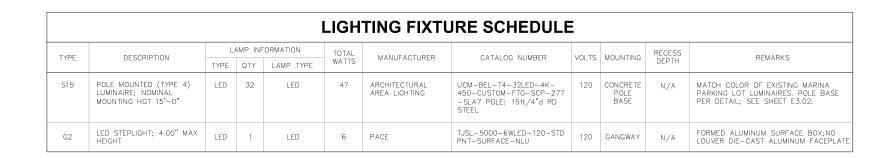


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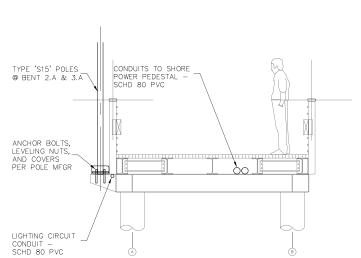
			REVISIONS	PROJECT:			ALAMA ACILITY	
				TITLE:		ECTRICAL	L PLAN & ING DIAGE	RAM
ı				DESIGNED BY:	EJD	PROJECT NO:	154038.06	SHEET NO:
ı				DRAWN BY:	KDD	DATE:	AUGUST 2018	
- 1	REV	DATE	DESCRIPTION	CHECKED BY:	EJD	SCALE:	NOTED	4



PREFERABLE TO USE SAME LIGHT POLE AS MARINA FOR MAINT. AND CONSISTENCY?

ΔÔ

SHORE POWER
PEDESTAL (TP)

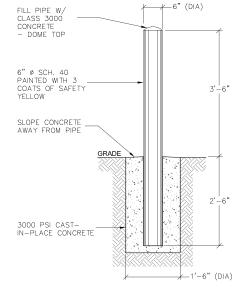


**TYPE S15 MOUNTING DETAIL** 

APPROACH PIER SECTION - NO SCALE

GANGWAY -ର୍ଦ୍ଦ TP MOUNTING DETAIL

GANGWAY SECTION - NO SCALE



VERIFY PEDESTAL CONFIGURATION WITH MFGR REP - MAY NEED LARGER ENCLOSURE FOR 400AMP WITH CT/METER

GROUND FAULT MONITOR

NOTE: EXACT ARRANGEMENT AND SIZE OF RACK MAY BE CHANGED TO REDUCE OVERALL DIMENSIONS. BOTH SIDES OF THE RACK MAY (BENDER) \_2" SQ. GALV. TUBE STEEL RACK WELDED, WITH WELDED END CAPS CT ENCLOSURE (PER PUD MIN WIDTH REQ'D BY EQUIPMENT STDS) NEMA 4X SS METER BASE (PER PUD STDS) NEMA 4X SS RECESSED WELDED STEEL TABS FOR PLYWOOD SUPPORT, PAINT-OUT. ATTACH PLYWOOD WITH 3/8" GALV. STEEL CARRIAGE BOLTS, NUTS AND WASHERS 3/4"t MARINE GRADE PLYWOOD MOUNTED FLUSH WITH FRONT OF STEEL FRAME, PAINT DUPLEX RECEPTACLE, 120VAC, 20A, GFCI, WITH METALLIC WP WHILE IN USE COVER 6'-6"MAX STEEL BASEPLATE W/4-1/2"x 12"L ANCHOR \_1 5/8" GALV. STRUT WELDED TO FRAME FOR CONDUIT MOUNTING HARDWARE FINISH GRADE -NOTE: CONCRETE PAD TO EXTEND 36" IN FRONT O -#4 REBAR @ 12"O.C. (BOTH DIRECTIONS) TO PUD POLE = TO PIER

> **SERVICE RACK DETAIL** ELEVATION - NOT TO SCALE

**GUARD POST DETAIL (TYP)** 

REMOVE SEGMENT OF 1" -PIPE RAIL IN FRONT OF LIGHT FIXTURE(S) TYPE G2 --MOUNT BELOW 4x12 RUBSTRIP ALUMINUM MOUNTING

GANGWAY SECTION

TYPE 'G2' LIGHTS TYPICAL OF 20 SHORE POWER GANGWAY -

# **TYPE G2 MOUNTING DETAIL**

OUTBOARD GANGWAY ELEVATION - TYPICAL 2 SIDES NO SCALE

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		REVISIONS	PORT OF KALAMA T-BARGE FACILITY					
			ELECTRICAL DETAILS & FIXTURE CUTS					
			DESIGNED BY:	EJD PROJECT NO:	154038.06	SHEET NO:		
			DRAWN BY:	KDD DATE:	AUGUST 2018	E2.00		
REV	DATE	DESCRIPTION	CHECKED BY:	EJD SCALE:	NOTED	LZ.00		

### BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, apply to this Section.

### 1.2 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. IMC: Intermediate metal conduit.
- C. LFMC: Liquidtight flexible metal conduit.
- RNC: Rigid nonmetallic conduit.
- E. RGS: Rigid galvanized steel conduit.

