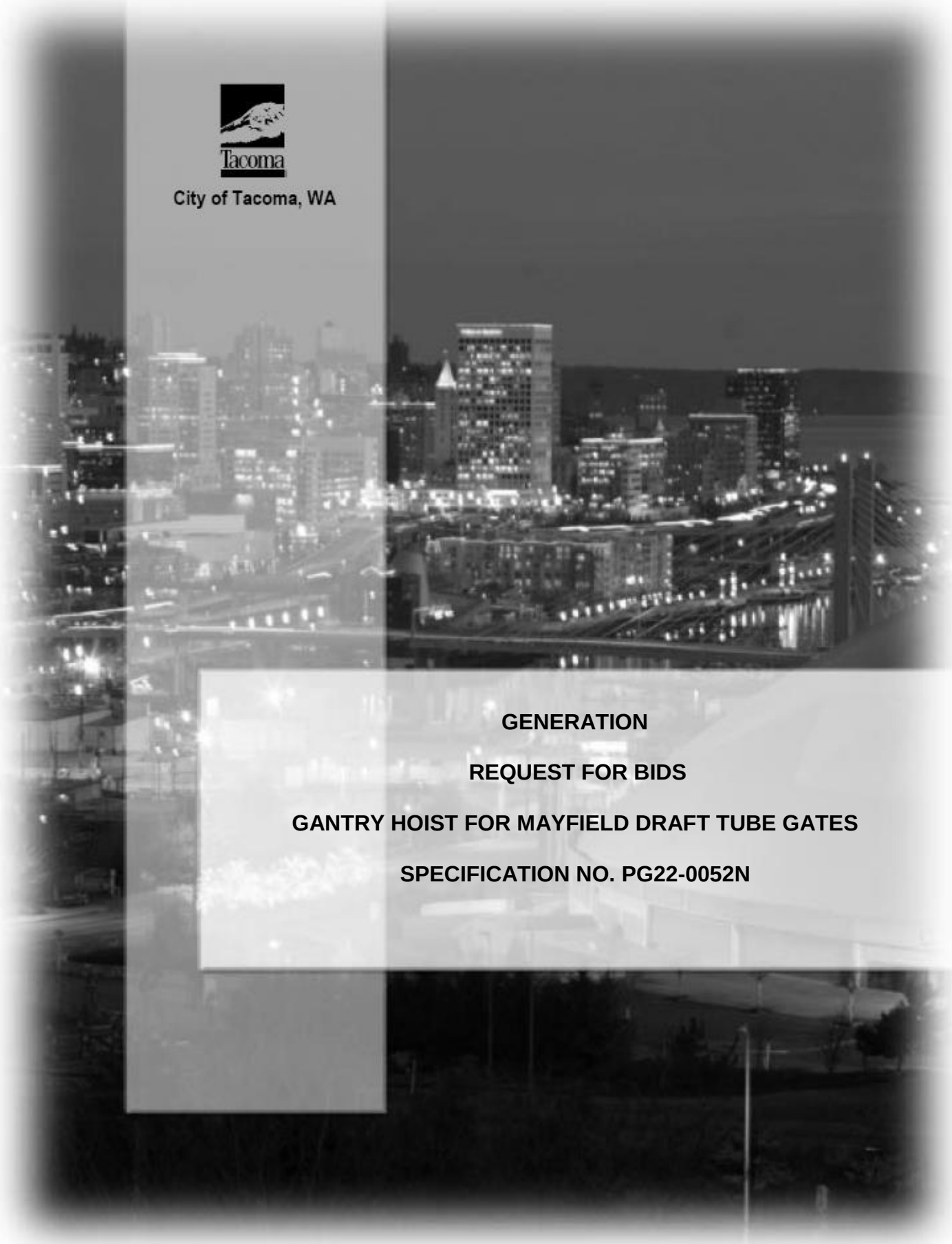


City of Tacoma, WA

GENERATION

REQUEST FOR BIDS

GANTRY HOIST FOR MAYFIELD DRAFT TUBE GATES

SPECIFICATION NO. PG22-0052N

SPECIFICATION CONTENTS

This Specification contains the following:

City of Tacoma
Power/Generation Engineering

REQUEST FOR BIDS PG22-0052N
Gantry Hoist for Mayfield Draft Tube Gates

Submittal Deadline: 11:00 a.m., Pacific Time, Wednesday, June 3, 2022

Submittal Delivery:

By Email:
sendbid@cityoftacoma.org
Maximum file size: 35 MB. Multiple emails may be sent for each submittal

Until further notice, public Bid Opening meetings have been cancelled.
Submittals in response to a RFB will be recorded as received. As soon as possible on the day of submittal deadline, preliminary results will be posted to www.TacomaPurchasing.org.

Solicitation Documents: An electronic copy of the complete solicitation documents may be viewed and obtained by accessing the City of Tacoma Purchasing website at www.TacomaPurchasing.org.

- Register for the Bid Holders List to receive notices of addenda, questions and answers and related updates.
- Click here to see a list of vendors registered for this solicitation.

Pre-Proposal Meeting: A pre-proposal meeting will not be held.

Project Scope: Supply of a Draft Tube Gate Hoist for the Mayfield Dam Powerhouse.

Estimate: $200,000 - $300,000

Paid Leave and Minimum Wage: Effective February 1, 2016, the City of Tacoma requires all employers to provide paid leave and minimum wages, as set forth in Title 18 of the Tacoma Municipal Code. For more information visit www.cityoftacoma.org/employmentstandards.

Americans with Disabilities Act (ADA Information: The City of Tacoma, in accordance with Section 504 of the Rehabilitation Act (Section 504) and the Americans with Disabilities Act (ADA), commits to nondiscrimination on the basis of disability, in all of its programs and activities. Specification materials can be made available in an alternate format by emailing Gail Himes at ghimes@cityoftacoma.org, or by calling her collect at 253-591-5785.

Federal Title VI Information:
"The City of Tacoma" in accordance with provisions of Title VI of the Civil Rights Act of 1964, (78 Stat. 252, 42 U.S.C. sections 2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that in any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, national origin in consideration of award.

Additional Information: Requests for information regarding the specifications may be obtained by contacting Debbie Seibert, Buyer by email to dseibert@cityoftacoma.org.

Protest Policy: City of Tacoma protest policy, located at www.tacomapurchasing.org, specifies procedures for protests submitted prior to and after submittal deadline.

Meeting sites are accessible to persons with disabilities. Reasonable accommodations for persons with disabilities can be arranged with 48 hours advance notice by calling 253-502-8468.

LETTERS AND CALLS

All information requested prior to the bid opening is subject to the limitations in Paragraph 1.20 of the **Standard Terms and Conditions.**

Address all letters to the Department of Public Utilities, P. O. Box 11007, Tacoma, Washington 98411.

For questions regarding Standard Terms and Conditions, Special or Technical Provisions, direct attention to Debbie Seibert, Buyer, dseibert@cityoftacoma.org.

For letters and calls regarding the EIC Program, direct attention to the EIC Program Coordinator at 253-591-5224 for calls, and to EIC/Community & Economic Development, Tacoma Municipal Building, 747 Market Street, Tacoma, Washington 98402, for letters.

For letters and calls regarding the LEAP Program, direct attention to the LEAP Coordinator at 253-594-7933 for calls, and to LEAP/ Community & Economic Development, Tacoma Municipal Building, 747 Market Street, Tacoma, Washington 98402, for letters.

All letters shall indicate the title and specification number (prior to award) or title and contract number (following award).

BIDDER'S CHECK LIST

The bidder's attention is especially called to the following forms which must be submitted with your bid:

(a) Schedule of bid price.

The unit/lump sum prices bid must be shown in the space provided.

(b) Signature page.

To be completed and signed by the bidder.

(c) Contractor's Record of Prior Contracts

(d) List of Equipment

The following forms are to be executed after the contract is awarded:

(a) Contract

SIGNATURE PAGE

CITY OF TACOMA - DEPARTMENT OF PUBLIC UTILITIES - TACOMA POWER

All submittals must be in ink or typewritten and must be executed by a duly authorized officer or representative of the bidding/proposing entity. If the bidder/proposer is a subsidiary or doing business on behalf of another entity, so state, and provide the firm name under which business is hereby transacted.

Submittals will be received and time stamped only at the City of Tacoma Purchasing Division, located in the Tacoma Public Utilities Administration North Building, Main Floor, at 3628 South 35th Street, Tacoma, WA 98409. **See the Request for Bids page near the beginning of the specification for additional details.**

REQUEST FOR BIDS SPECIFICATION NO. PG22-0052N

Gantry Hoist for Mayfield Draft Tube Gates

The undersigned bidder/proposer hereby agrees to execute the proposed contract and furnish all materials, labor, tools, equipment and all other facilities and services in accordance with these specifications.

The bidder/proposer agrees, by submitting a bid/proposal under these specifications, that in the event any litigation should arise concerning the submission of bids/proposals or the award of contract under this specification, Request for Bids, Request for Proposals or Request for Qualifications, the venue of such action or litigation shall be in the Superior Court of the State of Washington, in and for the County of Pierce.

Non-Collusion Declaration

The undersigned bidder/proposer hereby certifies under penalty of perjury that this bid/proposal is genuine and not a sham or collusive bid/proposal, or made in the interests or on behalf of any person or entity not herein named; and that said bidder/proposer has not directly or indirectly induced or solicited any contractor or supplier on the above work to put in a sham bid/proposal or any person or entity to refrain from submitting a bid/proposal; and that said bidder/proposer has not, in any manner, sought by collusion to secure to itself an advantage over any other contractor(s) or person(s).

Bidder/Proposer's Registered Name

Address

City, State, Zip

E-Mail Address

E.I.No. / Federal Social Security Number Used on Quarterly Federal Tax Return, U.S. Treasury Dept. Form 941

Signature of Person Authorized to Enter into Contracts for Bidder/Proposer — Date

Printed Name and Title

(Area Code) Telephone Number / Fax Number

State Business License Number
In WA, also known as UBI (Unified Business Identifier) Number

State Contractor's License Number (if applicable)
(See Ch. 18.27, R.C.W.)

Addendum acknowledgement: #1_____ #2_____ #3_____ #4_____

THIS PAGE MUST BE SIGNED AND RETURNED WITH SUBMITTAL

_____
Name of Bidder

PROPOSAL

	QUANTITY	BID UNIT	UNIT COST	TOTAL COST
ITEM 1				
Mayfield Powerhouse Draft Tube Gate Hoist	1	EA	$_____	$_____
ITEM 2				
Man Basket and Access Platform	1	EA	$_____	$_____

Delivered pricing F.O.B. Destination, Freight Pre-paid and Allowed per Specification

TOTAL ITEMS 1 & 2 $_____

**Sales Tax @ 7.8% $_____

(Note Paragraph 1.38 of the Standard Terms and Conditions

TOTAL AMOUNT $_____

Name of Bidder

NOTE: ONLY FIRM PRICES WILL BE ACCEPTED.

Indicate below whether you are offering any alternatives to makes/models included in this specification.

Alternates: Yes _____ How Many _____

Name of Bidder

PROPOSAL
NOTICE

All attachments of "Standard Terms and Conditions" or letters modifying the Proposal shall be referenced on this page under the appropriate headings or they will not be considered a part of the Proposal.

Bidder's Statement of Delivery Time:

Bidder's Statement of Price Guarantee:

(ONLY FIRM PRICES WILL BE ACCEPTED)

Manufacturer's/Bidder's Guarantees and/or Warranties of Material or Equipment:

State Whether Exception "IS" or "IS NOT" Taken to this Specification. Itemize any exceptions taken*****

***NOTE:** The City cannot legally accept a substantial deviation from these specifications. Bids containing any substantial deviation will be rejected as non-responsive.

Where the bidder indicates that exception is not taken to this specification, but then attaches non-conforming warranties or other modifications to the specification, it is then agreed that the bidder warrants that where the specification deviates from the attachment, the bidder will perform to the highest standard indicated.

CONTRACTOR'S RECORD OF PRIOR CONTRACTS

NAME _____ ADDRESS _____

Beginning Date	Completion Date	Contract With	Contact Person Telephone #	Amount of Contract

REMARKS: _____

(PG22-0052N)

Name of Bidder

LIST OF EQUIPMENT

Following is a list to be filled in by the bidder, showing equipment definitely available for use on the proposed work as required. (Give quantity, description, size or capacity, condition and present location of each item of equipment.)

CITY OF TACOMA
STANDARD TERMS AND CONDITIONS
GOVERNS BOTH GOODS AND SERVICES AS APPLICABLE

In the event of an award by the City, these Terms and Conditions stated herein, Additional Contract Documents if issued, Solicitation if issued, Purchase Orders if issued by City, and Supplier's Submittal, if provided, shall constitute the Contract between City and Supplier for the acquisition of goods, including materials, supplies, and equipment or for the provision of services and deliverables.

Said documents represent the entire Contract between the parties and supersede any prior oral statements, discussions, or understandings between the parties, and/or subsequent Supplier invoices. No modification of the Contract shall be effective unless mutually agreed in writing.

The specific terms and conditions of any Solicitation (Specification, Request for Bids, Request for Proposals, Requests for Qualifications, Requests for Quotations, Request for Information, bid documents, request to enter into negotiations, or other form of solicitation issued by City including any general, special, or technical provisions associated with such Solicitations) are incorporated herein by reference and supersede these Terms and Conditions where there is conflict or inconsistency.

In the event Additional Contract Documents are negotiated and agreed to in writing between Supplier and City, the specific terms of such Additional Contract Documents are incorporated herein by reference and supersede all other terms and conditions where there is conflict or inconsistency.

These Terms and Conditions, Additional Contract Documents if issued, Solicitation if issued, City purchase order if issued, are controlling over Supplier's Submittal if a Submittal is provided. Submittals if provided are incorporated herein by reference.

1.01 SUPPLIER / CONTRACTOR

As used herein, "Supplier" or "Contractor" shall be the Supplier(s) entering a Contract with City, whether designated as a Supplier, Contractor, Vendor, Proposer, Bidder, Respondent, Seller, Merchant, Service Provider, or otherwise.

1.02 SUBMITTAL

Submittal means Bids, Proposals, Quotes, Qualifications or other information, content, records or documents submitted in response to a City Solicitation.

1.03 FORMS OF SUBMITTAL

Unless stated otherwise, all submittals must be in SAP Ariba and submitted exactly as specified or directed, and all required forms must be used.

1.04 COSTS TO PREPARE SUBMITTAL

The City is not liable for any costs incurred by Supplier for the preparation of materials or a Submittal provided in response to a solicitation, conducting presentations to the City, or any other activities related to responding to the City's Solicitation.

1.05 LICENSES/PERMITS

A. Suppliers, if applicable, must have a Washington state business license at the time of Submittal and throughout the term of the Contract. Failure to include a Washington state business license may be grounds for rejection of the Submittal or cancellation of contract award. Information regarding Washington state business licenses may be obtained at http://bls.dor.wa.gov.

