Tacoma

CITY OF TACOMA

Tacoma Public Utilities/ Power Generation Engineering

ADDENDUM NO. 02 **DATE:** 4/22/2022

REVISIONS TO:
Request for Proposal Specification No. PG21-0655F
Cushman 2 Powerhouse Crane Control Upgrade

NOTICE TO ALL BIDDERS:

This addendum is issued to clarify, revise, add to or delete from, the original specification documents for the above project. This addendum, as integrated with the original specification documents, shall form the specification documents. The noted revisions shall take precedence over previously issued specification documents and shall become part of this contract.

REVISIONS TO THE SUBMITTAL DEADLINE:

The submittal deadline has been changed to 11:00 a.m., Pacific Time, Tuesday, May 17, 2022.

REVISIONS TO THE GENERAL INFORMATION AND REQUIREMENTS:
Replace Calendar of Events section with Calendar of Events marked Addendum 02.

Replace Submittal Checklist with Submittal Checklist marked Addendum 02.

REVISIONS TO THE SPECIFICATIONS:
Added Special Provisions to specification.

Added Proposal Pages marked Addendum 02 to Appendix A: SUBMITTAL FORMS (MUST BE SUBMITTED WITH RESPONSE). Any submittal received without these required items may be deemed non-responsive and not be considered for award.

REVISIONS TO THE TECHNICAL PROVISIONS:
Added Photos as an appendix to Technical Provisions.

QUESTIONS AND ANSWERS

Question 1: What RMP are the existing motors?

Answer 1: Main Hoist 470 RPM; Aux Hoist 505 RPM; Bridge Drive 775 RPM; Trolley Drive 505 RPM

Question 2: What is the capacity of the crane?

Answer 2: Main Hoist 125 tons; Aux Hoist rated for 15 tons

Question 3: Who do we contact for site visits?

Answer 3: Contact Tina Eide, Sr. Buyer at teide@cityoftacoma.org to coordinate site visits.

Question 4: Is there any other work that would be going on the same time as installation?

Answer 4: No major work will be happening at the same time.

Question 5: Motor Variable Frequency Drives (VFD) shall be Allen Bradley PowerFlex 750 Series or approved equal. (Page 26 G. VARIABLE FREQUENCY DRIVES)

Variable frequency drives (VFDs) shall be Allen Bradley Powerflex 70 or 700 drives rated for heavy duty operation (page 32 - D.MOTOR CONTROL) Section D.2 conflicts with Section G.1. Section D.2 should be deleted. The requirements for VFDs are correctly indicated in Section G.1
Is 755/750 series qualified for this?

Answer 5: Yes. The references to PowerFlex 750 Series includes both the 750 and 755 Series Drives.

Question 6: Will the deadline be extended?

Answer 6: Yes, the deadline is extended per Addendum 2.

Question 7: Floor loading for lifts

Answer 7: This will be provided to awarded vendor.

Question 8: Does the floor need to be protected for install?

Answer 8: The floor has terrazo finish. Rubber fork lift tires would have no issue. Dragging across the floor would require protection for the floor.

Question 9: Do you have a preference for load testing (solid weights or water weights)?

Answer 9: Engineer would need to approve method OR Solid weights is preferred.

Question 10: Is there a requirement for ARC Flash study?

Answer 10: There is an existing Arc Flash study that covers the Crane power feeder systems in their current state. That information can be provided to the awardee.

Question 11: The spec calls for part of ARC Flash study to be done with the bid. Is this required?

Answer 11: We will need preliminary calculations at design review. We do not need them at bid submittal. We will need final calculations prior to the construction phase.

Question 12: Is there a schedule for completion once the project is awarded?

Answer 12: 24 months

"The contract will be for a two-year period or until the project is complete, whichever is sooner. The City reserves the right to cancel the contract for any reason, by written notice, as stipulated in the contract" page # 8 / page 10

Question 13: Is the target for the AC motors 1800RPM?

Answer 13: We are open to any reasonable solution. We are thinking it will be gear motor 1800RPM with shaft spinning at the original motor speeds, or slower.

Question 14: Will the question deadline move since the submittal deadline is moved?

Answer 14: Yes, the question deadline is now 3pm Friday April 29, 2022

Question 15: What's the lay down area?

Answer 15: There is not a big area inside the powerhouse. There is a possible indoor area a 100ft north and a bigger area in a warehouse about 1/4 miles away. Both of those areas would need a forklift. There is a lay down area by the crane at the south end of the building that could be cordoned off. There may be other cranes it that area for maintenance.

NOTE: Acknowledge receipt of this addendum by initialing the corresponding space as indicated on the signature page. Vendors who have already submitted their bid/proposal may contact the Purchasing Division at 253-502-8468 and request return of their bid/proposal for acknowledgment and re-submittal. Or, a letter acknowledging receipt of this addendum may be submitted in an envelope marked Request for Proposal Specification No. PG21-0655F Addendum No. 2. The City reserves the right to reject any and all bids, including, in certain circumstances, for failure to appropriately acknowledge this addendum.

cc: Steve Belvin, Power Generation Engineering

Addendum 02

CALENDAR OF EVENTS

This is a tentative schedule only and may be altered at the sole discretion of the City.

Contract may be issued after Public Utility Board and/or City Council approval.

The anticipated schedule of events concerning this RFP is as follows:

Publish and issue RFP:	**4/11/2022**
Virtual Pre-Bid Meeting:	**4/20/2022**
Pre-Submittal Questions:	**4/29/2022**
Response to Questions:	**5/3/2022**
Submittal Due Date:	**5/17/2022**
Submittal Evaluated:	**5/27/2022**
Award Recommendation:	**6/13/2022**
Public Utility Board/City Council Approval:	**6/29/2022**

Addendum 02

SUBMITTAL CHECK LIST

This checklist identifies items to be included with your submittal. Any submittal received without these required items may be deemed non-responsive and not be considered for award.

Submittals must be received by the City of Tacoma Purchasing Division by the date and time specified in the Request for Proposal page.

The following items make up your submittal package:	
One original electronic copy PDF of your complete submittal package	
Signature Page " Appendix A"	
Price Proposal Pages "Appendix A"	
Information in Section 12 (Content To Be Submitted)	
Bid Bond	
Subcontractor Categories of Work Form	
State Responsibility Form	
Certification of Compliance with Wage Payment Statutes	
After award, the following documents will be executed:	
Services Contract	
Certificate of Insurance and related endorsements	
Performance Bond	
Payment Bond	
EIC & LEAP Documentation	

SPECIFICATION

SPECIFICATION NO. PG21-0655F

These Special and Technical Specifications
have been prepared under the direction of a
licensed Professional Engineer, registered
in the State of Washington

TABLE OF CONTENTS

DIVISION 1 - SPECIAL PROVISIONS

SECTION 01010 - SUMMARY OF WORK

1.1 PROJECT DESCRIPTION

This project includes the design and construction of a new controls system for the bridge crane located in the Cushman 2 Powerhouse. The task is to replace outdated control components with modern equipment to provide capability for smooth and precise low speed movements regardless of crane loading.

The contractor shall supply all materials required to complete the work required by this contract in excess of those materials to be supplied by Tacoma Power as listed in Section 01040 – Project Coordination.

In all cases, the City's contract is with one (1) general contractor and it is the general contractor's responsibility to ensure all work required to provide a complete and operational system is included in their bid. When possible, the City has attempted to reference work which should be coordinated with various trades, but it is the contractor's responsibility to coordinate and schedule the work of all subcontractors, trades, and suppliers to assure the proper and timely prosecution and completion of all items of work.

Major components of work under this contract include, but are not limited to, the following list:

A. SITE WORK

General work scope includes, but is not limited to, the following:

1. Removal of existing equipment that will not be reused.
2. Installation of new control system including ancillary and appurtenant items.
3. Commissioning, testing and certification as described in this specification.

1.2 PROJECT LOCATION

This project is located at the Cushman 2 Powerhouse 21451 N. Highway 101 Shelton, WA 98584, and as shown on The map included in this specification. The project is located in Mason County, Washington.

1.3 SITE SHOWING

The bidder will be responsible for examining the site and to have compared the site with the specifications and contract drawings contained in this specification, and be satisfied as to the facilities and difficulties attending the execution of the proposed contract (such as uncertainty of weather, floods, nature and condition of materials to be handled and all other conditions, special work conditions including work schedules, obstacles and contingencies) before the delivery of their proposal.

No allowance will be subsequently made by the City on behalf of the bidder by reason of any error or neglect on the bidder's part, for such uncertainties as aforesaid.

A pre-bid virtual meeting will be held prior to site showings, see Section 1.2 Meetings.

A required site showing will be conducted by individual appointment starting after the pre-bid meeting. Due to the nature of this project, the bidder is responsible for examining the site prior to placing a bid. **It is the bidder's responsibility to assure that they schedule an appointment and attend a site showing.** Coordinate arrangements with Tina Eide at teide@cityoftacoma.org . Failure to examine the site may be grounds to reject the bid. Tacoma Power shall make no adjustment to the price or provide any compensation to the contractor for impacts relating to the contractor's failure to consider the potential impacts of not only the site conditions observed, but changes in the observed conditions that could have been foreseen by the contractor. Come with Personal Protective Equipment including hard hat, steel toed shoes, and fall arrest harness.

By entering into the contract, the bidder represents that they have inspected in detail the project site and has become familiar with all the physical and local conditions affecting the project and/or the project site. Any information provided by the City to the contractor, relating to existing conditions on, under, or to the project and/or site including, but not limited to information pertaining to hazardous material abatement and other conditions affecting the project site, represents only the opinion of the City as to the location, character, or quantity of such conditions and is provided only for the convenience of the contractor. The contractor shall draw their own conclusions from such information and make such tests, review and analyses as the contractor deems necessary to understand such conditions and to prepare their proposal.

The City assumes no responsibility whatsoever with respect to the sufficiency or accuracy of such information and there is no guarantee, either expressed or implied, that the conditions indicated or otherwise found by the contractor as a result of any examination or exploration are representative of those existing throughout the work and/or project site.

The contractor shall carefully study and compare the contract documents with each other and shall at once report to the City errors, inconsistencies or omissions discovered. If the contractor performs any construction activity knowing it involves a recognized error, inconsistency or omission in the contract documents without such notice to the City, the contractor shall assume the risk and responsibility for such performance and shall bear an appropriate amount of the attributable costs for correction.

The contractor shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the contractor with the contract documents before commencing activities. Errors, inconsistencies or omissions discovered shall be reported to the City at once.

1.4 COMMENCEMENT, PROSECUTION AND COMPLETION

The contractor will be required to complete the contract documents and to provide surety and payment bonds within ten (10) calendar days after the award of the contract. The contractor shall begin the work to be performed in the contract within ten (10) calendar days after the date of notification to commence work. Notification to commence work may either be by letter or, if no letter is issued, by agreement at the preconstruction conference (or if no letter is issued, by the date the contract is executed by the City).

The contractor shall be required to complete all work within **24 months (730) calendar days** after the date of notification to commence work. If the contractor fails to complete all work within **730 calendar days**, the City will assess liquidated damages in accordance with Section 3.14 of the General Provisions.

The amount of liquidated damages set forth in General Provision 3.14 is hereby modified to $1,000 per day. All other terms in General Provision 3.14 shall remain the same.

1.5 SPECIFICATION FORMAT

This specification is written and formatted for use with Public Works specifications and is numbered to be consistent with other specifications, including Construction Specifications Institute (CSI) format, as modified by the City. It is not intended to indicate what work is to be accomplished by various subcontractors on the project. In all cases, the City's contract is with one (1) general contractor and it is the general contractor's responsibility to ensure all work required to provide a complete and operational facility is included in their bid.

When possible, the City has tried to reference work which should be included with various trades, but it is the contractor's responsibility to ensure all work is properly coordinated. The numbering system in the Special Provisions Section reflects standard provisions written by the City and assigned constant numbers. Thus, gaps will appear when specific sections are not used.

1.6 CONTRACT WORK TIMES

Contract work times shall be Monday through Friday, 7:00 a.m. to 5:30 p.m., excluding holidays, described in Section 2.13 of the General Provisions or as otherwise approved by the City.

The contractor is discouraged from working on weekends and holidays, and such work must be approved by the City. If the contractor elects to work on a Saturday, Sunday, holiday or longer than the designated contract work times, such work shall be considered overtime work. On all such overtime work, a City engineer or their inspector must be present. The contractor shall reimburse the City for the full amount of the costs for City employees who must work any such overtime hours. For the purpose of estimation of reimbursement of City employee's overtime, the bidder shall budget $150.00 per hour.

However, if the City orders work to be performed on overtime, all City employees' overtime costs will be at no expense to the contractor. The City will not require reimbursement for overtime hours worked by the City for inspection as detailed in the General Provisions if the conditions of this paragraph are met to the satisfaction of the engineer.

Once site work begins, the contractor shall submit a weekly proposed work plan showing required inspections for Monday through Sunday of the following week. This work plan shall be given to the engineer for approval by 11:00 A.M. every Thursday, which is when the coordination meeting as described in Section 01040 – Project Coordination will be held.

Work not specifically detailed on the weekly work plan as requiring inspection or building system shutdown shall not be performed unless approved by the engineer. The contractor shall reimburse the City for all inspection of work not previously scheduled or approved by the engineer. Work requiring inspection shall be determined solely by the engineer.

It is possible that other contractors or the City will be working in the project area during the time of construction. It shall be the responsibility of this contractor to coordinate its work with all other agencies and/or contractors within the project area.

1.7 QUALIFICATION OF CONTRACTORS

A. QUALIFIED CONTRACTORS

Only contractors with management, employees, and staff experienced in the type of work required by this specification, and with a record of successful completion of projects of similar scope, complexity, and overall cost will be considered. The bidder must complete the Contractor's Record of Prior Contracts form attached to this specification at the time of submitting their bid. The City will be the sole judge of the bidder's ability to meet the requirements of this paragraph. Bidders past work will be judged in complexity of job, time of completion, organization, and other factors that may indicate the abilities of the contractor.

1. The manufacturer shall have a minimum of five years documented product development, testing, and manufacturing experience with the products and services specified in this Section. The manufacturer shall also be represented by a complete sales, installation, and service operation within the United States.

2. The installer shall have a minimum of five years documented experience applying the work of this Section.

3. The contractor shall have a service office which has been established for a minimum of five years and is staffed with factory-authorized service technicians capable of servicing all aspects of the crane.

Submit to the engineer within ten (10) calendar days following execution of the contact documents, a list of all subcontractors, including each subcontractor’s address, telephone number, and contact person to be used on this project.

After completion of the project, an evaluation prepared on the form titled "Generation Contractor Performance Review" which is attached will be completed for the general and all subcontractors on this project. This form will be used to determine the adequacy of the work performed on this project including supervisor, quality of work, and adequate manpower and equipment, and the ability for the general or subcontractor to perform work for Tacoma Power in the future.

Any exception taken by any contractor to the comments on the form should be directed to the engineer within thirty (30) days of receipt. Failure to adequately respond to a poor evaluation within this time frame will be cause for rejection of future bids. The completed evaluation form will be shared with the contractor and subcontractors, but will be kept confidential by the City.

B. QUALIFIED SUPERINTENDENT

The contractor shall employ a competent superintendent as referenced in Section 01040 – Project Coordination, Paragraph 1.15 – Superintendent.

C. ELECTRICAL CONTRACTORS

As required in the Revised Code of Washington (RCW) 35.92.350 and in General Provisions section 1.08B, electrical construction or improvement work for this project shall be performed by an electrical contractor. It shall be the duty of every bidder to comply with the provisions of this Washington State Law and Tacoma Power requirements.

1.8 SPECIFICATIONS AND DRAWINGS

The following drawings and photos, attached to these specifications, are made a part of the contract:

Drawings for Reference

Drawing No.	Sheet No.	Title
BK095-1.DWG		Main Powerhouse Crane 1995-96 Upgrade Project, Cover Sheet
BK095-2.DWG		Main Powerhouse Crane 1995-96 Upgrade Project, Bridge Equipment Layout
BK095-3.DWG		Main Powerhouse Crane 1995-96 Upgrade Project, Trolley Equipment Layout
BK095-4.DWG		Main Powerhouse Crane 1995-96 Upgrade Project, Cab Equipment Layout
BK095-5.DWG		Main Powerhouse Crane 1995-96 Upgrade Project, Conductor Rails Layout
BK095-6.DWG		Main Powerhouse Crane 1995-96 Upgrade Project, Walkway Extension Details
BP-243		Cushman PH No.2_Main Floor LL Capacity_tn 02.11.2022
BK-020		Powerhouse No. 2 125 Ton Crane Clearances
BK-022		Niles Electric Travelling Crane specification sheet
BK-023		Shepard Niles Crane & Hoist, Niles Division, Crane Specifications
BP-252		Power House No. 2 Steel Frame, General Plans & Elevations
BP-253		Power House No. 2 Steel Frame, Roof Trusses & Lateral Bracing
BP-254		Power House No.2 Steel Frame, Crane Girder
BP-255		Power House No.2 Steel Frame, East Elevation & Details
BP-256		Power House No.2 Steel Frame, West Elevation & Details
BP-257		Power House No.2 Steel Frame, End Elevation – Main Building
BP266		Steel Frame, Crane Trolley Buss Supports
BP-273-1		Power House No.2 Superstructure, Cross Section
BP-274		Power House No.2 Superstructure, Inside Elev. of East Main Wall
BP-275		Power House No.2 Superstructure, Inside Elev. Of West Main Wall
BW1827.DWG -		Main Powerhouse Crane One Line Diagram
BW1828.DWG -		Main Powerhouse Crane Intermediate Relay Panel Layout
BW1829.DWG -		Main Powerhouse Crane Intermediate Relays Schematic
BW1830.DWG -		Main Powerhouse Crane Main Hoist Controller Wiring Diagram
BW1831.DWG -		Main Powerhouse Crane Aux Hoist Controller Wiring Diagram
BW1832.DWG -		Main Powerhouse Crane Bridge Drive Controller Wiring Diagram
BW1833.DWG -		Main Powerhouse Crane Trolley Drive Controller Wiring Diagram
BW1834.DWG -		Main Powerhouse Crane Disconnect Switch Wiring Diagram
BW1835.DWG -		Main Powerhouse Crane Pendant Layout & Schematic

BW1836.DWG - Main Powerhouse Crane Pendant Wiring DiagramPhotos for ReferenceDSC_0015

DSC_0057

IMG_0848

IMG_0876

IMG_4198

IMG_6856

IMG_6947

IMG_9376

IMG_9378

IMG_9379

IMG_9418

IMG_9423

IMG_9479

All contract drawings are reduced to approximately half-size. Typical full-size prints are available and may be inspected by prospective bidders in the office of the Assistant Generation Manager - Generation Section, Tacoma Power, Third Floor, Tacoma Public Utilities Building, 3628 South 35th Street, Tacoma, Washington. Copies of original drawings may be obtained through the engineer during the bidding period. The contractor will be required to pay for all City-made full-size prints.

The contractor shall keep on the job site a full-size copy of the drawings and the specifications, and shall, at all times, give the engineer access thereto.

1.9 EVALUATION OF BIDS

The award of this contract will not be based on cost alone as other factors and features are equally important. The contract will be awarded to the lowest responsive and responsible bidder complying with the specifications; provided such bid is reasonable and it is in the best interests of the City to accept.

The City, however, reserves the right to reject any and all bids and to waive any informalities in bids received. The City reserves the right to let the contract to the lowest responsive and responsible bidder whose bid will be most advantageous to the City, price and any other factors considered.

All other elements or factors, whether or not specifically provided for in this contract, which would affect the final cost to and the benefits to be derived by the City will be considered in determining the award of the contract. In addition, the bid evaluation factors set forth in City Code Section 1.06.262 may be considered by the City. The conclusive award decision will be based on the best interests of the City. The engineer's decision as to which contractor best meets the City's need will be final.

In addition to General Provisions Section 1.08, the following factors will be used in bid evaluation:

A. Experience and success of both company and superintendent completing at least three (3) projects of similar scope, complexity and overall cost.

B. Proposal prices, base bid, and cost of any or all alternates listed.

C. Review of all required submittals.

D. Past record with the City (including satisfying safety requirements).

E. Bidder's responsibility based on, but not limited to:

1. Ability, capacity, organization, technical qualifications and skill to perform the contract or produce the services required.
2. Contractor's construction record including references, judgment, stability, adequacy of equipment proposed to be furnished.
3. Whether the contract can be performed within the time specified.
4. Quality of performance of previous contracts or services

1.10 LIST OF SUBCONTRACTORS' AND CONTRACTOR'S CATEGORIES OF WORK

Bid proposals for construction including alteration or repair where the contract is estimated to exceed $1,000,000 including tax shall satisfy the following requirement: **Bidder shall complete the enclosed List of Subcontractors' and Contractor's Categories of Work in its entirety, and return completed form as part of the bid submittal package.**

1.11 LOCAL EMPLOYMENT AND APPRENTICESHIP TRAINING PROGRAM (LEAP)

LEAP is a mandatory City of Tacoma program that requires the prime contractor or service provider performing a qualifying public works project or service contract to ensure that 15-percent of the total labor hours worked on the project are performed by apprentices approved by the Washington State Apprenticeship Council (SAC) and/or residents of Tacoma. Compliance may be met through any combination of utilizing residents of Tacoma or SAC apprentices. Because the project is located within the Tacoma Power hydro project areas, then 25-percent of the LEAP requirement may be satisfied utilizing a resident of the project area.

The accompanying LEAP Regulations and forms are included in these specifications.

With the forms below, please note that the Prime Contractor LEAP Utilization Plan," **is to be completed and presented at the pre-construction meeting.**

LEAP can assist contractors in the recruitment, screening and selection of qualified City of Tacoma applicants interested in a career in the building & construction trades. Residents can be screened and provided with education, training and support services that lead to employment with your company. Contractors/vendors may obtain further information by contacting the City's LEAP Office at 253-591-5590 or e-mail leap@cityoftacoma.org. The LEAP Office is located in the City's Community & Economic Development Department, Tacoma Municipal Building, 747 Market Street, Room 900, Tacoma, Washington 98402.

1.12 PREVAILING WAGES

In addition to the requirements of Section 3.09(B) of the General Provisions, the contractor shall be required to post on the job site a copy of the intent form to pay prevailing wages.

As identified in the General Provisions, the contractor shall comply with the law regarding prevailing wages. These rules apply to any contractor who does business with the City, including owner/operators.

A Statement of Intent to Pay Prevailing Wages **MUST** be filed with the Washington Department of Labor & Industries upon award of contract. An Affidavit of Wages Paid **MUST** be filed with the Washington Department of Labor & Industries upon job completion.

Payments cannot be released by the City until certification of these filings are received by the engineer. Additional information regarding these submittals can be obtained by calling the Department of Labor & Industries, Prevailing Wage at 360-902-5335, or by visiting their website at:
http://www.lni.wa.gov/tradeslicensing/prevailingwage/default.asp

1.13 PERFORMANCE (SURETY), PAYMENT AND RETAINAGE BONDS

A. PERFORMANCE (SURETY) AND PAYMENT BONDS

The Contractor shall provide both a Surety and Payment Bond for 100-percent of the total contract award within ten (10) calendar days after award of the contract in accordance with the General Provisions. These bonds shall be required for each contract awarded under this specification.

B. RETAINAGE BOND

A 5-percent retainage bond may be provided in lieu of the City withholding five-percent retainage. If a retainage bond is not obtained, the City will withhold 5-percent retainage until the end of the contract. If a retainage bond is provided, the City form must be used.

Contractor shall provide notice of intent to provide retainage bond ten (10) days prior to first invoice. The City may elect to allow submission of retainage bond after the first payment at its discretion.

END OF SECTION

SECTION 01025 - MEASUREMENT AND PAYMENT

1.1 ADMINISTRATION

A. AUTHORITY

Payment will be made monthly based on the schedule of values. Percent completion will be calculated by the engineer based on schedule of values.

In case work is suspended, nearly suspended, or in case only unimportant progress is being made, the engineer may, at their discretion, make progress estimates at longer intervals than once a month.

Modify Section 2.14 of the General Provisions as follows.

Invoices shall be mailed to the attention of:

Tacoma Power
Generation/Buisness Systems
3628 South 35th Street
Tacoma, Washington 98409

NOTE: All questions regarding contract status or payments should be directed to the project engineer.

B. CONTRACT PRICE

The lump sum and unit bid prices shall be full and complete compensation for the contract work stated, together with all appurtenances incidental thereto, including materials, equipment, tools, labor, and all the costs to the contractor for completing the contract in accordance with the plans, specifications, and instructions of the engineer.

All work not specifically described or mentioned in these specifications, but are required to be constructed to achieve complete and operable systems, structures or amenities shall be considered incidental items of work, not separately compensable, and its price included in items of work specified in the specifications.

C. NON-PAYMENT FOR REJECTED OR SURPLUS PRODUCTS

Payment will not be made for any of the following:

1. Products wasted or disposed of in a manner that is not acceptable
2. Products determined as unacceptable before or after placement
3. Products not completely unloaded from the transporting vehicle
5. Products remaining on hand after completion of the work
6. Loading, hauling and disposing of rejected products

D. WORK INCIDENTAL TO BID ITEMS

The following list indicates work which shall be considered incidental to the appropriate bid item as listed in the proposal:

1. Daily clean up of the work area.

1.2 PROPOSAL ITEMS

1. MOBILIZATION/DEMOBILIZATION, PER LUMP SUM

A. MEASUREMENT

Mobilization/Demobilization shall be measured per the lump sum (LS), not to exceed 5-percent of the base bid price.

B. PAYMENT

The lump sum (LS) contract price for Mobilization/Demobilization shall be full compensation for all labor, equipment, and materials to mobilize to the job site, preparation of work areas, demobilization, including clean up and site restoration. Mobilization/demobilization will only be paid once regardless of the number of mobilizations.

70-percent of the bid amount will be paid upon completion of the initial mobilization and job site preparation. The remaining 30-percent will be paid upon completion of all site restoration and clean up.

2. 30% DESIGN REVIEW

A. MEASUREMENT

The work under this bid item will include all labor, meetings, coordination, incorporation of review comments, and acceptance by the City engineer of the 30% design content as detailed below.

a. Main Hoist Component Selections

b. Main Hoist horsepower, speed and brake sizing calculations.

c. Auxiliary Hoist Component Selections

d. Auxiliary Hoist horsepower, speed and brake sizing calculations.

e. Bridge Drive Component Selection

f. Bridge Drive horsepower, speed and brake sizing calculations.

g. Trolley Drive Component Selection

h. Trolley Drive horsepower, speed and brake sizing calculations.

i. Major Electrical component selections with Catalog Cut Sheets and Equipment Lists

j. Drawing List

k. Design phase execution schedule showing target completion dates for 60 and 90 percent design reviews.

l. Preliminary Design Acceptance

B. PAYMENT

Measurement will be per Lump Sum (LS) and payment will be made for the unit price bid "30% Design Review Acceptance" in accordance with the specifications as listed in the proposal.

3. 60% DESIGN REVIEW

A. MEASUREMENT

The work under this bid item will include all labor, meetings, coordination, incorporation of review comments, and acceptance by the City engineer of the 60% design content as detailed below.

a. Latest version of all 30% design submittal information

b. All drawings in a state of development sufficient to demonstrate form, fit and function

c. All remaining calculations pertinent to the design

d. Preliminary electrical component Bill of Materials and Equipment Lists

e. Preliminary electrical schematics and control panel layout drawings

f. Preliminary Project execution schedule, showing 90% design completion, fabrication, installation, commissioning, testing, training, and project closeout milestones

B. PAYMENT

Measurement will be per Lump Sum (LS) and payment will be made for the unit price bid "60% Design Review Acceptance" in accordance with the specifications as listed in the proposal.

4. 90% DESIGN REVIEW

A. MEASUREMENT

The work under this bid item will include all labor, meetings, coordination, incorporation of review comments, and acceptance by the City engineer of the 90% design content as detailed below.

a. Latest version of all 60% design submittal information

b. Design Drawings completed except for approval by Tacoma Power

c. Product Technical Data of components with Catalog Cut Sheets and Equipment Lists

d. Final electrical schematics and detailed wiring diagrams complete

e. Final panel layout drawings complete

f. Final electrical Bill of Materials complete

g. Detailed project execution schedule showing completion timeline for fabrication, installation, commissioning, testing, training, and project closeout.

B. PAYMENT

Measurement will be per Lump Sum (LS) and payment will be made for the unit price bid "90% Design Review Acceptance" in accordance with the specifications as listed in the proposal.

5. FINAL DESIGN ACCEPTANCE

A. MEASUREMENT

The work under this bid item will include all labor, meetings, coordination, incorporation of review comments, and acceptance by the City engineer of the complete design.

B. PAYMENT

Measurement will be per Lump Sum (LS) and payment will be made for the unit price bid "Final Design Acceptance".

6. INSPECTION OF GEARS AND BEARINGS TO BE REUSED IN THE HOIST GEARBOXES

A. MEASUREMENT

The work under this bid item will include all labor, materials and equipment to pin the load brakes and inspect the gears and bearing journals and shafting in the hoist gearcases.

B. PAYMENT

Measurement will be per Lump Sum (LS) and payment will be made for the unit price bid " Inspection of gears and bearings to be reused in the hoist gearboxes " in accordance with the specifications as listed in the proposal.

7. SHOP DRAWINGS

A. MEASUREMENT

The work under this bid item will include all labor, materials and equipment to create shop drawings that comprehensively communicate how to fabricate the design, including materials.

B. PAYMENT

Measurement will be per Lump Sum (LS) and payment will be made for the unit price bid "Shop Drawings" in accordance with the specifications as listed in the proposal.

8. PANEL, GEAR AND FUSES

A. MEASUREMENT

The work under this bid item will include all labor and materials to create the Panel, Gear and Fuses.

B. PAYMENT

Measurement will be per Lump Sum (LS) and payment will be made for the unit price bid "Panel, Gear and Fuses" in accordance with the specifications as listed in the proposal.

9. SELECTIVE DEMOLITION

A. MEASUREMENT

The work under this bid item will include all labor perform selective demolition.

B. PAYMENT

Measurement will be per Lump Sum (LS) and payment will be made for the unit price bid "Selective Demolition" in accordance with the specifications as listed in the proposal.

10. FACTORY ACCEPTANCE TESTING

A. MEASUREMENT

The work under this bid item will include all labor, materials and equipment to complete factory acceptance testing, and the correction of any issues uncovered during test.

B. PAYMENT

Measurement will be per Lump Sum (LS) and payment will be made for the unit price bid "Factory Acceptance Testing" in accordance with the specifications as listed in the proposal.

11. MANUFACTURER'S INSTALLATION INSTRUCTIONS

A. MEASUREMENT

The work under this bid item will include all labor and materials to create the Manufacturer's Installation Instructions. This document shall give specific instruction for attaining all critical parameters in the field, e.g. machinery alignments.

B. PAYMENT

Measurement will be per Lump Sum (LS) and payment will be made for the unit price bid "Manufacturer's Installation Instructions" in accordance with the specifications as listed in the proposal.

12. RIGGING PLAN

A. MEASUREMENT

The work under this bid item will include all labor and materials to create the Rigging Plan for hoisting items to and from the crane. See "Installation" section of the technical specifications.

B. PAYMENT

Measurement will be per Lump Sum (LS) and payment will be made for the unit price bid "Rigging Plan" in accordance with the specifications as listed in the proposal.

13. SAFETY PLAN FOR CERTIFICATION TESTING

A. MEASUREMENT

The work under this bid item will include all labor and materials to create the Safety Plan for Testing. See 'Commissioning' section of the technical specifications.

B. PAYMENT

Measurement will be per Lump Sum (LS) and payment will be made for the unit price bid "Safety Plan for Certification Testing" in accordance with the specifications as listed in the proposal.

14. COMMISSIONING PLAN

A. MEASUREMENT

The work under this bid item will include all labor and materials to create a Commissioning Plan. The Field Test Procedure and Load Test are bullet items in this plan. See 'Commissioning' section of the technical specifications.

B. PAYMENT

Measurement will be per Lump Sum (LS) and payment will be made for the unit price bid "Commissioning Plan" in accordance with the specifications as listed in the proposal.

15. FIELD TEST PROCEDURE (COMPREHENSIVE)

A. MEASUREMENT

The work under this bid item will include all labor and materials to create the Field Test Procedure. This procedure is to comprehensively verify the as built conditions match the design documentation. See 'Commissioning' section of the technical specifications.

B. PAYMENT

Measurement will be per Lump Sum (LS) and payment will be made for the unit price bid "Field Test Procedure" in accordance with the specifications as listed in the proposal.

16. LOAD TEST PLAN

A. MEASUREMENT

The work under this bid item will include all labor and materials to create the Load Test Plan. See 'Commissioning' section of the technical specifications.

B. PAYMENT

Measurement will be per Lump Sum (LS) and payment will be made for the unit price bid "Load Test Plan" in accordance with the specifications as listed in the proposal.

17. PUNCH LIST

A. MEASUREMENT

The work under this bid item will include all labor and materials to complete the “Punch List”. See ‘Contract Closeout’ section of the special specifications and the ‘Commissioning’ section of the technical specifications.

B. PAYMENT

Measurement will be per Lump Sum (LS) and payment will be made for the unit price bid "Punch List" in accordance with the specifications as listed in the proposal.

18. RATED LOAD TEST REPORT

A. MEASUREMENT

The work under this bid item will include all labor and materials to create the Load Test Report. See ‘Commissioning’ section of the technical specifications.

B. PAYMENT

Measurement will be per Lump Sum (LS) and payment will be made for the unit price bid "Load Test Report" in accordance with the specifications as listed in the proposal.

19. INSPECTION REPORT

A. MEASUREMENT

The work under this bid item will include all labor and materials to create the post test Inspection Report. See ‘Submittals’ section of the technical specifications.

B. PAYMENT

Measurement will be per Lump Sum (LS) and payment will be made for the unit price bid "Inspection Report" in accordance with the specifications as listed in the proposal.

20. CONTRACT DRAWINGS REDLINED WITH AS-BUILT CONDITIONS

A. MEASUREMENT

The work under this bid item will include all labor to gather information to create the As Built Drawings. See ‘Submittals’ section of the technical specifications. (Note that final As Built drawings are required below.)

B. PAYMENT

Measurement will be per Lump Sum (LS) and payment will be made for the unit price bid "As Built Drawings" in accordance with the specifications as listed in the proposal.

21. CRANE CERTIFICATION

A. MEASUREMENT

The work under this bid item will include all labor and materials to document the certification of the crane. The Certificate shall document the crane has successfully passed inspection, load test, and post test inspection, and is understood to be ready for service. See ‘Submittals’ and ‘Testing’ sections of the technical specifications.

B. PAYMENT

Measurement will be per Lump Sum (LS) and payment will be made for the unit price bid "Crane Certification" in accordance with the specifications as listed in the proposal.

22. WARRANTEE

A. MEASUREMENT

The work under this bid item will include all labor and materials to provide a one year warranty on the parts, materials, and system reliability of the upgraded portions of the crane.

B. PAYMENT

Measurement will be per Lump Sum (LS) and payment will be made for the unit price bid "Crane Warranty".

23. OPERATION AND MAINTENANCE MANUAL

A. MEASUREMENT

The work under this bid item will include all labor and materials to create the Operations and Maintenance Manual for the crane. See 'Submittals' section of the technical specifications.

B. PAYMENT

Measurement will be per Lump Sum (LS) and payment will be made for the unit price bid "Operation and Maintenance Manual" in accordance with the specifications as listed in the proposal.