# 1.3 SUBMITTALS

- A. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.
- B. For each type of raceway, wire, splice kits, fittings, etc., indicated. Include clearly marked manufacturers technical data.

### 1.4 RECORD DRAWINGS

A. Maintain continuously updated redline drawings during progress of the project. Show all changes from the contract documents.

#### 1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use
- B. Comply with NFPA 70.

### 1.6 COORDINATION

- A. Coordinate chases, slots, inserts, sleeves, and openings with general construction work and arrange in structure during progress of construction to facilitate the electrical installations that follow.
- B. Schedule required electrical outages at least 7 days in advance. Outages shall be scheduled after normal business hours of impacted facilities.
- C. Furnish support structures scaffolding, rigging, floatation, etc.—necessary to complete the electrical installation. Remove structures upon completion of the project.

A. Contractor shall warrant entire system for a period of not less than one year. This warranty shall include all installed components under this contract.

# PART 2 - PRODUCTS

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ENGINEERS, INC.

# 2.1 SUPPORTING DEVICES

A. For Use Outdoors: 316 stainless steel. Galvanized steel and non-metallic components are not permitted for use as supporting hardware except where specifically noted.

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### 2.2 ELECTRICAL IDENTIFICATION

- A. Identification Devices: A single type of identification product for each application category. Use colors prescribed by ANSI A13.1, NFPA 70, and these Specifications.
- B. Cable Labels: Comply with ANSI A13.1, Table 3, for minimum size of letters for legend and minimum length of color field for each raceway and cable size.
  - Type: Preprinted, flexible, self-adhesive, vinyl. Legend is overlaminated with a clear, weather— and chemical—resistant
  - Legend: Indicate voltage.

#### PART 3 - EXECUTION

# 3.1 ELECTRICAL EQUIPMENT INSTALLATION

- A. Materials and Components: Install level, plumb, and parallel and perpendicular to other structural systems and components, unless otherwise indicated.
- B. Equipment: Install to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.
- C. Right of Way: Give to raceways and piping systems installed at a required slope..

# 3.2 ELECTRICAL SUPPORTING DEVICE APPLICATION

- A. Wet and Damp Locations: stainless steel components.
- B. Dry Locations (inside service pedestal): Steel materials.

#### 3.3 SUPPORT INSTALLATION

A. Install support devices to securely and permanently fasten and support electrical components.

#### 3.4 DEMOLITION

- A. Protect existing electrical equipment and installations indicated to remain. If damaged or disturbed in the course of the Work, remove damaged portions and install new products of equal capacity, quality, and functionality at no additional cost to
- Remove demolished material from Project site.
- Remove, store, clean, reinstall, reconnect, and make operational components indicated for relocation.

# 3.5 FIFLD QUALITY CONTROL

- A. Inspect installed components for damage and faulty work, including the following:
  - Raceways.
  - Wire and connectors
  - Supporting devices for electrical components.
- Electrical identification.
- Electrical demolition.

## 3.6 CLEANING AND PROTECTION

- A. On completion of installation, including outlets, fittings, and devices, inspect exposed finish. Remove burrs, dirt, paint spots, and construction debris.
- B. Protect equipment and installations and maintain conditions to ensure that coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

# CONDUCTORS AND CABLES

## PART 1 - GENERAL

1.1 RELATED DOCUMENTS

HARBOR POWER

- D. Drawings and general provisions of the Contract, apply to this
- 1,2 SUBMITTALS
- A. Product Data: For each type of product indicated.

### 1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use
- B. Comply with NFPA 70.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
- 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.

# 2.2 CONDUCTORS AND CABLES

- A. Available Manufacturers:
  - American Insulated Wire Corp.; a Leviton Company.
  - General Cable Corporation.
- Southwire Company
- B. Conductor Material: Copper complying with NEMA WC 5 or 7; solid conductor for No. 10 AWG and smaller, stranded for No. 8 AWG and larger.
- C. Conductor Insulation Types: Type XHHW complying with NEMA WC 5 or 7.

#### 2.3 CONNECTORS AND SPLICES

- A. Available Manufacturers:
  - Hubbell/Anderson.
- 0-Z/Gedney; EGS Electrical Group LLC.
- 3M Company, Electrical Products Division.
- Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated. Splices shall be gel encapsulated type — no exceptions. Splice kits shall be UL listed for the application.

### PART 3 - EXECUTION

### 3.1 CONDUCTOR AND INSULATION APPLICATIONS

A. Feeders and branch circuits: Type XHHW single conductors in raceway

## 3.2 INSTALLATION

A. Prior to installation of conductors ensure all of chases are smooth and free of sharp edges and debris. Contractor shall smooth and round edges of electrical and communication chases in floats, including but not limited to, chases between float modules, entering junction boxes, and those stubbed to the outside of the float.