B. Upon award, it is the responsibility of the Supplier to register with the City of Tacoma's Tax and License Division, 733 South Market Street, Room 21, Tacoma, WA 98402-3768, 253-591-5252, https://www.cityoftacoma.org/government/city_departments/finance/tax_and_license/. Supplier shall obtain a business license as is required by Tacoma Municipal Code Subtitle 6C.20.

C. During the term of the Contract, Supplier, at its expense, shall obtain and keep in force any and all necessary licenses and permits.

1.06 PUBLIC DISCLOSURE: PROPRIETARY OR CONFIDENTIAL INFORMATION

A. Supplier Submittals, all documents and records comprising the Contract, and all other documents and records provided to the City by Supplier are deemed public records subject to disclosure under the Washington State Public Records Act, Chapter 42.56 RCW (Public Records Act). Thus, City may be required, upon request, to disclose the Contract and documents or records related to it unless an exemption under the Public Records Act or other laws applies. In the event CITY receives a request for such disclosure, determines in its legal judgment that no applicable exemption to disclosure applies, and Supplier has complied with the requirements to mark records considered confidential or proprietary as such requirements are stated below, City agrees to provide Supplier 10 days written notice of impending release. Should legal action thereafter be initiated by Supplier to enjoin or otherwise prevent such release, all expense of any such litigation shall be borne by Supplier, including any damages, attorneys' fees or costs awarded by reason of having opposed disclosure. City shall not be liable for any release where notice was provided and Supplier took no action to oppose the release of information.

B. If Supplier provides City with records or information that Supplier considers confidential or proprietary, Supplier must mark all applicable pages or sections of said record(s) as "Confidential" or "Proprietary." Further, in the case of records or information submitted in response to a Request for Proposals, an index must be provided indicating the affected pages or sections and locations of all such material identified Confidential or Proprietary. Information not included in the required index will not be reviewed for confidentiality or as proprietary before release. If Supplier fails to so mark or index Submittals and related records, then the City, upon request, may release said record(s) without the need to satisfy the requirements of subsection A above; and Supplier expressly waives its right to allege any kind of civil action or claim against the City pertaining to the release of said record(s).

C. Submission of materials in response to City's Solicitation shall constitute assent by Supplier to the foregoing procedure and Supplier shall have no claim against the City on account of actions taken pursuant to such procedure.

1.07 SUSTAINABILITY

A. The City has interest in measures used by its contractors to ensure sustainable operations with minimal adverse impact on the environment. The City seeks to do business with vendors that value community and environmental stewardship that help us meet our sustainable purchasing goals.

B. The City encourages the use of environmentally preferable products or services that help to minimize the environmental and human health impacts of City operations. Suppliers are encouraged to incorporate environmentally preferable products or services into Submittals wherever possible. "Environmentally preferable" means products or services that have a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose. This comparison may consider raw materials acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance, or disposal of the product or service.

C. Environmental Standards. The City seeks to ensure that all purchases comply with current environmental standards and product specifications. Where appropriate, third party independent certifiers such as Green Seal and USEPA Standards shall be a minimum specification for products to the City, unless specified otherwise herein.

D. The City encourages the use of sustainability practices and desires any awarded Suppliers to assist in efforts to address such factors when feasible for:

1. Pollutant releases
2. Toxicity of materials used
3. Waste generation
4. Greenhouse gas emissions, including transportation of materials and services
5. Recycle content
6. Energy consumption
7. Depletion of natural resources
8. Potential impact on human health and the environment

1.08 ALTERATIONS NOT ALLOWED

Except as otherwise specifically provided in a Solicitation, Submittals that are incomplete or conditioned in any way, contain erasures, alternatives or items not called for, or not in conformity with law, may be rejected as being non-responsive. Any attempt to condition a Submittal by inserting exceptions to the Solicitation or any conditions, qualifications or additions that vary its terms may result in rejection of the Submittal. The City may reject any submittal containing a material deviation from the Solicitation.

1.09 CORRECTION OF AMBIGUITIES AND OBVIOUS ERRORS

A. The City reserves the right to correct obvious errors in Supplier's Submittal. In this regard, if the unit price does not compute to the extended total price, the unit price shall govern.

B. Supplier shall notify the City of Tacoma Procurement and Payables Division in writing of any ambiguity, conflict, discrepancy, omission or other error in a Solicitation no later than five business days prior to the submittal deadline.

   1. For solicitations conducted in SAP Ariba, Supplier shall notify the City of Tacoma Procurement and Payables Division on the message board of the event.

   2. For all other solicitations, Supplier shall notify the contract person listed in the Solicitation.

C. The City will make necessary modifications by addendum.

D. Supplier is responsible for identifying ambiguities, conflicts, discrepancies, omissions or other errors in the Solicitation prior to providing its Submittal or the ambiguity, conflict, discrepancy, omission, or other error is waived. Any Submittal that includes assumed clarifications and/or corrections without the required authentication of the same is subject to rejection.

1.10 WARRANTIES/GUARANTEE

A. Suppliers warrant that all items, including services, as applicable:

   1. Are merchantable.

   2. Comply with the City's latest drawings and specifications.

   3. Are fit for the City's intended use.

   4. Will be performed according to the skill and care required by customarily accepted good practices and procedures followed by service providers rendering the same or similar type of service.

   5. Are new and unused unless otherwise stated.

   6. Comply with all applicable safety and health standards established for such products by the Occupational Safety and Health Administration (OSHA), Washington Industrial Safety and Health Act (WISHA) and/or Consumer Products Safety Act (CPSA), and all other applicable state and federal laws or agency regulations.

   7. Are properly packaged and contain appropriate instructions or warnings, including applicable MSDS sheets.

1.11 PATENTS, TRADEMARKS AND COPYRIGHTS

Suppliers warrant that equipment and/or materials furnished, including software, do not infringe on any patent, trademark or copyright, and agree to indemnify, defend and hold harmless, the City in the event of any infringement or claim thereof.

1.12 DELIVERY OF SUBMITTALS TO THE CITY'S PROCUREMENT AND PAYABLES DIVISION

A. Submittal packages must be received by the City's Procurement and Payables Division in SAP Ariba (unless another form of delivery is stated), prior to the scheduled time and date stated in the Solicitation.

B. Supplier is solely responsible for timely delivery of its Submittal.

C. Submittals received after the time stated in the solicitation will not be accepted.

D. For purposes of determining whether a Submittal has been timely received in SAP Ariba, the City's Procurement and Payables Division will rely on the submittal clock in SAP Ariba.

1.13 SUBMITTAL IS NON-COLLUSIVE

Supplier acknowledges that by its delivery of a Submittal to the City in response to a Solicitation, it represents that the prices in such Submittal are neither directly nor indirectly the result of any formal or informal agreement with another Supplier.

1.14 PARTNERSHIPS

The City will allow firms to partner in order to respond to a Solicitation. Multiple suppliers may team under a Prime Supplier's Submittal in order to provide responses to all sections in a single submission; however, each Supplier's participation must be clearly delineated by section. The Prime Supplier will be considered the responding vendor and the responsible party at contract award. All contract negotiations will be conducted only with the Prime Supplier. All contract payments will be made only to the Prime Supplier. Any agreements between the Prime Supplier and other companies will not be a part of the Contract between the City and the Prime Supplier. The City reserves the right to select more than one Prime Supplier.

1.15 WITHDRAWAL OF SUBMITTALS

A. Prior to Submittal Deadline. Submittals may be withdrawn (including in SAP Ariba) prior to the scheduled submittal deadline.

B. After Submittal Deadline. No Submittal can be withdrawn after having been opened before the actual award of the contract, unless the award is delayed more than 90 calendar days beyond the date of opening. If a delay of more than 90 calendar days does occur, Supplier must submit written notice to the City purchasing manager that Supplier is withdrawing its submittal.

1.16 ACCEPTANCE OF SUBMITTALS

A. If the solicitation announcement so states, submittals, unless previously withdrawn, will be read aloud, irrespective of any irregularities or informalities in such submittal, at the time and place specified in the solicitation announcement.

B. All submittals must remain open for acceptance by the City for a period of at least 90 calendar days from the submittal deadline.

1.17 RIGHT TO REJECT

The City of Tacoma reserves the right to reject any and all submittals, waive minor deviations or informalities, supplement, amend, reduce or otherwise modify the scope of work or cancel the solicitation, and if necessary, call for new submittals.

1.18 RESERVED RIGHTS

A. By providing a submittal in response to a City solicitation, Supplier acknowledges and consents to the below City rights and conditions. With regard to this procurement process, the City reserves, holds without limitation, and may exercise, at its sole discretion, the following rights and conditions:

1. To terminate the procurement process or decide not to award a contract as a result thereof by written notice to the Suppliers for any reason whatsoever with or without substitution of another solicitation.
2. To waive any defect, technicality, or any other minor informality or irregularity in any submittal, or any other response from Suppliers.
3. To issue addenda for any purpose including:
    a. To make minor or major changes or alterations to the evaluation, selection and/or performance schedule(s) for any events associated with a procurement.
    b. To supplement, amend, reduce, cancel, or otherwise modify a Solicitation, including but not limited to modifications to the description of services and/or products contained in the solicitation, by omitting services/products and/or including services/products.
4. To request clarifications, additional information, and/or revised Submittals from one or more Suppliers.
5. To conduct investigations with respect to the qualifications and experience of Supplier(s), including inspection of facilities and to request additional evidence to support any such information.

6. To eliminate any Supplier that submits an incomplete or inadequate response, or is non-responsive to the requirements of a Solicitation, or is otherwise deemed to be unqualified during any stage of the procurement process.
7. To select and interview a single finalist or multiple finalists to further the City's evaluation of Submittals provided in response to a Solicitation. The City may, in its sole and exclusive discretion as to what is in the City's best interest, elect not to conduct interviews of any or all Suppliers in connection with a solicitation process.
8. Except in the case of Requests for Bids, to negotiate any rate/fee offered by a Supplier. The City shall have the sole right to make the final rate/fee offer during contract negotiations. If the selected Supplier does not accept the City's final offer, the City may, in its sole discretion discontinue contract negotiations and commence negotiations with another Supplier, except as otherwise provided in Chapter 39.80, RCW.
9. To select and enter into a Contract with one or more Suppliers whose Submittal best satisfies the interests of the City and is most responsive, in the sole judgment of the City, to the requirements of a Solicitation.
10. To award by line item or group of line items.
11. To not award one or more items.
12. To issue additional or subsequent solicitations.
13. To seek partnerships between one or more Suppliers.
14. Request additional related products and services from the selected Supplier(s) as necessary throughout the term of the Contract.
15. Negotiate costs or fees in the event of new legislation or regulatory changes, or issuance of related compliance guidance, technology enhancements, and innovative solutions.
16. In the event the City receives questions concerning a Solicitation from one or more Suppliers prior to the deadline for response, the City reserves the right to provide such questions, and the City's responses, if any, to all Suppliers.
17. If an award is made and, prior to entering into a contract, subsequent information indicates that such award is not in the best interest of the City, the City may rescind the award without prior notice to Supplier and either award to another Supplier or reject all submittals or cancel this solicitation.
18. To cancel award of a contract at any time before execution of the Contract by both parties if cancellation is deemed to be in the City's best interest. In providing a submittal, Suppliers agree that the City is not liable for any costs or damages for the cancellation of an award. Supplier assumes the sole risk and responsibility for all expenses connected with the preparation of its submittal.
19. To add additional City departments or divisions to the Contract or develop a separate Contract with the Supplier subject to all terms, conditions and pricing of the original Contract
20. To take any other action affecting a Solicitation or a procurement process that is determined to be in the City's best interests.

1.19 SUBMITTAL CLARIFICATION

Suppliers may be asked to clarify their Submittal. This action shall not be construed as negotiations or any indication of intentions to award. If called upon, Supplier must respond to such requests within two business days or the timeframe set forth by the City in its request for clarification. Supplier's failure to respond to such a request may result in rejection of its Submittal.

1.20 EVALUATION OF SUBMITTALS

A. The City of Tacoma reserves the right to award to the lowest and best responsible Supplier(s) delivering a Submittal in compliance with the Solicitation, provided such Submittals are reasonable and are in the best interest of the City to accept. The City may use a number of criteria for determining award, including evaluation factors set forth in Municipal Code Section 1.06.262. Suppliers who are inexperienced or who fail to properly perform other contracts may have their submittal rejected for such cause.

1. Evaluation Factors. In addition to the factors set forth in Municipal Code Section 1.06.262, the following may be used by the City in determining the lowest and best responsible Submittal:

    a. Compliance with a Solicitation and with applicable City requirements, including by not limited to, the City's Ethics Code and its Small Business Enterprise and Local Employment and Apprenticeship programs.
    b. Submittal prices, listed separately if requested, as well as a lump sum total (if the unit price does not compute to the extended total price, the unit price shall govern).
    c. The total cost to the City, including all applicable taxes, may be the basis for contract award.
    d. Time of delivery and/or completion of performance (delivery date(s) offered).
    e. Warranty terms.
    f. Quality of performance of previous contracts or services, including safety requirements and past compliance with the City's Ethics Code.
    g. Previous and existing compliance with laws and ordinances relating to contracts or services.
    h. Sufficiency of financial resources.
    i. Quality, availability, and adaptability of the supplies or services to the particular use required.
    j. Ability to provide future maintenance and service on a timely basis.
    k. Location of nearest factory authorized warranty repair facility or parts dealership.
    l. Ability, capacity, experience, stability, reputation, integrity, character, judgment, technical qualifications, and skill to perform the contract or provide the services required.

2. Prompt Payment Discount. Payment discount periods of 20 calendar days or more, if offered in the submittal, will be considered in determining the apparent lowest responsible submittal. Discounts will be analyzed in context of their overall cumulative effect.

    a. ePayable/Credit Card Acceptance. Submittals offering ePayable/Credit card acceptance may be compared against submittals offering a prompt payment discount to evaluate the overall cumulative effect of the discount against the advantage to the City of the ePayable/Credit card acceptance, and may be considered in determining the apparent lowest responsible submittal.

3. All other elements or factors, whether or not specifically provided for in a Solicitation, which would affect the final cost to, and the benefits to be derived by, the City, may be considered in determining the award of a Contract. The final award decision will be based on the best interests of the City.

1.21 CONTRACT OBLIGATION

A. The Submittal contents of the successful Supplier will become contractual obligations if a Contract ensues.

B. In the event the City of Tacoma determines to award a Contract, the selected Supplier(s) may be requested to execute Additional Contract Documents.

C. Supplier shall register with the City of Tacoma on the SAP Ariba Network and be enabled for transactions upon request by the City.

D. Suppliers may propose amendments to City's Contract documents or to these Terms and Conditions, but the City retains the right to accept or reject proposed amendments.

E. No costs chargeable for work under the proposed Contract may be incurred before mutual acceptance and execution as directed.

1.22 AWARD

The City reserves the right to award Contracts for any or all items to one or more Suppliers in the best interests of the City.