24. COMPLETED TESTING FORMS

A. MEASUREMENT

The work under this bid item will include all labor and materials to execute the commissioning Field Test Procedure and document the results. See 'Submittals' section of the technical specifications.

B. PAYMENT

Measurement will be per Lump Sum (LS) and payment will be made for the unit price bid "Completed Testing Forms" in accordance with the specifications as listed in the proposal.

25. REPORTS OF WARRANTY SERVICE

A. MEASUREMENT

The work under this bid item will include all labor to document all warranty service. See 'Submittals' section of the technical specifications.

B. PAYMENT

Measurement will be per Lump Sum (LS) and payment will be made for the unit price bid "Reports of Warranty Service" in accordance with the specifications as listed in the proposal.

26. WARRANTY SPECIFIC REDLINE DRAWINGS

A. MEASUREMENT

The work under this bid item will include all labor to redline all drawings affected by warranty service. See 'Submittals' section of the technical specifications.

B. PAYMENT

Measurement will be per Lump Sum (LS) and payment will be made for the unit price bid "Warranty Specific Redline Drawings" in accordance with the specifications as listed in the proposal.

27. FINAL AS-BUILT DRAWINGS

A. MEASUREMENT

The work under this bid item will include all labor to create the Final As-Built drawings. See 'Submittals' section of the technical specifications.

B. PAYMENT

Measurement will be per Lump Sum (LS) and payment will be made for the unit price bid "Final As-Built Drawings" in accordance with the specifications as listed in the proposal.

28. ALL ELECTRONIC FILES

A. MEASUREMENT

The work under this bid item will include all labor and materials to submit all the electronic files developed for this project. See 'Submittals' section of the technical specifications.

B. PAYMENT

Measurement will be per Lump Sum (LS) and payment will be made for the unit price bid "Electronic Files" in accordance with the specifications as listed in the proposal.

29. FORCE ACCOUNT, PER LUMP SUM

A. MEASUREMENT

Measurement will be made for Force Account in accordance with Section 1-09.6 of the latest edition of the Standard Specifications for Road, Bridge and Municipal Construction of the Washington State Department of Transportation as modified by Force Account Work in the Special Provisions or on negotiated lump sum or unit price change orders added to the contract.

B. PAYMENT

Payment shall be made for change order items added to the contract which shall be treated as a deduct to the force account remaining available. There is no guarantee that there will be any Force Account work.

"Force Account," as listed in the proposal

1.3 SCHEDULE OF VALUES LIST

The following listing shall be used by the contractor as a minimum breakdown for the Schedule of Values required for this project. For each item, the contractor shall determine the unit of measure such as lump sum (LS), per each (EA), linear feet (LF), ton (TON), or cubic yard (CY), etc., and as approved by the engineer:

1. Mobilization (not otherwise listed below)
2. 30% Design Review
3. 60% Design Review
4. 90% Design Review
5. Final Design Acceptance

6. Inspection of gears and bearings to be reused in the hoist gearboxes
7. Shop Drawings
8. Factory Acceptance Testing
9. Panel, Gear and Fuses
10. Selective Demolition
11. Manufacturer's Installation Instructions
12. Rigging Plan
13. Safety Plan for Certification Testing
14. Commissioning Plan
15. Field Test Procedure
16. Load Test Plan
17. Punch List
18. Rated Load Test Report
19. Inspection report
20. Contract Drawings redlined with As-Built conditions
21. Crane Certification
22. Warrantee
23. Operation and Maintenance Manual
24. Completed Testing Forms
25. Reports of Warranty Service
26. Warranty specific redline drawings
27. Final As Built Drawings
28. All Electronic Files
29. Demobilization/Closeout

1.4 FORCE ACCOUNT WORK

This section supersedes Section 3.10, Paragraph C of the General Provisions.

In certain circumstances, the contractor may be required to perform additional work. Where the work to be performed is determined to be extra and not attributed to the contractor's negligence, carelessness, or failure to install permanent controls, it shall be paid in accordance with the unit contract price or by force account.

Such additional work not covered by contract items will be paid for on a force account basis in accordance with Section 1-09.6 of the Standard Specifications or as a negotiated change order with lump sum or unit price items. For the purpose of providing a common proposal for all bidders and for that purpose only, the City has estimated the potential cost of force account work, and has entered the amount in the bid proposal to become a part of the total bid by the contractor. However, there is no guarantee that there will be any force account work.

1.5 NON-PAYMENT FOR REJECTED OR SURPLUS PRODUCTS OR WORK

Payment will not be made for work rejected by the City. Products or work not meeting contract requirements shall be replaced by the contractor at no expense to the City, regardless of the impact to work, schedule or cost.

1.6 AS-BUILTS

The final payment of this contract will not be released until complete “AS-BUILT” plans are received and approved by the engineer.

END OF SECTION

SECTION 01040 - PROJECT COORDINATION

1.1 PROJECT ENGINEER/LEAD

The project engineer/lead shall be herein referenced as engineer in these specifications.

Construction management for this project with whom the contractor shall coordinate all their activities will be Mr. Steve Belvin at sbelvin@cityoftacoma.org once the notice to commence work is issued. Any changes to these specifications or plans shall be approved by this engineer prior to commencing any work.

Bidder inquiries, regarding technical specifications, may be directed to Steve Belvin at sbelvin@cityoftacoma.org.For general purchasing provisions, contact Tina Eide, Purchasing, at teide@cityoftacoma.org.

1.2 MEETINGS

A. PRE-BID MEETING

All bidders are invited to attend a pre-bid virtual meeting on virtually April 20th,2022 10:00 a.m. to 11: 00 a.m. Email teide@cityoftacoma.org to confirm your attendance.

B. PRE-CONSTRUCTION MEETING

Following award of the contract, the engineer will notify the selected bidder of the time and date of the pre-construction meeting to be held at the project location or the Third Floor Engineering Conference Room, Tacoma Public Utilities Administration Building, 3628 South 35th Street, Tacoma, Washington.

Minutes of the pre-construction meeting will be sent to the contractor and all meeting attendees. Recipients of the pre-construction meeting minutes will be required to direct any comments or changes to these minutes to the engineer within seven (7) days from the date of receipt. If no changes or comments are received within the seven (7) days, the meeting minutes will be kept by the engineer and become part of the project file.

C. SITE MEETINGS

The engineer will schedule weekly meetings virtually and at the project site once construction begins, prior to each major phase or section of work; prior to installing major pieces of equipment as identified by the engineer; and on an as-needed basis. Attendance is required of the contractor, site superintendent and major subcontractors at all such meetings. The engineer will notify the contractor of all required site meetings during the pre-construction meeting. Agenda will follow the same format as the pre-construction conference for applicable items.

Minutes of the weekly site meeting will be sent to the contractor and all meeting attendees. Recipients of the pre-construction meeting minutes will be required to direct any comments or changes to these minutes to the engineer within seven (7) days from the date of receipt. If no changes or comments are received within the seven (7) days, the meeting minutes will be kept by the engineer and become part of the project file.

D. COORDINATION MEETING WITH OTHER CONTRACTORS

While this project is underway there may be other major general contractors and City crews performing work in the vicinity of the project.

Work on these projects may require:

1. Loading and unloading of materials for these projects
2. Disruptions to the work areas adjacent to this project and other activities which must be coordinated among the City and all affected contractors.

As such, there may be coordination meetings required throughout the project depending on the other contracts and at the discretion of the project engineer.

These meetings will be attended by the contractor and/or superintendent and City project managers. These meetings will be to discuss any concerns which affect building systems or yard usage and any outages must be discussed in these meetings to obtain City approval. Adequate notice for major activities must be included in the contractor's schedule or at these meetings to allow for coordination with other contractors or City to mitigate specific construction activities.

1.3 COORDINATION WITH OTHERS

A. OPERATION OF EXISTING FACILITIES

The facilities or portions of facilities within the project limits must be kept in continuous operation throughout the construction period. With permission provided by the City in advance, portions of the existing facilities may be taken out of service for short periods.

It is possible that other contractors or the City will be working in the project area and other buildings at the Cushman project during the time of construction. It shall be the responsibility of this contractor to coordinate its work with all other agencies and/or contractors within the project area.

The contractor shall be responsible for coordinating and scheduling the work to be performed by the City so that it coincides with the contractor's work.

All construction activities shall be coordinated daily with the engineer or their designated representative. Changes to the schedule that will impact on dates shown as milestones on the schedule shall be coordinated with the engineer on a daily basis.

The City will be using this facility for ongoing daily operations.

The contractor shall become familiar with the ongoing operations and include all coordination required as part of the bid. The contractor shall follow all requirements of the City and do all coordination as part of the required work.

B. SCHEDULE AND COORDINATION OF WORK

The contractor shall coordinate scheduling, submittals, and all work specified herein to assure efficient and orderly sequence of the installation of interdependent construction elements with provisions for accommodating items installed later.

1.4 DIVISION OF WORK

A. MATERIAL FURNISHED AND INSTALLED BY CONTRACTOR

The contractor shall furnish and pay for all necessary materials (except City-furnished) and shall provide all labor, tools, equipment and superintendent, and perform all work incidental to the completion of the project as contemplated by this contract in accordance with the plans, specifications, and instructions of the engineer.

Each subcontractor shall furnish and install all materials and equipment unless otherwise specified.

B. WORK TO BE DONE BY CITY

The City will provide all materials and perform all work for:

1. Removal of the existing DC power inverter and DC disconnect panel will be performed by the City. Contractor shall be responsible to remove all runway mounted DC feeder wires and wire support system. Contractor shall also be resonsible to remove all bridge mounted DC feeder and control wires and wire support system.

2. Installation of a new AC power source will be performed by the City. Size (Amperage and short circuit current interruption) required shall be determined by the contractor.
3. Installation of a new 3-phase AC power disconnect at the generator floor will be performed by the City, This new disconnect will be ithe interface point for this contract.

Notify the engineer a minimum of four (4) days prior to needing any additional work to be performed by the City.

The contractor shall be responsible for coordinating and scheduling the work to be performed by the City so that it coincides with their work.

1.5 LIMITATION OF CONTRACTOR'S WORK AREA/OR CONTRACTOR'S USE OF PREMISES

A. BARRIERS

Dividing work area from area in City use.

B. CITY OCCUPANCY

The project and/or its surrounding area will be occupied/used by the City of on-going daily operations. The City will provide some indoor space for the contractor inside the powerhouse, as well as some additional space in another nearby building.

C. WORK BY OTHERS AND WORK BY CITY

At the time of construction of the crane controls project, other contractors may be on site performing other construction projects. The contractor shall coordinate all activities with the City during the construction period.

D. CONTRACTOR'S USE OF PREMISES

All requests for use of areas not designated for use by the contractor shall be made in writing to the engineer for approval at least four (4) days in advance of the need. The engineer shall approve those areas for use prior to use by the contractor.

All staging and work areas shall be submitted with bids for approval by the engineer.

1.6 HAZARDOUS MATERIALS

The City is aware there is lead paint on the existing crane. The contractor is required to follow all local, state, and federal laws pertaining to the disturbance, removal, handling, storing, transporting, and disposal of all materials deemed hazardous by law.

All work shall be performed by workers certified by Washington State Department of Labor and Industries as having successfully completed a state approved training course. All work shall be in accordance with EPA Title 40 CFR.

1.7 CONTRACT CHANGES

The City has developed four (4) forms to facilitate and track communications with the contractor. These are the **Request for Information (RFI), Engineering Change Directive (ECD), Proposal Request (PR),** and **Change Order Proposal (COP)**. These forms are included at the end of the Special Provisions.

The **Request for Information (RFI)** shall be used by the contractor whenever written direction on conflicts in plans, insufficient or unconstructable detail is shown, or any other issue which should be documented arises. The City may also use the form to inquire on contractor's methods, schedule or other issues not warranting more formal letter correspondence. The contractor shall maintain the numbering system and, as such, any issued by the City will be unnumbered until delivered to the contractor.

The **Engineering Change Directive (ECD)** shall be used by the City to transmit new or revised drawings, issue additions or modifications to the contract or furnish any other direction which should be documented. Directives are effective immediately. Should the contractor believe that such Directive should result in either a change in cost or time for the project, they shall notify the engineer prior to commencing such work and, if possible, submit a **Change Order Proposal** prior to the start of such work, but in no case, more than seven (7) days from receipt of said Directive.

In the event the City does not receive a **Change Order Proposal** from the contractor within seven (7) calendar days of the contractor's receipt of a Directive from the City, the contractor shall have no claim for extra cost or time or impacts attributable to the work required by the Directive. (Directives are numbered by the City.) Once the City and the contractor have established a price for the changes required by the Directive or any other request by the City for a change in the work, and a **Change Order Proposal** issues reflecting the agreed upon price, it is agreed and understood that the price reflected by the **Change Order Proposal** shall include all direct costs, indirect costs, and the contractor's estimate of impacts to its work, including but not limited to delay impacts, and shall represent a full and final settlement of all issues pertaining to the work required by the Directive, and work performed by the contractor up to the date of the **Change Order Proposal**.

The **Proposal Request (PR)** shall be used by the City to request pricing on a possible change in plans or additional work. The PR may also be used to request credits for deletion or changes in scope of work. The contractor shall respond to such requests with a **Change Order Proposal** within seven (7) days from receipt of said Request unless more time has been agreed to. Requests are numbered by the City.

The **Change Order Proposal (COP)** shall be used by the contractor to respond to City issued Proposal Requests, Engineering Change Directives or when the contractor believes that changed conditions or omitted, but necessary, work items exist. The COP may be used for requested changes in cost or time of the contract. COPs shall be numbered by the contractor, and, in the case of revision or resubmission of the same basic COP, the number shall be hyphenated with the letter "B", "C", etc.

1.8 DIFFERING SITE CONDITION

Differing site conditions shall be administered in accordance with Sections 1.04.5, 1.04.7, and 1.09.11 of the Standard Specifications except as stipulated in these Special and General Provisions. Contractor shall have no claim for additional costs or work, if it fails to submit a written RFI to the City immediately upon encountering any differing site condition, conflicts in the plans, specifications, or constructability issues.

The contractor shall promptly, and before conditions are disturbed, notify the engineer or their field representative of problems with subsurface conditions at the site, problems or conflicts in the plans or specifications or problems on constructability. A written **Request for Information (RFI)** shall be submitted by the contractor when such problems and direction are required.

The engineer shall promptly investigate the conditions, and if agreed upon with the contractor, adjustment shall be made on the appropriate details in writing to facilitate construction. The response may be on the **RFI** or may necessitate an **Engineering Change Directive (ECD)** or **Proposal Request (PR).** No claim by the contractor under this differing site condition shall be allowed except as agreed upon in writing with the engineer.

Whenever possible, should the City desire extra work to be performed a **Proposal Request (PR)** shall be sent to the contractor**.**

Whenever possible, the contractor shall submit in advance and in writing, a **Change Order Proposal (COP)** for changes in the scope of work and/or contract amount. This proposal shall be either accepted or rejected in writing by the project engineer prior to work commencing. When no agreement can be reached, the City may order extra work on force account.

When time is short, the contractor shall notify the City extra work is required or the City shall notify the contractor that extra work is needed and at a minimum, the engineer shall issue a handwritten **Engineering Change Directive**. In such cases, said handwritten **Directive** will not be considered as agreement that such work is extra. Within seven (7) days, the contractor shall submit a written **Change Order Proposal** for changes in the scope of work and/or contract amount.

1.9 CONSTRUCTION PROGRESS SCHEDULES

A. FORMAT

The contractor shall prepare schedules as a horizontal bar chart with separate bar for each major portion of work or operation, identifying the first work day of each week and include holidays and times when facility will not be available to contractor for City installed work.

B. CONTENT

This schedule shall be activity-oriented showing as nearly as can be determined the starting and completion dates of each event. The schedule shall show the materials delivery, structure erection, and installation. It will include the start and completion of each major structural, mechanical, communications and electrical item of work critical to the general contractor's operation.

Show complete sequence of construction, by activity, with dates for beginning and completion of each element of construction.

Identify each task by the appropriate proposal bid item number and subcontractor responsible.

As a minimum, the following tasks shall be included on the schedule:

1. Scope of Work identified, structural, mechanical, electrical and communications.
2. Phases of work where required.
3. Include all items in the schedule of values.
4. Demolition, Installation, Commissioning.

C. SEQUENCE SCHEDULING

It shall be the contractor’s responsibility to properly phase in all work specified herein including all work done by subcontractors.

Progress schedules are required to be coordinated with Tacoma Power and updated monthly or when changes occur. Acceptance or approval of the progress schedule does not release the contractor from the responsibility to provide the necessary resources to meet the schedule.

D. SUBMITTALS

The contractor shall submit initial schedules at the preconstruction meeting or at a minimum of within ten (10) working days after the contract award. After review, if changes are required by the engineer, resubmit required revised data within ten (10) working days.

The contractor shall use the attached Submittal Transmittal form (electronic version is available from the engineer) for all submittals.

Within twenty (20) days of the date of the contract, the contractor and the engineer will reach an agreement on any and all adjustments and all modifications to the submitted schedule which are warranted. The schedule, thus modified, will become part of the contract.

The failure of the contractor to submit a schedule(s), or the inability of the contractor and the City to reach an agreement as to modifications to a schedule, shall not excuse the contractor's obligation to perform the work required by the specifications in the number of days required by the specification.

Once a month, the City's and the contractor's site representatives will meet and perform a "Line-to-Line" review of items on the schedule, illustrating their plan for meeting the completion dates specified in this contract and the associated construction costs for each subcontractor.

1.10 SUPERINTENDENT

The contractor shall employ a competent superintendent (foreman) who shall be present at the project site at all times during the entire progress of the work, except those times when the contractor is demobilized. The superintendent shall be on site even when only a subcontractor is working, unless otherwise approved by the engineer. The foreman shall be satisfactory to the contractor, and shall have full authority to act on their behalf.

It will be the foreman's responsibility to have a set of plans and specifications on the project site during the progress of the work. The foreman shall mark or record on the plans all changes made during construction. Such redline "AS-BUILT" plans shall be available to the engineer at all times and shall be delivered to the engineer upon completion of the work.

The superintendent initially assigned to the project by the general contractor shall remain superintendent for the duration of the contract. If the superintendent is replaced, all work shall stop until an additional preconstruction meeting with the City is held. This work stoppage will be at the contractor's expense. The completion date shall remain unchanged, regardless of any work stoppage.

NOTE: The final retained portion of this contract shall not be released for any reasons until complete redline "AS-BUILT" plans are received and approved by the engineer. Redline "AS-BUILT" plans shall have all necessary information including make/model numbers, dimensions, and layout information necessary to properly draft changes in AutoCAD.

1.11 CLEAN UP

In addition to Section 3.11 - Cleaning Up of the General Provisions

A. DAILY

The contractor and the City inspector will walk the site daily and as required to determine the clean up and restoration required.

All areas shall be left safe, clean and free of debris.

Surplus, conduit material, tools, temporary structures, and rubbish shall be removed and disposed of by the contractor, and the construction site shall be left clean to the satisfaction of the engineer.

Clean up is considered incidental to the project and no payment will be allowed.

Collect waste daily and when containers are full, legally dispose of waste off site.

Clean-up of any area impacted by the construction shall be done weekly or as directed/instructed by the engineer.

END OF SECTION

TACOMA POWER
TACOMA PUBLIC UTILITIES

CHANGE ORDER PROPOSAL (COP)

(This form shall be used by the contractor to respond to City issued Proposal Requests, Engineering Change Directives or when the contractor believes that changed conditions or omitted, but necessary, work items exist. The COP may be used for requested changes in cost or time of the contract.)

COP No.: ☐ *(Contractor Assigns)*

REF. Doc.: ☐ *(Initiating a RFI, ECD or PR)*

Date: _____

Project Title: _____

Specification No.: _____ Contract No.: _____

Contractor:

Owner:
Tacoma Power/Generation
3628 South 35th Street
Tacoma, WA 98409

Title: _____

☐ Architectural ☐ Civil ☐ Structural ☐ Mechanical ☐ Electrical ☐ Other

Scope of Change:

Initiated By: _____ Representing: _____
(Name) *(Company)*

Cost/Credit: _____ Time Extension Request: _____

Attachment Type: _____
(Supporting Documentation)

This change order proposal shall include ALL labor, material, equipment, subcontractor costs, mark-ups including overhead, profit, any other direct and/or indirect costs, and any requests for additional time associated with the change in the scope of work.

City's Response:

Action: ☐ Approved ☐ Unapproved ☐ Revise and Resubmit *(Select only one)*

*Prior to any extra work the contractor shall submit a written **Change Order Proposal** (COP). See Section 01040, Contract Changes, of the specification for this Contract.*

Response By: _____ Attachment Type: _____
(Name) *(Supporting Documentation)*

Representing: _____ Response Date: _____
(Company) *(Date)*

Cc:

TACOMA POWER
TACOMA PUBLIC UTILITIES

ENGINEERING CHANGE DIRECTIVE (ECD)

(This form shall be used by the City to transmit new or revised drawings, issue additions or modifications to the contract or furnish any other direction which should be documented.)

ECD No.: ☐ *(City Assigns)*

Date: _____

Project Title: _____

Specification No.: _____ Contract No.: _____

Contractor:

Owner:
Tacoma Power/Generation
3628 South 35th Street
Tacoma, WA 98409

Title: _____

☐ Architectural ☐ Civil ☐ Structural ☐ Mechanical ☐ Electrical ☐ Other

You are hereby directed to make the following modification(s) in the Scope of Work in this Contract:

This document becomes effective upon receipt by the Contractor, with signature of an approved City representative. The Contractor shall then commence with modifications(s) listed above.

Attachment Type: _____ *(Supporting Documentation)*

Initiated By: _____ *(Name)*

Representing: _____ *(Company)*

Contractor's Response:

This ECD: ☐ Will Not ☐ May ☐ Will *(select one box only) result in a claim by the Contractor.*

*Prior to any extra work the contractor shall submit a written **Change Order Proposal** (COP). See Section 01040, Contract Changes, of the specification for this Contract.*

Attachment Type: _____ *(Supporting Documentation)*

Response By: _____ *(Name)*

Response Date: _____ *(Date)*

Representing: _____ *(Company)*

Cc:

TACOMA POWER
TACOMA PUBLIC UTILITIES

REQUEST FOR INFORMATION (RFI)

(This form shall be used by the contractor whenever written direction on conflicts in plans, insufficient or unconstructable detail is shown, or any other issue which should be documented arises; or by the City when additional clarification is required.)

RFI No.: _____ *(Contractor Assigns)*

Date: _____

Project Title: _____

Specification No.: _____ Contract No.: _____

Contractor:

Owner:
Tacoma Power/Generation
3628 South 35th Street
Tacoma, WA 98409

Subject: _____

☐ Architectural ☐ Civil ☐ Structural ☐ Mechanical ☐ Electrical ☐ Other

Requested Information:

Attachment Type: _____ Initiated By: _____
(Supporting Documentation) *(Name)*

Response Required: _____ Representing: _____
(Date) *(Company)*

Response:

Attachment Type: _____ Response By: _____
(Supporting Documentation) *(Name)*

Representing: _____
(Company)

*Prior to any extra work the contractor shall submit a written **Change Order Proposal** (COP). See Section 01040, Contract Changes, of the specification for this Contract.*

Response Date: _____
(Date)

City Approval:

The owner (Tacoma Power) reviewed the foregoing request and finds the response to be in order.

Project Engineer: _____ Response Date: _____
(Name) *(Date)*

Cc:

TACOMA POWER
TACOMA PUBLIC UTILITIES

PROPOSAL REQUEST (PR)

(This form shall be used by the City to request pricing on a possible change in plans or additional work. The PR may also be used to request credits for deletion or changes in scope of work.)

PR No.: ☐ *(City Assigns)*

Date: _____

Project Title: _____

Specification No.: _____ Contract No.: _____

Contractor:

Owner:
Tacoma Power/Generation
3628 South 35th Street
Tacoma, WA 98409

Subject: _____

☐ Architectural ☐ Civil ☐ Structural ☐ Mechanical ☐ Electrical ☐ Other

Scope of Request:

Attachment Type: _____
(Supporting Documentation)

This is not a change order or a notice to proceed with the described work. *Prior to any extra work the contractor shall submit a written* ***Change Order Proposal*** *(COP). See Section 01040, Contract Changes, of the specification for this Contract.*

Initiated By: _____ Representing: _____
(Name) *(Company)*

Cc:

TACOMA POWER
TACOMA PUBLIC UTILITIES

CONTRACTOR SUBMITTAL TRANSMITTAL

Submittal No.: ☐ *(Contractor Assigns)*

Date: _____

Project Title: _____

Specification No.: _____ Contract No.: _____

Contractor:

Owner:
Tacoma Power/Generation
3628 South 35th Street
Tacoma, WA 98409

Subject: _____

☐ Architectural ☐ Civil ☐ Structural ☐ Mechanical ☐ Electrical ☐ Other

Sending the Following Item(s):

☐ Submittals ☐ Product/Data ☐ Samples ☐ Plans ☐ Shop Drawings ☐ Copies
☐ Specifications ☐ Contract ☐ Other: _____

Copies	Section	Description of Product/Data	Manufacturer

Transmitted as:

☐ For Approval ☐ For Your Use ☐ Per Your Request ☐ For Review and Comment
☐ Other: _____

Remarks:

For Use by Architect/Engineer:

☐ No Exception Taken ☐ Make Corrections Noted ☐ Revise and Resubmit ☐ Rejected (See Response)

Corrections or comments made on the shop drawings during this review do not relieve Contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating his work with that of all other contractors and agencies performing his work in a safe and satisfactory manner.

Response Date: _____ Response By: _____
(Date) *(Name*

SECTION 01300 - SUBMITTALS AND SHOP DRAWINGS

1.1 SUBMITTALS REQUIRED/REQUESTED WITH BID

In addition to the items listed in the Bidders Checklist, the bidders **shall** submit with their bid package the following information. This information will be used for evaluation purposes.

1. Experience and success of both company and superintendent completing at least three (3) projects of similar scope, complexity, and overall cost. A detailed list of comparable projects with current list of contacts shall be submitted with the bids.
2. A minimum of ten (10) documented years experience in building or facilities construction supervision by superintendent. Bidders shall submit a resume of named superintendent with their bids.
3. List of members of the design team including experience and qualifications.

1.2 DOCUMENTS REQUIRED AT PRE DESIGN & CONSTRUCTION CONFERENCE

A. Work Hazard Analysis Report as required in Paragraph 3.06(B) of the General Provisions.

B. Construction Schedule as required in Section 01040 – Project Coordination.

C. List of Subcontractors, including each subcontractor's address, telephone number, and contact person to be used on this project.

D. Name of Job Superintendent.

A, SCHEDULE OF VALUES

Submit a detailed list of items to be included in the Schedule of Values within five (5) days of award of contract for approval by the engineer.

The Schedule of values will be used by the engineer to calculate monthly payment for percent completion as indicated in Section 01025.

Use the specification Table of Contents as a guide to establish the format for the Schedule of Values. List all items in the Schedule of Values subsection of the Measurement and Payment section of this specification.

1. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
   a. Related Specification Section or Division
   b. Description of Work
   c. Dollar Value either in dollars or as a percentage of the contract sum rounded to the nearest one-hundredth percent, adjusted to total 100-percent.
2. Provide a breakdown of the contract sum in sufficient detail to facilitate continued evaluation of applications for payment and progress reports. Break principal subcontract amounts down into several line items.
3. Round amounts to nearest whole dollar; the total shall equal the contract sum.
4. Provide a separate line item in the Schedule of Values for each part of the work where applications for payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

B. SCHEDULE UPDATING

Update and resubmit the Schedule of Values prior to the next application for payment or when change orders or engineering change directives result in a change in the contract sum as directed by the engineer.

1.3 SUBMITTALS AND SHOP DRAWINGS DURING CONSTRUCTION

Submittals and shop drawings submitted to the City as specified herein are intended to show compliance with the contract documents. Signatures, corrections or comments made on submittals do not relieve the contractor from compliance with requirements of the drawings and specifications. Neither does acceptance or approval of submittals by signature add to or delete from any contract requirements resulting from these specifications regardless of the wording of the submittals. Submittals will not be reviewed or approved when the term “By Others” is used. Submittals are reviewed or approved for general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating their work with that of other contractors, and performing their work in a safe and satisfactory manner. Piece-mealing of submittals will not be accepted.

A. SUBMITTALS PROCEDURES

1. Submittal Requirements: Submit as specified under individual sections. Submittals not requested will not be recognized or processed.
2. Transmittal Form: Accompany each submittal with transmittal letter, in triplicate. Transmittal form will be supplied by the engineer.
3. Submittal Numbering: Sequentially number transmittal forms in order submitted. Add alphabetic suffix to original submittal number of re-submittals.
4. Submittal Identification: Include project, contractor, subcontractor or supplier, pertinent drawing and detail number, specification section number, manufacturer, fabrication, product, material, and, as appropriate
5. Contractor’s Certification: Apply contractor’s stamp, signed or initialed, certifying that review, verification or products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the contract documents.
6. Contractor shall review submittals for adequate installation interface for all work prior to submitting them to the City.
7. Schedule of Submittals: Deliver to engineer, promptly, to meet critical path, and lead times as required to expedite the project.
8. Turn-Around Time: Allow from time of receipt ten (10) working days for each submittal and each re-submittal to be reviewed by the engineer.
9. Critical Issues: Prior to submittal, communicate with engineer reason for critical issue. Upon approval, allow ten (10) working days turn-around time from time of receipt by engineer.
10. Coordination and Consolidation of Submittals: Submit related items, sections or trades under one (1) submittal package for each unit of work or system where possible.
11. Deviations on Submittals: Identify deviations, including products and systems, not conforming with contract documents.

12. Product and System Limitations: Indicate conditions which may be detrimental to successful performance or completion of work.

14. Job Site Office Records: Maintain one (1) copy of every submittal, regardless of status, along with a current submittal log. Ensure that the most current, architect, and engineer stamped shop drawings and product data are distributed and subsequently used in connection with the work.

15. Re-Submittal Requirements: Revise initial submittal as directed and re-submit. Following procedures specified for the initial submittal. Make any corrections or changes in the submittals required by the engineer. Revise and make any further re-submittals until no exceptions are taken. Identify changes on re-submittal made since previous submittal.

16. Other Pertinent Submittals: Provide templates, inserts, and as applicable in timely fashion to other trades.

B. SCHEDULE OF SUBMITTALS

1. Within ten (10) days of notice to proceed, prepare schedule of submittals for design documents, shop drawings, product data, samples, and as specified for each section. Update as requested by engineer.

2. List submittals sequentially by project manual table of contents section numbers and titles.

3. Show submittal preparation time, field measurements and verification time, date submitted to engineer, date due back from engineer, item order dates, and delivery dates.

4. Identify individual delivery, long lead times, and critical ordering deadlines. Include ordering dates for each item including individual parts of major submittals.

5. Indicate specified time allocated for review, turn around and distribution.

6. Identify decision dates for selection of items not scheduled or otherwise approved.

7. Prior to construction, and in accordance with the conditions of the contract, submit list of major products proposed for use with name of manufacturer, tradesman, and model number of each product.

8. For products specified only by reference standards, give manufacturer, tradesman, model or catalog designation and reference standards.

C. SHOP DRAWINGS

1. Number and Format: Submit drawings for review in PDF format.

2. Submittal Procedure: Submit for engineer's review in accordance with submittal procedures specified in this section. After approved drawings are returned, the contractor shall reproduce and distribute copies to subcontractors and other entities, as applicable. Maintain one (1) copy of each shop drawing at field office and one (1) for project record documents to be delivered to the engineer at project completion.

3. Maximum Sheet Size: 24-inches by 36-inches or other allowable sizes of 8-1/2-inches by 11-inches or 11-inches by 17-inches.

4. Identification: Reference shop drawing details same as reference on contract documents, including sheet and detail descriptions, schedules and other identifyers. Indicate by whom materials, products, work, and installations are supplied, performed or installed. Do not use the expression "by others".

5. Presentation: Hand drafted or computer generated, delineated to present information in a clear and thorough manner. Freehand drawings not approved. CAD drawings shall be in AutoCAD by AutoDesk, or SolidWorks
6. Variations from Contract Documents due to Standard Shop Practices: Make transmittal outlining the variation.

D. PRODUCT DATA

1. Number of Copies: Submit two (2) copies to be retained by the engineer.
2. Submittal Procedures: Submit for engineer review in accordance with submittal procedures specified in this section. After review, distribute to subcontractors and other applicable entities. Maintain one (1) copy for project record documents to be delivered to engineer at project completion.
3. Identification: Mark each copy to identify specific products, models, options, tolerances, dimensions, and other pertinent data.
4. Manufacturer's Standard Data: Modify drawings and diagrams to delete inapplicable information. Supplement to provide pertinent information unique to project.

E. ELECTRONIC FILES OF MANUALS (FROM VENDORS):

1. Electronic manuals must be submitted in .PDF and compatible with the latest version of Adobe Professional.
2. Manuals should be scanned at 300 DPI.
3. Color originals should be scanned to color images if possible.
4. All .PDF files should be scanned at using Optical Character Recognition (OCR)
5. A manual must be submitted as a single .PDF file; addendums and attachments (may or may not include drawings) should not be submitted separately, or in different file formats.
6. Manuals that consist of multiple volumes should be submitted as individual files.
7. Manuals comprised of several sections or chapters should be bookmarked by the vendor.
8. If a vendor wished to include security settings (so that their documents are "read-only"), that is acceptable provided that Tacoma Power can view and print from the file.

F. DESIGN DETAILS

All design details shall be submitted to the City by the contractor during the design phase for review and approval prior to commencing any construction. This includes designs, loads and computations pertinent to connections and supports, as well as complete details of all structural members and structural connections.

END OF SECTION

SECTION 01400 - QUALITY CONTROL

1.1 REFERENCE STANDARDS

Reference to standards, specifications, manuals or codes of any technical society, organization, or association, or to the laws or regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest Standard Specification manual, code, or laws or regulations in effect at the time of opening of bids (or on the effective date of the agreement if there were no bids), except as may be otherwise specifically stated. However, no provision of any referenced standard, specification, manual, or code (whether or not specifically incorporated by reference in the contract documents) shall be effective to change the duties and responsibilities of City, contractor, or engineer, or employees from those set forth in the contract documents.

Any part of the work not specifically covered by these specifications shall be performed in accordance with the applicable section of the latest Edition of the "Standard Specifications for Road, Bridge and Municipal Construction" as prepared by the Washington State Department of Transportation and the Washington State Department of Public Works Association (APWA) as amended by the latest APWA Amendment No. 1 and the latest City of Tacoma Amendment No. 1.

These specifications will herein be referred to as the Standard Specifications.

1.2 INSPECTION, TESTING AND CERTIFICATION

A. INSPECTION

Construction inspection for the City will be performed by the City, or others as the City may designate and as the construction situation may dictate. The City inspector will be responsible for insuring that the contractor is complying with the contract plans and specifications.

Testing shall be as specified in the technical provisions of this specification.

END OF SECTION

SECTION 01500 - CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

1.1 UTILITIES

A. ELECTRIC SERVICE

The City will furnish without charge to the contractor 50 Amp, 120 and 240 volt single phase power at the Cushman 2 Powerhouse, or at a location specified by the engineer for the contractor's use. The contractor will furnish and maintain all necessary extension cords and adapters in accordance with the applicable rules and regulations. No metering will be required.

B. TELEPHONE SERVICE

The City will not provide telephone service for the contractor. Mobile telephone service is available at the site.

C. SANITARY FACILITIES

The contractor can use the rest rooms available at the Cushman 2 powerhouse. Coordinate use of these rest rooms with the project manager to ensure they are kept clean. Should the contractor fail to maintain the rest rooms, the contractor will be required to furnish sani-cans at their own expense.