## 3.3 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque—tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

## 3.4 FIFLD QUALITY CONTROL

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CONSTRUCTION OF THE DESIGN SHOWN ON THESE DRAWINGS.

WHERE SPECIFICATIONS ARE GENERAL OR NOT CALLED OUT,

INDUSTRY, DRAWINGS ARE FOR USE ON THIS PROJECT ONLY

THE SPECIFICATIONS SHALL CONFORM TO STANDARDS OF

- A. Testing: Perform the following field quality—control testing:
   1. After installing conductors and cables and before electrical circuitry has been energized, test for compliance with
- 2. Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Section 7.3.1. Certify compliance with test parameters.

### RACEWAYS AND BOXES

#### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, apply to this Section.

### 1.2 DEFINITIONS

- A. LFMC: Liquidtight flexible metal conduit.
- B. RNC: Rigid nonmetallic conduit.
- C. RGS: Rigid galvanized steel conduit

#### 1.3 SUBMITTALS

A. Product Data: For raceways, wireways and fittings, boxes, enclosures, and cabinets.

#### 1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
- 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.

# 2.2 METAL CONDUIT AND TUBING

# A. Available Manufacturers:

- Grinnell Co./Tyco International; Allied Tube and Conduit Div.
- LTV Steel Tubular Products Company.
- 0-Z Gedney; Unit of General Signal. B. Rigid Steel Conduit: ANSI C80.1.
- C. LFMC: Flexible steel conduit with PVC jacket.
- D. Fittings: NEMA FB 1; compatible with conduit and tubing materials.

# 2.3 BOXES, ENCLOSURES, AND CABINETS

- A. Manufacturers:
- 1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
- Emerson/General Signal: Appleton Electric Company.
- 4. Hubbell, Inc.; Killark Electric Manufacturing Co.
- 5. O-Z/Gedney; Unit of General Signal. 6. Skyline Electric Co., Seattle, WA.

REVISIONS

- Non-metallic Outlet and Device Boxes: not allowed. Sheet Metal Outlet and Device Boxes: not allowed. Cast-Metal Outlet and Device Boxes: NEMA FB 1, Type FS/FD,
- with gasketed cover. E. Hinged-Cover Enclosures: NEMA 250, type 4, with hinge cover and flush latch
- 1. Metal Enclosures: Powder coated stainless steel, finished inside and out, unless noted or specified otherwise.

# 2.4 FACTORY FINISHES

A. Finish: For raceway, enclosures, or cabinet components, provide manufacturer's marine white paint applied to factory—assembled enclosures and cabinets before shipping — or factory galvanized.

TITLE:

### PART 3 - EXECUTION

#### 3.1 RACEWAY APPLICATION

# A. Outdoors:

- Exposed: Rigid steel. Concealed: Rigid steel. Underground, Single Run: RNC.
- 4. Underground, Grouped: RNC.
- 5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
- 6. Boxes and Enclosures: NEMA 250, Type 3R (Type 4X on
- B. Minimum Raceway Size: 3/4-inch trade size (DN 21).

#### 3.2 INSTALLATION

- A. Keep raceways at least 6 inches (150 mm) away from parallel runs of water pipes. Install horizontal raceway runs above water
- B. Complete raceway installation before starting conductor installation.
- C. Support raceways as specified in Division 16 Section "Basic
- Electrical Materials and Methods.' D. Install temporary closures to prevent foreign matter from entering
- E. Protect stub-ups from damage where conduits rise through floor slabs. Arrange so curved portions of bends are not visible above the finished slab
- F. Make bends and offsets so ID is not reduced. Keep legs of bends in the same plane and keep straight legs of offsets parallel, unless otherwise indicated.
- G. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire.
- H. Stub-up Connections: Extend conduits through structure for connection to freestanding equipment. Install with an adjustable top or coupling threaded inside for plugs set flush with finished floor. Extend conductors to equipment with rigid steel conduit: FMC may be used 6 inches (150 mm) above finished grade.

- A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.
- 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
- 2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

## 3.4 CLEANING

A. After completing installation of exposed, factory—finished raceways and boxes, inspect exposed finishes and repair damaged

# 90% SUBMITTAL

# **PORT OF KALAMA T-BARGE FACILITY**

# **ELECTRICAL SPECIFICATIONS**

AND ARE NOT INTENDED FOR REUSE WITHOUT WRITTEN APPROVAL FROM PND. DRAWINGS ARE ALSO NOT TO BE USED T: 206.855.4600 PM: ED DAVID, PE ESIGNED BY ROJECT NO: IN ANY MANNER THAT WOULD CONSTITUTE A DETRIMENT RAWN BY: AUGUST 20 DIRECTLY OR INDIRECTLY TO PND. DATE HECKED BY