1.23 SUPPLIER'S REFUSAL TO ENTER INTO CONTRACT

Any Supplier who refuses to enter into a Contract after it has been awarded to the Supplier will be in breach of the agreement to enter the Contract, and Supplier's certified or cashier's check or bid bond, if any, shall be forfeited.

1.24 LEGAL HOLIDAYS

A. The City of Tacoma observes the following holidays, which shall apply to performance of all contracts:

New Year's Day	January 1
Martin Luther King's Birthday	3rd Monday in January
Washington's Birthday	3rd Monday in February
Memorial Day	Last Monday in May
Independence Day	July 4
Labor Day	1st Monday in September
Veteran's Day	November 11
Thanksgiving Day	4th Thursday of November
Day after Thanksgiving	4th Friday of November
Christmas Day	December 25

B. When any of these holidays occur on Saturday or Sunday, the preceding Friday or the following Monday, respectively, is a legal holiday for the City of Tacoma.

1.25 CONTRACT TERM

All services shall be satisfactorily completed and all deliverables provided by the termination date stated, and the Contract shall expire on said date unless mutually extended in writing by the parties.

1.26 EXTENSION OF CONTRACT

Contracts shall be subject to extension at City's sole discretion.

1.27 TERMINATION AND SUSPENSION

A. Termination for Convenience
   1. Supplies. The City may terminate a Contract for supplies at any time upon prior written notice to Supplier. Upon the effective date of termination specified in such notice, and payment by the City, all conforming supplies, materials, or equipment previously furnished hereunder shall become its property.

   2. Services. The City may terminate a Contract for services at any time, with or without cause, by giving 10 business days written notice to Supplier. In the event of termination, all finished and unfinished work prepared by Supplier pursuant to the Contract shall be provided to the City. In the event City terminates the Contract due to the City's own reasons and without cause due to Supplier's actions or omissions, the City shall pay Supplier the amount due for actual work and services necessarily performed under the Contract up to the effective date of termination, not to exceed the total compensation set forth in the Contract.

B. Termination for Cause. The City may terminate a Contract for either services or supplies in the event of any material breach of any of the terms and conditions of the Contract if the Supplier's breach continues in effect after written notice of breach and 30 days to cure such breach and fails to cure such breach.

C. Suspension. For either services or supplies, the City may suspend a Contract, at its sole discretion, upon three business days' written notice to Supplier. Such notice shall indicate the anticipated period of suspension. Any reimbursement for expenses incurred due to the suspension shall be limited to Supplier's actual expenses and shall be subject to verification. Supplier shall resume performance of services under the Contract without delay when the suspension period ends.

D. Termination or suspension of a Contract by City shall not constitute a waiver of any claims or remaining rights the City may have against Supplier relative to performance under a Contract.

1.28 DEFAULT/BREACH

In the event of material default or breach by Supplier on any of the conditions of a Contract, Supplier agrees that the City may, at its election, procure the goods or services from other sources, and may deduct from the unpaid balance due Supplier, or collect against the bond or security (if any), or may invoice and recover from Supplier all costs paid in excess of the price(s) set forth in the Contract.

1.29 SCOPE OF SERVICES/CONTRACT MODIFICATION

Supplier agrees to diligently and completely perform the services and provide the deliverables required by a Contract.

A. Supplies. The City at any time by written change order or other form of written contract amendment may make reasonable changes in the place of delivery, installation, or inspection, the method of shipment or packing, identification and ancillary matters that Supplier may accommodate without substantial additional expense.

B. Services. The City shall have the right to make changes within the general scope of services and/or deliverables upon execution in writing of a change order or other written form of contract amendment. If the changes will result in additional work effort by Supplier the City agrees to reasonably compensate Supplier for such additional effort up to the maximum amount specified in the Contract or as otherwise provided by Tacoma Municipal Code. Any new services accepted by the City may be added to the Contract and/or substituted for discontinued services. New services shall meet or exceed all requirements of original award.

C. Expansion Clause. A Contract may be further expanded in writing to include other related services or products normally offered by Supplier, as long as the price of such additional services or products have a profit margin equal to or less than that in place at the time of original submittal. Such additions and prices will be established in writing. New items not meeting these criteria will not be added to the Contract. Supplier profit margins are not to increase as a result any such expansion.

1.30 FEDERAL, STATE, AND MUNICIPAL LAWS AND REGULATIONS

Supplier shall comply with all federal, state, municipal, and/or local laws and regulations in the performance of all terms and conditions of the Contract. Supplier shall be solely responsible for all violations of the law from any cause in connection with its performance of work under the Contract.

1.31 PREVAILING WAGES

A. If federal, state, local, or any applicable law requires Supplier to pay prevailing wages in connection with a Contract, and Supplier is so notified by the City, then Supplier shall pay applicable prevailing wages.

B. If applicable, a Schedule of Prevailing Wage Rates and/or the current prevailing wage determination made by the Secretary of Labor for the locality or localities where the Contract will be performed is attached and made of part of the Contract by this reference. If prevailing wages do apply to the Contract, Supplier and its subcontractors shall:

1. Be bound by and perform all transactions regarding the Contract relating to prevailing wages and the usual fringe benefits in compliance with the provisions of Chapter 39.12 RCW, as amended, the Washington State Prevailing Wage Act and/or the Davis-Bacon Act (40 U.S.C. 3141- 3144, and 3146-3148) and the requirements of 29 C.F.R. pt. 5 as may be applicable, including the federal requirement to pay wages not less than once a week,

2. Ensure that no worker, laborer or mechanic employed in the performance of any part of the Contract shall be paid less than the prevailing rate of wage specified on that Schedule and/or specified in a wage determination made by the Secretary of Labor (unless specifically preempted by federal law, the higher of the Washington state prevailing wage or federal Davis-Bacon rate of wage must be paid)and Additionally, in compliance with applicable federal law, contractors are required to pay wages not less than once a week.

3. Immediately upon award of the Contract, contact the Department of Labor and Industries, Prevailing Wages section, Olympia, Washington and/or the federal Department of Labor, to obtain full information, forms and procedures relating to these matters. Per such procedures, a Statement of Intent to Pay Prevailing Wages and/or other or additional documentation required by applicable federal law, must be submitted by Contractor and its subcontractors to the City, in the manner requested by the City, prior to any payment by the City hereunder, and an Affidavit of Wages Paid and/or other or additional documentation required by federal law must be received or verified by the City prior to final Contract payment.

1.32 COPELAND ANTI-KICKBACK ACT

For contracts subject to Davis Bacon Act the following clauses will be incorporated into the Contract:

1. Contractor. The contractor shall comply with 18 U.S.C. § 874, 40 U.S.C. § 3145, and the requirements of 29 C.F.R. pt. 3 as may be applicable, which are incorporated by reference into this contract.

2. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clause above and such other clauses as FEMA may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all of these contract clauses.

3. Breach. A breach of the contract clauses above may be grounds for termination of the contract, and for debarment as a contractor and subcontractor as provided in 29 C.F.R. § 5.12.

1.33 FEDERAL AID PROJECTS

The City of Tacoma, in accordance with Title VI of the Civil Rights Act of 1964, 78 Stat. 252, 42 U.S.C. 2000d to 2000d-4 and Title 49, Code of Federal Regulations, Department of Transportation, subtitle A, Office of the Secretary, part 21, nondiscrimination in federally assisted programs of the Department of Transportation issued pursuant to such Act, hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this advertisement, disadvantaged business enterprises as defined at 49 CFR, part 26, will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, national origin, or sex in consideration for an award.

1.34 FEDERAL FINANCIAL ASSISTANCE

If federal funds, including FEMA financial assistance to the City of Tacoma, will be used to fund, pay or reimburse all or a portion of the Contract, Contractor will comply with all applicable Federal law, regulations, executive orders, FEMA policies, procedures, and directives and the following clauses will be incorporated into the Contract:

A. EQUAL EMPLOYMENT OPPORTUNITY. During the performance of this Contract, Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following:

    1. Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

    2. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor; state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.

    3. The Contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the Contractor's legal duty to furnish information.

    4. The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

5. The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

6. The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

7. In the event of the Contractor's noncompliance with the nondiscrimination clauses of this Contract or with any of the said rules, regulations, or orders, this Contract may be canceled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

8. The Contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (8) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance:

   Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

B. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (B)(1) of this section the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (B)(1) of this section, in the sum of $27 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (b)(1) of this section.

3. Withholding for unpaid wages and liquidated damages. The City shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (B)(2) of this section.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (B)(1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (B)(1) through (4) of this section.

C. CLEAN AIR ACT

1. Contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, 42 U.S.C. § 7401 et seq.

2. Contractor agrees to report each violation to the City and understands and agrees that the City will, in turn, report each violation as required to assure notification to the Federal Emergency Management Agency, and the appropriate Environmental Protection Agency Regional Office.

3. Contractor agrees to include these requirements in each subcontract exceeding $150,000 financed in whole or in part with Federal assistance provided by FEMA.

D. FEDERAL WATER POLLUTION CONTROL ACT

1. Contractor agrees to comply with all applicable standards, orders, or regulations issued pursuant to the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 et seq.

2. Contractor agrees to report each violation to the City and understands and agrees that the City will, in turn, report each violation as required to assure notification to the Federal Emergency Management Agency, and the appropriate Environmental Protection Agency Regional Office.

3. Contractor agrees to include these requirements in each subcontract exceeding $150,000 financed in whole or in part with Federal assistance provided by FEMA.

E. DEBARMENT AND SUSPENSION

1. This Contract is a covered transaction for purposes of 2 C.F.R. pt. 180 and 2 C.F.R. pt. 3000. As such, the contractor is required to verify that none of the contractor's principals (defined at 2 C.F.R. § 180.995) or its affiliates (defined at 2 C.F.R. § 180.905) are excluded (defined at 2 C.F.R. § 180.940) or disqualified (defined at 2 C.F.R. § 180.935).

2. Contractor must comply with 2 C.F.R. pt. 180, subpart C and2 C.F.R. pt. 3000, subpart C, and must include a requirement to comply with these regulations in any lower tier covered transaction it enters into.

3. This certification is a material representation of fact relied upon by the City. If it is later determined that the contractor did not comply with 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C, in addition to remedies available to (insert name of recipient/subrecipient/applicant), the Federal Government may pursue available remedies, including but not limited to suspension and/or debarment.

4. Contractor agrees to comply with the requirements of 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C while this offer is valid and throughout the period of any contract that may arise from this offer. The bidder or proposer further agrees to include a provision requiring such compliance in its lower tier covered transactions.

F. BYRD ANTI-LOBBYING AMENDMENT

1. Contractors who apply or bid for an award of $100,000 or more shall file the required certification with City. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, officer or employee of Congress, or an employee of a Member of Congress in connection with obtaining any Federal contract, grant, or any other award covered by 31 U.S.C. § 1352. Each tier shall also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Such disclosures are forwarded from tier to tier up to the recipient who in turn will forward the certification(s) to the City.

2. If applicable, Contractor must sign and submit to the City the following certification:

APPENDIX A, 44 C.F.R. PART 18 – CERTIFICATION REGARDING LOBBYING
Certification for Contracts, Grants, Loans, and Cooperative Agreements

The undersigned certifies, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

The Contractor, _____, certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the provisions of 31 U.S.C. Chap.38, Administrative Remedies for False Claims and Statements, apply to this certification and disclosure, if any.

_____
Signature of Contractor's Authorized Official

_____
Name and Title of Contractor's Authorized Official
_____Date

G. PROCUREMENT OF RECOVERED MATERIALS

1. In the performance of this contract, the Contractor shall make maximum use of products containing recovered materials that are EPA-designated items unless the product cannot be acquired:

   a. Competitively within a timeframe providing for compliance with the contract performance schedule;
   b. Meeting contract performance requirements; or
   c. At a reasonable price.

2. Information about this requirement, along with the list of EPA- designated items, is available at EPA's Comprehensive Procurement Guidelines web site, https://www.epa.gov/smm/comprehensive- procurement-guideline-cpg-program.

3. Contractor also agrees to comply with all other applicable requirements of Section 6002 of the Solid Waste Disposal Act.

1.35 CONTRACT PRICING

A. Submitted prices shall include costs of submittal preparation, servicing of the account, all contractual requirements during contract period such as transportation, permits, insurance costs, bonds, labor, wages, materials, tools, components, equipment, and appurtenances necessary to complete the work, which shall conform to the best practice known to the trade in design, quality, material, and workmanship.

B. Surcharges of any type will not be paid.

C. If applicable, related additional products and corresponding services of benefit to the City not specifically required in a solicitation, but which Supplier offers to provide, may be included with the submittal. Supplier may request to add new products if the City approves them and Supplier can demonstrate the pricing is from the same pricing structure/profit margin.

D. Unless specifically stated otherwise, only firm prices will be accepted and all prices shall remain firm during the term of a Contract.

E. Price increases may at City's discretion be passed along during a contract period if the increase is mandated by statute, or the result of a tariff.

F. By submitting prices, Supplier warrants prices equal to or better than the equivalent prices, terms, and benefits offered by Supplier to any other government unit or commercial customer.

G. Should Supplier, during the term of a Contract, enter into any other contract, agreement or arrangement that provides lower prices, more favorable terms or greater benefits to any other government unit or commercial customer, the Contract with the City shall thereupon be deemed amended to provide the same price or prices, terms and benefits to the City. This provision applies to comparable products and purchase volumes by the City that are not less than the purchase volumes of the government unit or commercial customer that has received the lower prices, greater benefits, or more favorable terms.

H. If at any time during the term of the Contract, Supplier reduces prices to other buyers purchasing approximately the same quantities stated on the Contract, Supplier will immediately notify the City purchasing manager of such fact, and the price(s) for future orders under the Contract shall be reduced accordingly.

I. The City is entitled to any promotional pricing during the Contract period.

J. Price decreases shall be immediately passed on to the City.

K. The City reserves the right to increase or decrease the quantities of any item awarded pursuant to the Contract and pay according to the unit prices quoted in the submittal with no adjustments for anticipated profit.

1.36 APPROVED EQUALS WHEN ALTERNATES ARE ALLOWED

A. Unless an item is indicated as "no substitute," special brands, when named, are intended to describe the standard of quality, performance, or use desired. Equal items will be considered by the City, provided that Supplier specifies the brand and model, and provides all descriptive literature, independent test results, specification sheets, schematic drawings, photographs, product samples, local servicing, parts availability, etc., to enable the City to evaluate the proposed equal. Performance testing in the field may be required.

B. The decision of the City as to what items are equal shall be final and conclusive. If the City elects to purchase a brand represented by Supplier to be an "equal," the City's acceptance of the item is conditioned on the City's inspection and testing after receipt. If, in the sole judgment of the City, the item is determined not to be an equal, the item shall be returned at Supplier's expense.

C. When a brand name or level of quality is not stated in Supplier's submittal, it is understood Supplier's submittal shall exactly confirm with those required in the Contract. If more than one brand name is stated in a Solicitation, Supplier(s) must indicate the brand and model/part number to be supplied.