D. TEMPORARY FIRE PROTECTION

Provide temporary fire protection as follows.

1. Provide adequate numbers and types of fire extinguishers
2. Store combustible materials in fire-safe containers in fire-safe locations
3. Prohibit smoking in hazardous fire-exposure locations
4. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition.

1.2 JOB SHACK

A. JOB SHACK

The contractor may supply a job shack. Construction plans shall be kept at the site. If supplied, the shack shall be large enough to keep **"AS-BUILT"** plans and provide access to City inspectors and engineers as required.

The contractor shall keep on the job site a full size copy of the drawings and specifications, and shall at all times give the engineer access thereto.

B. STORAGE AREA

The City will provide an open storage area to the contractor at the Cushman 2 Powerhouse parking lot. 50 Amp, single phase 220V power will be made available. Some space inside the powerhouse building will be provided to the contractor as well. The contractor will restore the storage area to its original condition at the end of the job. The contractor will provide security, as necessary, to safeguard its materials and machinery during construction.

1.3 SECURITY AND ACCESS

A. GENERAL

This section includes

1. Security program
2. Entry control
3. Restriction and operational control

B. SECURITY PROGRAM

Contractor shall comply with Tacoma Power's security policies and procedures and take adequate precaution to protect Tacoma Power's property and employees.

C. ENTRY CONTROL

1. Procedures for the entry and exit of contractor's personnel and materials shall be determined at the preconstruction meeting.
2. Contractor shall maintain a current list of contractor and subcontractor personnel available for on-site inspection.

D. RESTRICTIONS AND OPERATIONAL CONTROL

1. Contractor Operations: Access shall be restricted to the immediate work area and access route identified to be used during construction. Contractor shall confine personnel to the immediate work vicinity while on site.
2. Emergency Site Access during Construction: Fire lanes must remain open during construction.

1.4 SAFETY

In addition to Paragraph 3.06 "Safety" of the General Provisions, the contractor shall:

A. WORK HAZARD ANALYSIS

The contractor and their subcontractors shall thoroughly review the scope of work of the proposed project. The contractor will be responsible to indicate a work hazard analysis on the form of "Contractor's Work Hazard Analysis Report" attached with the proposal; i.e., any known or potential safety issues or phases of construction that may require specific safety procedures as identified by WISHA or OSHA regulations, and/or prudent construction practices; i.e., fall protection, scaffolding, etc.

This report shall be completed and submitted to the engineer before the preconstruction conference. A copy of this report will be forwarded to the City Safety Officer for review. A copy of this report shall be maintained at the work site (accessible to the supervisor).

The City will review the submitted report and may require the contractor to clarify their safety procedures submitted or detail their procedures for ensuring safe working conditions for other working conditions not listed in the original submitted report; and/or explain how the procedures meet current safety regulations. In no case, may the contractor commence work until the Job Hazard Analysis Report has been reviewed and approved by the engineer.

1.5 PROTECTION OF ADJACENT AREAS DURING CONSTRUCTION

The contractor shall take any measures, including but not limited to the ones listed below, to protect adjacent areas from the affects of construction.

Installing temporary walls or barriers to completely divide or separate the work area from ongoing Tacoma Power operations. Visqueen or plastic shall be a minimum of 8 mil thick and shall form a continuous barrier sufficient to stop all construction dust and residue. .

Other work and barrier requirements as directed by the engineer to provide separation between the contractor's work area and ongoing Tacoma Power operations.

The contractor shall take any measures, including but not limited to the ones listed below, to protect adjacent areas and quadrants from the affects of construction.

1.6 DUST CONTROL

The contractor shall take reasonable measures to prevent unnecessary dust. Hydropower generators will be in operation during construction and are adversely affected by dust. END OF SECTION

SECTION 01600 - MATERIAL AND EQUIPMENT

1.1 QUALITY OF WORKMANSHIP AND MATERIAL

A. WORKMANSHIP

The contractor shall employ only competent, skillful, and orderly persons to do the work. If, in the engineer's opinion, a person is incompetent, disorderly or otherwise unsatisfactory, the engineer shall notify the contractor, in writing, of same. The contractor shall immediately discharge such personnel from the work and shall not again employ those person(s) on said contract again. Work shall conform to the highest industry standards.

See General Provisions, Paragraph 3.08 - Contractor - Supervision and Character of Employees for additional requirements.

B. MATERIALS

Materials shall be delivered to the project site in the manufacturer's original containers, bundles or packages unopened with the seals unbroken and the labels intact. Each type of material shall be of the same make and quality throughout. Manufactured articles, materials and equipment shall be installed in accordance with each manufacturer's written directions, unless otherwise specified.

All materials and equipment to be provided under this contract shall conform to the latest edition of the applicable codes, but in no case shall be contrary to the laws of the State of Washington and/or Federal Government.

The equipment supplied shall meet appropriate ANSI, OSHA, WISHA, and all Federal, state, and local standards for the type of equipment provided for its intended use.

Deliver, store and handle products according to manufacturer's written instructions, using means and methods that will prevent damage, deterioration, and loss, including theft.

1. Schedule delivery to minimize long-term storage and to prevent overcrowding construction spaces.
2. Deliver with labels and written instructions for handling, storing, protecting, and installing.
3. Inspect products at time of delivery for compliance with the contract documents and to ensure items are undamaged and properly protected.
4. Store heavy items in a manner that will not endanger supporting construction.
5. Store products subject to damage on platforms or pallets, under cover in a weather tight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required.

1.2 SALVAGEABLE AND NONSALVAGEABLE MATERIAL

A. SALVAGE TO TACOMA PUBLIC UTILITIES

Contractor shall carefully remove in a manner to prevent damage to all materials and equipment specified or indicated to be salvaged and reused or to remain property of the City. The contractor shall store and protect salvaged items specified or indicated to be reused in the work.

Any items damaged in removal, storage or handling through carelessness or improper procedures shall be replaced by the contractor in kind or with new items.

All materials considered salvageable by the engineer's representative shall be accumulated and tightly packaged in a container suitable for the type of materials being salvaged. Salvaged materials not reused on this job shall be returned to Tacoma Power Warehouse, 3628 South 35th Street (rear), Tacoma, Washington, between the hours of 9:00 A.M. and 2:00 P.M., Monday through Friday.

B. PROPERTY OF CONTRACTOR

Demolition, not indicated for salvage, becomes property of contractor. Removed from site at contractor's expense to a legal waste site obtained by the contractor

Materials deemed to be non-salvageable by the engineer's representative shall be disposed by the contractor to a legal dump site obtain by him. All costs to dispose of non-salvageable materials shall be the contractor's responsibility.

The contractor may, if approved by the City, furnish and install new items in lieu of those specified or indicated to be salvaged and reused, in which case such removed items will become the contractor’s property. Existing materials and equipment removed by the contractor shall not be reused in the work except where so specified or indicated.

END OF SECTION

SECTION 01700 - CONTRACT CLOSEOUT

1.1 DOCUMENTS REQUIRED UPON COMPLETION OF WORK

A. CLOSE OUT PROCEDURES

The contractor shall notify the engineer in writing when identified tasks are complete and ready for inspection. The engineer will make the inspection, forward the results of same to the contractor, who shall promptly correct any deficiencies noted.

The contractor shall notify the engineer in writing when all punchlist deficiencies have been completed. The engineer will promptly set a time for final inspection, at which time the engineer and the contractor shall jointly inspect the work. The contractor will promptly correct any deficiencies noted.

It is possible that other contractors or the City will be working in the project area during the time of construction. It shall be the responsibility of this contractor to coordinate their work with all other agencies and/or contractors within the project area.

B. FINAL DOCUMENTATION

Upon completion of the work and before final payment is made, the contractor shall deliver to the engineer, in addition to such other items specified in these specifications, the following documents:

1. "AS-BUILT" Drawings

   "AS-BUILT" drawings and specifications of new or revised existing work, provided by the general, mechanical and electrical contractors, and all other subcontractors, including all addendum's, change orders, deviations, changes, and dimensions of their work from the construction documents, shall be updated monthly during the construction. Monthly payments will not be made until all redline as-builts are updated.

   Provide all shop and construction drawings used for the project, the final record drawings (these shall be "AS-BUILT" to reflect the actual installation) including all design drawings and AutoCAD files, if applicable.

   NOTE: The final payment for this contract will not be released until "AS-BUILT" drawings are received and approved by the engineer.

2. Maintenance and Operation Manuals

   Three (3) complete sets of maintenance and operation manuals and supplement drawings and one (1) electronic manual (.pdf), if necessary, for the care and maintenance of materials and equipment items installed. These manuals shall be prepared by the manufacturer's representatives, and collected and bound in one (1) brochure by the general contractor. The contractor shall also instruct the City's maintenance personnel to such care and maintenance as directed by the manufacturers.

   The electronic manual shall be formatted as follows:

   a. Electronic manuals must be submitted in .PDF and compatible with the latest version of Adobe Professional.

   b. Manuals should be scanned at 300 DPI.

   c. Color originals should be scanned to color images if possible.

   d. All .PDF files should be scanned at using Optical Character Recognition (OCR)

e. A manual must be submitted as a single .PDF file; addendums and attachments (may or may not include drawings) should not be submitted separately, or in different file formats.

f. Manuals that consist of multiple volumes should be submitted as individual files.

g. Manuals comprised of several sections or chapters should be bookmarked by the vendor.

h. If a vendor wished to include security settings (so that their documents are "read-only"), that is acceptable provided that Tacoma Power can view and print from the file.

3. All Guarantees and/or Agreements

   a. All guarantees, warranties, and/or agreements for such equipment and materials as carry such guarantees.

4. Final Clean Up

All surfaces disturbed shall be restored to a condition equal to that before the work began.

Surplus conduit material, tools, temporary structures, dirt and rubbish shall be removed and disposed of by the contractor, and the project area shall be left clean to the satisfaction of the engineer.

Clean up is considered incidental to the project and no measurement and payment will be allowed.

END OF SECTION

SECTION 01750 - LEAD AND OTHER HAZARDOUS MATERIAL REMOVAL

PART 1 GENERAL

1.1 SECTION INCLUDES

The work in this section shall include all work that will require disturbance and/or complete removal of lead-bearing or other hazardous materials.

A. This section is to establish and implement procedures and practices to be used for the removal and disposal of lead based coatings and other hazardous materials.

1. All hazardous waste removal, handling, and disposal shall follow WAC 173-303.

B. The City has performed an analysis with the aid of a consultant on a variety of areas on different items listed in the proposal.

1. Test results are available upon request. It is expected that there may be additional locations, not accessible at time of inspection, which contain lead within the coatings.
2. All lead and other hazardous material coatings found on the different items listed in the proposal, but not specifically detailed, shall be removed or prepared per the attached specifications.
3. The cost of removal, storage, and disposal of the lead or other hazardous material coatings shall be incidental to the specific proposal item.

1.2 TESTING OF COATINGS

A. The contractor shall be responsible for the testing of all coatings to be removed.

B. Testing shall be performed in a laboratory using EPA Method 7420 or equal method for lead, EPA method 7190 or equal method for chromium and EPA Method 7130 or equal method for cadmium.

C. The tests performed shall determine what hazardous materials are present within the coatings and the percent by mass of these hazardous materials within the coatings.

D. The contractor shall report test results to the engineer prior to any work performed on removal of the surface coatings.

1.3 CODES, LAWS AND REGULATIONS

The following laws, codes and regulations shall be followed for removal of lead-based paints and other hazardous materials or wastes contained within coatings to be removed.

A. Washington State Department of Labor and Industries Chapters 296-155 WAC, 296-24 WAC, 296-62 WAC

B. Washington State Department of Ecology Chapters 173-303 WAC, 173-304 WAC

C. Code of Federal Regulations Chapters 29 and 40.

1.4 SITE WORK AND EMPLOYEE HEALTH

A. COMPETENT PERSONS

1. All persons involved with planning and performing stages of the work where airborne lead exposure exists shall be competent, knowledgeable, and have training and experience in jobs involving lead exposure.
2. All employees working on site shall have been provided with current training and have experience in work involving lead exposure prior to the commencement of any work.

B. EMPLOYEE TRAINING AND INFORMATION

1. All employees exposed to airborne lead shall be provided with information and training on hazards of lead and measures for controlling these hazards and protection of health.
2. All training shall follow at a minimum WAC 296-155-17625 and WAC 296-62-3040.

C. MEDICAL MONITORING OF EMPLOYEES

1. All employees involved with coating removal containing lead will be biologically monitored.
2. Any employee with elevated blood lead level shall be temporarily removed from all job duties involving exposure to airborne lead above permissible limits.
3. All monitoring shall follow WAC 296-62-3050 at a minimum.

D. PERSONAL HYGIENE FACILITIES

1. Clean change areas will be provided for all personal change items where airborne lead exposure exceeds permissible exposure limits.
2. The clean change area shall be equipped with storage facilities for lead contaminated clothing and equipment.
3. All employees exposed to airborne lead above permissible limits shall be provided with a station to wash their hands and face at a minimum.
4. Personal hygiene facilities shall follow WAC 296-24 Part B-1 and WAC 296-155-17619.

E. PROTECTIVE CLOTHING AND EQUIPMENT

1. Protective clothing and equipment shall be worn by all employees working within areas where lead exposure is above permissible limits.
2. Protective clothing and equipment shall follow the requirements of WAC 296-24 and WAC 296-155-17615.

F. CONTAINMENT AREA FOR WASTE MATERIALS

1. An area shall be approved by the engineer for the storage of hazardous waste materials on site.
2. This location shall be free from traffic or other potential hazards that may displace or damage storage containers.
3. All site control shall follow WAC 296-62-3030 and WAC 173-303 at a minimum.

G. EXPOSURE LIMITS

1. The contractor shall maintain records of monitoring system for employee exposure of the constituents listed below.
2. The contractor shall remove the employee from work and notify the engineer within 24 hours if any of the limits set below are exceeded.
3. The contractor shall begin work again upon notification from the engineer once the problem has been corrected.
4. Exposure limit practices shall follow WAC 296-155-17623 and record keeping shall follow WAC 296-155-17629*.
5. Airborne Lead: Shall follow CFR 1926.62. PEL = 50 $\mu g/m^3$ (based on 8 hour TWA)* Action Level = 30 $\mu g/m^3$ (based on 8 hour TWA)* WAC 296-155-17606 shall be followed.
6. Airborne Chromium: Shall follow CFR 1910.1000. PEL = 500 $\mu g/m^3$ (based on 8 hour TWA)* Action Level = 2500 $\mu g/m3$ (based on 8 hour TWA).*

7. Airborne Cadmium: Shall follow CFR 1910.1027. PEL = 5 μg/m^3 (based on 8 hour TWA)* Action Level = 2.5 μg/m3 (based on 8 hour TWA).*

   * or as established by Federal, State or local regulations or requirements.

H. SIGNS FOR WORK AREA

1. Work areas shall be posted with visible signs for the presence of airborne lead or other hazardous waste materials.
2. The signs will be posted in areas that are outside of the work area and fall below permissible levels of airborne lead or other contaminates.
3. Site signs shall follow WAC 296-155-17627 at a minimum.

PART 2 EXECUTION

2.1 GENERAL

A. The contractor shall perform a baseline study for each work area where hazardous materials will be disturbed.
   1. The contractor shall include all aspects of the environment local to the job site.
   2. The contractor shall submit a plan showing test locations and results to the engineer prior to commencement of work involving the disturbance of hazardous materials at the job site.
   3. Upon completion of work, including demobilization, the contractor shall perform a post-baseline study and shall submit the study to the engineer.
   4. The City will not make final payment for work until the engineer has received and reviewed the post-baseline study.

B. All lead and hazardous waste removal work shall be performed by workers that have completed training and are knowledgeable in the removal of lead and hazardous waste materials.

C. The contractor shall follow all requirements of the above codes and regulations to protect all people who may enter the work area during lead or other hazardous waste removal.

D. All requirements of the county departments of health shall be followed at all times.

E. The contractor shall furnish and require use of respiratory equipment and special protective clothing for all employees exposed to airborne lead and other hazardous materials.

F. The contractor shall be responsible for the removal, encapsulation and disposal of all lead and other hazardous waste materials disturbed under this contract.

G. The contractor shall supply a copy of their lead abatement program, management policies and procedures to the City with their bid submittal.

END OF SECTION

(PG21-0655F)

_____
Name of Bidder

PROPOSAL

	QUANTITY	BID UNIT	UNIT COST	TOTAL COST
ITEM 1 Design and Build Crane Controls Upgrade	1	EA	$_____	$_____

*Force Account $ 150,000

*Bidders shall include the $ 150,000 figure as part of their overall bid.

TOTAL ITEMS 1 - 4 $_____

**Sales Tax @ _____ $_____

(**Note Paragraph 1.13 of General Provisions)

TOTAL AMOUNT $_____

(PG21-0655F)

_____
Name of Bidder

PROPOSAL

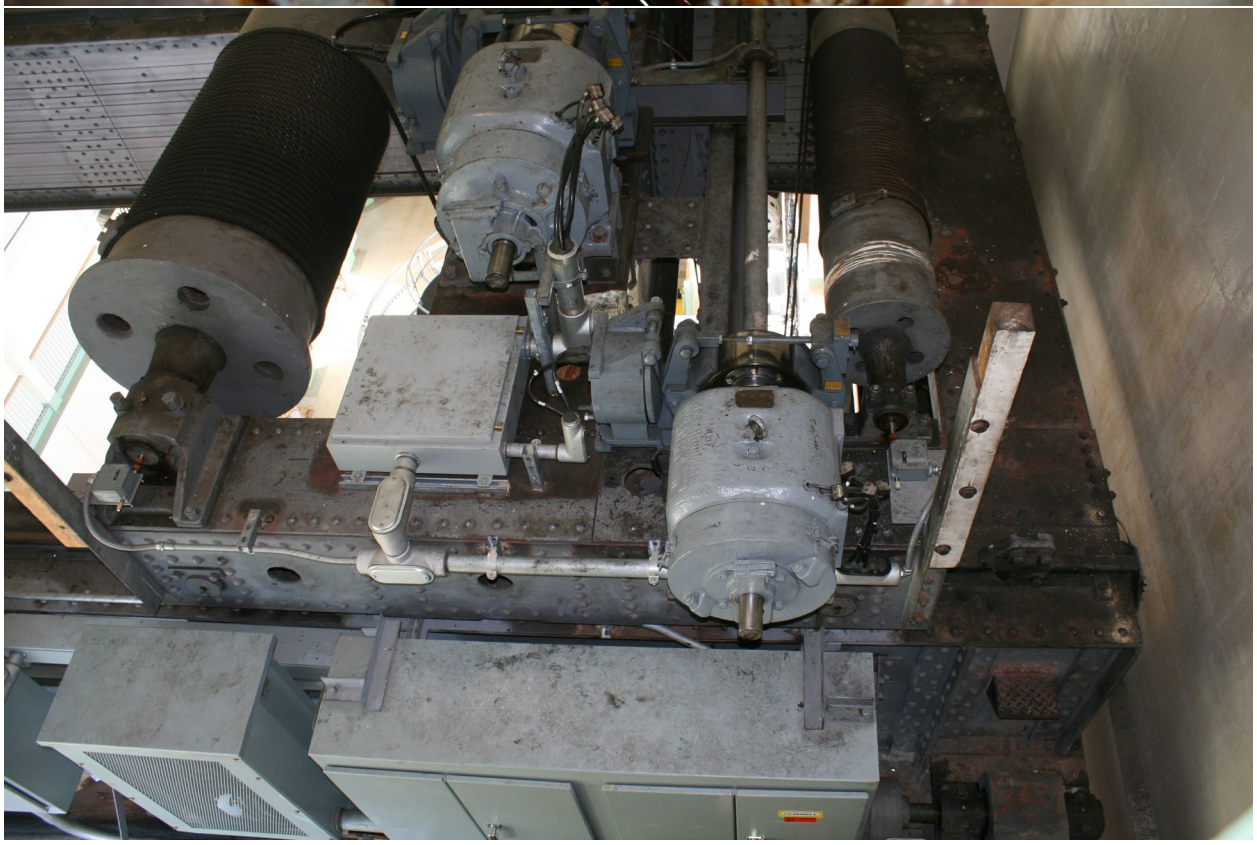
NOTE TO BIDDERS

A pre-bid meeting will be held virtually on Wednesday, April 12th, 2022 from 9 a.m. to 10 a.m. You may attend via this link or call 1-253-666-4424 ID: 263257110# Please confirm your attendance with Ms. Tina Eide, at teide@cityoftacoma.org.

If you are unable to attend this meeting, please call the SBE (Small Business Enterprise) Office at 253-591-5224 and/or the LEAP (Local Employment and Apprenticeship Program), at 253-591-5826, for instructions in filling out the SBE/LEAP forms (if applicable) or for questions concerning these requirements.

Addendum 02

Appendix to Technical Provisions




CAP
15
TON
SPARE FUSES INSIDE

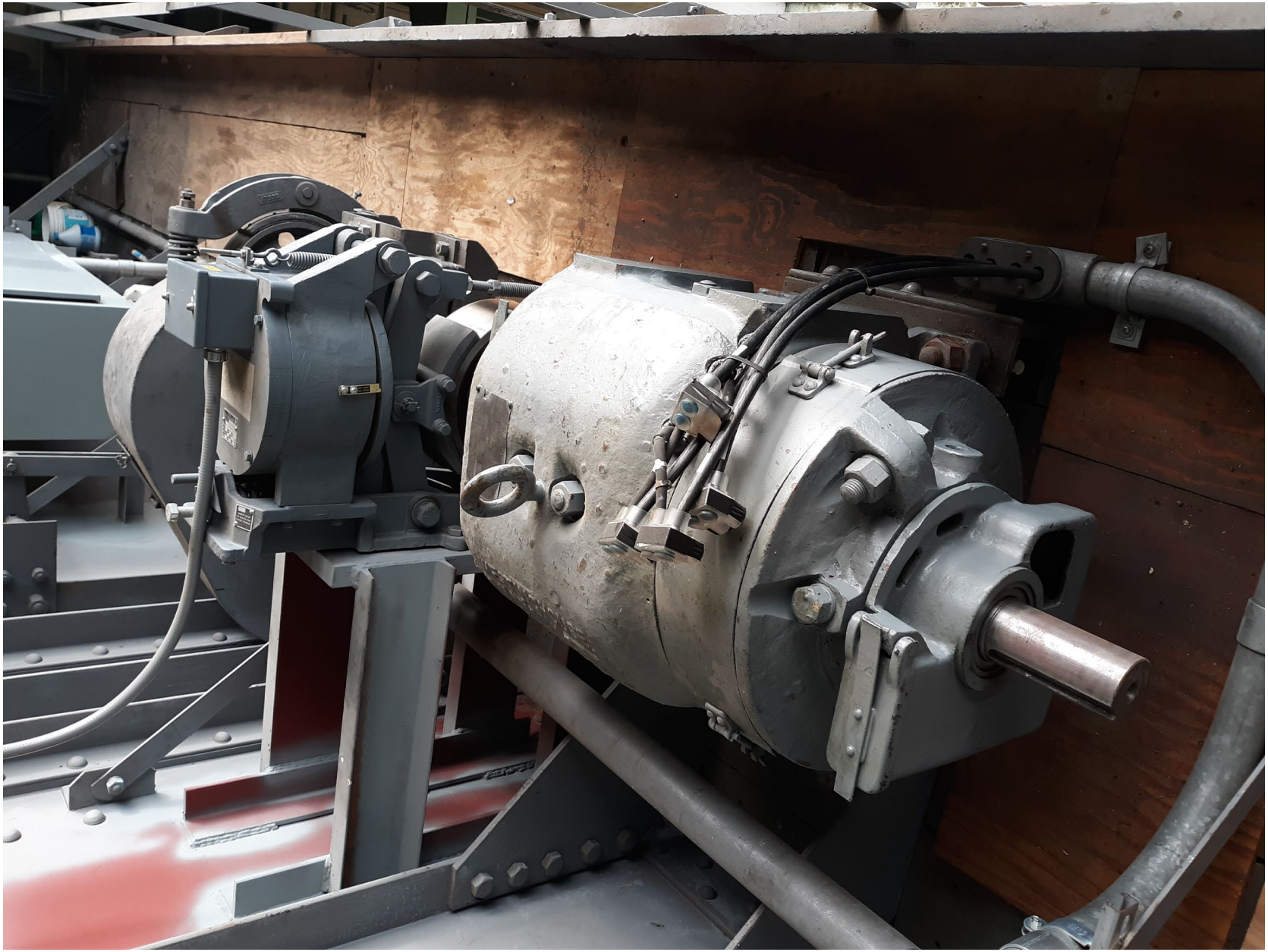

125 TON NILES CRANE
N049628


125 TON NILES CRANE


HUBBELL
250 VOLTS
DC

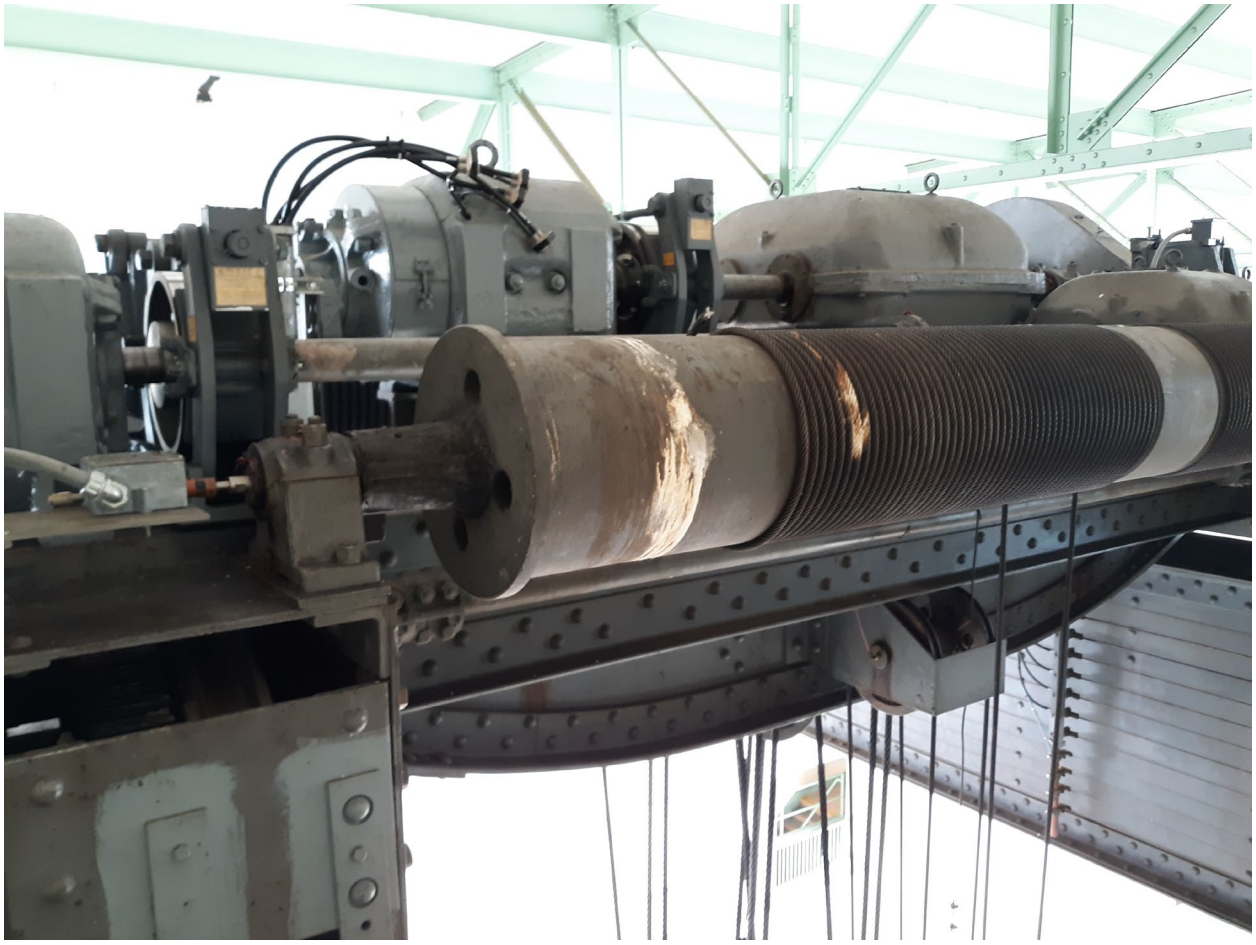

MANUAL
RADIO


CAP
15

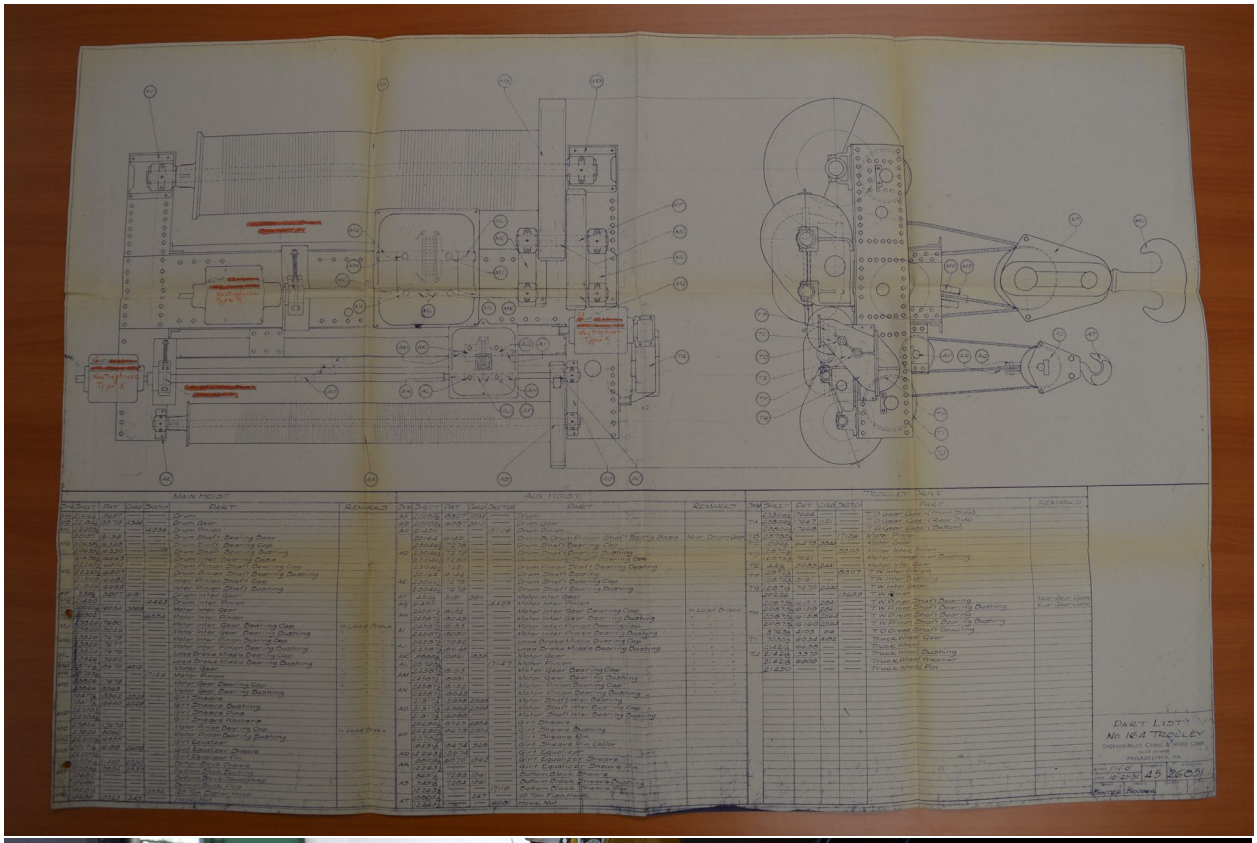



CONTROL CHIEF
REMOTE CONTROLS
CONTROL CHIEF
REMOTE CONTROLS

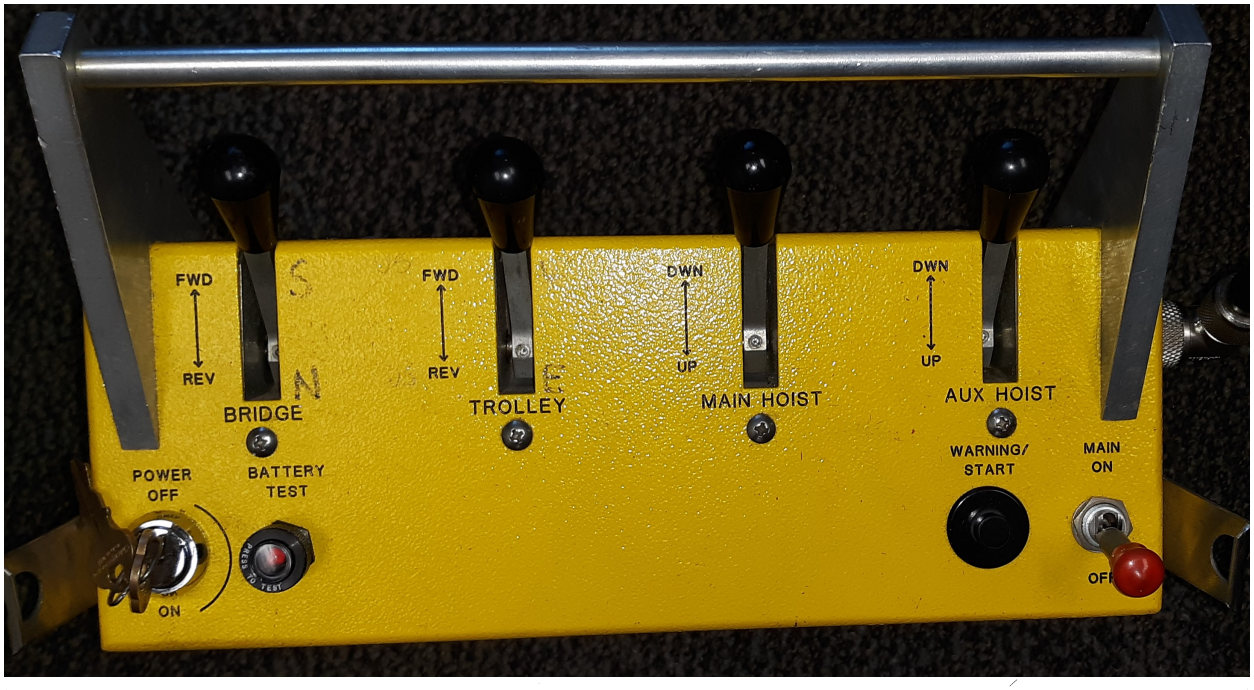

WARNING!