1.37 RISK OF LOSS, SHIPPING AND DELIVERY

A. Shipping. Prices must be quoted FOB destination (the place of destination as defined in RCW 62A.2-319, as that statute may hereafter be amended), with freight prepaid and allowed (shipping costs included in unit prices), and risk of loss remaining with Supplier until delivery is tendered.

B. Delivery. Delivery will be to the designated addresses set forth in a Solicitation or as otherwise stated in the Contract. Deliveries shall be between 9:00 a.m. and 3:30 p.m., Monday through Friday only, except Legal Holidays. Failure to make timely delivery shall be cause for termination of the contract or order and return of all or part of the items at Supplier's expense except in the case of force majeure.

1.38 DELIVERY OF PRODUCTS AND PROVISION OF SERVICES – IDLING PROHIBITED

A. The City of Tacoma has a commitment to reduction of unnecessary fuel emissions and improving air quality by reducing unnecessary air pollution from idling vehicles. Limiting car and truck idling supports cleaner air, healthier work environments, the efficient use of city resources, the public's enjoyment of City properties and programs, conservation of natural resources, and good stewardship practices.

B. Vehicles and/or diesel fuel trucks shall not idle at the time and location of the delivery to the City of Tacoma for more than three minutes. The City requires contractors to utilize practices that reduce fuel consumption and emission discharge, including turning off trucks and vehicles during delivery of products to the City. Exceptions to this requirement include when associated power is necessary to make a delivery or provide the service, when the engine is used to provide power to another device, and when a running engine is required for proper warm-up and cool-down of the engine.

1.39 PACKING SLIPS AND INVOICES

A. Each invoice shall show City of Tacoma purchase order number, release number if applicable, quantity, unit of measure, item description, unit price and extended price for each line if applicable, services and deliverables provided if applicable. Line totals shall be summed to give a grand total to which sales tax shall be added, if applicable.

1. For transactions conducted in SAP Ariba, invoices shall be submitted through Ariba.

2. For invoices paid by ACH or by check, unless stated otherwise, invoices shall be electronically submitted by email with corresponding PO number listed in the subject line to accountspayable@cityoftacoma.org.

3. For invoices paid by credit card, invoices shall also display the last name of the cardholder and last four digits (only) of the card number (e.g., Jones/6311). Unless stated otherwise, invoices shall be electronically submitted by email with corresponding PO number listed in the subject line to (do not combine different POs into one invoice or charge) to pcardadmin@cityoftacoma.org.

B. Any terms, provisions or language in Supplier's invoice(s) that conflict with the terms of the Contract are superseded and shall not apply to the Contract unless expressly accepted in writing by the City.

C. Packing slips and shipping notices shall be sent to the specific City Division or Department receiving the item(s) at the address stated in City's Solicitation or as otherwise stated in the Contract and include complete description of items, contents of items if crated or cased, quantity, shipping point, carrier, bill of lading number and City of Tacoma purchase order.

D. Supplier shall package orders, preferably in environmental friendly packaging such as reduced packaging and recyclable packing materials.

1.40 COOPERATIVE PURCHASING

The Washington State Interlocal Cooperation Act RCW 39.34 provides that other governmental agencies may purchase goods and services based on the Contract with the City in accordance with the terms and prices of the Contract if all parties are agreeable. Each public agency shall formulate a separate contract with Supplier, incorporating the terms and conditions of the Contract with the City of Tacoma. The City shall incur no liability in connection with such contracts or purchases by other public agencies thereunder. It will be Supplier's responsibility to inform such public agencies of the Contract with the City. Supplier shall invoice such public agencies as separate entities.

1.41 TAXES

A. Unless otherwise stated, applicable federal, state, City, and local taxes shall be included in the submittal and in contract as indicated below. As used herein, the term "taxes" shall include any and all taxes, assessments, fees, charges, interest, penalties, and/or fines imposed by applicable laws and regulations in connection with the procurement of goods and/or services hereunder.

   1. Federal Excise Tax. The City of Tacoma is exempt from federal excise tax. The City will furnish a Federal Excise Tax Exemption certificate, if required. If Supplier fails to include any applicable tax in its submittal, then Supplier shall be solely responsible for the payment of said tax.

   2. State and Local Sales Tax. The City of Tacoma is subject to Washington state sales tax. It is Supplier's obligation to state the correct sales tax percentage and include the applicable Washington state, city and local sales tax as a separate line item(s) in the submittal.

   3. City of Tacoma Business and Occupation Tax. It is Supplier's obligation to include City of Tacoma Business and Occupation tax in the unit and/or lump sum prices submitted; it shall not be shown separately on the submittal. Per Sub-Title 6A of the City of Tacoma Municipal Code, transactions with the City of Tacoma may be subject to the City's Business and Occupation Tax.

B. Any or All Other Taxes. Any or all other taxes are the responsibility of Supplier unless otherwise required by law. Except for state sales tax, Supplier acknowledges that it is responsible for the payment of all taxes applicable to the Contract and Supplier agrees to comply with all applicable laws regarding the reporting of income, maintenance of records, and all other requirements and obligations imposed pursuant to applicable law.

C. If the City is assessed, made liable, or responsible in any manner for taxes contrary to the provisions of the Contract, Supplier agrees to hold the City harmless from such costs, including attorney's fees. In the event Supplier fails to pay any taxes, assessments, penalties, or fees imposed by any governmental body, including a court of law, other than those taxes the City is required to pay, then Supplier authorizes the City to deduct and withhold or pay over to the appropriate governmental body those unpaid amounts upon demand by the governmental body. It is agreed that this provision shall apply to taxes and fees imposed by City ordinance. Any such payments shall be deducted from Supplier's total compensation.

1.42 COMPENSATION

A. The City shall compensate Supplier in accordance with the Contract. Said compensation shall be the total compensation for Supplier's performance hereunder including, but not limited to, all work, services, deliverables, materials, supplies, equipment, subcontractor's fees and all reimbursable travel and miscellaneous or incidental expenses to be incurred by Supplier. Unless stated otherwise the total stated compensation may not be changed without a written change order or other form of contract amendment.

B. Payment(s) made in accordance with the Contract shall fully compensate Supplier for all risk, loss, damages or expense of whatever nature, and acceptance of payment shall constitute a waiver of all claims submitted by Supplier.

1.43 PAYMENT TERMS

A. Payment shall be made through the City's ordinary payment process, and shall be considered timely if made within 30 days of receipt of a properly completed invoice. All payments shall be subject to adjustment for any amounts, upon audit or otherwise, determined to have been improperly invoiced. The City may withhold payment to Supplier for any services or deliverables not performed as required hereunder until such time as Supplier modifies such services or deliverables to the satisfaction of the City.

B. Invoices will not be processed for payment, nor will the period of cash discount commence, until all invoiced items are received and satisfactory performance of the Contract has been attained. Upon CITY'S request, Supplier shall submit necessary and appropriate documentation, as determined by the CITY, for all invoiced services and deliverables. If an adjustment in payment is necessary due to damage or dispute, the cash discount period shall commence on the date final approval for payment is authorized.

1.44 PAYMENT METHOD – EPAYABLES – CREDIT CARD ACCEPTANCE – EFT/ACH ACCEPTANCE

A. Payment methods include:

1. EPayables (Payment Plus). This is payment made via a virtual, single use VISA card number provided by the City's commercial card provider. Suppliers accepting this option will receive "due immediately" payment terms. Two options for acceptance are available to suppliers. Both are accompanied by an emailed advice containing complete payment details:

    a. Straight-through processing (buyer initiated). Immediate, exact payments directly deposited to supplier accounts by the City's provider bank; the supplier does not need to know card account details.
    b. Supplier retrieves card account through the secure, on-line portal provided via email notifications sent by the City's commercial card provider.

2. Credit card. Tacoma's VISA procurement card program is supported by standard bank credit suppliers and requires that merchants abide by the VISA merchant operating rules. It provides "due immediately" payment terms.

    a. Suppliers must be PCI-DSS compliant (secure credit card data management) and federal FACTA (sensitive card data display) compliant.
    b. Suppliers must be set up by their card processing equipment provider (merchant acquirer) as a minimum of a Level II merchant with the ability to pass along tax, shipping and merchant references information.

3. Electronic Funds Transfer (EFT) by Automated Clearing House (ACH). Standard terms are net 30 for this payment method.

4. Check or other cash equivalent. Standard terms are net 30 for this payment method.

B. The City's preferred method of payment is by ePayables (Payment Plus) followed by credit card (aka procurement card). Suppliers may be required to have the capability of accepting the City's ePayables or credit card methods of payment**. The City of Tacoma will not accept price changes or pay additional fees when ePayables (Payment Plus) or credit card is used.**

C. The City, in its sole discretion, will determine the method of payment for goods and/or services as part of the Contract.

1.45 NOTICES

Unless otherwise specified, except for routine operational communications, which may be delivered personally or transmitted by electronic mail, all notices required by the Contract shall be in writing and shall be deemed to have been duly given if delivered personally or mailed first-class mail, postage prepaid, to Supplier's registered agent and to the applicable City department representative.

1.46 INDEPENDENT CONTRACTOR STATUS

A. Supplier is considered an independent contractor who shall at all times perform his/her duties and responsibilities and carry out all services as an independent contractor and shall never represent or construe his/her status to be that of an agent or employee of the City, nor shall Supplier be eligible for any employee benefits. No payroll or employment taxes or contributions of any kind shall be withheld or paid by the City with respect to payments to Supplier. Supplier shall be solely responsible for all said payroll or employment taxes and/or contributions including, but not limited to, FICA, FUTA, federal income tax, state personal income tax, state disability insurance tax and state unemployment insurance tax. If the City is assessed, made liable or responsible in any manner for such taxes or contributions, Supplier agrees to indemnify and hold the City harmless from all costs incurred, including attorney fees.

B. Unless otherwise specified in writing, Supplier shall provide at its sole expense all materials, working space, and other necessities and instruments to perform its duties under the Contract. Supplier, at its sole expense, shall obtain and keep in force any and all applicable licenses, permits and tax certificates necessary to perform the Contract.

1.47 NONDISCRIMINATION

Supplier agrees to take all steps necessary to comply with all federal, state, and City laws and policies regarding non-discrimination and equal employment opportunities. Supplier shall not discriminate in any employment action because of race, religion, color, national origin or ancestry, sex, gender identity, sexual orientation, age, marital status, familial status, or the presence of any sensory, mental, or physical handicap. In the event of non-compliance by Supplier with any of the non-discrimination provisions of the Contract, the City shall be deemed to have cause to terminate the Contract, in whole or in part.

1.48 REPORTS, RIGHT TO AUDIT, PERSONNEL

A. Reports. Supplier shall, at such times and in such form as the City may reasonably require, furnish the City with periodic status reports pertaining to the services undertaken or goods provided pursuant to the Contract.

B. Right to Audit. Upon City's request, Supplier shall make available to City all accounts, records and documents related to the scope of work for City's inspection, auditing, or evaluation during normal business hours as reasonably needed by City to assess performance, compliance and/or quality assurance under the Contract or in satisfaction of City's public disclosure obligations as applicable.

C. Personnel. If before, during, or after the execution of a Contract, Supplier has represented or represents to the City that certain personnel would or will be responsible for performing services pursuant to the Contract, then Supplier is obligated to ensure that said personnel perform said Contract services to the maximum extent permitted by law. Substantial organizational or personnel changes within Supplier's firm are expected to be communicated to City immediately. Failure to do so could result in termination of the Contract. This provision shall only be waived by written authorization by the City, and on a case-by-case basis.

1.49 INSURANCE

A. During the course and performance of a Contract, Supplier will provide proof and maintain the insurance coverage in the amounts and in the manner specified in the City of Tacoma Insurance Requirements as is applicable to the services, products, and deliverables provided under the Contract. The City of Tacoma Insurance Requirements document, if issued, is fully incorporated into the Contract by reference.

B. Failure by City to identify a deficiency in the insurance documentation provided by Contractor or failure of City to demand verification of coverage or compliance by Contractor with these insurance requirements shall not be construed as a waiver of Contractor's obligation to maintain such insurance.

1.50 INDEMNIFICATION – HOLD HARMLESS

A. Supplier agrees to indemnify, defend, and hold harmless the City of Tacoma, its officers, agents and employees, from and against any and all liability which may accrue to or be sustained by the City of Tacoma for any claim, suit or legal action made or brought against the City for the death of or injury to persons (including Supplier's or subcontractor's employees), or damage to property involving Supplier or subcontractor(s) and their employees or agents, or for any other cause arising out of and in connection with or incident to the performance of the Contract, except for injuries or damages caused by the sole negligence of the City. In this regard, Supplier recognizes it is waiving immunity under Industrial Insurance Law, Title 51 RCW. This indemnification includes attorney's fees and the cost of establishing the right to indemnification hereunder in favor of the City of Tacoma. By Supplier's acceptance of this order, he/she agrees that this subsection has been mutually negotiated.

B. These indemnifications shall survive the termination of a Contract.

1.51 CONFLICT OF INTEREST

No officer, employee, or agent of the City, nor any member of the immediate family of any such officer, employee or agent as defined by City ordinance, shall have any personal financial interest, direct or indirect, in a Contract, either in fact or in appearance. Supplier shall comply with all federal, state, and City conflict of interest laws, statutes, and regulations. Supplier represents that Supplier presently has no interest and shall not acquire any interest, direct or indirect, in the program to which the Contract pertains that would conflict in any manner or degree with the performance of Supplier's services and obligations hereunder. Supplier further covenants that, in performance of a Contract, no person having any such interest shall be employed. Supplier also agrees that its violation of the City's Code of Ethics contained in Chapter 1.46 of the Tacoma Municipal Code shall constitute a breach of Contract subjecting the Contract to termination.

1.52 CITY OWNERSHIP OF WORK/RIGHTS IN DATA/PUBLICATIONS

A. To the extent that Supplier creates any work subject to the protections of the Copyright Act (Title 17 U.S.C.) in its performance of a Contract, Supplier agrees to the following: The work has been specially ordered and commissioned by the City. Supplier agrees that the work is a "work made for hire" for copyright purposes, with all copyrights in the work owned by City. To the extent that the work does not qualify as a work made for hire under applicable law, and to the extent that the work includes material subject to copyright, Supplier hereby assigns to City, its successors and assigns, all right, title and interest in and to the work, including but not limited to, all copyrights, patent, trade secret and other proprietary rights, and all rights, title and interest in and to any inventions and designs embodied in the work or developed during the course of Supplier's creation of the work.

B. Supplier shall be solely responsible for obtaining releases and/or licenses for the reproduction, distribution, creation of derivative works, performance, display, or other use of copyrighted materials. Should Supplier fail to obtain said releases and/or licenses, Supplier shall indemnify, defend, and hold harmless the City for any claim resulting there from.

1.53 DUTY OF CONFIDENTIALITY

Supplier acknowledges that unauthorized disclosure of information or documentation concerning the Scope of Work hereunder may cause substantial economic loss or harm to the City except for disclosure of information and documents to Supplier's employees, agents, or subcontractors who have a substantial need to know such information in connection with Supplier's performance of obligations under the Contract. Supplier shall not, without prior written authorization by the City allow the release, dissemination, distribution, sharing, or other publication or disclosure of information or documentation obtained, discovered, shared or produced pursuant to a Contract.

1.54 DISPUTE RESOLUTION

In the event of a dispute pertaining to ta Contract, the parties agree to attempt to negotiate in good faith an acceptable resolution. If a resolution cannot be negotiated, then the parties agree to submit the dispute to voluntary non-binding mediation before pursuing other remedies. This provision does not limit the City's right to terminate.

1.55 GOVERNING LAW AND VENUE

A. Washington law shall govern the interpretation of the Contract. The state or federal courts located in Pierce County Washington shall be the sole venue of any mediation, arbitration, or litigation arising out of the Contract.

B. Respondents providing submittals from outside the legal jurisdiction of the United States of America will be subject to Tacoma's City Attorney's Office (CAO) opinion as to the viability of possible litigation pursuant to a contract resulting from this Specification. If it is the opinion of the CAO that any possible litigation would be beyond reasonable cost and/or enforcement, the submittal may be excluded from evaluation.

1.56 ASSIGNMENT

Supplier shall not assign, subcontract, delegate or transfer any obligation, interest or claim to or under the Contract without the prior written consent of the City.

1.57 WAIVER

A waiver or failure by either party to enforce any provision of the contract shall not be construed as a continuing waiver of such provisions, nor shall the same constitute a waiver of any other provision of the Contract.

1.58 SEVERABILITY AND SURVIVAL

If any term, condition or provision herein or incorporated by reference is declared void or unenforceable or limited in its application or effect, such event shall not affect any other provisions hereof and all other provisions shall remain fully enforceable. The provisions of the Contract, which by their sense and context are reasonably intended to survive the completion, expiration or cancellation of the Contract, shall survive termination of the Contract.

1.59 NO CITY LIABILITY

Neither the City, its officials, staff, agents, employees, representatives, or consultants will be liable for any claims or damages resulting from any aspect of this procurement process.

1.60 SIGNATURES

A signed copy of Submittals, Contract documents, including but not limited to contract amendments, contract exhibits, task orders, statements of work and other such Contract related documents, delivered by email or other means of electronic transmission including by using a third party service, which service is provided primarily for the electronic execution of electronic records, shall be deemed to have the same legal effect as delivery of an original signed copy.

The Contractor (Contractor) shall maintain at least the minimum insurance set forth below. By requiring such minimum insurance, the City of Tacoma shall not be deemed or construed to have assessed the risk that may be applicable to Contractor under this Contract. Contractor shall assess its own risks and, if it deems appropriate and/or prudent, maintain greater limits and/or broader coverage.

1. GENERAL REQUIREMENTS

The following General Requirements apply to Contractor and to Subcontractor(s) of every tier performing services and/or activities pursuant to the terms of this Contract. Contractor acknowledges and agrees to the following insurance requirements applicable to Contractor and Contractor's Subcontractor(s):

1.1. City of Tacoma reserves the right to approve or reject the insurance provided based upon the insurer, terms and coverage, the Certificate of Insurance, and/or endorsements.

1.2. Contractor shall not begin work under the Contract until the required insurance has been obtained and approved by City of Tacoma.

1.3. Contractor shall keep this insurance in force during the entire term of the Contract and for Thirty (30) calendar days after completion of all work required by the Contract, unless otherwise provided herein.

1.4. Insurance policies required under this Contract that name "City of Tacoma" as Additional Insured shall:
- 1.4.1. Be considered primary and non-contributory for all claims.
- 1.4.2. Contain a "Separation of Insured provision and a "Waiver of Subrogation" clause in favor of City of Tacoma.

1.5. Section 1.4 above does not apply to contracts for purchasing supplies only.

1.6. Verification of coverage shall include:
- 1.6.1. An ACORD certificate or equivalent.
- 1.6.2. Copies of all endorsements naming the City of Tacoma as additional insured and showing the policy number.
- 1.6.3. A notation of coverage enhancements on the Certificate of Insurance shall not satisfy these requirements – actual endorsements must be submitted.

1.7. Liability insurance policies, with the exception of Professional Liability and Workers' Compensation, shall name the City of Tacoma and its officers, elected officials, employees, agents, and authorized volunteers as additional insured.
- 1.7.1. No specific person or department should be identified as the additional insured.
- 1.7.2. All references on certificates of insurance and endorsements shall be listed as "City of Tacoma".
- 1.7.3. The City of Tacoma shall be additional insured for both ongoing and completed operations using Insurance Services Office (ISO) form CG 20 10 04 13 and CG 20

37 04 13 or the equivalent for the full available limits of liability maintained by the Contractor irrespective of whether such limits maintained by the Contractor are greater than those required by this Contract and irrespective of whether the Certificate of Insurance describes limits lower than those maintained by the Contractor.

1.8. Contractor shall provide a Certificate of Insurance for each policy of insurance meeting the requirements set forth herein when Contractor provides the signed Contract for the work to City of Tacoma. Contractor shall provide copies of any applicable Additional Insured, Waiver of Subrogation, and Primary and Non-contributory endorsements. Contract or Permit number and the City Department must be shown on the Certificate of Insurance.

1.9. Insurance limits shown below may be written with an excess policy that follows the form of an underlying primary liability policy or an excess policy providing the required limit.

1.10. Liability insurance policies shall be written on an “occurrence” form, except for Professional Liability/Errors and Omissions, Pollution Liability, and Cyber/Privacy and Security

1.11. If coverage is approved and purchased on a “Claims-Made” basis, Contractor warrants continuation of coverage, either through policy renewals or by the purchase of an extended reporting period endorsement as set forth below.

1.12. The insurance must be written by companies licensed or authorized in the State of Washington pursuant to RCW 48 with an (A-) VII or higher in the A.M. Best's Key Rating Guide www.ambest.com.

1.13. Contractor shall provide City of Tacoma notice of any cancellation or non-renewal of this required insurance within Thirty (30) calendar days.

1.14. Contractor shall not allow any insurance to be cancelled or lapse during any term of this Contract, otherwise it shall constitute a material breach of the Contract, upon which City of Tacoma may, after giving Five (5) business day notice to Contractor to correct the breach, immediately terminate the Contract or, at its discretion, procure or renew such insurance and pay any and all premiums in connection therewith; with any sums so expended to be repaid to City of Tacoma by Contractor upon demand, or at the sole discretion of City of Tacoma, offset against funds due Contractor from City of Tacoma.

1.15. Contractor shall be responsible for the payment of all premiums, deductibles and self-insured retentions, and shall indemnify and hold the City of Tacoma harmless to the extent such a deductible or self-insured retained limit may apply to the City of Tacoma as an additional insured. Any deductible or self-insured retained limits in excess of Twenty Five Thousand Dollars ($25,000) must be disclosed and approved by City of Tacoma Risk Manager and shown on the Certificate of Insurance.

1.16. City of Tacoma reserves the right to review insurance requirements during any term of the Contract and to require that Contractor make reasonable adjustments when the scope of services has changed.

1.17. All costs for insurance shall be incidental to and included in the unit or lump sum prices of the Contract and no additional payment will be made by City of Tacoma to Contractor.

1.18. Insurance coverages specified in this Contract are not intended and will not be interpreted to limit the responsibility or liability of Contractor or Subcontractor(s).

1.19. Failure by City of Tacoma to identify a deficiency in the insurance documentation provided by Contractor or failure of City of Tacoma to demand verification of coverage or compliance by Contractor with these insurance requirements shall not be construed as a waiver of Contractor's obligation to maintain such insurance.

1.20. If Contractor is a State of Washington or local government and is self-insured for any of the above insurance requirements, a certification of self-insurance shall be attached hereto and be incorporated by reference and shall constitute compliance with this Section.

2. CONTRACTOR

As used herein, "Contractor" shall be the Supplier(s) entering a Contract with City of Tacoma, whether designated as a Supplier, Contractor, Vendor, Proposer, Bidder, Respondent, Seller, Merchant, Service Provider, or otherwise.

3. SUBCONTRACTORS

It is Contractor's responsibility to ensure that each subcontractor obtain and maintain adequate liability insurance coverage. Contractor shall provide evidence of such insurance upon City of Tacoma's request.

4. REQUIRED INSURANCE AND LIMITS

The insurance policies shall provide the minimum coverages and limits set forth below. Providing coverage in these stated minimum limits shall not be construed to relieve Contractor from liability in excess of such limits.

4.1 Commercial General Liability Insurance

Contractor shall maintain Commercial General Liability Insurance policy with limits not less than One Million Dollars ($1,000,000) each occurrence and Two Million Dollars ($2,000,000) annual aggregate. The Commercial General Liability Insurance policy shall be written on an Insurance Services Office form CG 00 01 04 13 or its equivalent. Products and Completed Operations shall be maintained for a period of three years following Substantial Completion of the Work related to performing construction services.

This policy shall include product liability especially when a Contract solely is for purchasing supplies. The Commercial General Liability policy shall be endorsed to include:

A per project aggregate policy limit, using ISO form CG 25 03 05 09 or an equivalent endorsement.

4.2 Workers' Compensation

4.2.1 Contractor shall comply with Workers' Compensation coverage as required by the Industrial Insurance laws of the State of Washington, as well as any other similar coverage required for this work by applicable federal laws of other states. The Contractor must comply with their domicile State Industrial Insurance laws if it is outside the State of

Washington.

4.3 Employers' Liability Insurance

Contractor shall maintain Employers' Liability coverage with limits not less than One Million Dollars ($1,000,000) each employee, One Million Dollars ($1,000,000) each accident, and One Million Dollars ($1,000,000) policy limit.

4.4 Professional Liability Insurance or Errors and Omissions

Contractor and/or its subcontractor shall maintain Professional Liability or Errors and Omissions with limits of One Million Dollars ($1,000,000) per claim and Two Million Dollars ($2,000,000) in the aggregate covering acts, errors and omissions arising out of the professional services under this Contract.
If the policy limit includes the payment of claims or defense costs, from the policy limit, the per claim limit shall be Two Million Dollars ($2,000,000).
If the scope of such design-related professional services includes work related to pollution conditions, the Professional Liability policy shall include Pollution Liability coverage.
If provided on a "claims-made" basis, such coverage shall be maintained by policy renewals or an extended reporting period endorsement for not less than three years following the end of the Contract.

4.5 Builder's Risk Insurance

Contractor shall maintain during the term of the Contract and until final acceptance of the work by the City of Tacoma, a policy of Builder's Risk Insurance providing coverage for all-risk of physical injury to all structures to be constructed according to the Contract. City of Tacoma shall be included as a named insured (not named as additional insured) on the policy. Builder's Risk Insurance policy shall:

4.5.1 Have a deductible of no more than Five Thousand Dollars ($5,000) for each occurrence, the payment of which will be the responsibility of Contractor. Any increased deductibles accepted by City of Tacoma will remain the responsibility of Contractor.
4.5.2 Be on an ISO Special Form Causes of Loss or equivalent and shall insure against the perils flood, earthquake, theft, vandalism, malicious mischief, and collapse.
4.5.3 Include coverage for temporary buildings, debris removal, and damage to materials in transit or stored off-site.
4.5.4 Be written in the amount of the completed value of the structures, with no coinsurance provisions exposure on the part of Contractor or City of Tacoma.
4.5.5 Contain a Waiver of Subrogation provision whereby each insured waives their subrogation rights to the extent the loss is covered by this insurance.
4.5.6 Grant permission to occupy, allowing the building or structure to be partially occupied prior to completion, without detrimental effect to the coverage provided.
4.5.7 Include coverage for the testing and startup of the building's operating systems.
4.5.8 Include coverage for City of Tacoma's loss of use or business interruption arising out of a covered loss which delays completion.
4.5.9 Include resultant damage coverage for loss due to faulty workmanship and defective material.

Contractor and City of Tacoma waive all rights against each other, their respective subcontractors, agents, and representatives for damages caused by fire or other perils to the extent covered by Builder's Risk Insurance or other property insurance applicable to the

work. The policies shall provide such waivers by endorsement or otherwise.

4.6 Other Insurance

Other insurance may be deemed appropriate to cover risks and exposures related to the scope of work or changes to the scope of work required by City of Tacoma. The costs of such necessary and appropriate Insurance coverage shall be borne by Contractor.

MASTER
SUPPLY SPECIFICATION

SPECIFICATION NO. PG22-0052N

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

SPECIAL PROVISIONS

1. PROJECT DESCRIPTION

This contract includes the supply of a Draft Tube Gate Hoist for the Mayfield Dam Powerhouse in accordance with this specification.

2. MATERIAL SHIPPING QUANTITIES

The minimum order by the City will be one. The quantities listed in the bid proposal are estimates, and the actual quantities ordered will depend upon the City's needs.

3. CONTRACT PERIOD

A. The City intends this supply contract to be one (1) time purchase contract based on the contract documents.

4. PROJECT COORDINATION

A. Management for this project, with whom the vendor shall coordinate all their activities with, will be Mr. Steve Belvin, at sbelvin@cityoftacoma.org.

B. Vendor technical inquires pertaining to this specification may be directed to Mr. Steve Belvin, at sbelvin@cityoftacoma.org.

5. PROPOSAL ITEMS

A. Refer to Proposal for Specification page(s) for a listing of the required bid item.

B. Bid item shall be measured by unit payment price per each (EA) unless otherwise noted, and shall be full and complete compensation including delivery. (See Delivery Section).

6. WORKING DAYS

A. Working days are weekly Monday through Friday. City observed holidays as listed in Section 1.24 of the Standard Terms and Conditions would not be included.

7. QUALIFICATION OF VENDORS

A. Only vendors experienced in this type of work, and with a record of successful completion of jobs of similar scope, will be considered for this contract. The City will be the sole judge of the vendor's ability to meet the requirements of this paragraph.

B. Bidders are required to submit, on the attached Contractor's Record of Prior Contracts form, a minimum of five (*5)* references including date(s) and amount of contract, company name, contact person, and phone number.

8. MEETINGS

A. As required by the engineer weekly meetings shall be included in the vendor pricing. The first meeting start date shall be scheduled within five (5) days after award of contract. Allow for twelve (12) meetings. The vendor shall include adequate pricing to include manufacturer's representative, vendor's representative and/or service personnel as applicable. The meetings may be remotely attended or in person at the site of the manufacturer at the discretion of the engineer.

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 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 vendor best meets the City's need will be final.