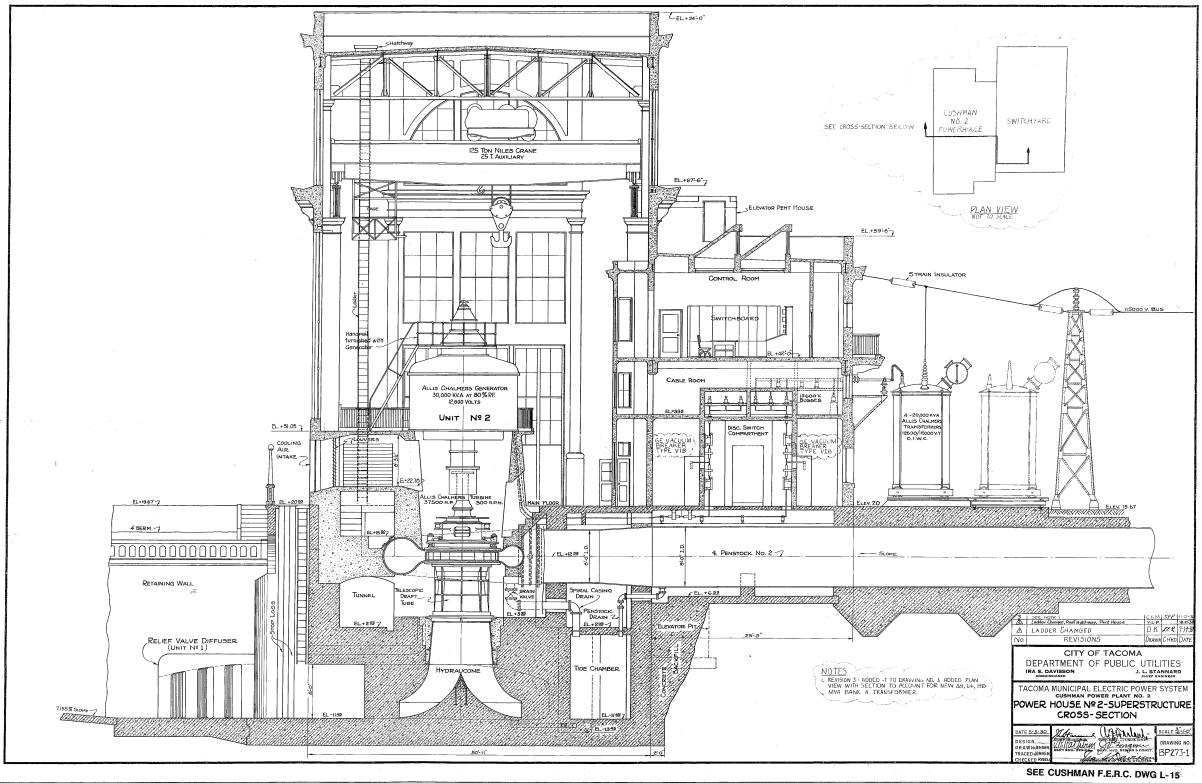



STOP/RESET
HOIST
UP
DOWN
AUX. HOIST
UP
DOWN
BRIDGE
FWD
SOUTH
REV
NORTH
TROLLEY
FWD
REV

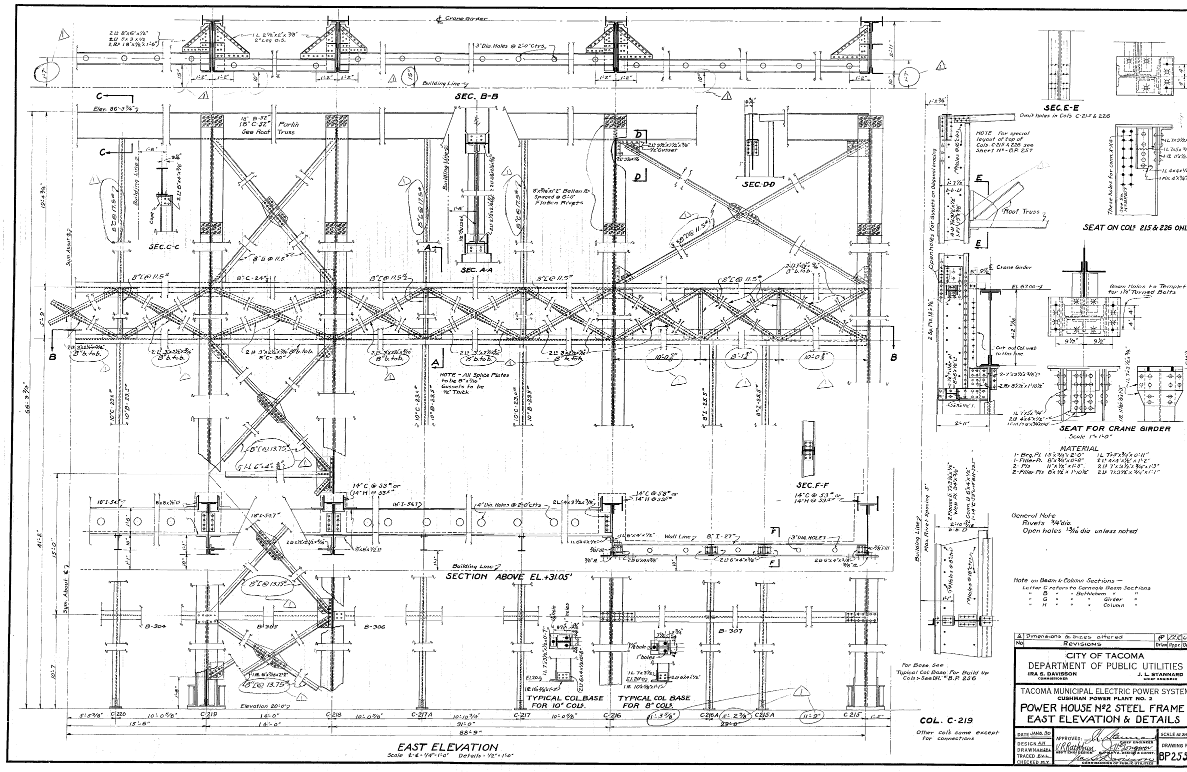


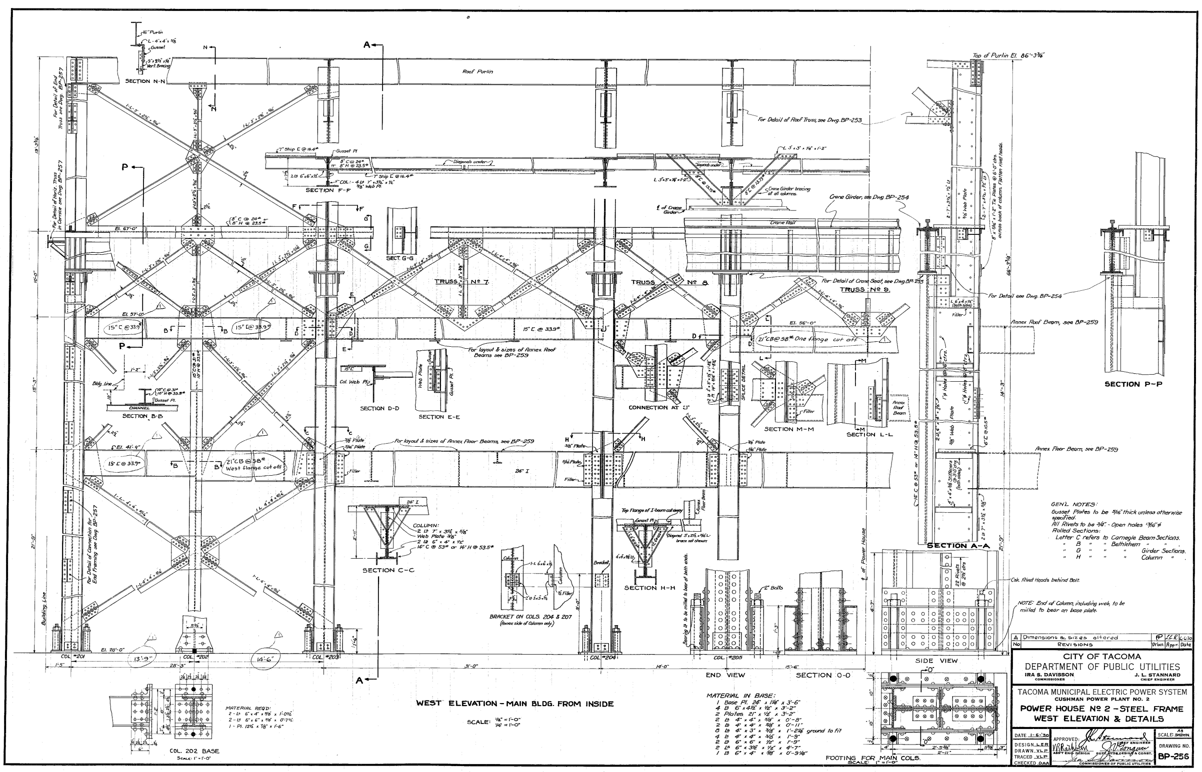
PART LIST
No. 164 TROLLEY
SHEPARD NILES CRANE & HOIST CORP.
MONTOUR
PHILLIPSBURG, PA.

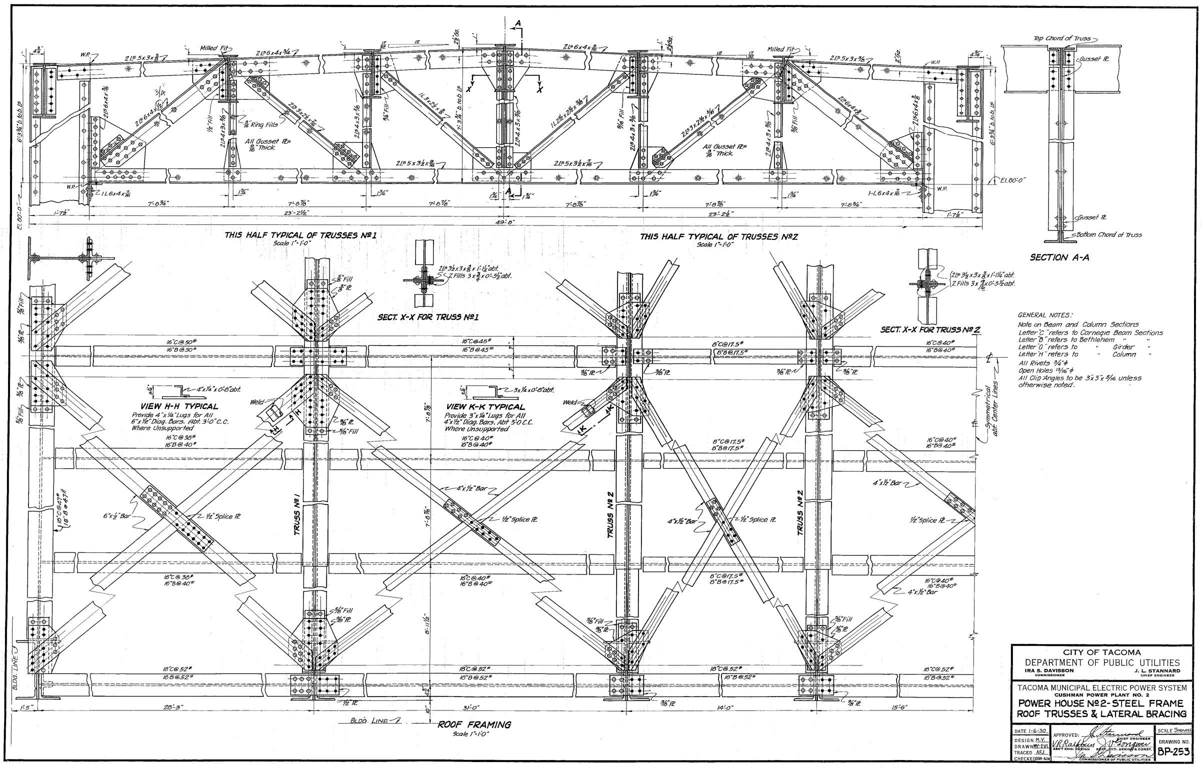


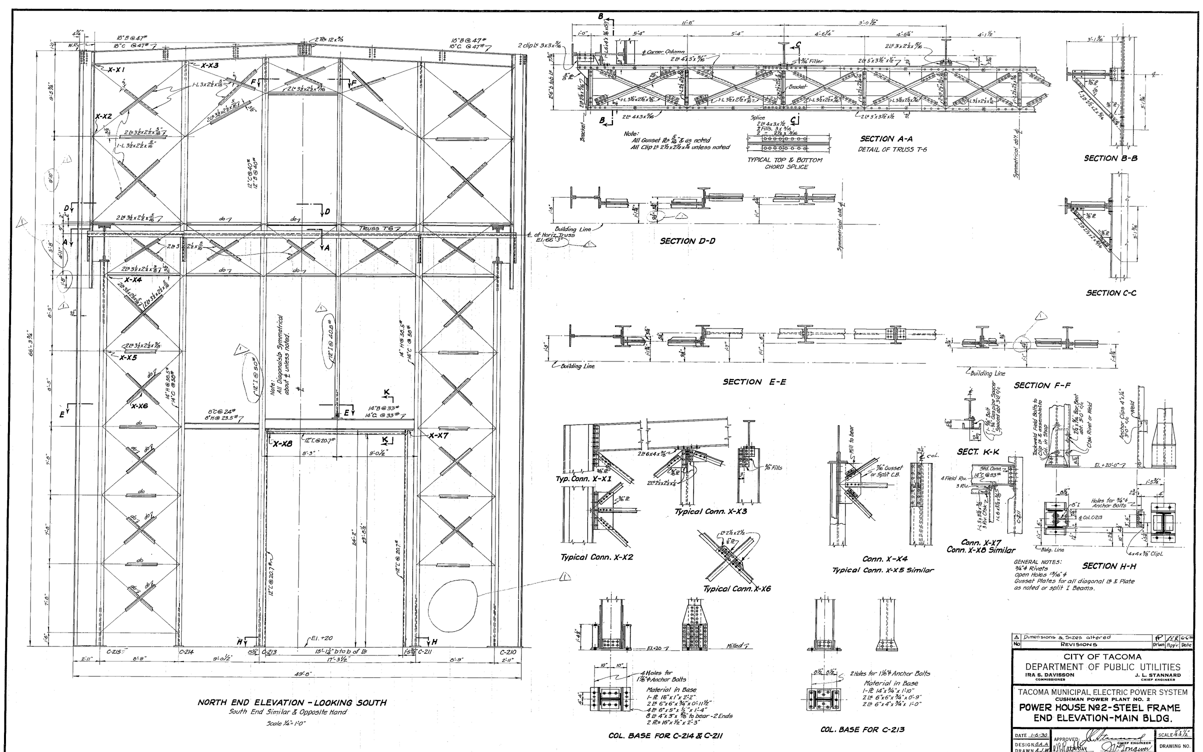


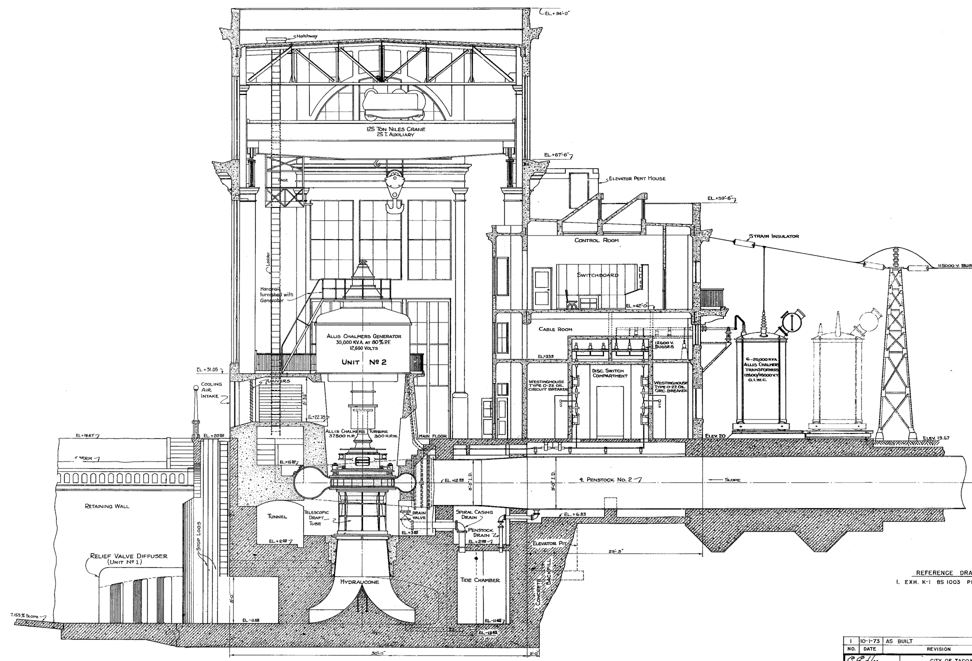
SEE CUSHMAN F.E.R.C. DWG L-15


EAST ELEVATION
SEC. B-B
SEC. A-A
SEC. C-C
SEC. D-D
SEC. E-E
SEC. F-F
SECTION ABOVE EL.+31.05'
SEAT ON COLS 215 & 226 ONLY
SEAT FOR CRANE GIRDER
TYPICAL COL. BASE FOR 10" COL.
TYPICAL COL. BASE FOR 8" COL.
COL. C-219
Other cols. same except for connections
MATERIAL
General Note
Rivets 3/4 dia.
Open holes 13/16 dia unless noted
Note on Beam & Column Sections —
Letter C refers to Carnegie Beam Sections
" B " " Bethlehem "
" G " " Girder "
" H " " Column "
Dimensions & Sizes altered
Revisions
CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
IRA S. DAVISSON
J. L. STANNARD
TACOMA MUNICIPAL ELECTRIC POWER SYSTEM
CUSHMAN POWER PLANT NO. 2
POWER HOUSE NO 2 STEEL FRAME
EAST ELEVATION & DETAILS
BP255


WEST ELEVATION - MAIN BLDG. FROM INSIDE
SECTION N-N
SECTION F-F
SECTION G-G
SECTION B-B
SECTION D-D
SECTION E-E
SECTION C-C
SECTION H-H
CONNECTION AT "C"
SECTION M-M
SECTION L-L
SECTION A-A
SECTION P-P
TRUSS No 7
TRUSS No 8
TRUSS No 9
BRACKET ON COLS. 204 & 207
COL. 202 BASE
END VIEW
SECTION O-O
SIDE VIEW
FOOTING FOR MAIN COLS.
MATERIAL IN BASE:
GEN'L NOTES:
Gusset Plates to be 3/8" thick unless otherwise specified.
All Rivets to be 3/4" - Open holes 13/16".
Rolled Sections:
Letter C refers to Carnegie Beam Sections.
" B " " Bethlehem "
" G " " Girder Sections.
" H " " Column "
Dimensions & Sizes altered
Revisions
CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
IRA S. DAVISSON
J. L. STANNARD
TACOMA MUNICIPAL ELECTRIC POWER SYSTEM
CUSHMAN POWER PLANT NO. 2
POWER HOUSE No 2 - STEEL FRAME
WEST ELEVATION & DETAILS
BP-256


THIS HALF TYPICAL OF TRUSSES №1
THIS HALF TYPICAL OF TRUSSES №2
SECTION A-A
SECT. X-X FOR TRUSS №1
SECT. X-X FOR TRUSS №2
VIEW H-H TYPICAL
VIEW K-K TYPICAL
GENERAL NOTES:
ROOF FRAMING
CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
IRA S. DAVISSON
J. L. STANNARD
TACOMA MUNICIPAL ELECTRIC POWER SYSTEM
CUSHMAN POWER PLANT NO. 2
POWER HOUSE №2-STEEL FRAME
ROOF TRUSSES & LATERAL BRACING
BP-253


NORTH END ELEVATION - LOOKING SOUTH
South End Similar & Opposite Hand
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
SECTION F-F
SECT. K-K
SECTION H-H
COL. BASE FOR C-214 & C-211
COL. BASE FOR C-213
REVISIONS
CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
IRA S. DAVISSON
J. L. STANNARD
TACOMA MUNICIPAL ELECTRIC POWER SYSTEM
CUSHMAN POWER PLANT NO. 2
POWER HOUSE №2-STEEL FRAME
END ELEVATION-MAIN BLDG.
BP-257



REFERENCE DRAWING

1. EXH. K-1 BS 1003 PROJECT AREA

SCALE 3/16" = 1'-0"

1	10-1-73	AS BUILT	NOK	EEC	CEH
NO.	DATE	REVISION	BY	CHK	APP

SECT. SUPV.
CHIEF ENGR.
LIGHT SUPT.

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION
A. J. BENEDETTI
DIRECTOR PUBLIC UTILITIES

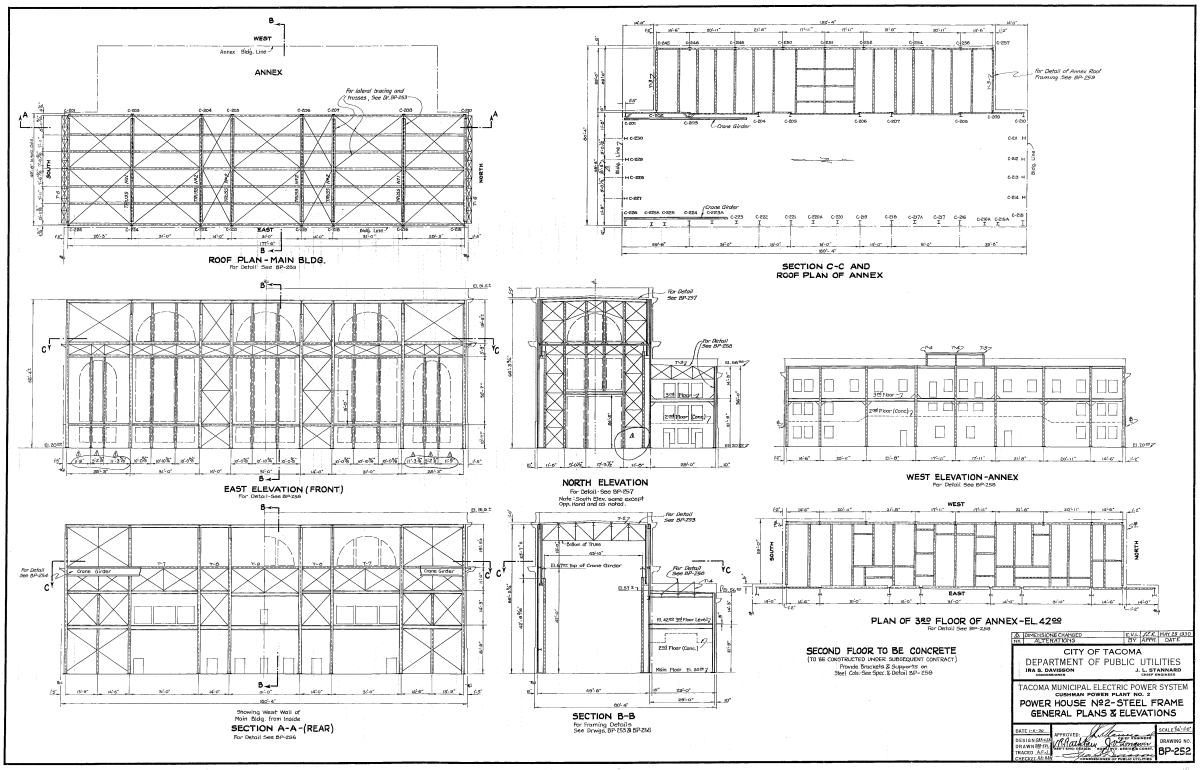
DATE 5-5-30 SCALE 3/16"=1'-0"
DES. TR. J
DR. J CHK. R
DRAWING NUMBER BP-273

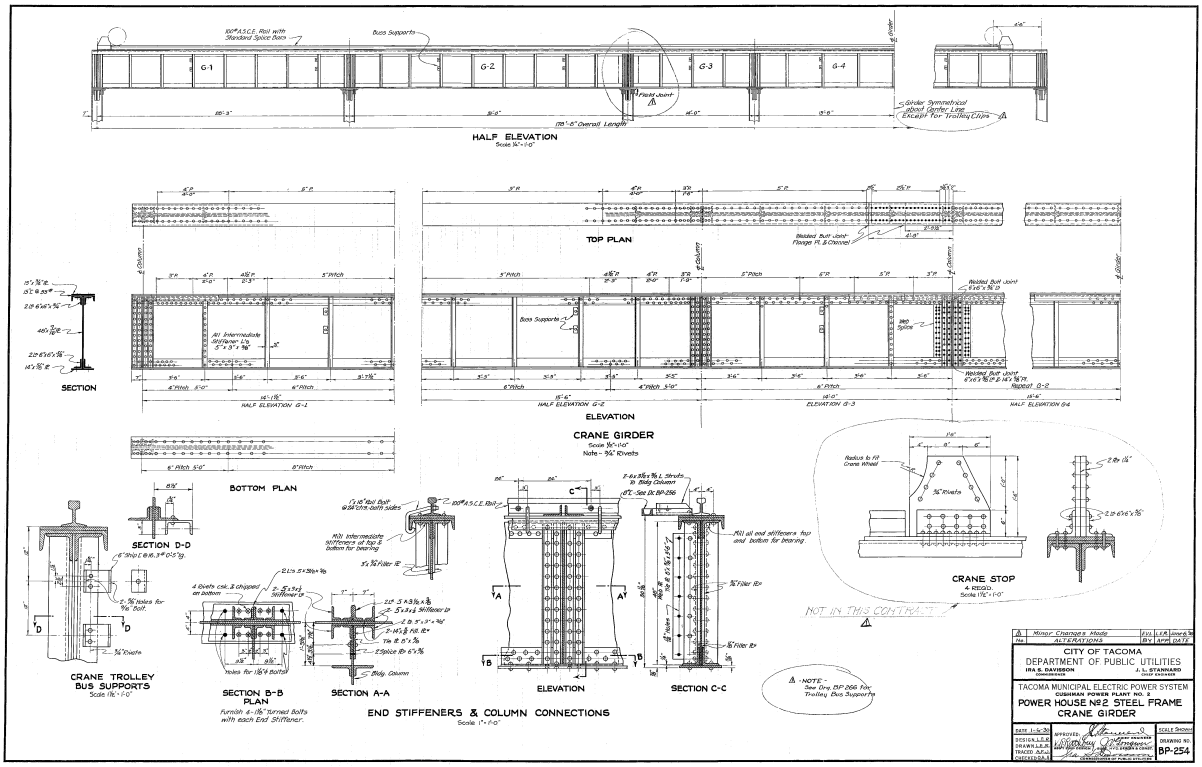
PROJECT NO. 460 WASHINGTON
CUSHMAN POWER DEVELOPMENT

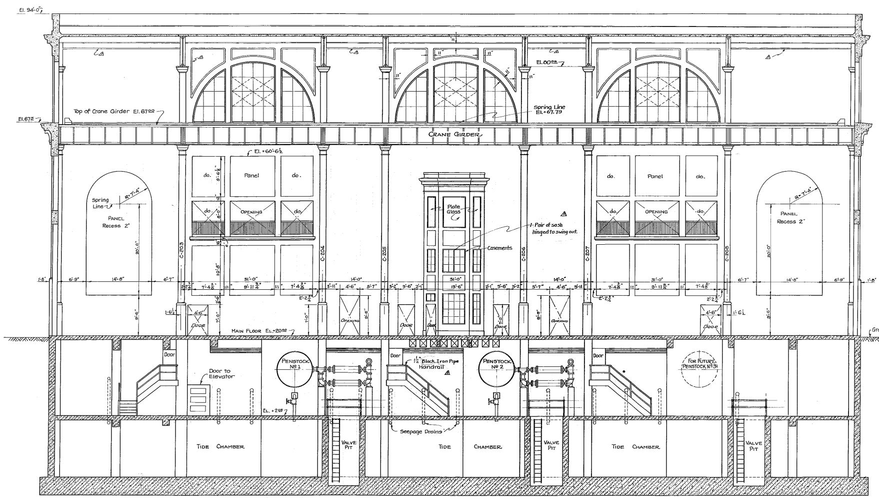
POWERHOUSE NO. 2 SUPERSTRUCTURE SECTION

FERC NO. 460-1047

EXHIBIT L-15
SHEET 15 OF 19


ANNEX
ROOF PLAN - MAIN BLDG.
SECTION C-C AND ROOF PLAN OF ANNEX
EAST ELEVATION (FRONT)
NORTH ELEVATION
WEST ELEVATION - ANNEX
SECTION A-A (REAR)
SECTION B-B
PLAN OF 3RD FLOOR OF ANNEX - EL. 429
SECOND FLOOR TO BE CONCRETE
CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
TACOMA MUNICIPAL ELECTRIC POWER SYSTEM
CUSHMAN POWER PLANT NO. 2
POWER HOUSE NO 2 - STEEL FRAME
GENERAL PLANS & ELEVATIONS
BP-252


HALF ELEVATION
TOP PLAN
ELEVATION
CRANE GIRDER
BOTTOM PLAN
SECTION D-D
CRANE TROLLEY BUS SUPPORTS
SECTION B-B PLAN
SECTION A-A
ELEVATION
SECTION C-C
END STIFFENERS & COLUMN CONNECTIONS
CRANE STOP
NOT IN THIS CONTRACT
CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
TACOMA MUNICIPAL ELECTRIC POWER SYSTEM
CUSHMAN POWER PLANT NO. 2
POWER HOUSE NO 2 STEEL FRAME
CRANE GIRDER
BP-254



INSIDE ELEVATION OF WEST MAIN WALL

SHOWING SECTION THRU SUBSTRUCTURE

No.	REVISIONS	Drawn	Ch'k'd	Date
2	Minor Corrections	L.E.R.		3-10-31
1	Notations	J.W.G.	L.E.R.	7-3-30

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
IRA S. DAVISSON, COMMISSIONER — J. L. STANNARD, CHIEF ENGINEER

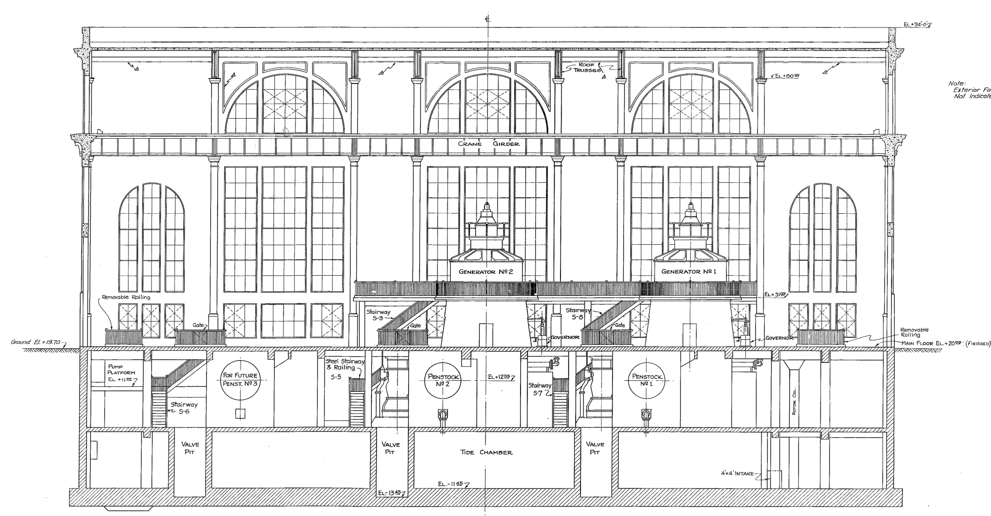
TACOMA MUNICIPAL ELECTRIC POWER SYSTEM
CUSHMAN POWER PLANT NO. 2

POWER HOUSE Nº2-SUPERSTRUCTURE
INSIDE ELEV. OF WEST MAIN WALL

DATE 5-5-30
DESIGN JENSEN
DRAWN JENSEN
TRACED JENSEN
CHECKED L.E.R.

CHIEF ENGINEER — SUPT. ELEC. DESIGN & CONST.
ASS'T ENG. DESIGN — SUPT. HYD. DESIGN & CONST.
COMMISSIONER OF PUBLIC UTILITIES

SCALE 1/8" = 1'-0"
DRAWING NO. BP-275



INSIDE ELEVATION OF EAST MAIN WALL

SHOWING SECTION THRU SUBSTRUCTURE

No.	Revisions	Drawn	Ch'k'd	Date
1	Wall Panel shown	D.K.	L.E.R.	7-15-30

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
IRA S. DAVISSON, COMMISSIONER — J. L. STANNARD, CHIEF ENGINEER

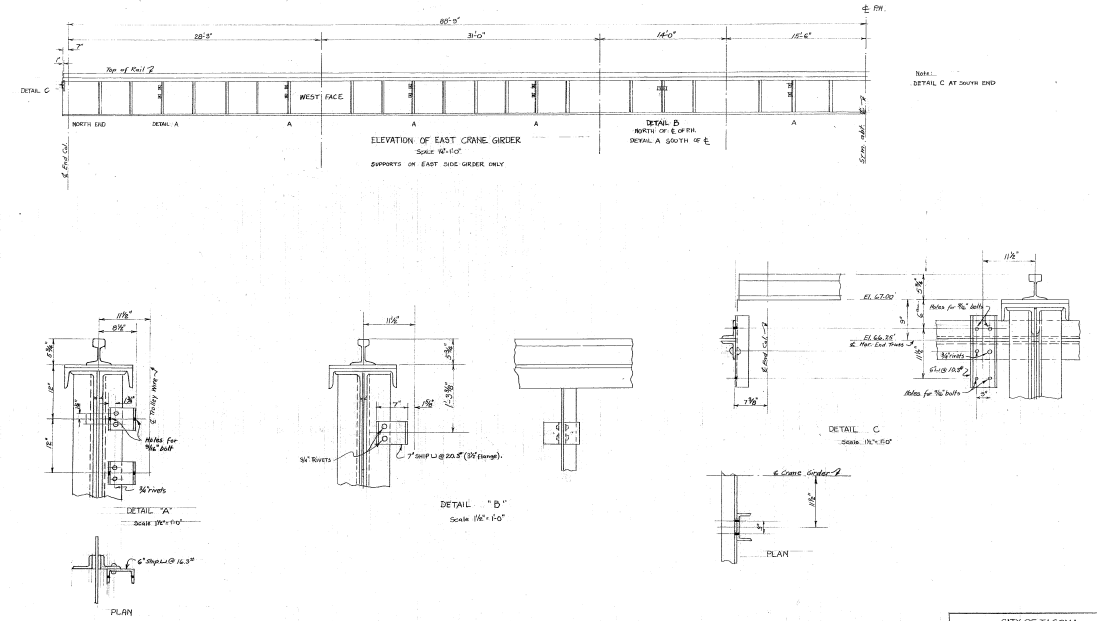
TACOMA MUNICIPAL ELECTRIC POWER SYSTEM
CUSHMAN POWER PLANT NO. 2

POWER HOUSE Nº 2-SUPERSTRUCTURE
INSIDE ELEV. OF EAST MAIN WALL

DATE 5-5-30
DESIGN A.F.J.
DRAWN A.F.J.
TRACED A.F.J.
CHECKED L.E.R.

CHIEF ENGINEER — SUPT. ELEC. DESIGN & CONST.
ASS'T ENG. DESIGN — SUPT. HYD. DESIGN & CONST.
COMMISSIONER OF PUBLIC UTILITIES

SCALE 1/8" = 1'-0"
DRAWING NO. BP-274

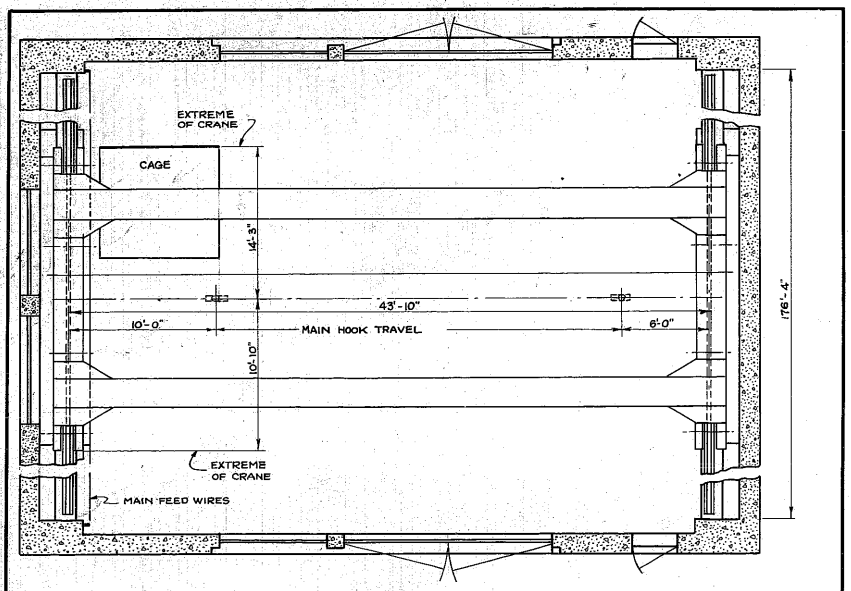


CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
IRA S. DAVISSON, COMMISSIONER — J. L. STANNARD, CHIEF ENGINEER

TACOMA MUNICIPAL ELECTRIC POWER SYSTEM
CUSHMAN POWER PLANT NO. 2
STEEL FRAME
CRANE TROLLEY BUSS SUPPORTS

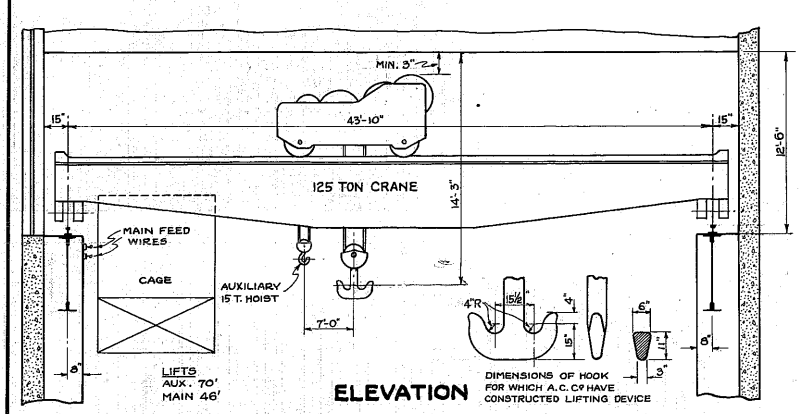
DATE: MAR. 10, 1930
DESIGN
DRAWN LUNN
TRACED
CHECKED
APPROVED: ____ CHIEF ENGINEER
ASS'T ENG. DESIGN — SUPT. HYD. DESIGN & CONST.
COMMISSIONER OF PUBLIC UTILITIES
SCALE: SHOWN
DRAWING NO. BP-266

18



PLAN

NOTE: LOCATION AND DIMENSIONS FOR MAIN FEED WIRES TO BE FURNISHED UPON COMPLETION OF GIRDER DESIGN OF BLDG.



LIFTS
AUX. 70'
MAIN 46'

ELEVATION

DIMENSIONS OF HOOK FOR WHICH A.C. Co HAVE CONSTRUCTED LIFTING DEVICE

APPROVED: J. L. Stannard CHIEF ENGINEER
Ira S. Davisson ASST. ENGR. DESIGN & PUR. ELEC. DEP'T & COMM.
Ira S. Davisson COMM. OF PUB. UTILITIES

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
IRA S. DAVISSON - COMMISSIONER J. L. STANNARD - CHIEF ENGINEER
TACOMA MUNICIPAL ELECTRIC POWER SYSTEM
CUSHMAN POWER PLANT NO. 2
POWER HOUSE NO. 2
125 TON CRANE CLEARANCES

DATE: 9-9-29
SCALE - ½"=1'-0"
DESIGN BY ARH
DRAWN BY AFJ
TRACED BY AFJ
CHECKED BY ARH
DRAWING Nº BK-020

CPR # 55

Form No. 48 -6M

BK 022 DR #35

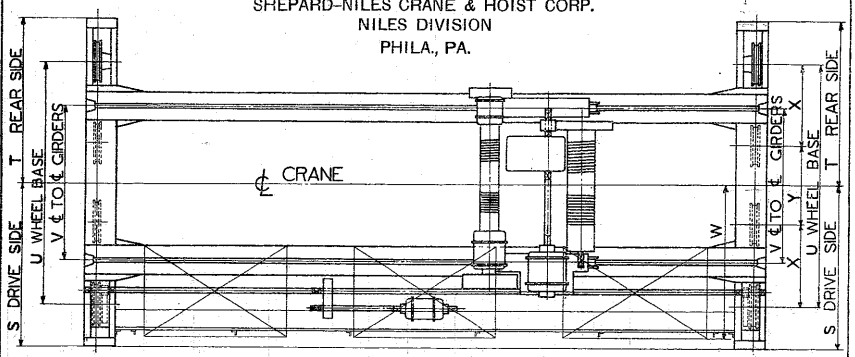
SHEET 400

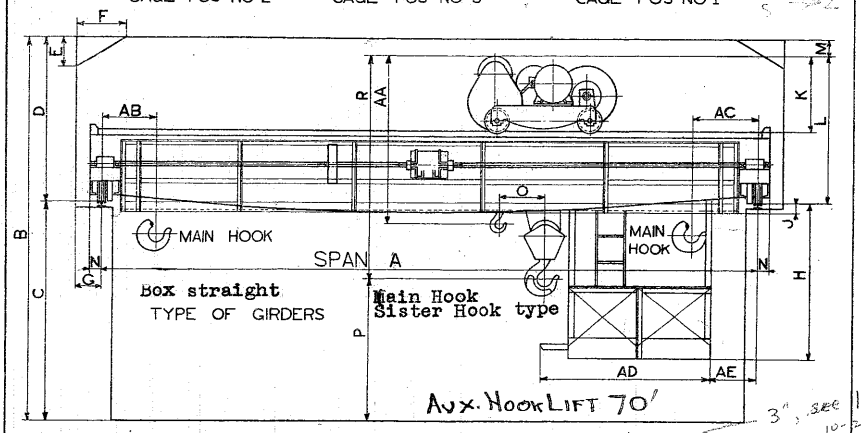
NILES ELECTRIC TRAVELING CRANE

CAPACITY 250000/30000# DATE 9-25-29

PROPOSED FOR CITY OF TACOMA

SHEPARD-NILES CRANE & HOIST CORP.
NILES DIVISION
PHILA., PA.





CAPACITY MAIN HOIST	CAPACITY AUX HOIST	MAX WHEEL LOAD	RUNWAY RAIL	POS OF CAGE	NO OF WHEELS	A	B	C	D
250000	30000	78000	100	1	8	43'10"			12'0-1/4"

E	F	G	H	J	K	L	M	N	O	P	R
		15"	8'6"		5'5"	11'9¼"	6¼"	12"	3'1"	46'0"	13'9"

S	T	U	V	W	X	Y	AA	AB	AC	AD	AE
14'3"	10'10"	19'6"	15'0"	14'3"	5'0"	9'6"	11'6"	6'0"	6'0"	8'0"	2'3"

3", see letter 10-21-29

BK-022

Form No. 3

BK 023

Shepard-Niles Crane & Hoist Corp.
Niles Division
Mifflin Street, (*East of Front Street*)
Philadelphia, Pa.

Proposal No.

CRANE SPECIFICATIONS

Date 9-25-29 19

To CITY OF TACOMA

ONE 125 Ton Electric Traveling Crane 43 Ft. 10 In Span

15-ton Auxiliary Hoist 4 motor single Trolley Type

Dimensions of Crane Card 400 Lift of Hook not to exceed main 46 aux 70 Ft. 0 0 In.

	Main Hoist	Aux. Hoist	Trolley	Bridge
Maximum Working Load in Lbs.	250000	30000		
Maximum Test Load in Lbs.	312500	37500		
Maximum Speed, Ft. per Min., Full Load	5	18	60	80
Maximum Speed, Ft. per Min., No Load	10	36	100	100
Horse Power of Motors	60	33	33	50

Current Delivered at Crane 220 volts d c

DESCRIPTION OF CRANE

General Design Muscle Shoals #2

Trolley Photo 1224 and 1225

Bridge Photos 1211-1226-1201-1208 (8 wheels)

Mechanical Brake Photo 1239

Electric Brake Niles Photo 1158

Niles block actuated limit switch

Bottom Block Photo 1165 main
831 auxiliary

Motors Westinghouse "K"

Controllers General Electric 3100 drum

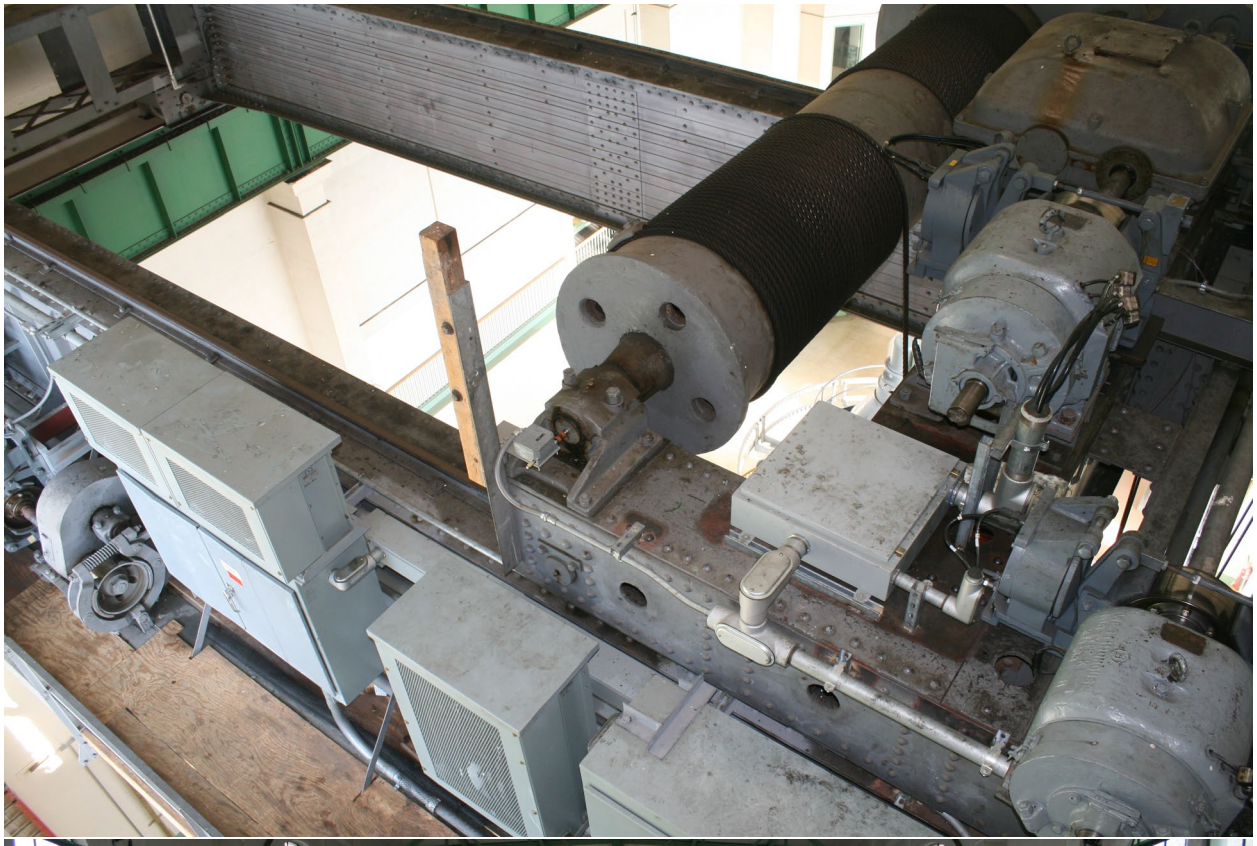
Estimated Weight 157000

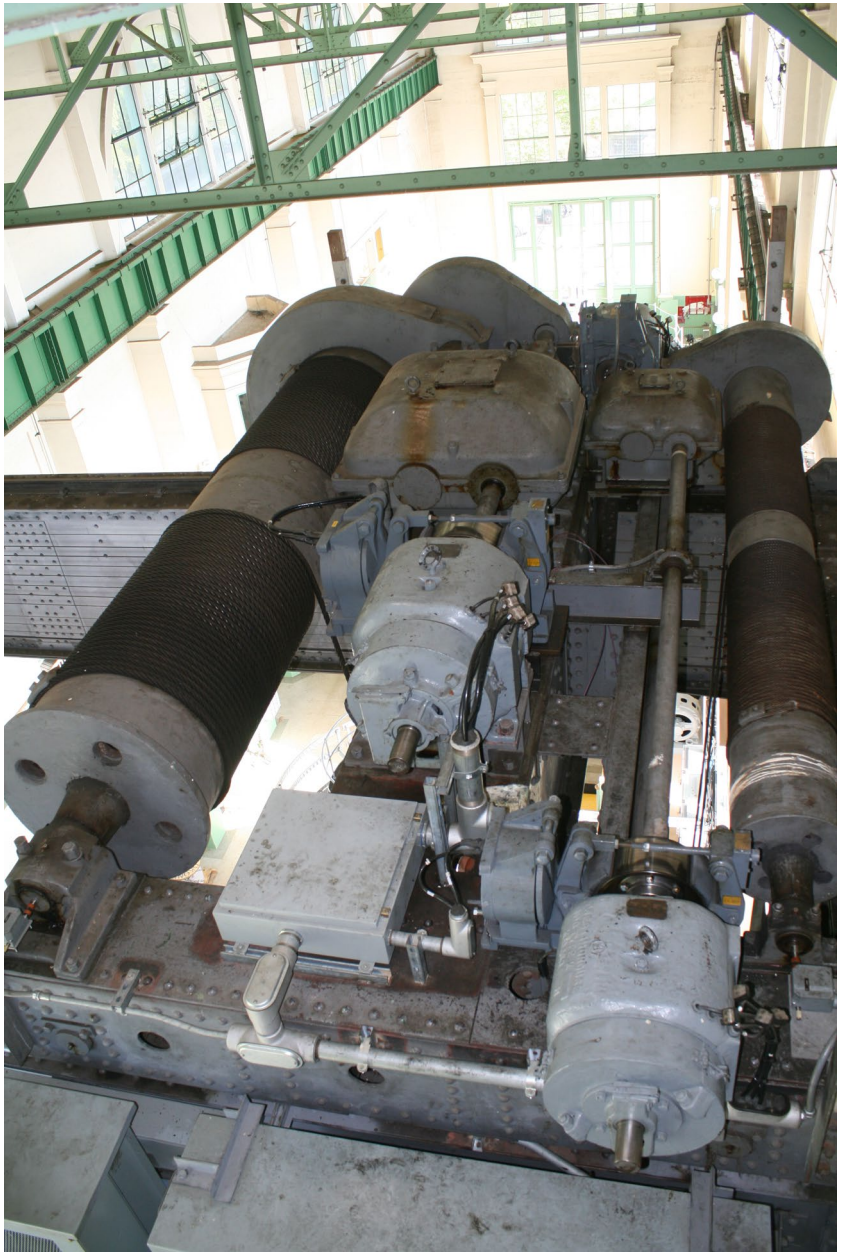
Runway Wire No. 4/0 B.&S. Gauge for Runway Ft. In. Long Furnished by Purchaser

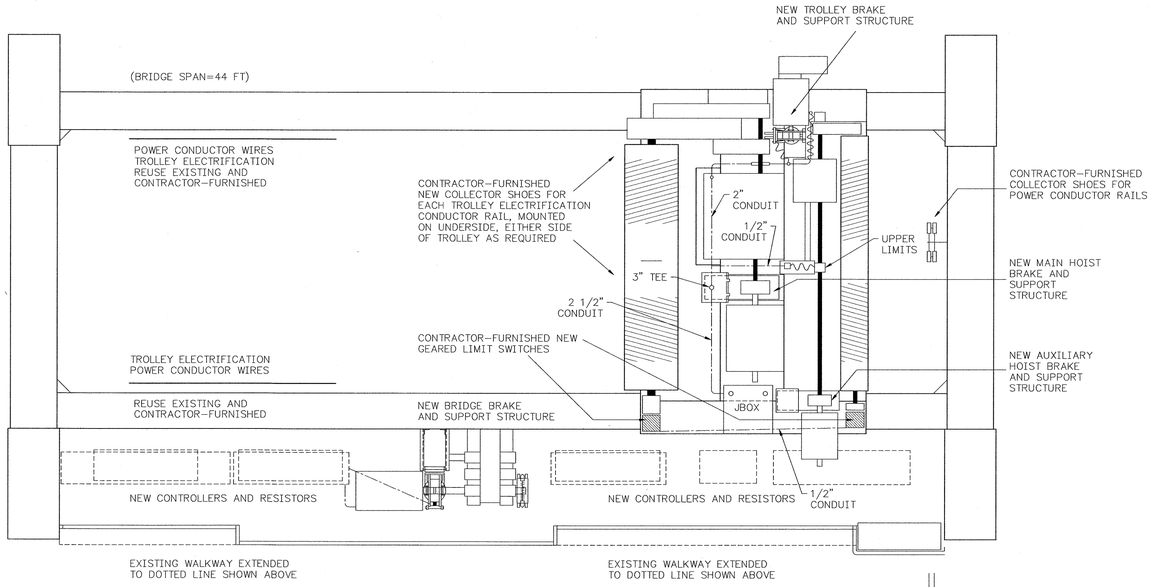
Runway Rails 100 Lbs.A.S.C.E. for Runway Ft. In. Long Furnished by "

FACTOR OF SAFETY NOT LESS THAN 5 IN ALL PARTS OF CRANE

BK-023 DR.#35

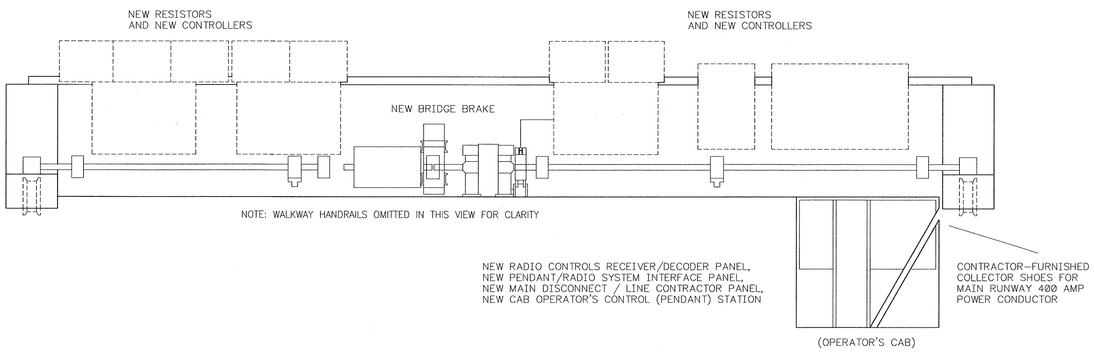






125 TON CRANE MODERNIZATION, PLAN VIEW

INSPECTED & RETENTIONED EXISTING
POWER CONDUCTOR WIRES
FOR MAIN RUNWAY SYSTEM
RUNWAY LENGTH = 175 FT



CONTRACTOR-FURNISHED EQUIPMENT:
STOP/START PUSHBUTTON IN CAB;
BRIDGE BRAKE SELECTOR SWITCH IN CAB;
CAB-MOUNTED WARNING BEACON

125 TON CRANE MODERNIZATION, SIDE VIEW

REFERENCE DRAWINGS:

BK095-1 TO 6	MAIN P.H. CRANE 1995-96 UPGRADE PROJECT LAYOUTS & DETAILS
BW1827	MAIN P.H. CRANE 1995-96 UPGRADE PROJECT ONE-LINE W/D
BW1828	MAIN P.H. CRANE INTERMEDIATE RELAY PANEL LAYOUT & W/D
BW1829	MAIN P.H. CRANE INTERMEDIATE RELAYS SCHEMATIC
BW1830	MAIN P.H. CRANE MAIN HOIST MAGNETIC CONTROLLER W/D & SCHEMATIC
BW1831	MAIN P.H. CRANE AUX HOIST MAGNETIC CONTROLLER W/D & SCHEMATIC
BW1832	MAIN P.H. CRANE BRIDGE DRIVE MAGNETIC CONTROLLER W/D & SCHEMATIC
BW1833	MAIN P.H. CRANE TROLLEY DRIVE MAGNETIC CONTROLLER W/D & SCHEMATIC
BW1834	MAIN P.H. CRANE DISCONNECT SWITCH W/D & SCHEMATIC
BW1835	MAIN P.H. CRANE BRIDGE CRANE PENDANT LAYOUT & SCHEMATIC
BW1836	MAIN P.H. CRANE BRIDGE CRANE PENDANT WIRING DIAGRAM

GENERAL CONSTRUCTION NOTES:

1. IN 1995 A DESIGN WAS PURCHASED FROM A CONSULTING FIRM SPECIALIZING IN CRANE REBUILDS. MAJOR MATERIALS FOR THAT DESIGN (NEW CONTROLS, BRAKES & RESISTORS) WERE PURCHASED IN 1996 AND IN 1996 THE PROJECT WAS DEFERRED, WAITING FOR DISPOSITION OF A NEW PROJECT LICENSE.

2. THE PROJECT IS THE RENOVATION OF THE ELECTRICAL SYSTEM FOR CRANE POWERING AND CONTROL; THE EXISTING MAIN RUNWAY ELECTRIFICATION SPAN WIRES SYSTEM, ALL MOTORS ON THE CRANE WERE RE-UTILIZED. THE EXISTING WEIGHTED UPPER LIMITS DID NOT CHANGE.

3. A CONTRACT TO CHAMPION CRANE (AUBURN, WASHINGTON) TO INSTALL ALL OF THE MATERIAL PURCHASED IN 1996-1997 WAS ISSUED IN 2004. THE CRANE WAS REBUILT AND LOAD TESTED BY CHAMPION IN 2004.

4. REFER TO THE CONTRACT SPECIFICATIONS AND THESE DRAWINGS FOR THE MAJOR COMPONENTS THAT WERE FURNISHED UNDER THE INSTALLATION CONTRACT. THE INSTALLATION CONTRACTOR FURNISHED ALL INTERCONNECTING WIRING AND CONDUITS, MINIMUM SIZE AS INDICATED BY THESE DRAWINGS, OR IN ACCORDANCE WITH N.E.C. WHEN THE SIZE HAD NOT BEEN SPECIFIED.

5. THESE DRAWINGS ARE SUPPLEMENTED BY ADDITIONAL DRAWINGS FROM HUBBLE (THE MOTOR CONTROLLERS/RESISTORS MANUFACTURER), AND ALSO FROM CONTROL CHIEF (THE RADIO CONTROLS SYSTEM MANUFACTURER). THESE DRAWINGS ARE ELECTRICAL ELEMENTARY, PANEL INTERCONNECTION AND WIRING DIAGRAMS WHICH INCLUDE SPECIFIC WIRE NUMBERS. THE INSTALLATION CONTRACTOR PERMANENTLY LABELED ALL FIELD WIRES TO MATCH THESE DRAWINGS.

DRAWINGS LISTING:

THIS DRAWING DERIVED FROM
MARK ONEY CONSULTING
DRAWING TCL2-001

REV. NO. Ø

LEWIS L. SIMPSON
STATE OF WASHINGTON
19197
REGISTERED
PROFESSIONAL ENGINEER
EXPIRES 07/16/06

NO.	DATE	REVISION	BY	CHECKED	APPROVED

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

CUSHMAN #2 DAM
MAIN POWERHOUSE CRANE
1995-96 UPGRADE PROJECT
COVER SHEET

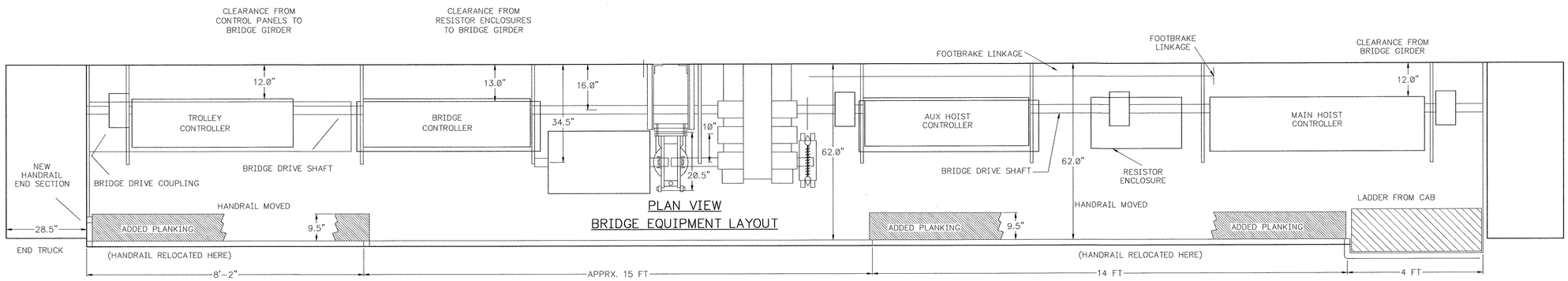
SUBMITTED
APPROVED
DATE 02/14/05

DESIGNED	DRAWN	CHECKED
Mfr.	Mfr./VAP	JME

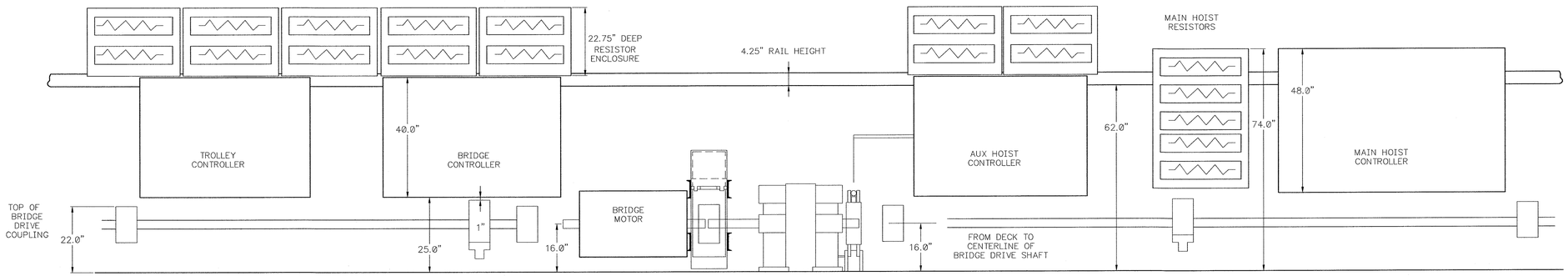
SCALE NONE

DRAWING NO. BK095-1

DWG: BK095-1 FILED IN: o-cushm2



PLAN VIEW
BRIDGE EQUIPMENT LAYOUT



ELEVATION VIEW
BRIDGE EQUIPMENT LAYOUT

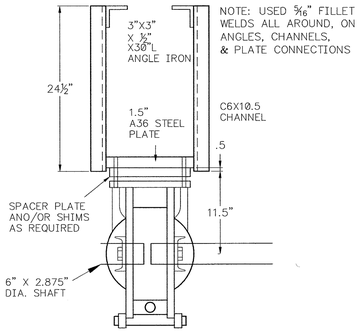
GENERAL NOTES:

1. ENCLOSURES WERE ATTACHED TO THE BRIDGE GIRDER UTILIZING STEEL 3"X3"X¼" ANGLES AND/OR ½" PLATES SUITABLE FOR ATTACHING FLOOR-MOUNTING BOLTS OF ENCLOSURES, AND UTILIZING EYEBOLT HOLES ON TOP OF ENCLOSURES FOR HOLDING ½" PLATE SECTIONS TO PANEL TOPS.

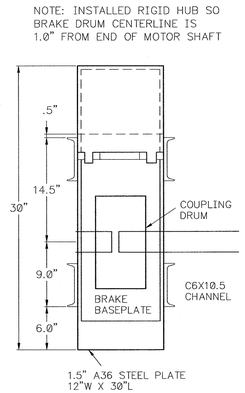
2. EACH PANEL HAS A ½" PLATE SECTION ATTACHED TO IT'S TOP, AND THESE PLATES ARE ATTACHED TO THE BRIDGE GIRDER (BRACED) VIA THE SUPPORT ANGLE FRAMES.

3. NEW SUPPORT FRAMES ARE ATTACHED TO BRIDGE GIRDER UTILIZING LONG SECTIONS OF ANGLE, FILLET WELDED ALL AROUND.

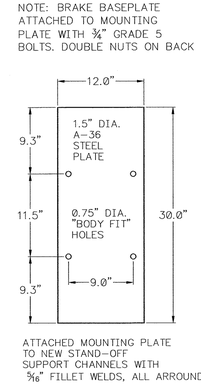
4. THE ½" PLATE ON TOP AUX HOIST, BRIDGE, AND TROLLEY ENCLOSURES ARE DRILLED AND TAPPED SUITABLE FOR MOUNTING OF THE RESISTOR RACKS ON TOP OF THESE ENCLOSURES.



BRIDGE BRAKE MOUNT DETAILS
PLAN VIEW

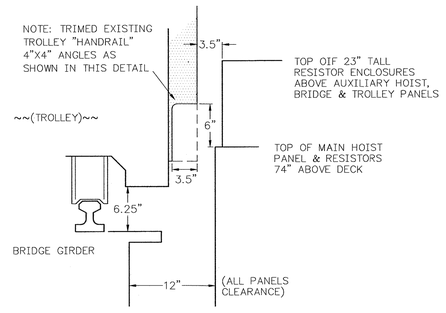


BRIDGE BRAKE MOUNT DETAILS
ELEVATION VIEW



NEW BRAKE MOUNTING PLATE

EQUIPMENT CLEARANCES



END VIEW OF TROLLEY & BRIDGE GRIDER
(FACING SOUTH)

REFERENCE DRAWINGS:

BK095-1 TO 6	MAIN P.H. CRANE 1995-96 UPGRADE PROJECT LAYOUTS & DETAILS
BW1827	MAIN P.H. CRANE 1995-96 UPGRADE PROJECT ONE-LINE W/D
BW1828	MAIN P.H. CRANE INTERMEDIATE RELAY PANEL LAYOUT & W/D
BW1829	MAIN P.H. CRANE INTERMEDIATE RELAYS SCHEMATIC
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BW1833	MAIN P.H. CRANE TROLLEY DRIVE MAGNETIC CONTROLLER W/D & SCHEMATIC
BW1834	MAIN P.H. CRANE DISCONNECT SWITCH W/D & SCHEMATIC
BW1835	MAIN P.H. CRANE BRIDGE CRANE PENDANT LAYOUT & SCHEMATIC
BW1836	MAIN P.H. CRANE BRIDGE CRANE PENDANT W/D

THIS DRAWING DERIVED FROM MARK ONEY CONSULTING DRAWING TCL2-002

REV. NO. Ø

LEWIS L. SIMPSON
STATE OF WASHINGTON
19193
REGISTERED PROFESSIONAL ENGINEER
EXPIRES 07/16/06

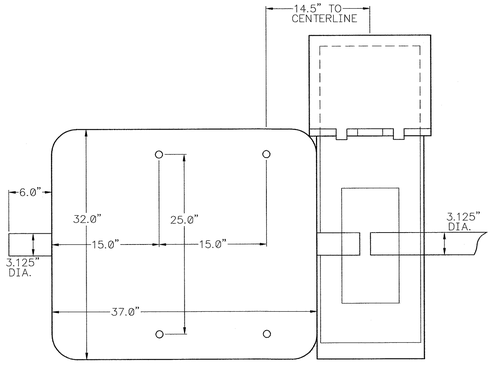
NO.	DATE	REVISION	BY	CHECKED	APPROVED

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

CUSHMAN #2 DAM
MAIN POWERHOUSE CRANE
1995-96 UPGRADE PROJECT
BRIDGE EQUIPMENT LAYOUT

SUBMITTED	DESIGNED	DRAWN	CHECKED
	Mfr.	Mfr./VAF	
APPROVED	02/14/05 DATE	NONE SCALE	
	DRAWING NO. BK095-2		

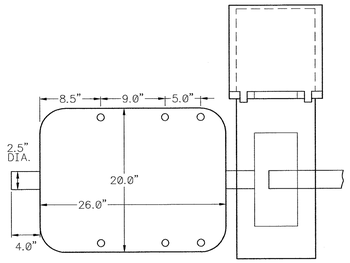
DWG: BK095-2 FILED IN: a-cushm2



INSTALLED RIGID HUB SO THAT CENTERLINE OF NEW BRAKE DRUM IS 1.5" PAST THE END OF THE 6" LONG MOTOR SHAFT

NOTE: INSTALLED COUPLING WITH RIGID ELEMENT ON MOTOR SHAFT.