In addition to Standard Terms and Conditions Section 1.20, the following factors will be used in bid evaluation:

A. Compliance with specification.

B. Proposal prices, listed separately, as well as a lump sum total.

C. Time of delivery.

D. Vendor's response to Proposal Notice questionnaire page.

E. Vendor'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. References, judgment, experience, efficiency, and stability
3. Whether the material request can be delivered within the time specified
4. Quality of performance of previous contracts or services

10. ADMINISTRATION - MEASUREMENT AND PAYMENT

A. CONTRACT PRICE

The 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 vendor for completing the contract in accordance with the plans, specifications, and instructions of the engineer.

All work not specifically called out in these specifications, but required to construct complete and operable systems, structures or amenities shall be considered incidental to the contract.

B. PROPOSAL ITEMS

1. ITEM 1 FURNISH DRAFT TUBE GATE HOIST, AS SPECIFIED

NOTE: Bidders are required to bid on Item 1 listed on Proposal Pages. Bidders may bid on the branded product, as listed, or submit a bid from an alternate manufacturer, but not both. All bids for alternate manufacturer must provide a detailed comparison that support the alternate product meets or exceeds the listed brand. See Submittals Section – Product Data.

Bids submitted that do not meet the requirements of this paragraph may be deemed non-responsive.

A. MEASUREMENT

Items 1 Furnish Product, As Ordered, shall be measured per each (EA) for each type.

B. PAYMENT

The contract unit price per each (EA) shall be full compensation for all costs associated with supply and delivery of Items 1 Furnish Draft Tube Gate Hoist, As Specified, in accordance with the attached specifications.

2. ITEM 1 FURNISH MAN BASKET AND ACCESS PLATFORM

NOTE: Bidders are required to bid on Item 2 listed on Proposal Pages. Bidders may bid on the branded product, as listed, or submit a bid from an alternate manufacturer, but not both. All bids for alternate manufacturer must provide a detailed comparison that support the alternate product meets or exceeds the listed brand. See Submittals Section – Product Data.

Bids submitted that do not meet the requirements of this paragraph may be deemed non-responsive.

A. MEASUREMENT

Items 2 Furnish Product, As Ordered, shall be measured per each (EA) for each type.

B. PAYMENT

The contract unit price per each (EA) shall be full compensation for all costs associated with supply and delivery of Items 2 Furnish Man Basket and Access Platform, As Specified, in accordance with the attached specifications.

11. "OR EQUAL" CLAUSE OR SUBSTITUTIONS

A. GENERAL

When the engineer approves a substitution, it is with the understanding that the contractor guarantees the substituted article to be equal to, or better than, the article specified. The engineer will judge the suitability, reliability, and service availability of a proposed substitute. To be considered by the engineer, the request for substitution shall be accompanied with complete physical and technical data, manufacturer's catalogue data, photographs, samples, and the address of the nearest authorized service representative, as applicable.

The decision of the engineer on "OR EQUALS" shall be final.

The requirements of Standard Terms and Conditions, Section 1.33 - Approved Equals also apply.

B. PRIOR TO BID OPENING

Substitution approvals will be considered prior to the bid opening if the bidder submits their request for substitution not less than ten (10) working days prior to the date set for bid opening. All substitution requests shall be submitted using the "Substitution Request Form" included in the bid packet and shall be sent to the individual as noted at the top of the form. Substitution requests not received by the named individual will not be evaluated and not allowed as a substitution prior to bidding. Submit all requests and product data in triplicate.

Saturday, Sunday and holidays listed in Paragraph 1.24 of the Standard Terms and Conditions are excluded from the calculation of ten (10) days. An addendum listing such approvals may/will be issued prior to bidding.

Bidders who do not receive prior written approvals of "OR EQUAL" by three (3) days prior to bid submittal must base their bids on the items specified.

C. AFTER BID OPENING

Proposed substitution and deviation requests shall be reviewed during the time of submittal review.

Substitution and deviation requests will be received and considered only when one or more of following conditions are satisfied:

1. The specified product or method of construction cannot be provided within the contract period and the contractor submittal is submitted within time frame allowed.
2. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
3. The specified product or method of construction cannot be provided in a manner that is compatible with other materials.
4. A substantial advantage is offered to the Owner, in terms of cost, time, or other considerations of merit.
5. The product as specified includes the statement, “or equal” and one of the above conditions governs
6. The engineer’s decision on all substitution or deviation requests shall be final.

12. CONTRACT CHANGES

The City has developed four (4) forms to facilitate and track communications with the vendor. 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 vendor 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 vendor’s methods, schedule or other issues not warranting more formal letter correspondence. The vendor shall maintain the numbering system and, as such, any issued by the City will be unnumbered until delivered to the vendor.

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 vendor 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, less than seven (7) days from receipt of said Directive. Should no Change Order Proposal be received by the City within seven (7) days, such claim for extra cost or time shall be presumed to be dropped. Directives are numbered by the City.

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 vendor 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 vendor to respond to City issued Proposal Requests, Engineering Change Directives or when the vendor 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 vendor, and, in the case of revision or resubmission of the same basic COP, the number shall be hyphenated with the letter “B”, “C”, etc.

13. QUALITY OF MATERIAL WORKMANSHIP

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.

All materials and equipment to be provided under this contract shall conform to the latest applicable section 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, SAE and all Federal, state, and local standards for the type of equipment provided for its intended use.

Unless otherwise noted in this specification, all materials and equipment incorporated into any item covered by the specification shall be new and of the most suited of their respective kinds for their intended use. All workmanship shall be in accordance with accepted industry construction practices.

For ease of reference in this specification, certain equipment and materials or processes may be designated by a trade name, manufacturer's name, manufacturer's catalog number, or other similar designation. Wherever such designation appears in this specification, it shall be deemed to be followed by the words "or approved equal." The exception to this is when the reference is followed by the word **"No Substitutions"**. These particular items have been identified in an effort to standardize the Utilities inventory of replacement parts and **NO EXCEPTIONS/ALTERNATES** will be permitted in these cases.

If the vendor elects to bid alternative equipment, materials, or processes where allowed, then complete data must be submitted with the bid showing that the alternative item or process is of a quality equal to or better than that specified and has the required characteristics for the intended use. Failure to submit such data will render the bid non-responsive.

Upon request, the vendor shall furnish to the City within five (5) working days such additional information relating to such alternative items as the City may require. In the event that the equivalency is not readily ascertained from the information supplied by the successful vendor, the City may test the material or equipment, or have it tested. The successful vendor shall bear all expense of the City's determination of whether or not alternative equipment, materials or processes are equal to those designated. The City shall keep expense records of all costs and charges associated with such determination of equivalency.

14. SUBMITTALS

Prior to final acceptance of contract pricing, material submittals for any alternate materials proposed shall be provided for engineer review.

Submittals 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 vendor from compliance with requirements of the contract. 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.

Piece-mealing of submittals shall not be accepted.

A. PRODUCT DATA

1. Number of Copies: Submit four (4) copies to the engineer for review. One (1) copy, with corrections/comments, to be returned to vendor.
2. Identification: Mark each copy to identify specific products, models, options, tolerances, dimensions, and other pertinent data.
3. Vendor must provide a detailed comparison of the proposed product as it compares with the equivalent proposed to allow evaluation. Incomplete submittals will not be reviewed and bids will be rejected.

15. MAINTENANCE AND OPERATION MANUALS AND DRAWINGS

1. Three (3) complete sets of maintenance and operations (O&M) manuals and supplement drawings for the care and maintenance of materials and equipment items supplied.

   These manuals shall be prepared by the manufacturer’s representatives, and collected and bound in separate brochures by the vendor. These manuals shall include all provided equipment data, electrical data and other necessary information pertaining to the materials.
2. The vendor shall also include necessary instructions or training to the City’s personnel to such care and maintenance as directed by the manufacturer.
3. Electronic Copies: Provide one electronic copy of all the complete mechanical O&M manuals on a USB drive. Furnish one (1) USB drive for each hard copy of O&M manual provided; located in pocket on inside of manual cover.

16. GUARANTEES AND WARRANTIES

All guarantees, warranties, and/or agreements for such equipment and materials as carry such guarantees shall be provided to the City.

Equipment shall be warranted by the manufacturer to be free from all manufacturing defects and capable of providing satisfactory operation for a period of one (1) year (or longer, see Technical Specifications for additional warranty requirements) after the date of project acceptance. Vendor shall include in their bid all costs associated with this warranty to ensure that the warranty extends to one (1) year after the date of project acceptance and/or factory start-up.

Possible project delays and failure by others to complete their work may cause the date of project acceptance to be substantially delayed. The vendor shall be responsible for increasing the warranty dates by corresponding amounts to still provide one (1) year warranties.

17. PACKING AND SHIPPING

A. VENDOR RESPONSIBILITIES

The vendor shall be responsible for industry standard packing which conforms to requirements of carrier's tariffs and ICC regulations. Containers must be clearly marked as to lot number, destination, address, engineer, and purchase order number and release number.

B. PREPARATION FOR SHIPMENT

All items shall be properly prepared for shipment.

All heavy parts shall be provided with skids to facilitate handling.

All heavy parts shall be securely boxed and identified as to content.

The vendor will be responsible for all damage to the shipment incurred in transit.

C. SHIPPING

Shipping as detailed under this paragraph will constitute the only shipping instructions under these specifications. All items shall be shipped F.O.B. to the destinations stated herein. A complete packing list must be included.

18. DELIVERY

This section is in addition to the Standard Terms and Conditions, Section 1.34 – Price, Risk of Loss, Delivery.

A. SHIPPING

The ordered materials shall be delivered F.O.B. to:

Tacoma Power
Cowlitz Project
253 Hydro Lane
Silver Creek, Washington 98585

Attention: Lee Edwards

Notification must be received at least 48 hours prior to delivery.

Delivery is F.O.B. destination, freight pre-paid and allowed. Quotes with freight allowances to Tacoma will be declared non-responsive.

B. SHIPPING NOTICES AND INVOICES

This section is in addition to the Standard Terms and Conditions, Section 1.36 – Packing Slips, Shipping Notices and Invoices.

Shipping notices shall be mailed to:

Tacoma Power
Generation
3628 South 35th Street
Tacoma, Washington 98409

Attention: Steve Belvin

Invoices shall be mailed to:

Tacoma Power
Generation
3628 South 35th Street
Tacoma, Washington 98409

Attention: Business Systems

19. INSPECTION

A. INSPECTION AND ACCEPTANCE

All goods are subject to final inspection and acceptance by the engineer. Material failing to meet the requirements of this contract will be held at vendor's risk and may be returned to vendor. If so returned, the cost of transportation, unpacking, inspection, repacking, reshipping or other like expenses are the responsibility of the vendor.

B. FACTORY INSPECTION

An authorized representative shall be permitted to be present to witness the manufacture of bid items and/or perform a quality audit of the facility.

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 14 22 00

PART 1 GENERAL

1.1 SECTION INCLUDES

Manufacture and deliver Mayfield Draft Tube Stop Log Hoist per the drawing package included in Appendix 'A' of this specification.

1. Stencil the load capacity of the hoist on both sides of the hoist motor weather cover.
2. Steel stamp the load capacity of the davit to the plate at the end of the davit. Riveting a nameplate with the load capacity to the plate is also acceptable.

1.2 SUBMITTALS

Submit for approval any variations or substitutions to the specified design in accordance with Section 01300 - Submittals and Shop Drawings.

1.3 DELIVERY AND STORAGE

Deliver the completed hoist to the hydroproject with freight pre-approved and allowed. A suggested breakdown for shipping is shown in the specification drawing package, with the intent of simplifying as much as possible the reassembly at the hydroproject.

Package items for safe shipping and outdoor storage appropriately to protect electrical items including open conduit from water intrusion.

PART 2 PRODUCTS

2.1 MAYFIELD DRAFT TUBE STOP LOG HOIST

A. STRUCTURAL AND MECHANICAL.

Build as shown on the specification drawings in Appendix A. Drawings included in this specification are:

Drawing Number	Title
MK205-1	COVER SHEET & DRAWING INDEX
MK205-2	PLAN, ELEVATION & DETAILS
MK206-1	HOIST ASSEMBLY
MK206-2	HOIST REDUCER
MK207-1	DRUM WELDMENT & MACHINING
MK207-2	DRUM WELDMENT & MACHINING
MK208	DRUM ASSEMBLY PARTS
MK209	DRUM ASSEMBLY PARTS
MK210	GANTRY TRUCK WELDMENT
MK211	TRUCK WELDMENT DETAIL ITEMS
MK212	TRUCK MACHINING
MK213	GANTRY TOP CHORDS
MK214	END TIES

MK215	GUSSET PLATE, LEG & BRACE
MK216-1	TRAVEL DRIVE ASSEMBLY
MK216-2	TRAVEL DRIVE GEARMOTOR
MK217	WHEEL ASSEMBLY & SHAFT
MK218	TRAVEL DRIVE MOTOR COVER
MK219	RAIL SWEEP & THREADED ROD ASS'Y
MK220	JIB ASSEMBLY & PARTS
MK221	JIB WELDMENT
MK222	CABLE REEL ASSEMBLY AND PARTS
MK223	ELECTRICAL CABINET ASSEMBLY
MK224	SHIPPING COMPONENTS

B. ELECTRICAL

See Division 26 - Electrical in this specification.

2.2 MAN BASKET AND ACCESS PLATFORM

Build as shown on the specification drawings in Appendix A. Drawings included in this specification are:

Drawing Number	Title
MK230	ACCESS EQUIPMENT, MAN BASKET & ACCESS PLATFORM
MK231	ACCESS EQUIPMENT, MAN BASKET WELDMENT
MK232	ACCESS EQUIPMENT, MAN BASKET DETAIL ITEMS
MK233	ACCESS EQUIPMENT, ACCESS PLATFORM WELDMENT

PART 3 EXECUTION

3.1 SHOP LOAD TEST

Perform a 100% capacity load test at the manufacturer before shipping.

Coordinate with the City engineer to witness the test.

END OF SECTION

DIVISION 26 - ELECTRICAL

SECTION 26 05 11 – GENERAL ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. The section provides the requirements for the design, manufacture, shop assembly, shop testing, installation and final testing requirements for the control system for Mayfield Draft Tube Gate Hoist.

B. Equipment furnished and installed under this section shall be fabricated and assembled in full conformity with the Drawings, specifications, engineering data, instructions, and recommendations of the equipment manufacturer, unless exceptions are noted by the City.

C. General dimensions and arrangements and partial bill of materials are indicated on the Drawings. System Supplier shall be responsible for coordinating the enclosure sizes, mounting and arrangements to accommodate the equipment being provided.

1.2 RELATED SECTIONS

SECTION 14– SUBMITTALS

SECTION 13 – QUALITY OF MATERIAL WORKMANSHIP

SECTION 19 – INSPECTION

1.3 SERVICE DESCRIPTION

A. The Gate Hoist handles the stop logs during maintenance of a hydropower unit. Each of these loads are large and heavy and require precision handling and locating of these pieces. The stop logs weigh 5 tons. Personnel handling these items during maintenance operations depend on this precision control for their safety.