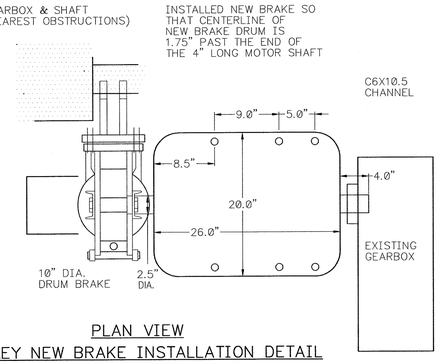
PLAN VIEW
MAIN HOIST BRAKE REPLACEMENT DETAIL



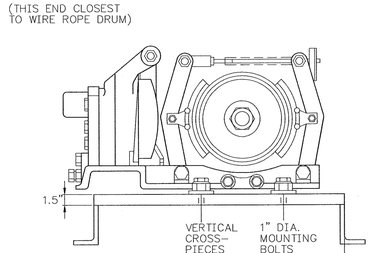
INSTALLED RIGID HUB SO THAT CENTERLINE OF NEW BRAKE DRUM IS 3.0" PAST THE END OF THE 4" LONG MOTOR SHAFT

NOTE: INSTALLED COUPLING WITH RIGID ELEMENT ON MOTOR SHAFT. USE MEDIUM INTERFERENCE FIT (CLASS "FN2", MACH. HANDBOOK)

PLAN VIEW
AUXILIARY HOIST BRAKE REPLACEMENT DETAIL



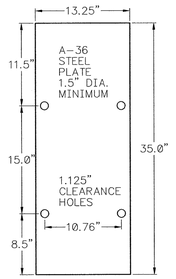
PLAN VIEW
TROLLEY NEW BRAKE INSTALLATION DETAIL



INSTALLED NEW MOUNTING PLATE AND SHIM TO FIT. THICKNESS OF BASEPLATE IS 1.5" MINIMUM & SUITABLE FOR ⅛" – ¼" SHIMS

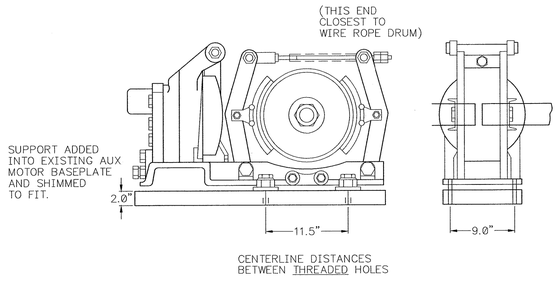
CENTERLINE DISTANCE BETWEEN HOLES

SIDE VIEW. MAIN HOIST
BRAKE SUPPORT MOUNTING



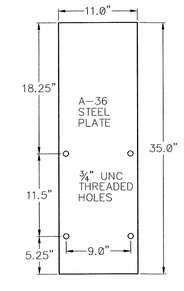
ATTACHED NEW MOUNTING PLATE TO 1.5" VERTICAL CROSS-PIECES AND ATTACHED THESE TO DECK WITH MINIMUM ⅜" FILLET WELDS, ALL AROUND

PLAN VIEW
BRAKE MOUNTING PLATE



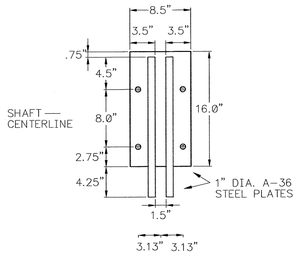
CENTERLINE DISTANCES BETWEEN THREADED HOLES

SIDE & END VIEWS
AUXILIARY HOIST BRAKE REPLACEMENT DETAIL



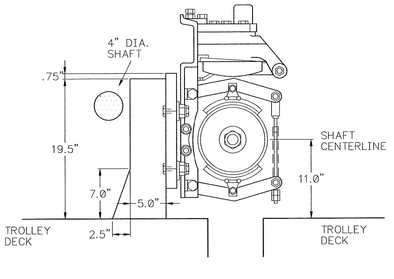
ATTACHED BASEPLATE TO EXISTING MOTOR SUPPORT BEAMS WITH MINIMUM 5/16" FILLET WELDS, ALL AROUND

PLAN VIEW
BRAKE MOUNTING PLATE

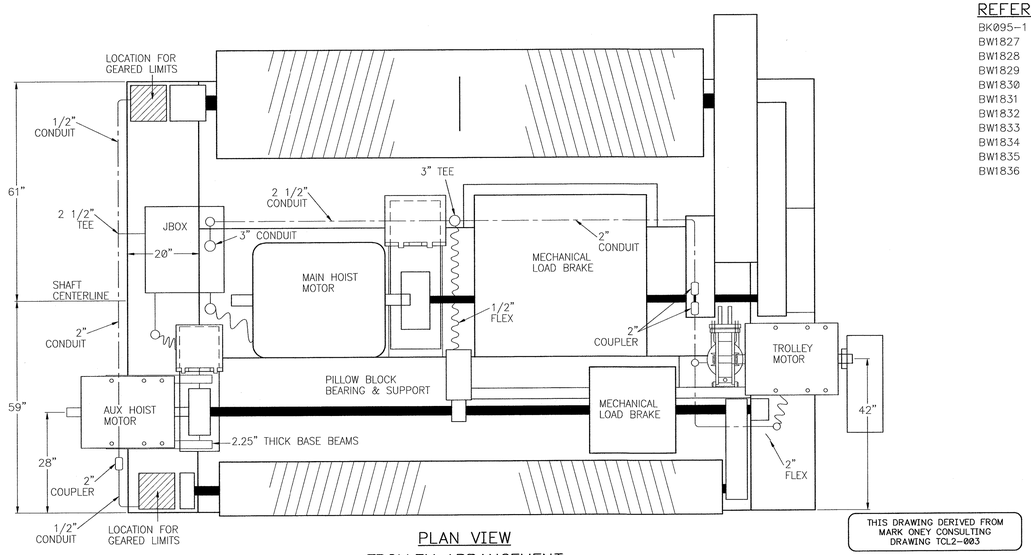


CENTERLINE TO CENTERLINE FOR Ø.625" DIA. MOUNTING HOLES (USE GRADE 5, ⅝" DIA. UNC MOUNTING BOLTS, DOUBLE NUT ON BACK)

PLAN VIEW
TROLLEY BRAKE MOUNTING BASE



NOTE: ATTACHED 1" VERTICAL SUPPORT PLATES TO 1" BRAKE MOUNTING PLATE, AND TO THE TROLLEY DECK AS SHOWN, WITH MINIMUM 5/16" FILLET WELD ALL AROUND.



THIS DRAWING DERIVED FROM MARK ONEY CONSULTING DRAWING TCL2-003

PLAN VIEW
TROLLEY ARRANGEMENT

REFERENCE DRAWINGS:

BK095-1 TO 6	MAIN P.H. CRANE 1995-96 UPGRADE PROJECT LAYOUTS & DETAILS
BW1827	MAIN P.H. CRANE 1995-96 UPGRADE PROJECT ONE-LINE W/D
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BW1835	MAIN P.H. CRANE BRIDGE CRANE PENDANT LAYOUT & SCHEMATIC
BW1836	MAIN P.H. CRANE BRIDGE CRANE PENDANT WIRING DIAGRAM

GENERAL NOTES:

1. REMOVED EXISTING MAIN & AUXILIARY HOIST BRAKES, INCLUDING COUPLINGS.
2. ALL WELDING WAS DONE BY A CERTIFIED WELDER.

NO.	DATE	REVISION	BY	CHECKED	APPROVED

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

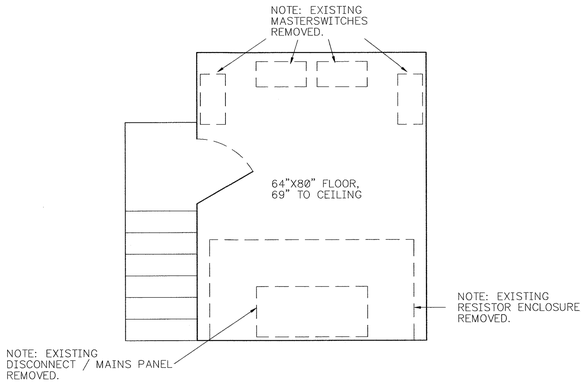
CUSHMAN #2 DAM
MAIN POWERHOUSE CRANE
1995-96 UPGRADE PROJECT
TROLLEY EQUIPMENT LAYOUT

REV. NO.

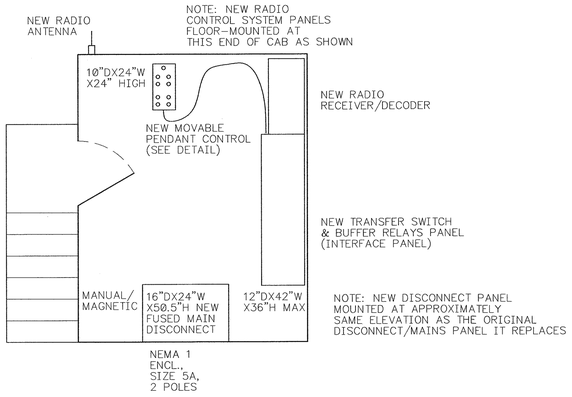
LEWIS L. SIMPSON
STATE OF WASHINGTON
19183
REGISTERED
PROFESSIONAL ENGINEER
EXPIRES 07/16/06

SUBMITTED	DESIGNED	DRAWN	CHECKED
	Mfr.	Mfr./VAF	
APPROVED	02/14/05 DATE	NONE SCALE	
	DRAWING NO.	BK095-3	

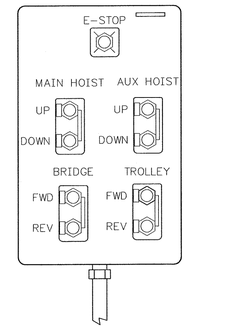
DWG: BK095-3 FILED IN: c-cushm2



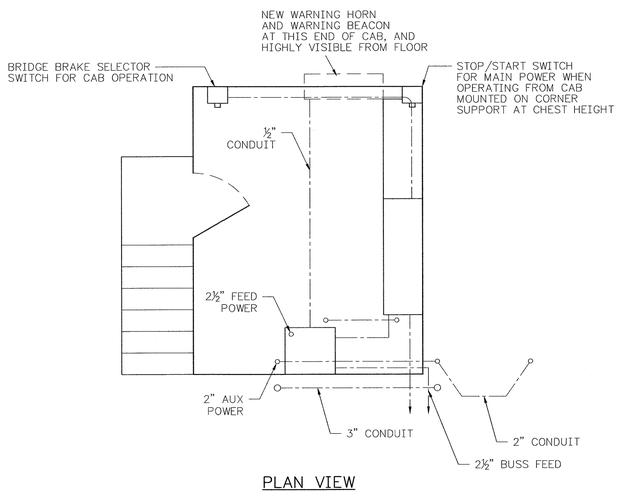
PLAN VIEW
OPERATOR'S CAB ORIGINAL EQUIPMENT LAYOUT



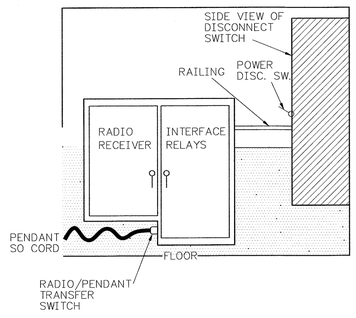
PLAN VIEW
OPERATOR'S CAB LAYOUT



NEW PENDANT
DETAIL



PLAN VIEW
CONTRACTOR-FURNISHED CAB-MOUNTED EQUIPMENT



FACE VIEW
INTERFACE PANEL DETAIL

REFERENCE DRAWINGS:

BK095-1 TO 6	MAIN P.H. CRANE 1995-96 UPGRADE PROJECT LAYOUTS & DETAILS
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BW1834	MAIN P.H. CRANE DISCONNECT SWITCH W/D & SCHEMATIC
BW1835	MAIN P.H. CRANE BRIDGE CRANE PENDANT LAYOUT & SCHEMATIC
BW1836	MAIN P.H. CRANE BRIDGE CRANE PENDANT WIRING DIAGRAM

THIS DRAWING DERIVED FROM MARK ONEY CONSULTING DRAWING TCL2-004

LEWIS L. SIMPSON
STATE OF WASHINGTON
19913
REGISTERED PROFESSIONAL ENGINEER
EXPIRES 07/16/06

NO.	DATE	REVISION	BY	CHECKED	APPROVED

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

CUSHMAN #2 DAM
MAIN POWERHOUSE CRANE
1995-96 UPGRADE PROJECT
CAB EQUIPMENT LAYOUT

REV. NO.

SUBMITTED	DESIGNED	DRAWN	CHECKED
	Mfr.	Mfr./VAF	
APPROVED	02/14/05 DATE	NONE SCALE	
	DRAWING NO.	BK095-4	

DWG: BK095-4 FILED IN: o-cushm2

NOTE: BRIDGE SPAN IS APPROXIMATELY 44 FEET, BRIDGE CONDUCTOR RAIL SECTIONS ARE MAXIMUM 40 FEET LONG (EACH)

CONDUIT TO FOUR CONDUCTOR RAILS FOR TROLLEY MOTOR

CONDUIT TO TWO CONDUCTOR RAILS FOR TROLLEY MOTOR

EXISTING CONDUCTOR (SPAN) WIRES AND SUPPORTS ON THE INBOARD SIDE OF EACH MAIN BRIDGE GIRDER, WERE USED.
10 CONDUCTORS ON THE EAST BRIDGE GIRDER, AND 12 CONDUCTORS ON THE WEST BRIDGE GIRDER. MOUNT WITH 3 INCH ON-CENTERS VERTICAL SPACING.

CONDUIT TO FOUR CONDUCTOR RAILS FOR MAIN HOIST MOTOR

MAINLINE CONDUCTOR RAILS AND COLLECTORS ARE MOUNTED IN THIS GENERAL LOCATION

CONDUIT TO FOUR CONDUCTOR RAILS FOR MAIN HOIST LIMITS

CONDUIT TO FOUR CONDUCTOR RAILS FOR AUX HOIST MOTOR

CONDUIT TO FOUR CONDUCTOR RAILS FOR AUX HOIST LIMITS

CONDUIT FOR BRIDGE MOTOR

TROLLEY PANEL

BRIDGE PANEL

AUX HOIST PANEL

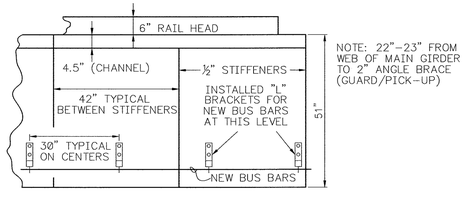
MAIN HOIST RESISTORS

MAIN HOIST PANEL

LADDER TO CAB

PLAN VIEW
GENERAL ARRANGEMENT

NOTE: TOTAL LENGTH OF MAIN RUNWAY IS APPROXIMATELY 175 FEET



ELEVATION VIEW OF MAIN RUNWAY SUPPORT GIRDER
ELECTRICAL CONDUCTOR RAILS INSTALLATION DETAIL

REFERENCE DRAWINGS:

BK095-1 TO 6	MAIN P.H. CRANE 1995-96 UPGRADE PROJECT LAYOUTS & DETAILS
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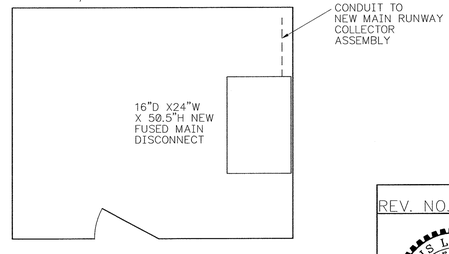
BW1835	MAIN P.H. CRANE BRIDGE CRANE PENDANT LAYOUT & SCHEMATIC
BW1836	MAIN P.H. CRANE BRIDGE CRANE PENDANT WIRING DIAGRAM

GENERAL NOTES FOR CONDUCTORS AND COLLECTOR ASSEMBLIES:

MAINLINE CONDUCTOR WIRES WERE RE-TENSIONED, RE-USED, AND SHOES WERE RE-CONDITIONED.
NEW SPAN WIRES ON THE CRANE BRIDGE WERE ADDED FOR NEW LIMIT SWITCH CIRCUITS.



PLAN VIEW
CAB. MAIN DISCONNECT ORIENTATION

THIS DRAWING DERIVED FROM MARK ONEY CONSULTING DRAWING TCL2-005

REV. NO. Ø

LEWIS L. SIMPSON — STATE OF WASHINGTON — REGISTERED PROFESSIONAL ENGINEER

EXPIRES 07/16/06

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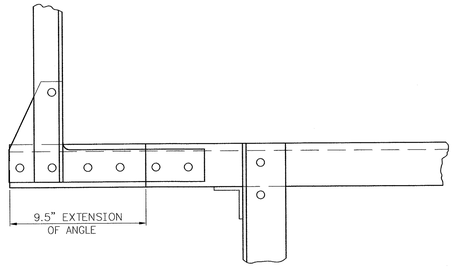
CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

CUSHMAN #2 DAM

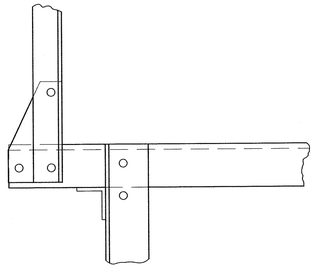
MAIN POWERHOUSE CRANE 1995-96 UPGRADE PROJECT CONDUCTOR RAILS LAYOUT

SUBMITTED	DESIGNED	DRAWN	CHECKED
	Mfr.	Mfr./VAF	
APPROVED	DATE 02/14/05	SCALE NONE	
	DRAWING NO. BK095-5		

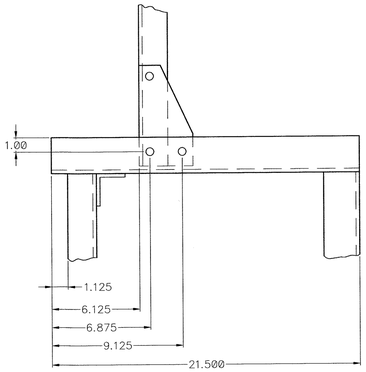
DWG: BK095-5 FILED IN: a-cushm2



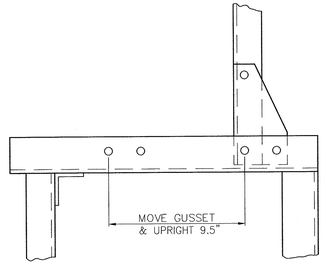
NEW EXTENSION GUSSET, VIEW LOOKING SOUTH
(TYPICAL OF FOUR PLACES)



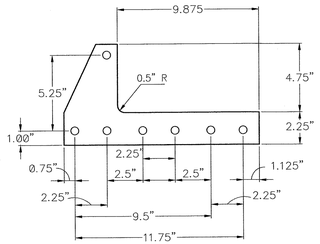
EXISTING GUSSET (REFERENCE ONLY)
VIEW LOOKING SOUTH (TYPICAL)



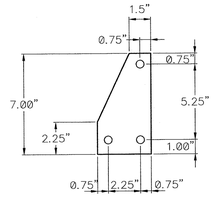
EXISTING GUSSET AT CENTER OF CAB. (REFERENCE ONLY)
(WALKWAY NORTH END, BY CAB LADDER HATCH)



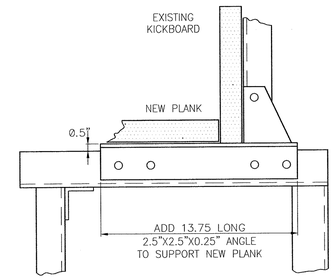
SOUTH END (LAST) WALKWAY SUPPORT. VIEW LOOKING SOUTH
SHOWING NEW POSITION OF EXISTING GUSSET & UPRIGHT



0.25" A-36 STEEL PLATE
0.5" DIAMETER HOLES



0.25" STEEL PLATE
0.5" DIAMETER HOLES



FINAL VIEW WITH ADDITION OF NEW SUPPORT ANGLE

REFERENCE DRAWINGS:

BK095-1 TO 6	MAIN P.H. CRANE 1995-96 UPGRADE PROJECT LAYOUTS & DETAILS
BW1827	MAIN P.H. CRANE 1995-96 UPGRADE PROJECT ONE-LINE W/D
BW1828	MAIN P.H. CRANE INTERMEDIATE RELAY PANEL LAYOUT & W/D
BW1829	MAIN P.H. CRANE INTERMEDIATE RELAYS SCHEMATIC
BW1830	MAIN P.H. CRANE MAIN HOIST MAGNETIC CONTROLLER W/D & SCHEMATIC
BW1831	MAIN P.H. CRANE AUX HOIST MAGNETIC CONTROLLER W/D & SCHEMATIC
BW1832	MAIN P.H. CRANE BRIDGE DRIVE MAGNETIC CONTROLLER W/D & SCHEMATIC
BW1833	MAIN P.H. CRANE TROLLEY DRIVE MAGNETIC CONTROLLER W/D & SCHEMATIC
BW1834	MAIN P.H. CRANE DISCONNECT SWITCH W/D & SCHEMATIC
BW1835	MAIN P.H. CRANE BRIDGE CRANE PENDANT LAYOUT & SCHEMATIC
BW1836	MAIN P.H. CRANE BRIDGE CRANE PENDANT WIRING DIAGRAM

GENERAL NOTES

1. REMOVED EXISTING HANDRAIL AND SUPPORTS AND RELOCATED AS SHOWN IN THIS DRAWING.

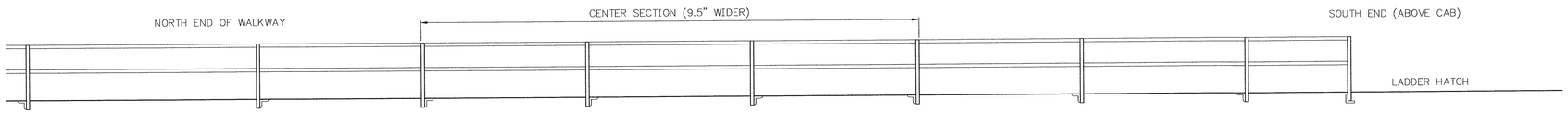
2. USED EXTENSION GUSSETS ON BACK SIDE OF NEW EXTENSION ANGLES FOR WALKWAY SUPPORTS.

3. WELDED NEW EXTENSION ANGLES TO EXISTING, MATCH IN KIND. USED FULL PENETRATION WELD, AND GROUND SMOOTH ON BACK SIDES.

4. REUSED EXISTING HOLES AND USED NEW NUTS AND BOLTS TO MATCH EXISTING.

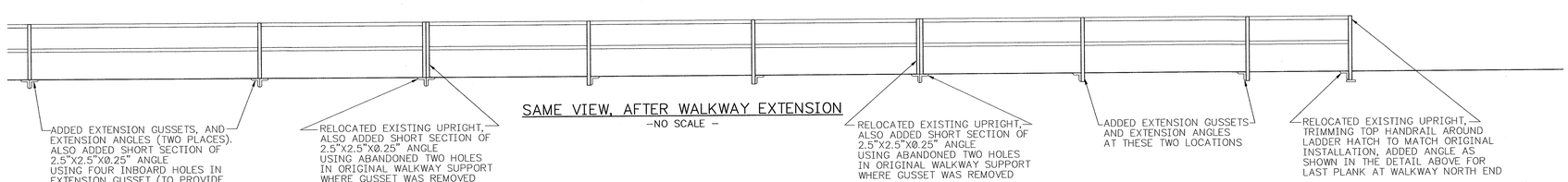
5. AT NORTH END OF WALKWAY, REUSED SHORT SECTION OF HANDRAIL AND SUPPORT (WHERE WALKWAY CURRENTLY BECOMES WIDER), SO THAT HANDRAIL IS COMPLETED AT NORTH END OF TRUCK.

6. NEW PLANKS ARE COMMERCIAL "2X10" HARDWOOD. PLANKS ARE DRILLED AND BOLTED TO SUPPORTS, TO MATCH EXISTING. REINSTALLED KICKBOARD PLANKING SIMILAR TO ORIGINAL.



ELEVATION VIEW LOOKING EAST, EXISTING WALKWAY & WALKWAY SUPPORT ANGLES (NO SCALE)
(REFERENCE ONLY)
-NO SCALE -

CENTER SECTION: MOVED EXISTING 1.5" ANGLE UPRIGHTS TO INBOARD SIDE OF EXISTING WALKWAY SUPPORT ANGLES AT EACH END OF CENTER SECTION. REATTACHED (CUT AND WELD AT BOTTOM) AT NEW LOCATION. THEN TRIMED OFF THE EXTRA HANDRAIL LENGTH (APPROXIMATELY 1.5" TO 1.75"). THEN THE ENTIRE END SECTIONS OF HANDRAILS WERE MOVED TO LINE UP WITH THE CENTER SECTION HANDRAILS.



SAME VIEW, AFTER WALKWAY EXTENSION
-NO SCALE -

THIS DRAWING DERIVED FROM
MARK ONEY CONSULTING
DRAWING TCL2-007

REV. NO. Ø

LEWIS L. SIMPSON
STATE OF WASHINGTON
1917
REGISTERED
PROFESSIONAL ENGINEER

EXPIRES 07/16/06

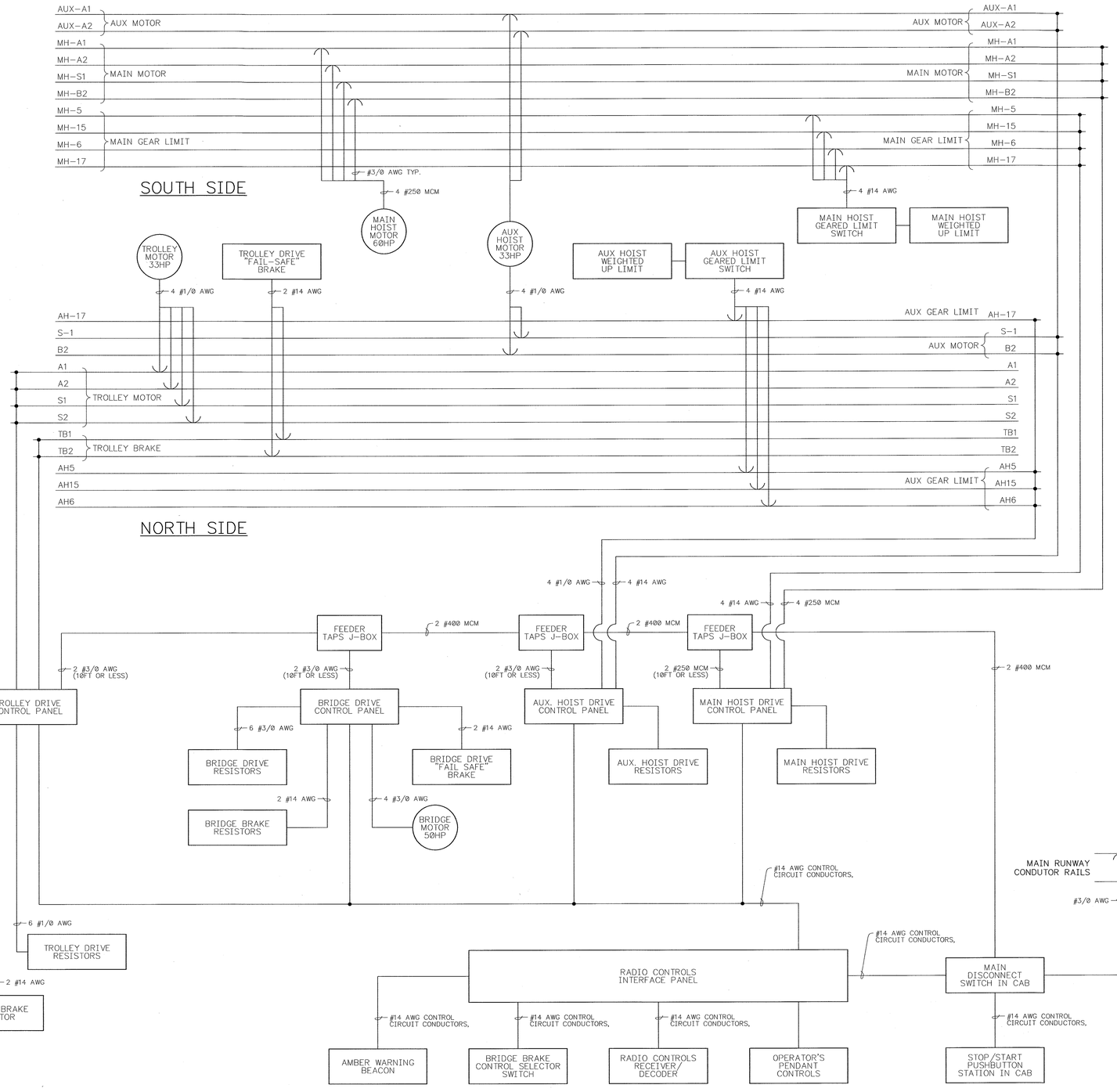
NO.	DATE	REVISION	BY	CHECKED	APPROVED

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

CUSHMAN #2 DAM
MAIN POWERHOUSE CRANE
1995-96 UPGRADE PROJECT
WALKWAY EXTENSION DETAILS

SUBMITTED	DESIGNED	DRAWN	CHECKED
	Mfr.	Mfr./VAP	FMYE
APPROVED	DATE	SCALE	
	02/14/05	NONE	
	DRAWING NO.		
	BK095-6		

DWG: BK095-6 FILED IN: a-cushm2



REFERENCE DRAWINGS:

BK095-1 TO 6	MAIN P.H. CRANE 1995-96 UPGRADE PROJECT LAYOUTS & DETAILS
BW1828	MAIN P.H. CRANE INTERMEDIATE RELAY PANEL LAYOUT & W/D
BW1829	MAIN P.H. CRANE INTERMEDIATE RELAYS SCHEMATIC
BW1830	MAIN P.H. CRANE MAIN HOIST MAGNETIC CONTROLLER W/D & SCHEMATIC
BW1831	MAIN P.H. CRANE AUX HOIST MAGNETIC CONTROLLER W/D & SCHEMATIC
BW1832	MAIN P.H. CRANE BRIDGE DRIVE MAGNETIC CONTROLLER W/D & SCHEMATIC
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BW1834	MAIN P.H. CRANE DISCONNECT SWITCH W/D & SCHEMATIC
BW1835	MAIN P.H. CRANE BRIDGE CRANE PENDANT LAYOUT & SCHEMATIC
BW1836	MAIN P.H. CRANE BRIDGE CRANE PENDANT LAYOUT WIRING DIAGRAM

NOTE:

1. WIRE IS SUITABLE FOR HIGH TEMPERATURE SERVICE AT RESISTORS.
2. WIRE IS SUITABLE FOR "OPEN" INSTALLATION WHERE CONNECTION IS TO CONDUCTOR RAILS.
3. MINIMUM CONDUIT SIZING COMPLIES WITH N.E.C. & FEEDER TAPS ARE LESS THAN 10FT LONG.
4. CONTRACTOR PROVIDED WIRING, CONDUITS, & J-BOXES.
5. EACH MAIN HOIST CONDUCTOR RAIL IS UTILIZED BY A TANDEM (TWO SHOE) COLLECTOR.

THIS DRAWING DERIVED FROM MARK ONEY CONSULTING DRAWING TCL2-006

REV. NO. 1

LEWIS L. SIMPSON STATE OF WASHINGTON 19983 REGISTERED PROFESSIONAL ENGINEER

EXPIRES 07/16/06

NO.	DATE	REVISION	BY	CHECKED	APPROVED
1	10-10-05	ADD MOTOR DETAIL	VAF	20	9/14

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

CUSHMAN #2 POWERHOUSE

MAIN POWERHOUSE CRANE 1995-96 UPGRADE PROJECT ONE-LINE WIRING DIAGRAM

SUBMITTED	DESIGNED	DRAWN	CHECKED
LEWIS L. SIMPSON	Mfr.	Mfr./VAF	FME
APPROVED	02/14/05 (DATE)	NONE (SCALE)	
F. MAX EMRICK	DRAWING NO.	BW1827	

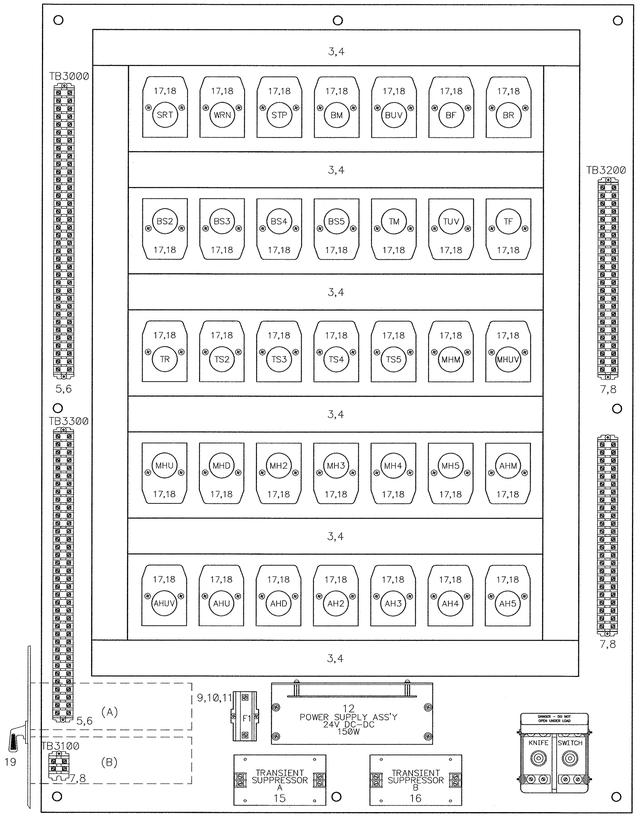
DWG: BW1827 FILED IN: g-cushn2

TB3000

12	1	RST	12
31	2	RWN	31
51	3	RSP	51
71	4	RB5	71
91	5	RB3	91
111	6	RBR	111
131	7	RBM	131
151	8	RBUV	151
171	9	RBF	171
191	10	RB2	191
211	11	RB4	211
231	12	RT4	231
251	13	RT2	251
271	14	RTF	271
291	15	RTUV	291
311	16	RTM	311
331	17	RTR	331
351	18	RT3	351
371	19	RT5	371
391	20	RM5	391
411	21	RM3	411
431	22	RMU	431
451	23	RMM	451
471	24	RMUV	471
491	25	RMD	491
511	26	RM2	511
531	27	RM4	531
551	28	RA4	551
571	29	RA2	571
591	30	RAD	591
611	31	RAUV	611
631	32	RAM	631
651	33	RAU	651
671	34	RA3	671
691	35	RA5	691
11	36	+24F	11

TB3300

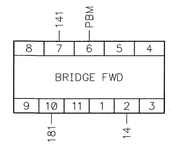
	1	PST	21
	2	PWN	41
	3	PSP	61
	4	PB5	81
PB3	5	PB3	101
PBR	6	PBR	121
PBM	7	PBM	PBM
PBUV	8	PBUV	161
PBF	9	PBF	181
PB2	10	PB2	201
	11	PB4	221
	12	PT4	241
PT2	13	PT2	261
PTF	14	PTF	281
PTUV	15	PTUV	301
PTM	16	PTM	PTM
PTR	17	PTR	341
	18	PT3	361
	19	PT5	381
PM5	20	PM5	401
PM3	21	PM3	421
PMU	22	PMU	441
PMM	23	PMM	461
PMUV	24	PMUV	481
PMD	25	PMD	501
PM2	26	PM2	521
	27	PM4	541
	28	PA4	561
PA2	29	PA2	581
PAD	30	PAD	601
PAUV	31	PAUV	621
PAM	32	PAM	641
PAU	33	PAU	661
PA3	34	PA3	681
	35	PA5	701

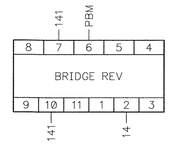


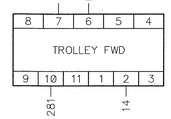
RELAY PANEL LAOUT

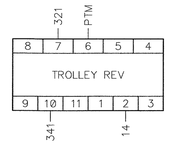
TB3200

711	1	P1	P1
724	2	P4	P4
722	3	P3	P3
731	4	WD1	WD1
742	5	WD2	WD2
751	6	B1	B1
762	7	B3	B3
772	8	B4	B4
782	9	B5	B5
792	10	B6	B6
802	11	B7	B7
812	12	B8	B8
822	13	B9	B9
832	14	B10	B10
841	15	T1	T1
852	16	T3	T3
862	17	T4	T4
872	18	T5	T5
882	19	T6	T6
892	20	T7	T7
902	21	T8	T8
912	22	T9	T9
922	23	T10	T10
931	24	MH1	MH1
942	25	MH3	MH3
952	26	MH4	MH4
962	27	MH5	MH5
972	28	MH6	MH6
982	29	MH7	MH7
992	30	MH8	MH8
1002	31	MH9	MH9
1012	32	MH10	MH10
1021	33	AH1	AH1
1032	34	AH3	AH3
1042	35	AH4	AH4
1052	36	AH5	AH5
1062	37	AH6	AH6
1072	38	AH7	AH7
1082	39	AH8	AH8
1092	40	AH9	AH9
1102	41	AH10	AH10



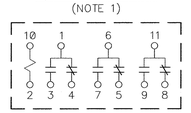






RELAY PINOUT

(NOTE 1)



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BW1835	MAIN P.H. CRANE BRIDGE CRANE PENDANT LAYOUT & SCHEMATIC
BW1836	MAIN P.H. CRANE BRIDGE CRANE PENDANT WIRING DIAGRAM

NOTE:

1. FOUR BRAKE RELAYS ADDED FOR PENDANT CONTROL.

THIS DRAWING DERIVED FROM CONTROL CHIEF Mfr. DRAWING 72015

REV. NO. 0

LEWIS L. SIMPSON STATE OF WASHINGTON 1983 REGISTERED PROFESSIONAL ENGINEER

EXPIRES 07/16/06

NO.	DATE	REVISION	BY	CHECKED	APPROVED

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

CUSHMAN #2 POWERHOUSE

MAIN POWERHOUSE CRANE INTERMEDIATE RELAY PANEL LAYOUT & WIRING DIAGRAM

SUBMITTED

APPROVED

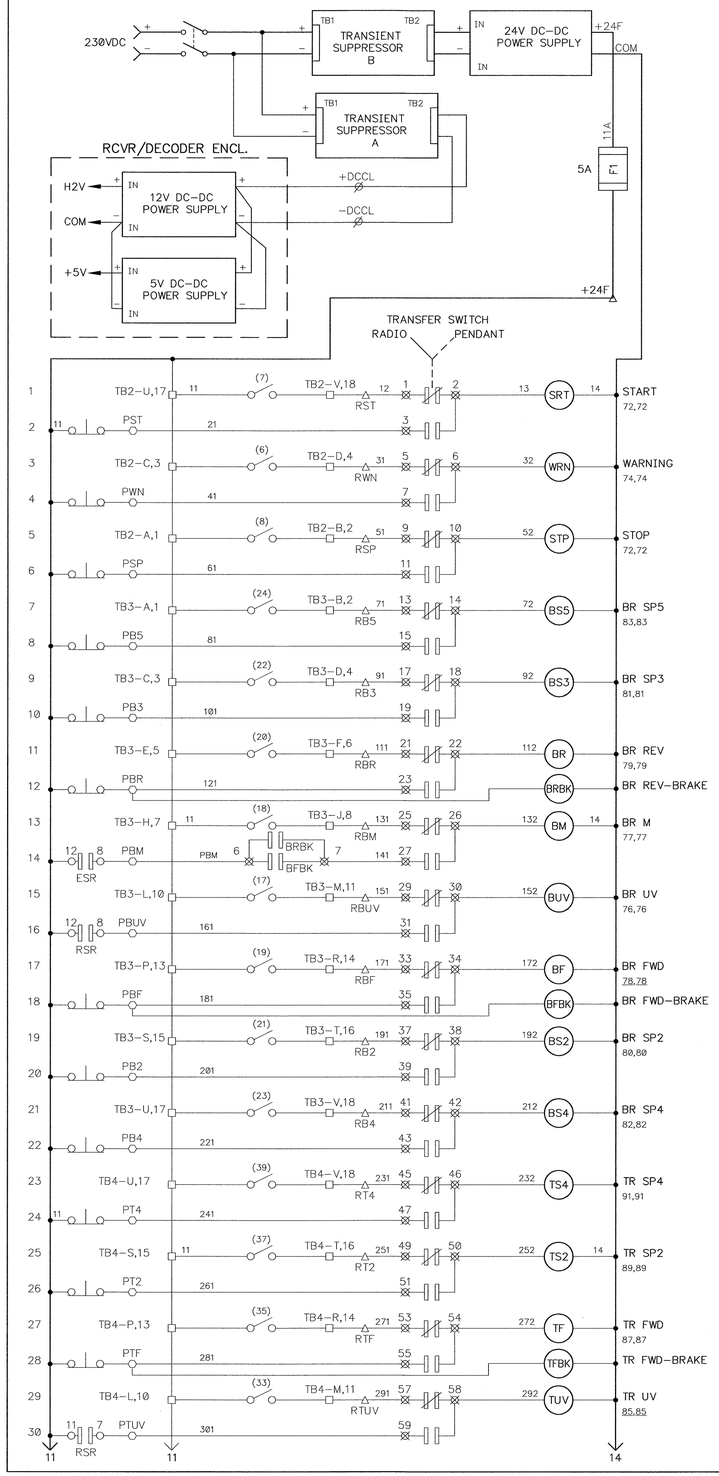
DESIGNED	DRAWN	CHECKED
Mfr./LLS	LLS/VAF	

02/11/05 DATE

NONE SCALE

DRAWING NO. BW1828

DWG: BW1828 FILED IN: a-cushm2



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BW1835	MAIN P.H. CRANE BRIDGE CRANE PENDANT LAYOUT & SCHEMATIC
BW1836	MAIN P.H. CRANE BRIDGE CRANE PENDANT W/D

NOTES:

1) "TS" INDICATES TRANSFER SWITCH SHOWN IN RADIO POSITION.