1.4 REFERENCE STANDARDS

A. All work shall be performed, and materials shall be furnished in accordance with the NEC - National Electrical Code, the NESC - National Electrical Safety Code, and the following standards where applicable:

ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
AWG	American Wire Gauge
Fed Spec	Federal Specification
ICEA	Insulated Cable Engineers Association
IEEE	Institute of Electrical and Electronics Engineers
IESNA	Illuminating Engineering Society of North America
NEIS	National Electrical Installation Standards
NEMA	National Electrical Manufacturers Association

NFPA National Fire Protection Association

UL Underwriters' Laboratories

B. Electrical equipment and materials shall be listed for the purpose for which they are to be used, by an independent testing agency. Two such organizations are Underwriters Laboratories (UL), Canadian Standards Association (CSA). Independent testing agency shall be acceptable to the inspection authority having jurisdiction.

C. When a product is not available with a testing laboratory listing for the purpose for which it is to serve, the product may be required by the inspection authority to undergo inspection and testing at the manufacturer's place of assembly. All costs and expenses incurred for such inspections shall be included in the original contract price. Before the inspection is conducted, Contractor shall submit a copy of the inspection procedure to be used.

D. Jurisdiction for this project is the City of Tacoma, Electrical Inspection Department. Contractor shall verify that equipment provided is in conformance with the listing guidelines per City of Tacoma requirements.

1.5 SUBMITTALS

A. SUBSTITUTIONS

1. Substitutions are allowed only for those items marked as allowed on the Bill of Materials, included in Attachment A. If substitutions are not allowed on a particular item, requests for substitutions on those items will not be considered.
2. If items listed in the Bill of Materials spreadsheet indicate substitutions are allowed, and a substitution is being requested, the Contractor must request a substitution in writing.
3. If requesting a substitution, the Contractor shall provide detailed information in the form of manufacturer's drawings, catalog cuts, part numbers and technical information so that the City may determine if the proposed substitution item is equal in form fit and function to the item referenced in the Bill of Materials list.
4. The Contractor may not use a substituted item unless approved in writing by the City.

B. PANEL LAYOUT DRAWINGS

1. Submit design drawings for all equipment prior to ordering or fabrication. No deviations from the submittals as approved shall be permitted and any materials purchased prior to approval shall be at the sole risk of the Contractor. Drawings shall include a General Arrangement Drawing showing all new hardware.
2. The Contractor shall submit Panel Layout Drawings showing the layout of the electrical panel being constructed and will illustrate the general arrangement of all components contained in the panel.
   a. All panel components must be installed in accordance with the manufacturer's recommendations and according to the provided user's manuals.
   b. Cut-out details for panels with face mountings shall be listed on the panel layouts.

C. PANEL WIRING DIAGRAM DRAWINGS

1. The Contractor shall submit Wiring Diagrams detailing the internal wiring of the electrical panel.

a. The component placements on the Wiring Diagrams should match the placement of components on the panel layouts as closely as possible.

b. Each electrical component inside the wiring diagram has a designated device abbreviation that is unique to that electrical panel. For example, a circuit breaker is abbreviated as CB#, where # is the circuit breaker number inside that panel. If there is a CB1 within a panel, it is the only circuit breaker abbreviated as CB1 inside that particular panel.

c. Each electrical component inside the panel must be labeled with the device abbreviation either on the backplane near the device or directly on the device. The devices must be labeled as listed on the wiring diagrams and the labels must be made clearly visible.

d. Terminal strips are treated as an electrical device and are abbreviated as TA through TZ, or TB1-TB2, etc... Each terminal block within a terminal strip has a unique number associated with it. Terminal strip designators and terminal numbers will be indicated in the wiring diagrams

e. Every terminal number on each device is unique to that device and shall be clearly labeled on the wiring diagram. For example, on a terminal strip, each terminal is clearly numbered and unique to that terminal strip. Terminal #5 on terminal strip TC would be abbreviated as TC-5. As another example, terminal 2 on circuit breaker #1 is abbreviated as CB1-2.

f. Some electrical components have sub-components. For example, most VFD's (Variable Frequency Drives) have multiple terminal strips and each terminal on the terminal strip has a unique number designation. Terminal #1 on terminal strip TA on VFD #1 is abbreviated as VD1-TA-1. However, on that same VFD, there can also be a terminal #1 on terminal strip TB and it is abbreviated VD1-TB-1.

g. Given the examples above, the terminal abbreviations can be summed up as follows:

ELECTRICAL_COMPONENT # – SUBELECTRICAL_COMPONENT # [If Applicable] – TERMINAL_NUMBER

h. Not all devices will have internal wiring associated with it. Not all terminals on an electrical device will be wired to.

i. Some terminals have multiple wires tied to them.

j. Some terminal blocks have multiple terminals that are electrically equivalent. For these, terminate only one wire per terminal unless otherwise specified.

k. Required wire colors and wire sizes shall be called out in the table on the wiring diagrams. Exceptions and special wire size or color requirements will be called out separately on the drawings.

l. Each terminal on the wiring diagram that has a wire attached to it shows the destination terminal in the form of the abbreviation given in item 8 above. The source and destination terminals reference each other. For example, if there is a wire running between TA-1 and TB-1. TA-1 will reference TB-1 to denote there is a wire running from TA-1 to TB-1. Likewise, TB-1 will reference TA-1 to denote that there is a wire running from TB-1 to TA-1.

m. In some cases, there are cable terminations (rather than a single conductor insulated wire) that run between multiple terminals. The number designations on the wires follow the E1 (K1) color code, unless otherwise noted.

D. OPERATION AND MAINTENANCE MANUALS

1. Include operation and maintenance documentation for all equipment and devices, including the travel drive, hoist drive, power and control circuit conductors, safety and control mechanisms, and all other parts and services as defined in this specification. Documentation shall include manufacturer's model number, manufacturer's installation instructions, frequency of inspection, recommended cleaning methods and materials, testing methods, and calibration tolerances. In the event such manuals are not obtainable from the manufacturer, it shall be the responsibility of the Contractor to compile and include them. Advertising brochures shall not be used in lieu of the required technical manuals.
2. The maintenance and operating manuals shall include key component breakaway pictures for ease of parts ordering, catalog cut pages, part numbers, and sub-assembly details.
3. The Contractor shall provide a Recommended Spare Parts List.

E. AS-BUILT DRAWINGS:

1. Prepare and provide as-built drawings (final drawings) that reflect all modifications made to the original design drawings during the construction, fabrication or testing.
2. The Contractor shall be responsible for marking up the project drawings as construction progresses in order to indicate the 'As-Built' condition of the project where deviations exist to the contract documents/design or clarification is required.

F. WARRANTY

1. Upon completion of the work the contractor shall supply the City with a single-source warranty of U.S. origin direct from the manufacturer.
2. Submit written reports on each service or inspection to the Project Manager during the warranty period.
3. During the warranty period, all copies of the drawings and manuals shall be updated to include all changes which were required to solve problems covered by the warranty.
4. Warranty period shall be one (1) year.

G. FACTORY ACCEPTANCE TEST PROCEDURE

1. A Factory Acceptance Testing (FAT) procedure shall be submitted to and approved by the City prior to FAT.

1.6 QUALITY ASSURANCE

A. INSPECTION POINTS

1. Upon reasonable notice to the Contractor, the City's engineer or designee shall be free to stop by the fabricator anytime during the normal business hours and inspect the progress of the job.
2. The engineer shall be notified, in a reasonable period of time, of points of interest for inspection, final assembly, and shop test.

3. The engineer may also request other points for inspection.

1.7 DESIGN REQUIREMENTS

A. REFERENCE DRAWINGS & DOCUMENTS

1. The schematic drawings and documents listed below provide the basis for the Contractor in designing the Mayfield Draft Tube Gate Hoist control system. Copies of these drawings and documents are attached to this Specification as Appendix A – DRAWINGS & DOCUMENTS. Errors or omissions in these drawings and documents should be brought to the attention of the City's electrical engineer.

SCHEMATIC DRAWINGS:

MW1010-1	Draft Tube Gate Hoist 480VAC Power Schematic
MW1010-2	Draft Tube Gate Hoist 120VAC Control Schematic

BILL OF MATERIALS (BOM):

Mayfield Draft Tube Gate Hoist BOM (Excel Spreadsheet)

DESCRIPTION OF SYSTEM OPERATION (DOSO):

Mayfield Draft Tube Gate Hoist DOSO (Word Document)

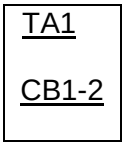
B. GENERAL

1. All Control Panels shall be UL508A certified.
2. Power distribution wiring on the line side of panel fuses shall be minimum #12 AWG. Secondary power distribution wiring shall be minimum #14 AWG. All interconnecting wiring and wiring to terminals for external connection shall be stranded copper, insulated for not less than 600 volts, with a moisture resistant and flame retardant covering rated for not less than 90°C.
3. All internal panel wiring shall be type MTW (Machine Tool Wire) stranded copper wiring rated not less than 600 volts and 90 deg C rated. Wires within the panel shall conform to the minimum size as specified in UL508A.

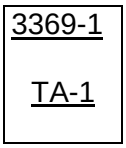
Type	Color
480 VAC – Phase 1	Brown
480 VAC – Phase 2	Orange
480 VAC – Phase 3	Yellow
120 VAC Ungrounded	Red
120 VAC Grounded	White
Earth Ground (PE)	Green

4. All wiring termination ends must have a feral crimp attachment to allow tighter torque regulation of the termination and to prevent unintentional whiskers from sticking out. All terminations must be tightened to the torque rating according to UL508A.
5. All wiring shall be grouped or cabled and firmly supported inside the panel. Each individual wire in power, control, and instrumentation circuits shall be provided with identification markers at each point of termination. The wire markers shall be positioned to be readily visible for inspection and the identification numbers shall match the identification on the supplier's panel wiring drawings.

6. Wiring shall be bundled in groups and bound with nylon cable ties or routed in Panduit or similar nonmetallic slotted ducts. Ducts shall be readily accessible within the panel, with removable covers, and with space equal to at least 40 percent of the depth of the duct remaining available for future use after completion of installation and field wiring. Sufficient space shall be provided between cable groups or ducts and terminal blocks for easy installation or removal of cables.
7. Wire labels must be provided at each end of the wire termination. The wire label must show both wire destination abbreviations on each termination. For example: For a wire that runs between terminal TA-1 and terminal CB1-2, a wire label would be placed at the connection at TA-1 and at CB1-2 and should read as follows (the order is not important):



8. Each wire termination requires two identical labels. These labels will allow a person to know where the wire termination points are at each end of the wire. The wire labels should be clearly visible. Cable terminations will be marked similarly. The label for Cable# 3369, conductor #1 to terminal TA-1 should read as follows:



9. All wire labels must be wipe resistant, polyolefin material that can withstand ambient temperatures from -50ºC to 130ºC.
10. Terminal blocks for external connections shall be suitable for 12 AWG wire, shall be rated 30 amperes at not less than 300 volts and shall be screw clamp type. Terminal blocks shall be fabricated complete with marking strip, covers, and pressure connectors. Terminals shall be labeled to agree with identification shown on the supplier's submittal drawings. A terminal shall be provided for each conductor of external circuits, plus one (1) ground for each shielded cable. Not more than two (2) wires shall be terminated on a single terminal. Not less than 8 inches of clearance shall be provided between the terminal strips and the base of vertical panels for conduit and wiring space. Not less than 25 percent spare terminals shall be provided. Each control loop or system shall be individually fused, and all fuses or circuit breakers shall be clearly labeled and located for easy maintenance.

PART 2 PRODUCT

2.1 ENCLOSURES

A. MATERIAL

1. Enclosure material shall be stainless steel type 304. The surface of the enclosure shall not be painted.

B. DESIGN & NEMA RATING

1. Enclosures shall be designed for surface-mounting. Enclosures shall have a NEMA Type 4X designation.

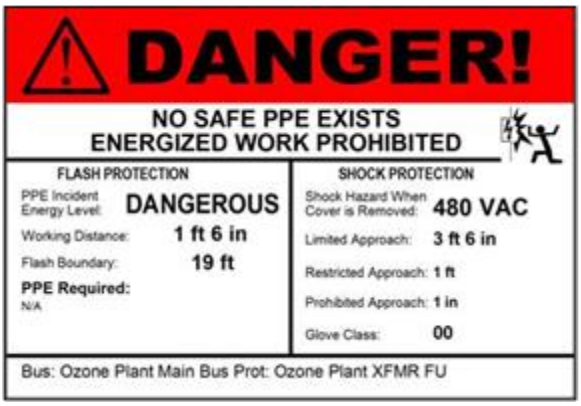
2. Enclosure seams shall be continuously welded and ground smooth.
3. Enclosure doors shall contain a seamless foam in-place gasket and a rolled lip around three sides of the door. Stainless-steel door clamps shall be provided to secure the door closed. The door shall include a hasp and staple for securing the door with a padlock.
4. Any holes or penetrations into the enclosure shall be sealed to prevent moisture from entering the enclosure. Components mounted on the exterior of the enclosures (horns, lights, switches, conduit penetrations, etc) shall not compromise the integrity of the enclosure NEMA rating.

C. VENT DRAIN

1. Install a one-way vent drain on the bottom side of the electrical enclosure to allow moisture and air to vent out of the enclosure but not flow back in.

D. LABELS

1. A neatly printed or typed directory shall be mounted on the inside of the door. The directory shall list all control panel fuses, their function, class, type and ampacity.
2. Label all components inside panel per the designator shown on the schematic drawings.
3. Install a plastic engraved legend plate at the Control Mode Selector Switch.
4. Place an engraved plastic label on the exterior of all field devices indicating their component designator as shown on the schematic drawings. (rotary cam switches, lights and horns, etc.)
5. Install a neatly engraved plastic label plate on the outside of the enclosure door to indicate the panel name (function) and panel identifier (CP-#). In addition, a separate label shall be placed on the door that indicates the power source feeding this enclosure (lighting panel) and circuit number (Power Fed From . . . .)
6. Secure engraved plastic labels to the door with machine screws. Use of double-sided tape or glue is not allowed.
7. Industrial control panels shall be provided with permanent labels warning the risk of arc flash and shock hazard. Labels shall be designed to meet the City's standard for content as shown below and in accordance with ANSI Z535.4.



E. MANUFACTURER

1. The enclosure manufacturer shall be Hoffman or approved equal.

2.2 CABLE REEL

A. AMPACITY & VOLTAGE RATING

1. Cord reel shall be rated for 45 Amp, 600 VAC.

B. SIZE & CAPACITY

1. Cord reel shall have 150 feet of portable SOOW 4 conductor cord capacity.

C. REEL STYLE

1. Cord reel shall be gear-driven crank rewind style.
2. Cord reel shall contain double brushes per circuit; brushes are copper graphite, copper alloy rings.

D. BRAKE STYLE

1. Cord reel shall be auxiliary rewind and pinion brake standard.

E. GUIDE ROLLERS

1. Cord reel shall contain two Hannay Utility Guide Rollers assembly, Type B2.
   a. Place one B2 roller assembly in the low-mount, bottom-wind position on the right side of cable reel facing the slip ring assembly.
   b. Place a second B2 roller assembly in the high-mount, top-wind position on the left side of the cable reel facing the slip ring assembly.