2) NUMBERS IN PARENTHESIS INDICATE RELAY NUMBERING FOR DIAGNOSTIC TROUBLESHOOTING. REFER TO DWG. 7201-3000 FOR RELAY CARD POSITIONS.

LEGEND:

- ⊠ TRANSFER SWITCH TERMINAL
- △ TERMINALS ON TB3000
- ⌀ TERMINALS ON TB3100
- ○ TERMINALS ON TB3200
- ○ TERMINALS ON TB3300
- □ TERMINALS ON TB2, TB3, TB4, TB5, & TB6

THIS DRAWING DERIVED FROM CONTROL CHIEF Mfr. DRAWING 72014

NO.	DATE	REVISION	BY	CHECKED	APPROVED

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

REV. NO. 0

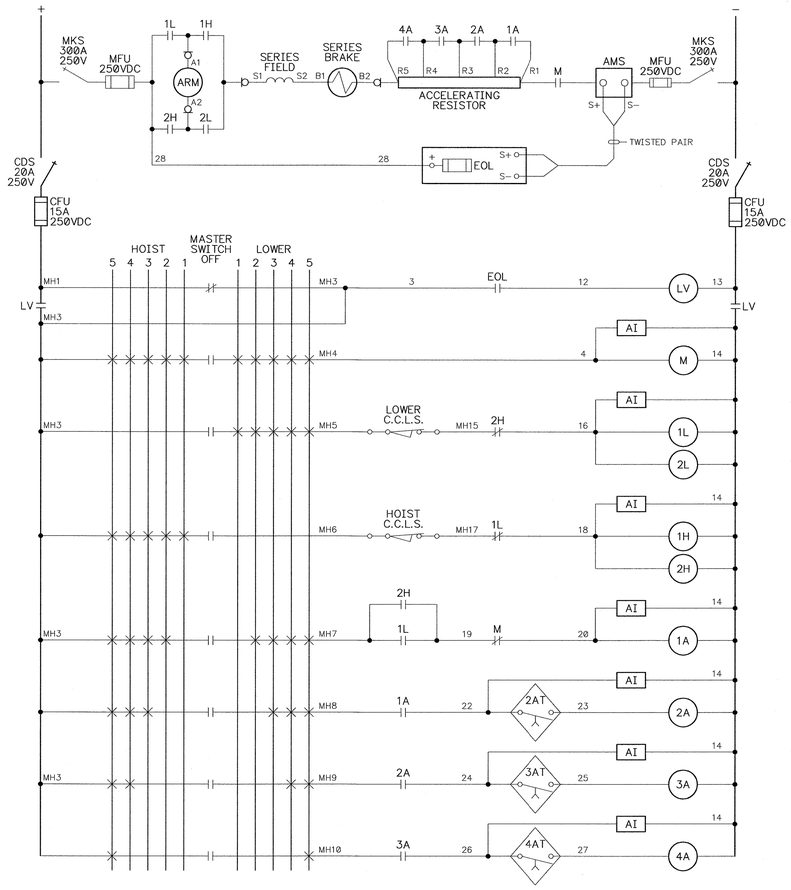
LEWIS L. SIMPSON — STATE OF WASHINGTON — 19193 — REGISTERED PROFESSIONAL ENGINEER
EXPIRES 07/16/06

CUSHMAN #2 POWERHOUSE
MAIN POWERHOUSE CRANE INTERMEDIATE RELAYS SCHEMATIC

SUBMITTED	DESIGNED	DRAWN	CHECKED
	Mfr.	Mfr./VAF	
APPROVED	DATE 02/14/05	SCALE NONE	
	DRAWING NO. BW1829		

DWG: BW1829 FILED IN: a-cushm2

SCHEMATIC DIAGRAM



CONTACTOR SEQUENCE

CONTACTS	HOIST					OFF	LOWER				
	5	4	3	2	1		1	2	3	4	5
M	X	X	X	X	X		X	X	X	X	X
1L							X	X	X	X	X
2L							X	X	X	X	X
1H	X	X	X	X	X						
2H	X	X	X	X	X						
1A	X	X	X	X				X	X	X	X
2A	X	X	X						X	X	X
3A	X	X								X	X
4A	X										X

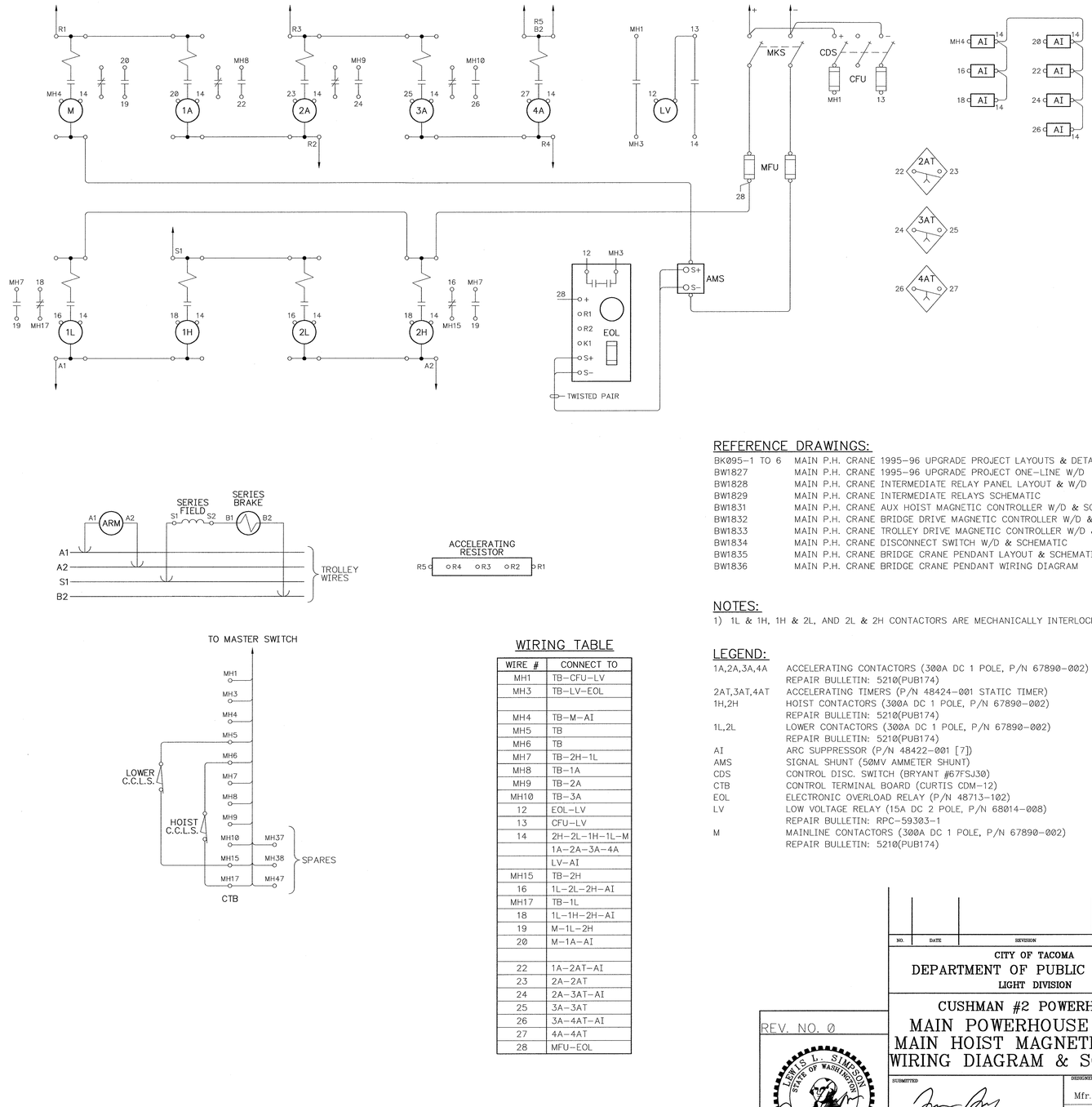
X = CONTACT CLOSED

H.P.	FLI	MFU AMPS	50MV SHUNT	FL SHUNT SIGNAL	EOL RELAY SETTINGS DIAL	INST.	INVER.
50	184	300A	200A	46MV	80	250%	5 SEC
60	235	350A	300A	39MV	60	250%	5 SEC
65	254	400A	300A	42.3MV	72	250%	5 SEC
70	256	400A	300A	42.7MV	72	250%	5 SEC
75	275	400A	300A	45.8MV	80	250%	5 SEC
90	343	500A	300A	57MV	98	250%	5 SEC
100	368	600A	400A	46MV	80	250%	5 SEC

RELAY SETTINGS

SYMBOL	SETTING
2AT	0.5 SEC
3AT	0.5 SEC
4AT	0.5 SEC

WIRING DIAGRAM



WIRING TABLE

WIRE #	CONNECT TO
MH1	TB−CFU−LV
MH3	TB−LV−EOL
MH4	TB−M−AI
MH5	TB
MH6	TB
MH7	TB−2H−1L
MH8	TB−1A
MH9	TB−2A
MH10	TB−3A
12	EOL−LV
13	CFU−LV
14	2H−2L−1H−1L−M
	1A−2A−3A−4A
	LV−AI
MH15	TB−2H
16	1L−2L−2H−AI
MH17	TB−1L
18	1L−1H−2H−AI
19	M−1L−2H
20	M−1A−AI
22	1A−2AT−AI
23	2A−2AT
24	2A−3AT−AI
25	3A−3AT
26	3A−4AT−AI
27	4A−4AT
28	MFU−EOL

REFERENCE DRAWINGS:

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BW1835	MAIN P.H. CRANE BRIDGE CRANE PENDANT LAYOUT & SCHEMATIC
BW1836	MAIN P.H. CRANE BRIDGE CRANE PENDANT WIRING DIAGRAM

NOTES:

1) 1L & 1H, 1H & 2L, AND 2L & 2H CONTACTORS ARE MECHANICALLY INTERLOCKED.

LEGEND:

1A,2A,3A,4A	ACCELERATING CONTACTORS (300A DC 1 POLE, P/N 67890-002) REPAIR BULLETIN: 5210(PUB174)
2AT,3AT,4AT	ACCELERATING TIMERS (P/N 48424-001 STATIC TIMER)
1H,2H	HOIST CONTACTORS (300A DC 1 POLE, P/N 67890-002) REPAIR BULLETIN: 5210(PUB174)
1L,2L	LOWER CONTACTORS (300A DC 1 POLE, P/N 67890-002) REPAIR BULLETIN: 5210(PUB174)
AI	ARC SUPPRESSOR (P/N 48422-001 [7])
AMS	SIGNAL SHUNT (50MV AMMETER SHUNT)
CDS	CONTROL DISC. SWITCH (BRYANT #67FSJ30)
CTB	CONTROL TERMINAL BOARD (CURTIS CDM-12)
EOL	ELECTRONIC OVERLOAD RELAY (P/N 48713-102)
LV	LOW VOLTAGE RELAY (15A DC 2 POLE, P/N 68014-008) REPAIR BULLETIN: RPC-59303-1
M	MAINLINE CONTACTORS (300A DC 1 POLE, P/N 67890-002) REPAIR BULLETIN: 5210(PUB174)

THIS DRAWING DERIVED FROM HUBBELL INDUSTRIAL CONTROLS Mfr. DRAWING C-85707-001 SHT. 1 & 2

REV. NO. Ø

LEWIS L. SIMPSON — STATE OF WASHINGTON — 9983 — REGISTERED PROFESSIONAL ENGINEER

EXPIRES 07/16/06

NO.	DATE	REVISION	BY	CHECKED	APPROVED

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

CUSHMAN #2 POWERHOUSE
MAIN POWERHOUSE CRANE
MAIN HOIST MAGNETIC CTRLR
WIRING DIAGRAM & SCHEMATIC

SUBMITTED

APPROVED

DESIGNED	DRAWN	CHECKED
Mfr.	Mfr./VAF	

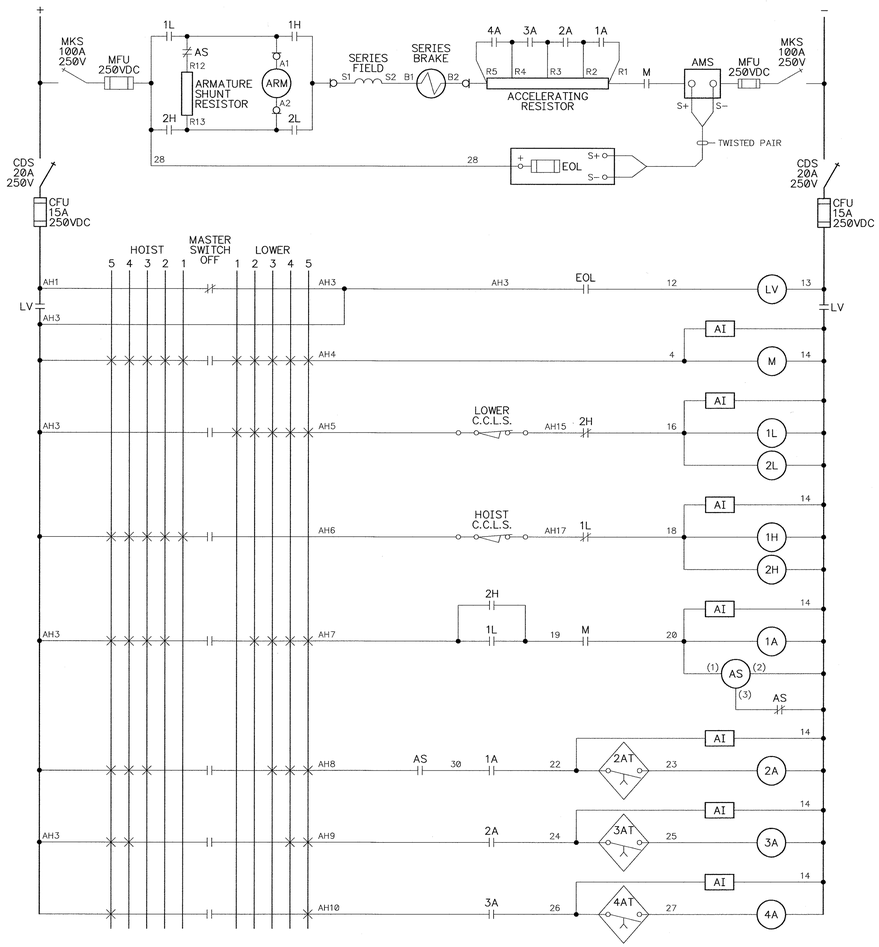
02/14/05 DATE

NONE SCALE

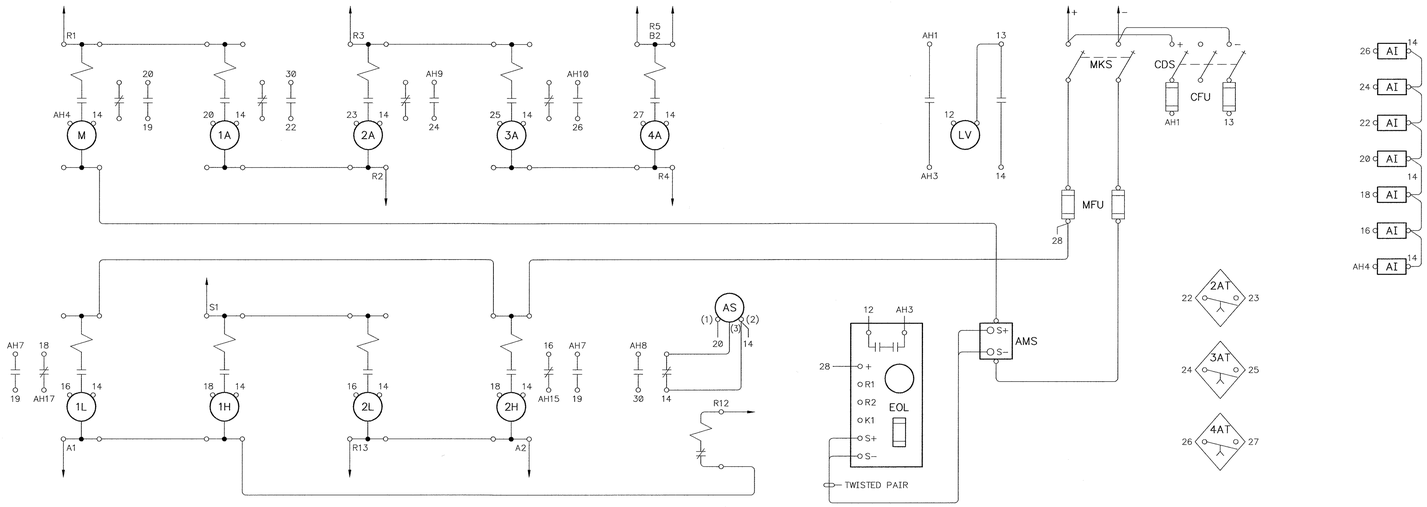
DRAWING NO.
BW1830

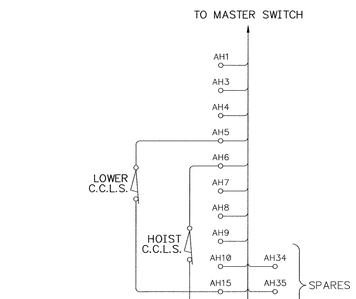
DWG: BW1830 FILED IN: a-cushm2

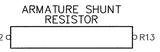
SCHEMATIC DIAGRAM

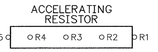


WIRING DIAGRAM









CONTACTOR SEQUENCE

CONTACTS	HOIST					OFF	LOWER				
	5	4	3	2	1		1	2	3	4	5
M	X	X	X	X	X		X	X	X	X	X
1L							X	X	X	X	X
2L							X	X	X	X	X
1H	X	X	X	X	X						
2H	X	X	X	X	X						
1A	X	X	X	X				X	X	X	X
2A	X	X	X						X	X	X
3A	X	X								X	X
4A	X										X
AS						X	X	X			

X = CONTACT CLOSED

H.P.	FLI	MFU AMPS	50MV SHUNT	FL SHUNT SIGNAL	EOL RELAY SETTINGS DIAL	INST.	INVER.
19	77	125A	100A	38.5MV	60	250%	5 SEC
20	77	125A	100A	38.5MV	60	250%	5 SEC
25	95	150A	100A	47.5MV	83	250%	5 SEC
26	106	150A	100A	53MV	93	250%	5 SEC
30	114	175A	100A	57MV	98	250%	5 SEC
33	128	200A	150A	42.7MV	72	250%	5 SEC
35	130	200A	150A	43.3MV	74	250%	5 SEC

RELAY SETTINGS

SYMBOL	SETTING
2AT	0.5 SEC
3AT	0.5 SEC
4AT	0.5 SEC

WIRING TABLE

WIRE #	CONNECT TO
AH1	TB–CFU–LV
AH3	TB–LV–EOL
AH4	TB–M–AI
AH5	TB
AH6	TB
AH7	TB–2H–1L
AH8	TB–AS
AH9	TB–2A
AH10	TB–3A
12	EOL–LV
13	CFU–LV
14	AS–2H–2L–1H
	1L–M–1A–2A
	3A–4A–LV–AI
AH15	TB–2H
16	1L–2L–2H–AI
AH17	TB–1L
18	1L–1H–2H–AI
19	M–1L–2H
20	M–1A–AS–AI
22	1A–2AT–AI
23	2A–2AT
24	2A–3AT–AI
25	3A–3AT
26	3A–4AT–AI
27	4A–4AT
28	MFU–EOL
30	1A–AS

THIS DRAWING DERIVED FROM HUBBELL INDUSTRIAL CONTROLS Mfr. DRAWING C-85709-001 SHT. 1 & 2

REFERENCE DRAWINGS:

BK095-1 TO 6	MAIN P.H. CRANE 1995-96 UPGRADE PROJECT LAYOUTS & DETAILS
BW1827	MAIN P.H. CRANE 1995-96 UPGRADE PROJECT ONE-LINE W/D
BW1828	MAIN P.H. CRANE INTERMEDIATE RELAY PANEL LAYOUT & W/D
BW1829	MAIN P.H. CRANE INTERMEDIATE RELAYS SCHEMATIC
BW1830	MAIN P.H. CRANE MAIN HOIST MAGNETIC CONTROLLER W/D & SCHEMATIC
BW1832	MAIN P.H. CRANE BRIDGE DRIVE MAGNETIC CONTROLLER W/D & SCHEMATIC
BW1833	MAIN P.H. CRANE TROLLEY DRIVE MAGNETIC CONTROLLER W/D & SCHEMATIC
BW1834	MAIN P.H. CRANE DISCONNECT SWITCH W/D & SCHEMATIC
BW1835	MAIN P.H. CRANE BRIDGE CRANE PENDANT LAYOUT & SCHEMATIC
BW1836	MAIN P.H. CRANE BRIDGE CRANE PENDANT WIRING DIAGRAM

NOTES:

1) 1L & 1H, 1H & 2L, AND 2L & 2H CONTACTORS ARE MECHANICALLY INTERLOCKED.

LEGEND:

1A,2A,3A,4A	ACCELERATING CONTACTORS (100A DC 1 POLE, P/N 17359-000) REPAIR BULLETIN: 5210(PUB137)
2AT,3AT,4AT	ACCELERATING TIMERS (P/N 48424-001 STATIC TIMER)
1H,2H	HOIST CONTACTORS (100A DC 1 POLE, P/N 17359-000) REPAIR BULLETIN: 5210(PUB137)
1L,2L	LOWER CONTACTORS (100A DC 1 POLE, P/N 17359-000) REPAIR BULLETIN: 5210(PUB137)
AI	ARC SUPPRESSOR (P/N 48422-001 [7])
AMS	SIGNAL SHUNT (50MV AMMETER SHUNT)
AS	ARMATURE SHUNT CONTACTORS (100A DC 1 POLE N.C., P/N 68091-001) REPAIR BULLETIN: 5210(PUB104)
CDS	CONTROL DISC. SWITCH (BRYANT #67FSJ30)
CTB	CONTROL TERMINAL BOARD (CURTIS CDM-12)
EOL	ELECTRONIC OVERLOAD RELAY (P/N 48713-102)
LV	LOW VOLTAGE RELAY (15A DC 2 POLE, P/N 68014-008) REPAIR BULLETIN: RPC-59303-1
M	MAINLINE CONTACTORS (100A DC 1 POLE, P/N 17359-000) REPAIR BULLETIN: 5210(PUB137)

NO.	DATE	REVISION	BY	CHECKED	APPROVED

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

CUSHMAN #2 POWERHOUSE
MAIN POWERHOUSE CRANE AUX HOIST MAGNETIC CTRLR WIRING DIAGRAM & SCHEMATIC

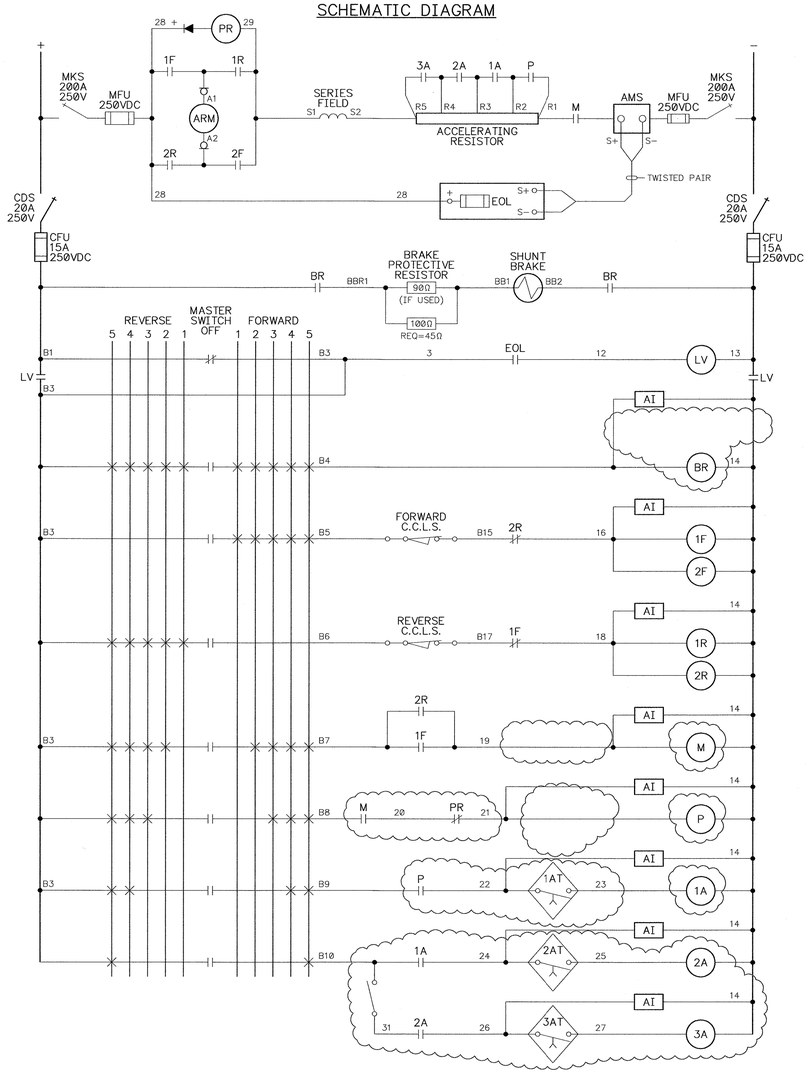
REV. NO. 0

LEWIS L. SIMPSON — STATE OF WASHINGTON — 19193 — REGISTERED PROFESSIONAL ENGINEER
EXPIRES 07/16/06

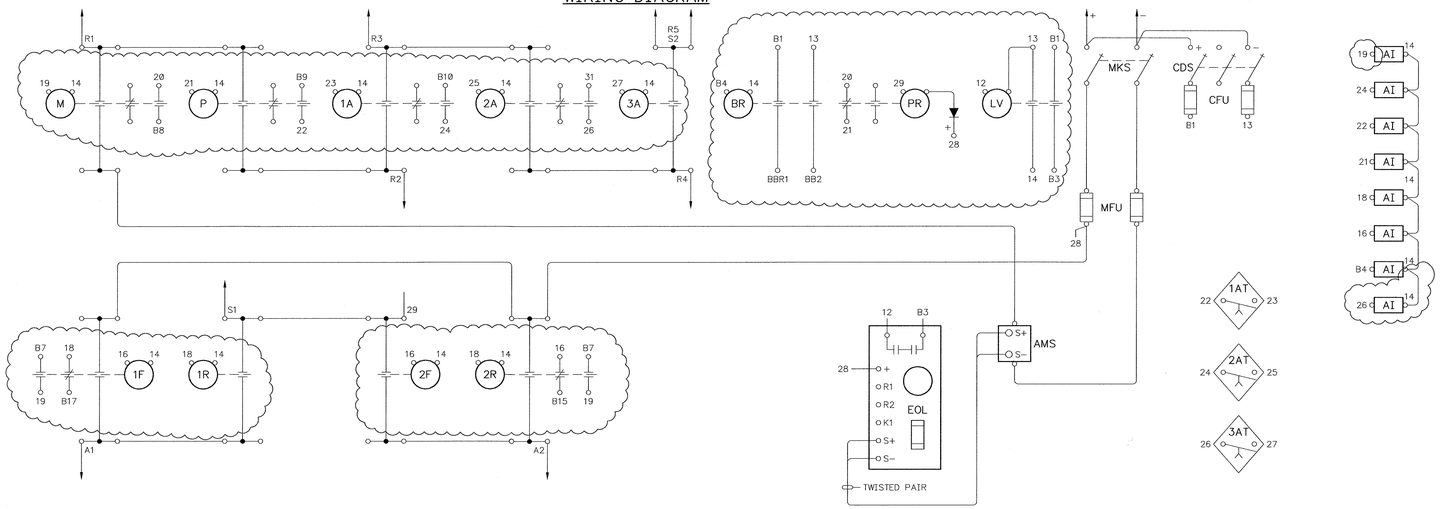
SUBMITTED	DESIGNED	DRAWN	CHECKED
	Mfr.	Mfr./VAF	
APPROVED	02/14/05 DATE	NONE SCALE	
	DRAWING NO.	BW1831	

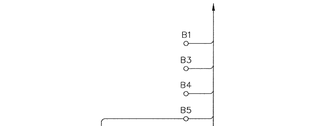
DWG: BW1831 FILED IN: a-cushm2

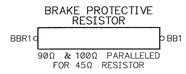
SCHEMATIC DIAGRAM

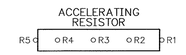


WIRING DIAGRAM









CONTACTOR SEQUENCE

CONTACTS	REVERSE					OFF	FORWARD				
	5	4	3	2	1		1	2	3	4	5
BR	X	X	X	X	X		X	X	X	X	X
1F							X	X	X	X	X
2F							X	X	X	X	X
1R	X	X	X	X	X						
2R	X	X	X	X	X						
M	X	X	X	X				X	X	X	X
P	X	X	X						X	X	X
1A	X	X								X	X
2A-3A	X										X

X = CONTACT CLOSED

H.P.	FLI	MFU AMPS	50MV SHUNT	FL SHUNT SIGNAL	EOL RELAY SETTINGS		
					DIAL	INST.	INVER.
50	184	300A	200	46MV	80	250%	5 SEC

RELAY SETTINGS

SYMBOL	SETTING
PR	D.O. 20V
1AT	2.0 SEC
2AT	1.0 SEC
3AT	0.5 SEC

WIRING TABLE

WIRE #	CONNECT TO
B1	TB-CFU-LV-BR
B3	TB-LV-EOL
B4	TB-BR-AI
B5	TB
B6	TB-2R-1F
B7	TB-2R-1F
B8	TB-M
B9	TB-P
B10	TB-1A
12	EOL-LV
13	CFU-LV-BR
14	2R-2F-1R-1F
	M-P-1A-2A
	3A-LV-AI-BR
B15	TB-2R
16	1F-2F-2R-AI
B17	TB-1F
18	1F-1R-2R-AI
19	1F-2R M-AI
20	M-PR
21	P-PR-AI
22	P-1AT-AI
23	1A-1AT
24	1A-2AT-A1
25	2A-2AT
26	2A-3AT-AI
27	3A-3AT
28	MFU-PR-EOL
29	PR-2F
30	1A-AS
31	2A
BBR1	TB-BR
BB1	TB
BB2	TB-BR

REFERENCE DRAWINGS:

BK095-1 TO 6	MAIN P.H. CRANE 1995-96 UPGRADE PROJECT LAYOUTS & DETAILS
BW1827	MAIN P.H. CRANE 1995-96 UPGRADE PROJECT ONE-LINE W/D
BW1828	MAIN P.H. CRANE INTERMEDIATE RELAY PANEL LAYOUT & W/D
BW1829	MAIN P.H. CRANE INTERMEDIATE RELAYS SCHEMATIC
BW1830	MAIN P.H. CRANE MAIN HOIST MAGNETIC CONTROLLER W/D & SCHEMATIC
BW1831	MAIN P.H. CRANE AUX HOIST MAGNETIC CONTROLLER W/D & SCHEMATIC
BW1833	MAIN P.H. CRANE TROLLEY DRIVE MAGNETIC CONTROLLER W/D & SCHEMATIC
BW1834	MAIN P.H. CRANE DISCONNECT SWITCH W/D & SCHEMATIC
BW1835	MAIN P.H. CRANE BRIDGE CRANE PENDANT LAYOUT & SCHEMATIC
BW1836	MAIN P.H. CRANE BRIDGE CRANE PENDANT WIRING DIAGRAM

NOTES:

1. 1F & 1R, 1R & 2F, AND 2F & 2R CONTACTORS ARE MECHANICALLY INTERLOCKED.

LEGEND:

1A,2A,3A	ACCELERATING CONTACTORS (150A DC 1 POLE, P/N 17359-000) REPAIR BULLETIN: 5210(PUB137)
1AT,2AT,3AT	ACCELERATING TIMERS (P/N 48424-001 STATIC TIMER)
1F,2F	FORWARD CONTACTORS (150A DC 1 POLE, P/N 17359-000) REPAIR BULLETIN: 5210(PUB137)
1R,2R	REVERSE CONTACTORS (150A DC 1 POLE, P/N 17359-000) REPAIR BULLETIN: 5210(PUB137)
AI	ARC SUPPRESSOR (P/N 48422-001 [7])
AMS	SIGNAL SHUNT (50MV AMMETER SHUNT)
BR	BRAKE CONTACTORS (25A DC 2 POLE [10A B.O.], P/N 68014-008) REPAIR BULLETIN: 5210(PUB101)
CDS	CONTROL DISC. SWITCH (BRYANT #67FSJ30)
CTB	CONTROL TERMINAL BOARD (CURTIS CDM-18)
EOL	ELECTRONIC OVERLOAD RELAY (P/N 48713-102)
LV	LOW VOLTAGE RELAY (15A DC 2 POLE, P/N 68014-008) REPAIR BULLETIN: RPC-59303-1
M	MAINLINE CONTACTORS (150A DC 1 POLE, P/N 17359-000) REPAIR BULLETIN: 5210(PUB137)
P	ACCELERATING CONTACTOR (150A DC 1 POLE, P/N 17359-000) REPAIR BULLETIN: 5210(PUB137)
PR	PLUGGING RELAY (TYPE VR RELAY DC, P/N 17487-000 REPAIR BULLETIN: RPC-58896-1

NO.	DATE	REVISION	BY	CHECKED	APPROVED
1	2/25/05	ADD COAST TO TRAVERSING	VAF	JW	MEE

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

CUSHMAN #2 POWERHOUSE
MAIN POWERHOUSE CRANE
BRIDGE DRIVE MAGNETIC CTRLR
WIRING DIAGRAM & SCHEMATIC

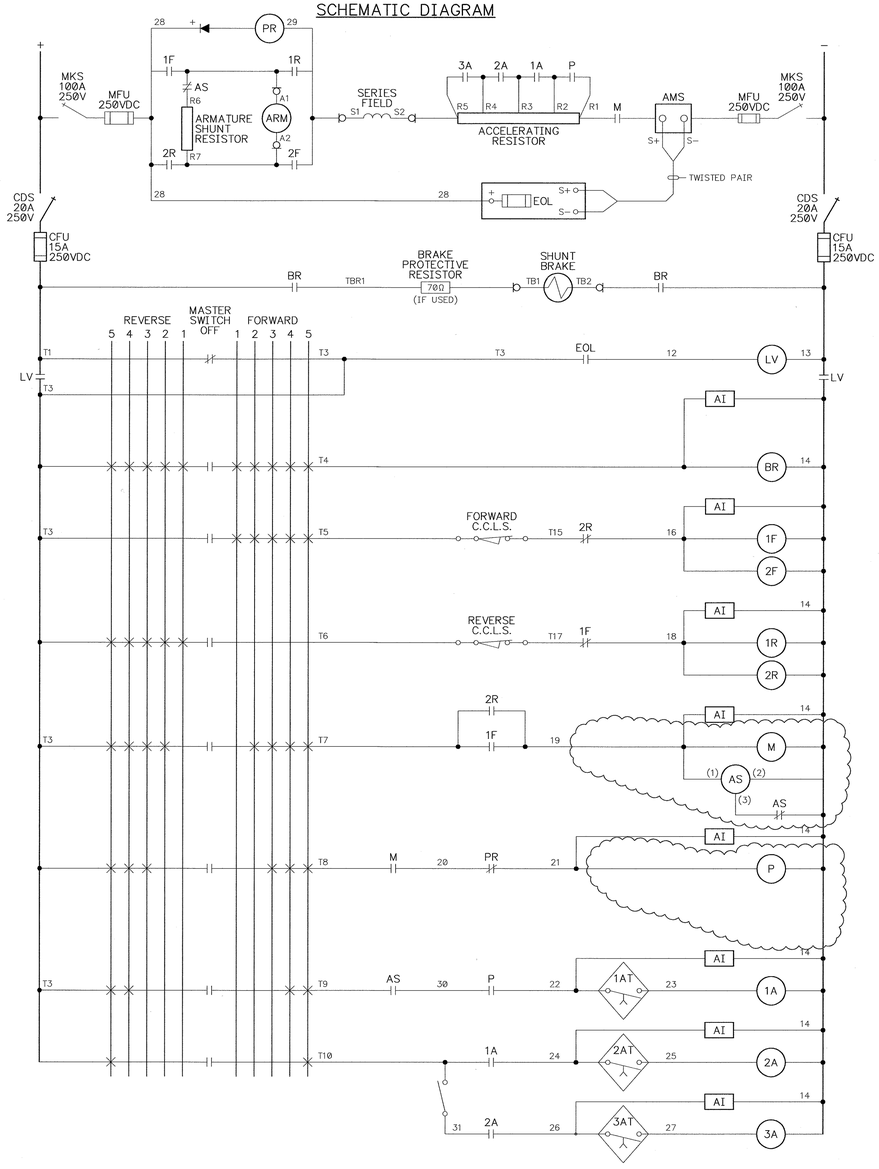
REV. NO. 1

LEWIS L. SIMPSON STATE OF WASHINGTON 19193 REGISTERED PROFESSIONAL ENGINEER
EXPIRES 07/16/06

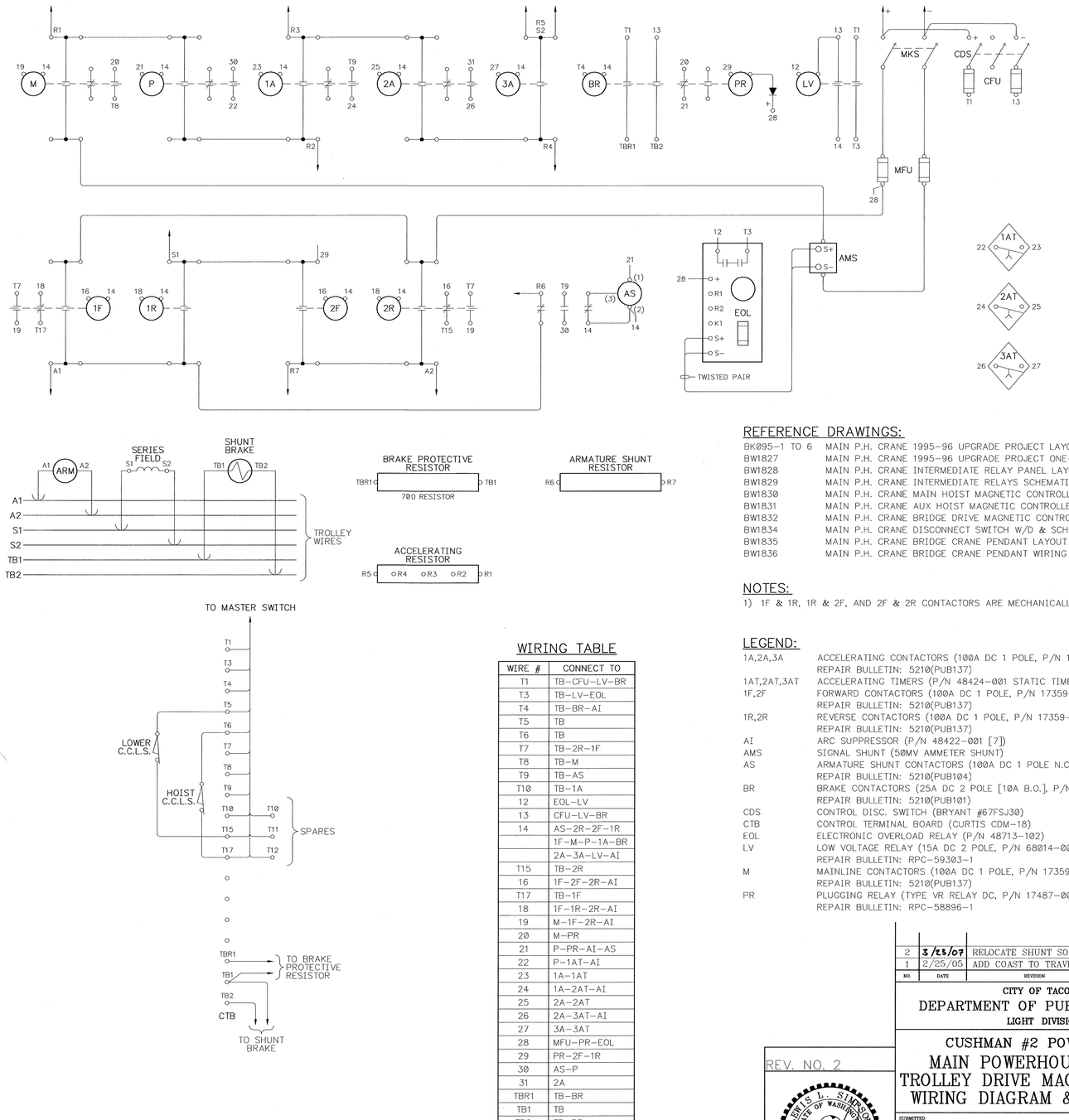
SUBMITTED	DESIGNED	DRAWN	CHECKED
LEWIS L. SIMPSON	Mfr.	Mfr./VAF	FME
APPROVED: F. MAX EMRICK	DATE: 02/14/05	SCALE: NONE	
	DRAWING NO.: BW1832		

DWG: BW1832 FILED IN: o-cushm2

SCHEMATIC DIAGRAM



WIRING DIAGRAM



REFERENCE DRAWINGS:

BK095-1 TO 6	MAIN P.H. CRANE 1995-96 UPGRADE PROJECT LAYOUTS & DETAILS
BW1827	MAIN P.H. CRANE 1995-96 UPGRADE PROJECT ONE-LINE W/D
BW1828	MAIN P.H. CRANE INTERMEDIATE RELAY PANEL LAYOUT & W/D
BW1829	MAIN P.H. CRANE INTERMEDIATE RELAYS SCHEMATIC
BW1830	MAIN P.H. CRANE MAIN HOIST MAGNETIC CONTROLLER W/D & SCHEMATIC
BW1831	MAIN P.H. CRANE AUX HOIST MAGNETIC CONTROLLER W/D & SCHEMATIC
BW1832	MAIN P.H. CRANE BRIDGE DRIVE MAGNETIC CONTROLLER W/D & SCHEMATIC
BW1834	MAIN P.H. CRANE DISCONNECT SWITCH W/D & SCHEMATIC
BW1835	MAIN P.H. CRANE BRIDGE CRANE PENDANT LAYOUT & SCHEMATIC
BW1836	MAIN P.H. CRANE BRIDGE CRANE PENDANT WIRING DIAGRAM

NOTES:

1) 1F & 1R, 1R & 2F, AND 2F & 2R CONTACTORS ARE MECHANICALLY INTERLOCKED.

LEGEND:

1A,2A,3A	ACCELERATING CONTACTORS (100A DC 1 POLE, P/N 17359-000) REPAIR BULLETIN: 5210(PUB137)
1AT,2AT,3AT	ACCELERATING TIMERS (P/N 48424-001 STATIC TIMER)
1F,2F	FORWARD CONTACTORS (100A DC 1 POLE, P/N 17359-000) REPAIR BULLETIN: 5210(PUB137)
1R,2R	REVERSE CONTACTORS (100A DC 1 POLE, P/N 17359-000) REPAIR BULLETIN: 5210(PUB137)
AI	ARC SUPPRESSOR (P/N 48422-001 [7])
AMS	SIGNAL SHUNT (50MV AMMETER SHUNT)
AS	ARMATURE SHUNT CONTACTORS (100A DC 1 POLE N.C., P/N 68091-001) REPAIR BULLETIN: 5210(PUB104)
BR	BRAKE CONTACTORS (25A DC 2 POLE [10A B.O.], P/N 68014-008) REPAIR BULLETIN: 5210(PUB101)
CDS	CONTROL DISC. SWITCH (BRYANT #67FSJ30)
CTB	CONTROL TERMINAL BOARD (CURTIS CDM-18)
EOL	ELECTRONIC OVERLOAD RELAY (P/N 48713-102)
LV	LOW VOLTAGE RELAY (15A DC 2 POLE, P/N 68014-008) REPAIR BULLETIN: RPC-59303-1
M	MAINLINE CONTACTORS (100A DC 1 POLE, P/N 17359-000) REPAIR BULLETIN: 5210(PUB137)
PR	PLUGGING RELAY (TYPE VR RELAY DC, P/N 17487-000 REPAIR BULLETIN: RPC-58896-1

WIRING TABLE

WIRE #	CONNECT TO
T1	TB-CFU-LV-BR
T3	TB-LV-EOL
T4	TB-BR-AI
T5	TB
T6	TB
T7	TB-2R-1F
T8	TB-M
T9	TB-AS
T10	TB-1A
12	EOL-LV
13	CFU-LV-BR
14	AS-2R-2F-1R
	1F-M-P-1A-BR
	2A-3A-LV-AI
T15	TB-2R
16	1F-2F-2R-AI
T17	TB-1F
18	1F-1R-2R-AI
19	M-1F-2R-AI
20	M-PR
21	P-PR-AI-AS
22	P-1AT-AI
23	1A-1AT
24	1A-2AT-AI
25	2A-2AT
26	2A-3AT-AI
27	3A-3AT
28	MFU-PR-EOL
29	PR-2F-1R
30	AS-P
31	2A
TBR1	TB-BR
TB1	TB
TB2	TB-BR

CONTACTOR SEQUENCE

CONTACTS	REVERSE 5	4	3	2	1	OFF	FORWARD 1	2	3	4	5
BR	X	X	X	X	X		X	X	X	X	X
1F							X	X	X	X	X
2F							X	X	X	X	X
1R	X	X	X	X	X						
2R	X	X	X	X	X						
M	X	X	X	X				X	X	X	X
P	X	X	X						X	X	X
1A	X	X								X	X
2A-3A	X										X
AS							X	X	X		

X = CONTACT CLOSED

RELAY SETTINGS

SYMBOL	SETTING
PR	D.O. 20V
1AT	2.0 SEC
2AT	1.0 SEC
3AT	0.5 SEC

H.P.	FLI	MFU AMPS	50MV SHUNT	FL SHUNT SIGNAL	EOL RELAY SETTINGS DIAL	INST.	INVER.
19	77	125A	100A	38.5MV	60	250%	5 SEC
20	77	125A	100A	38.5MV	60	250%	5 SEC
20	80	125A	100A	40MV	65	250%	5 SEC
25	95	150A	100A	47.5MV	83	250%	5 SEC
26	106	150A	100A	53MV	93	250%	5 SEC
30	114	175A	100A	57MV	98	250%	5 SEC
33	128	200A	150A	42.7MV	72	250%	5 SEC
35	130	200A	150A	43.3MV	74	250%	5 SEC

NO.	DATE	REVISION	BY	CHECKED	APPROVED
2	3/23/07	RELOCATE SHUNT SOLENOID	VAF	JS	3/28/07
1	2/25/05	ADD COAST TO TRAVERSING	VAF	LLS	FME

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

REV. NO. 2

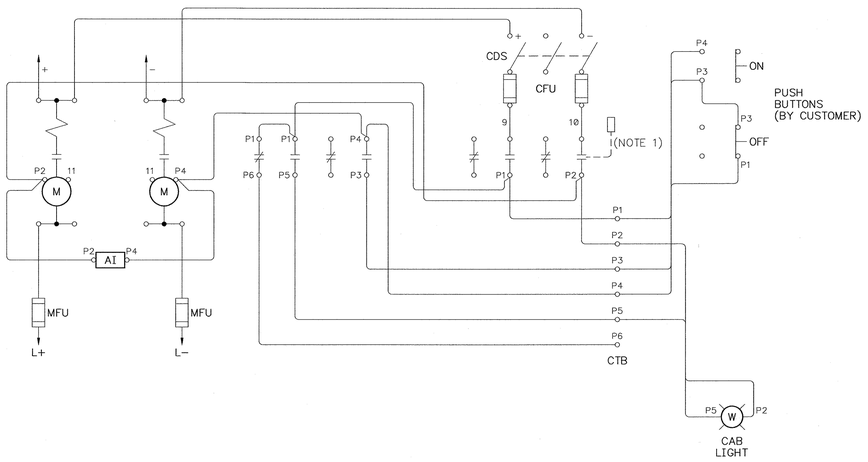
CUSHMAN #2 POWERHOUSE
MAIN POWERHOUSE CRANE TROLLEY DRIVE MAGNETIC CTRLR WIRING DIAGRAM & SCHEMATIC

LEWIS L. SIMPSON STATE OF WASHINGTON 19193 REGISTERED PROFESSIONAL ENGINEER
EXPIRES 07/16/08

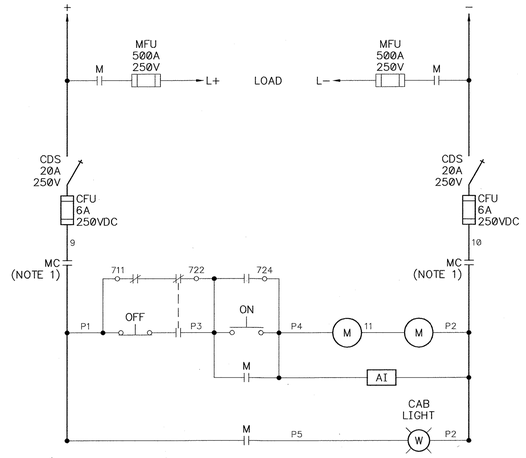
SUBMITTED	DESIGNED	DRAWN	CHECKED
LEWIS L. SIMPSON	Mfr.	Mfr./VAF	FME
APPROVED	02/14/05 DATE	NONE SCALE	
F. MAX EMRICK	DRAWING NO. BW1833		

DWG: BW1833 FILED IN: a-cushm2

WIRING DIAGRAM



SCHEMATIC DIAGRAM



REFERENCE DRAWINGS:

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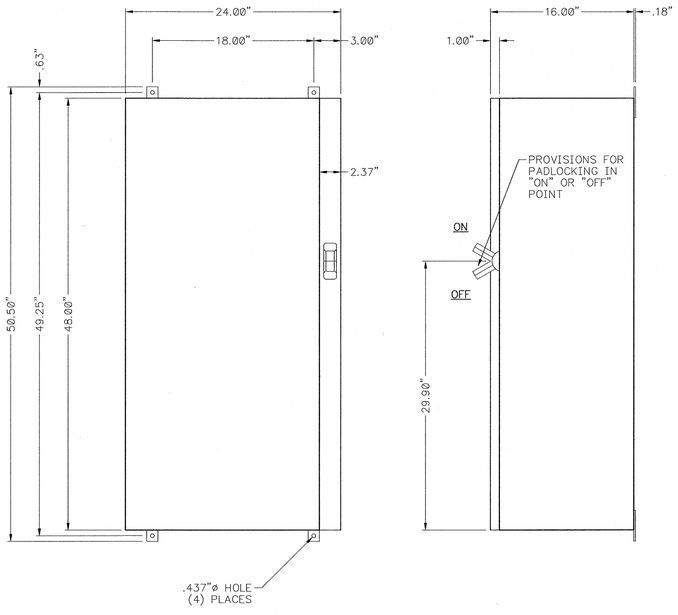
BW1829	MAIN P.H. CRANE INTERMEDIATE RELAYS SCHEMATIC
BW1830	MAIN P.H. CRANE MAIN HOIST MAGNETIC CONTROLLER W/D & SCHEMATIC
BW1831	MAIN P.H. CRANE AUX HOIST MAGNETIC CONTROLLER W/D & SCHEMATIC
BW1832	MAIN P.H. CRANE BRIDGE DRIVE MAGNETIC CONTROLLER W/D & SCHEMATIC
BW1833	MAIN P.H. CRANE TROLLEY DRIVE MAGNETIC CONTROLLER W/D & SCHEMATIC
BW1834	MAIN P.H. CRANE DISCONNECT SWITCH W/D & SCHEMATIC
BW1835	MAIN P.H. CRANE BRIDGE CRANE PENDANT LAYOUT & SCHEMATIC
BW1836	MAIN P.H. CRANE BRIDGE CRANE PENDANT W/D

NOTES:

1) CONTACTS CONTROLLED BY OPERATING HANDLE.

LEGEND:

AI	ARC SUPPRESSOR (P/N 48422–001)
CDS	CONTROL DISC. SWITCH (BRYANT #67FSJ30)
CTB	CONTROL TERMINAL BOARD (CURTIS CDM–6)
M	MAINLINE CONTACTORS (400A DC 2 POLE, P/N 67890–003) REPAIR BULLETIN: 5210(PUB174)



CABINET DETAIL
SCALE 1–1/2"=1'–0"

THIS DRAWING DERIVED FROM HUBBELL INDUSTRIAL CONTROLS Mfr. DRAWING B–78160–005 SHT. 1 & 2

REV. NO. Ø

LOWELL L. SIMPSON
STATE OF WASHINGTON
19193
REGISTERED
PROFESSIONAL ENGINEER

EXPIRES 07/16/06

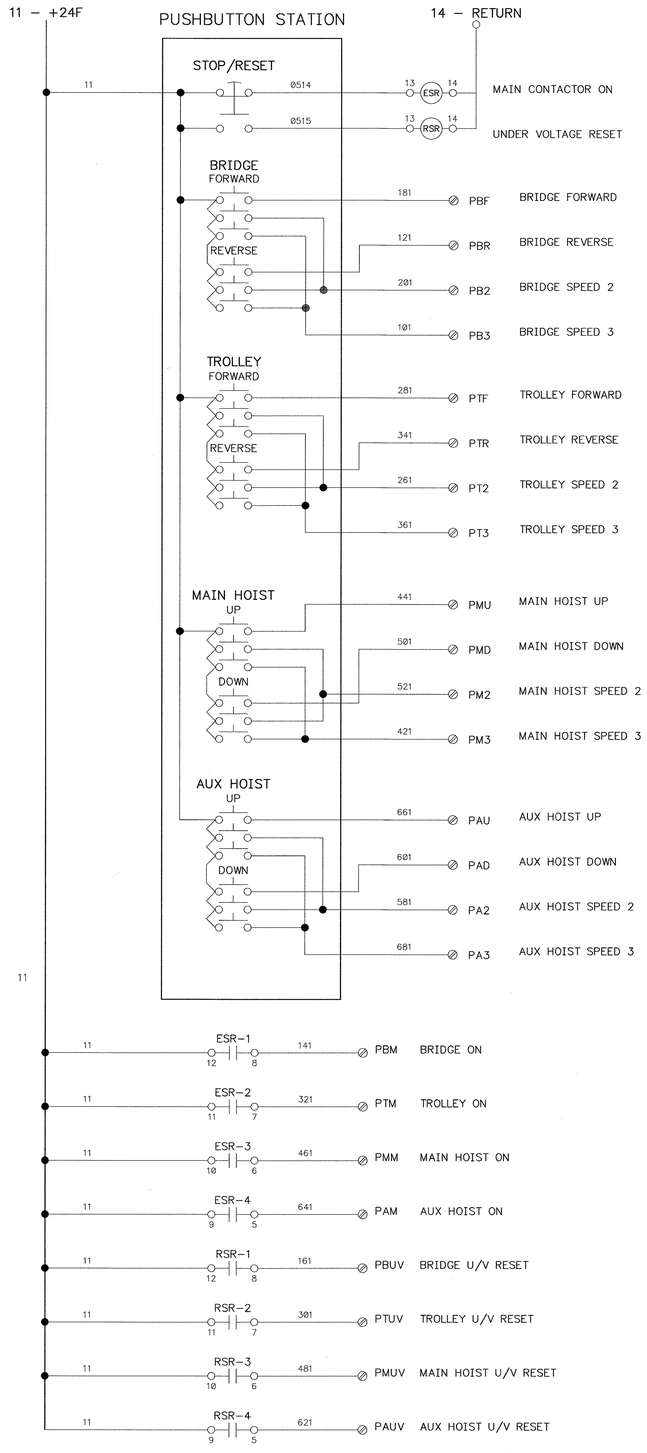
NO.	DATE	REVISION	BY	CHECKED	APPROVED

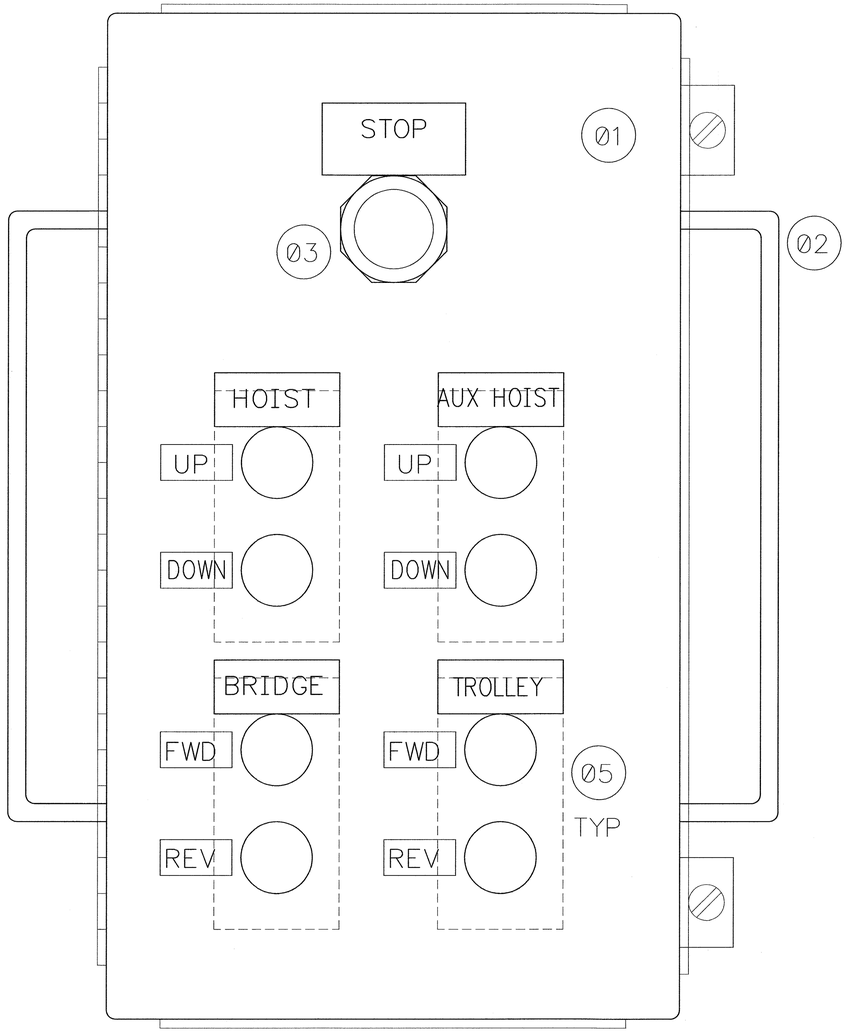
CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

CUSHMAN #2 POWERHOUSE
MAIN POWERHOUSE CRANE DISCONNECT SWITCH WIRING DIAGRAM & SCHEMATIC

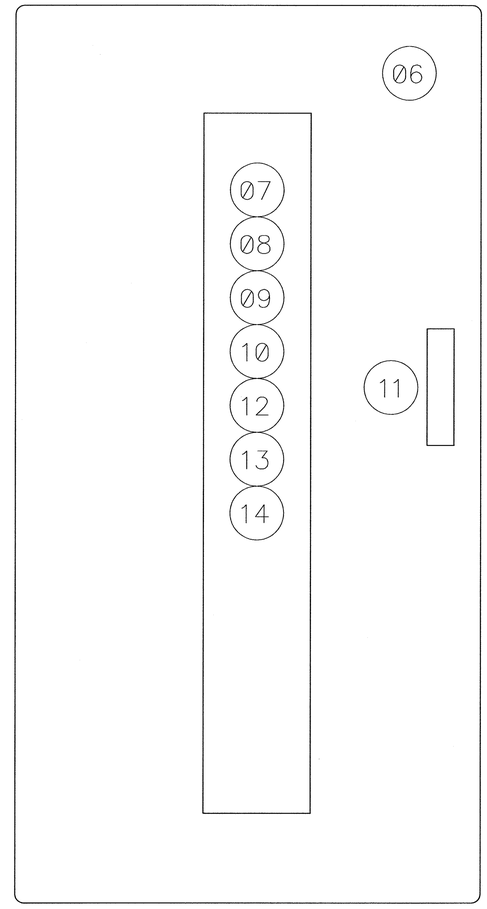
SUBMITTED	DESIGNED	DRAWN	CHECKED
	Mfr.	Mfr./VAF	
APPROVED	02/14/05 DATE	NONE SCALE	
	DRAWING NO. BW1834		

DWG: BW1834 FILED IN: o–cushm2





A–1486CH



BILL OF MATERIAL			
P/N	QTY	DESCRIPTION & MODEL No.	MANUFACTURER
01	1	OPERATOR ENCLOSURE, A–14086CH	HOFFMAN
02	2	HANDLE KIT, C–CCH220	HOFFMAN
03	1	RED STOP PUSHBUTTON, 800T–FXT6A1	ALLEN–BRADLEY
04	–	–	–
05	4	5–SPEED PUSHBUTTON, 2040–80825–000	HUBBELL
06	1	BACKPAN, A–14P8	HOFFMAN
07	2	END ANCHOR, 1492–N23	ALLEN–BRADLEY
08	1	END BARRIER, 1492–N36	ALLEN–BRADLEY
09	24	TERMINAL BLOCK, 1492–H1	ALLEN–BRADLEY
10	A/R	DIN RAIL, 1492–N22	ALLEN–BRADLEY
11	1	GROUND BAR, GB–5	SIEMENS
12	2	4 POLE 24 VDC RELAY, RH4B–ULC	IDEC
13	2	RELAY BASE, SH4B–05	IDEC
14	2	RELAY CLIP, SH4B–02F1	IDEC

REFERENCE DRAWINGS:

BK095–1 TO 6	MAIN P.H. CRANE 1995–96 UPGRADE PROJECT LAYOUTS & DETAILS
BW1827	MAIN P.H. CRANE 1995–96 UPGRADE PROJECT ONE–LINE W/D
BW1828	MAIN P.H. CRANE INTERMEDIATE RELAY PANEL LAYOUT & W/D
BW1829	MAIN P.H. CRANE INTERMEDIATE RELAYS SCHEMATIC
BW1830	MAIN P.H. CRANE MAIN HOIST MAGNETIC CONTROLLER W/D & SCHEMATIC
BW1831	MAIN P.H. CRANE AUX HOIST MAGNETIC CONTROLLER W/D & SCHEMATIC
BW1832	MAIN P.H. CRANE BRIDGE DRIVE MAGNETIC CONTROLLER W/D & SCHEMATIC
BW1833	MAIN P.H. CRANE TROLLEY DRIVE MAGNETIC CONTROLLER W/D & SCHEMATIC
BW1834	MAIN P.H. CRANE DISCONNECT SWITCH W/D & SCHEMATIC
BW1836	MAIN P.H. CRANE BRIDGE CRANE PENDANT WIRING DIAGRAM

NOTES:

1. TERMINAL AND WIRE NUMBERS MATCH THOSE ON CONTROL CHIEF RADIO INTERMEDIATE RELAY PANEL DRAWING 7201–3850.

THIS DRAWING DERIVED FROM CHAMPION & ASSOC. Mfr. DRAWING 3372E030

REV. NO. Ø

LEWIS L. SIMPSON STATE OF WASHINGTON 19993 REGISTERED PROFESSIONAL ENGINEER

EXPIRES 07/16/05

NO.	DATE	REVISION	BY	CHECKED	APPROVED

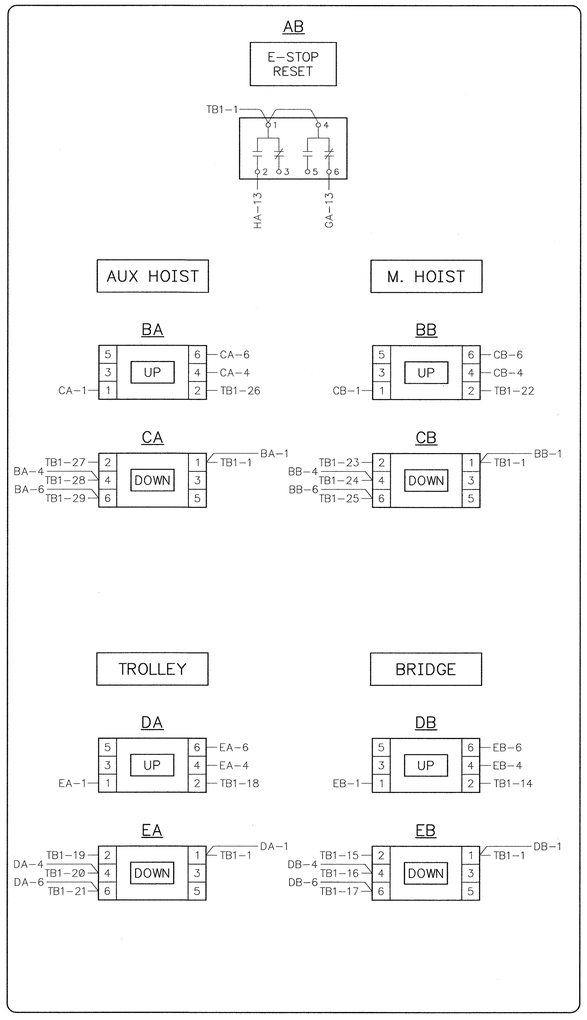
CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

CUSHMAN #2 POWERHOUSE

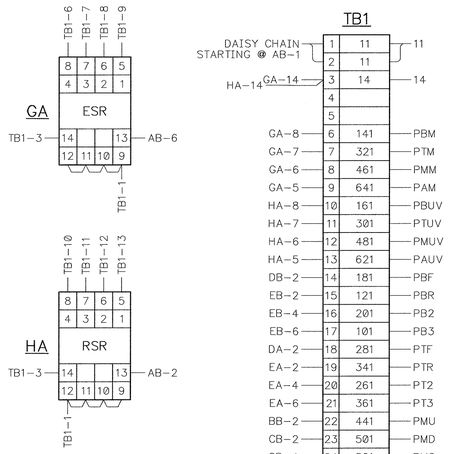
MAIN POWERHOUSE CRANE BRIDGE CRANE PENDANT LAYOUT & SCHEMATIC

SUBMITTED	DESIGNED	DRAWN	CHECKED
	Mfr.	Mfr./VAF	JME
APPROVED	DATE 02/14/05	SCALE NONE	
	DRAWING NO. BW1835		

DWG: BW1835 FILED IN: a–cushm2



PENDANT COVER



PENDANT

REFERENCE DRAWINGS:

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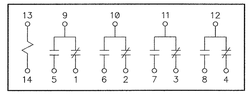
BW1835	MAIN P.H. CRANE BRIDGE CRANE PENDANT LAYOUT & SCHEMATIC

LEGEND:

UP	MULTI STEP PUSHBUTTON (3-STEP)
DOWN	MULTI STEP PUSHBUTTON (3-STEP)
ESR	ESTOP INTERPOSING RELAY (250VDC)
RSR	RESET INTERPOSING RELAY (250VDC)

RELAY PINOUT



NO.	DATE	REVISION	BY	CHECKED	APPROVED

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

CUSHMAN #2 POWERHOUSE
MAIN POWERHOUSE CRANE BRIDGE CRANE PENDANT WIRING DIAGRAM

REV. NO. 0

LEWIS L. SIMPSON
STATE OF WASHINGTON
19193
REGISTERED
PROFESSIONAL ENGINEER
EXPIRES 07/16/05

SUBMITTED

APPROVED

DESIGNED	DRAWN	CHECKED
LLS	VAF	

02/14/05 DATE
NONE SCALE
DRAWING NO.
BW1836

DWG: BW1836 FILED IN: a-cushm2