F. MANUFACTURER AND PART NUMBER

1. Cord reel shall be a Hannay 6616-25-26 cord reel, **no substitutions**.

2.3 RADIO CONTROL SYSTEM

The radio control system consists of three key components, a portable handheld transmitter, a machine-based receiver unit, and an antenna. The transmitter and receiver are “paired” and only exchange data with their paired partner on an assigned frequency.

A. TRANSMITTER

1. The transmitter shall have 10 functions accomplished with 4 single step motion control rocker switches, an ON/ALARM pushbutton, and a STOP/OFF pushbutton.
2. The transmitter shall have a range of 300ft with an obstructed view and 1000ft range with a direct line of sight to the antenna.
3. Transmitter commands will be processed within a 60millisecond response time.
4. The transmitter shall be a handheld, battery powered unit with replaceable batteries.
5. The transmitter shall have an IP 66/67 rating and a durable polypropylene case to ensure operation in outdoor environments.

B. RECEIVER

1. The receiver shall monitor communications with the transmitter to verify at least one valid transmission is received each second to continue operations. If a valid transmission is not received on a one second periodic basis, the receiver will automatically power down the system. The receiver has a programmable automatic shutdown function (15 minutes).
2. Information packets are encoded with a16-bit Cyclic Redundancy Code (CRC) checking scheme to ensure communication comes only from the paired partner.
3. The receiver shall have 10 SPST 8A rated control output relays and one reserved safety relay.
4. The receiver shall be a 120 VAC powered unit.
5. The Receiver shall be housed in a NEMA 12 aluminum housing.

C. REMOTE ANTENNA

1. The Receiver shall be mounted inside the electrical control cabinet to protect it from exposure to extreme weather conditions in the outdoor environment. This location inside the electrical cabinet shields the standard, receiver-mounted, flexible, “rubber duck” antenna from obtaining signals from the handheld transmitter. Thus, the flexible “rubber duck” antenna shall be replaced with a remote mounted antenna kit.
2. The antenna mounting bracket shall be attached either to the exterior of the control cabinet or anchored to the frame of the Draft Tube Gate Hoist.
3. The antenna shall be connected to the TNC connector on top of the receiver unit using the 9 footlong coax cable provided in the Remote Antenna Kit.
4. The remote mounted antenna shall be installed in a vertical orientation.

D. MANUFACTURER AND PART NUMBER

1. The Radio Control unit shall be a Remtron Part Number 25S08A (includes both the handheld transmitter P/N 25T10A-S08A and the machine mounted receiver P/N 25R11A-S08A), **no substitutions.**
2. The Remote Antenna Kit (“rubber duck” replacement) shall be a Remtron Part Number 2CAB-9110-A002-A, **no substitutions.**

2.4 CONTROL VOLTAGE TRANSFORMER

The transformer shall be hung outside of the main electrical panel to avoid damaging or overheating the components inside the panel.

A. STYLE

1. The transformer shall be suitable for outdoor conditions. The transformer windings and core shall be encapsulated with electrical grade resin and be housed in a NEMA 3R-rated enclosure.
2. The transformer shall have a maximum temperature rise of 95 degrees Celsius.

B. RATING

1. The transformer shall have a 1KVA rating,
2. The transformer shall have a primary voltage of 480V and a secondary voltage of 120V.

C. FUSING

1. The transformer shall be equipped with both primary and secondary fuses. Fuse types and amperage ratings shall be selected in accordance with NEC requirements.

D. ACCEPTABLE MANUFACTURERS

1. Use a Jefferson Electric series 411 transformer or approved equal

2.5 VARIABLE FREQUENCY DRIVE

A variable frequency drive (VFD) controls the Mayfield Draft Tube Gate Hoist travel motor. Two travel speeds will be provided. High speed mode (60 Hz) provides the operator with quick travel times when moving the system long distances. Low speed mode (15 Hz) provides the capability for precise positioning over the stop logs.

The VFD also provides the capability for acceleration and deceleration move profiles. These accel/decel profiles ensure that there is no wheel spin, skidding, sliding or excessive load swings when positioning the hoist system over the stop log access areas.

A. ACCEPTABLE MANUFACTURERS

1. The travel motor variable frequency drive (VFD) shall be an Allen-Bradley Open Type, IP 20 enclosure, Series 523 VFD P/N:25A-D4P0N104, **no substitutions.**

B. VFD FEATURES

1. The VFD shall be a compact design and must include a built-in Human Interface Module (HIM).
2. The VFD shall operate correctly with an input voltage between 380VAC to 480VAC, 47 HZ to 63 Hz.
3. The VFD output shall be rated to supply 3–phase motor power at 4.0 amps (2 HP, 1.5 kW).

C. PROPER INSTALLATION AND GROUNDING

1. The Contractor shall provide a fused input power supply to the VFD. Use Class CC time delay fuses rated for 600 VAC. The fuses shall be sized in accordance with the NEC and the manufacturer's recommendations.
2. The drive Safety Ground must be connected to system ground.
3. Ground impedance must conform to the requirements of national and local industrial safety regulations and/or electrical codes.

4. The motor cable shall be Type 1 shielded VFD rated cable with 4 XLPE tinned conductors (3 phases + dedicated ground wire) inside a 100 % overall shield with drain wire. The cable shall be rated to 2000V, 90 deg C.

D. DRIVE PARAMETERS

1. The Contractor shall properly configure the VFD for use in this application. Required motor nameplate information shall be set in the drive parameters.
2. The Contractor shall configure the drive to provide 3 second acceleration and deceleration profiles.
3. The drive shall be configured to provide two speeds of operation. Speed selection shall be made by changing the state of an assigned drive digital input.
4. The Contractor shall configure the drive's relay output to signal that the motor is moving in either direction at a non-zero speed. This output will be used to control the motor brake.
5. Drive parameters shall be electronically recorded. Final drive settings at completion and delivery of the system shall be supplied to the City's engineer.

E. DRIVE DIRECTION CONTROL

1. The drive direction control is dictated by energizing one of two inputs on the VFD Pin 02 (start/ run forward) and Pin 03 (run reverse).
2. Pins 02 and 03 will receive 24V DC from the VFD's Pin 11 through external relays.
3. In order to prevent Pin 02 and Pin 03 from being energized at the same time, operating the VFD in forward and reverse, two external relays will be electrically interlocked.
4. Travel Forward (TRVF) External Relay
   a. To operate the VFD in the forward direction a normally open contact from the TRVF relay will be placed between the VFD's pin 11 and the VFD's pin 02.
   b. Electrically interlock the VFD's pin 03 by wiring a normally closed contact between the radio control system/pendant and the Travel Reverse (TRVR) relay coil.
5. Travel Reverse (TRVF) External Relay
   a. To operate the VFD in the reverse direction a normally open contact from the TRVR relay will be placed between the VFD's pin 11 and the VFD's pin 03.
   b. Electrically interlock the VFD's pin 02 by wiring a normally closed contact between the radio control system/pendant and the Travel Forward (TRVF) relay coil.

F. DRIVE SPEED CONTROL

1. The VFD drive speed shall be programmed to 60Hz by default, High-Speed mode.
2. The VFD drive speed will be 15Hz, Low Speed mode, when the VFD's digital input 05 is energized.
3. Use two external relays in sealing relay contact scheme to set the VFD into Low-Speed mode.
4. High Speed (HSPD) External Relay.
   a. Place a normally closed contact from the HSPD relay to break the contact seal between the radio control system/pendant and the Low Speed (LSPD) relay coil.

5. Low Speed (LSPD) External Relay

    a. Seal in the LSPD relay contact by placing a normally open contact between the 120VAC bus and the normally closed contact from the HSPD relay.

2.6 MOTOR STARTER

The hoist motor is controlled by an across-the-line motor starter.

1. The motor starter style shall be a 3-phase, reversing, open combination starter, Allen Bradley Bulletin 107S series combination starter or approved equal.
2. Contactor coils shall operate on 120 VAC, 60 Hz.
3. Starter contacts shall be rated for 600 VAC, 9 A minimum.
4. The combination motor starter shall include a 3-pole motor protection circuit breaker with a Class 10 Trip Curve. The circuit breaker shall be equipped with an adjustable trip range. The circuit breaker shall be properly sized to supply the 3 HP hoist motor.
5. The starter shall have 2 NO and 2 NC auxiliary contacts, one set per contactor.
6. The combination starter shall include an electronic overload relay with adjustable trip range properly sized to supply the 3 HP hoist motor. The electronic overload relay shall be equipped with a tripped indicator and a manual trip reset button.
7. The Contractor shall properly configure the motor protection circuit breaker, auxiliary contacts, and overload relay for use in this application. Required motor nameplate information shall be considered when designing for this application.
8. Overload relay shall be a Allen Bradley Bulletin 193 E1 Plus series overload relay or approved equal

2.7 BRAKE RECTIFIERS

The braking system components are fully integrated on the motor/gearbox combination by Nord, the motor manufacturer, prior to shipment based on customer ordered preferences.

The motor brakes are mechanically set by springs and electrically released by energizing a DC operated coil. Each motor is equipped with a brake rectifier to convert the available AC voltage to DC to operate the brake coil.

A. HOIST MOTOR BRAKE

1. As the hoist motor is powered by an across-the-line motor starter (at 60 Hz), the input power for this brake rectifier is taken directly from taps in the motor connection box. When motor power is applied, the brake is released.
2. Contacts from brake control relay BR2 will close when the hoist motor is running. These contacts connect terminals 3 and 4 on the brake rectifier, causing the rectifier to transition from full wave operation to half wave operation.
3. Before the BR2 contacts close, the brake rectifier will output 205VDC to overcome the force applied the mechanical springs. Once the BR2 contacts close, the rectifier will then lower its output to 105VDC to allow quicker setting of the brake upon de-energizing the brake. The quick brake set is an important requirement in hoisting operations. It eliminates load drop or droop when the motor is switched off.

4. The Contractor shall properly wire the brake rectifier in accordance with the Nord braking scheme GP103-40. This scheme is depicted on the City Drawing MW1010-1, which is included in Appendix A – Drawings.

B. TRAVEL MOTOR BRAKE

1. As the travel motor is powered by a VFD, the motor power can vary in frequency anywhere between 0 Hz to 60 Hz. The brake rectifier is designed to operate only at 60 Hz. For this reason, the input power for this brake rectifier is taken, not from the motor, but directly from the incoming 480 VAC line.
2. Contacts from brake control relay BR1 will close when the travel motor is running. These closed contacts send 480 VAC at line frequency (60 Hz) to the brake rectifier. BR1 is controlled by an output from the VFD. When the VFD reports a non-zero speed, BR1 is energized to release the travel motor brake.
3. A jumper wire has been inserted across terminals 3 and 4 on the brake rectifier. This causes the rectifier to always operate in half wave mode and output 205 VDC to the brake coil when energized.
4. The Contractor shall properly wire the brake rectifier in accordance with the Nord braking scheme VBR101. This scheme is depicted on the City Drawing MW1010-1, which is included in Appendix A – Drawings.

2.8 CORDED PENDANT

The corded pendant is intended for use only as a backup to the radio control system, should the radio system fail. In use, the corded pendant is tethered to the Mayfield Draft Tube Gate Hoist by a 20 foot long umbilical cable.

A modular electrical plug is provided as a quick disconnecting means for the umbilical cable. The corded pendant is typically disconnected and stored in a safe place within the powerhouse.

The corded pendant provides similar features to those provided by the radio system.

1. The yellow corded pendant enclosure shall be double insulated and made from polypropylene material. The enclosure shall provide an IP65 rating.
2. The corded pendant shall have 6 momentary normally open push buttons.
3. The corded pendant shall also have 1 push-to-stop twist-to-release emergency stop button.
4. The push buttons shall be 22mm diameter with screw clamp terminals. Operational pairs of buttons shall be mechanically interlocked.
5. The corded pendant shall be equipped with a stepped, rubber sleeve cable entry strain relief boot.
6. The corded pendant shall be Schneider Electric P/N XACA67131 or approved equal.
7. The Contractor shall equip the corded pendant with a 20 foot long 14 AWG-10 conductor Type SOOW cable.
8. The Contractor shall install a quick disconnect modular plug on the end of the umbilical cable. This plug shall mate with the connector base mounted on the electrical panel.

9. The Contractor shall provide a protective cover for the connector base to provide weather protection when the corded pendant is not connected.
10. The modular plug and base shall each have a 10 circuit insert. The current rating for each circuit of the insert shall be 16 A and 250 V. The pins of the inserts shall have screw terminals with clamps for securing the wires. Use of crimp on terminals is not allowed.
11. Use Harting Industrial Connectors Han series EMC/B hoods, housings and inserts or approved equal.

2.9 WARNING LIGHTS & HORNS

A. DESCRIPTION

The warning horn sounds to alert personnel in the area that the 480 VAC motor power is being applied to the Stoplog Host. The red motor power-on light is continuously illuminated any time the MLC is energized and 480 VAC motor power is available at the Draft Tube Gate Hoist.

Anytime the travel drive brake is release and motion has been initiated, a warning horn will sound to alert personnel in the area that the Draft Tube Gate Hoist is traveling. In addition to the warning horn, a high intensity amber strobe light with flash. This ensures that personnel will be warned even if the environment is particularly noisy, such as during a spill event at the Mayfield Powerhouse.

The horn and lights enclosure is a NEMA 4X box. The box is the mounting panel for the warning horn, power on light, and strobe light and integrated horn. Place the box as shown on drawing MK205 for item #20 horn and lights electrical box assembly.

B. WARNING HORN

1. The warning horn shall operate as described above and shall meet the following requirements:
   a. Enclosure shall be NEMA 4X rated.
   b. The sound level will be adjustable between 78 to 103dB at 10ft.
   c. The unit must utilize a 120VAC 60Hz source.
   d. Mount the warning horn on the door of the horn and lights enclosure.
   e. Use Edwards Signaling, warning horn P/N: 876-N5 or approved equal.

C. POWER ON LIGHT

1. The Power On Light shall operate as described above and shall meet the following requirements:
   a. The power on enclosure shall be NEMA 4X rated.
   b. The light will use a halogen light source and have a red lens.
   c. The unit must utilize a 120VAC 60Hz source.
   d. Mount the power on light on the top of the horn and lights enclosure.
   e. Use Edwards Signaling, beacon steady on halogen 105 series P/N:105SINHR-N5 or approved equal.

D. STROBE LIGHT AND INTEGRATED HORN

1. The Strobe Light and Horn shall operate as described above and shall meet the following requirements:
   a. The warning horn enclosure shall be outdoor rated and mounted with the lens facing upwards, no exceptions.
   b. The light will strobe a xenon light source and have an amber lens.
   c. The sound level of the horn will be 95db at 1 meter and 85dB at 10ft.
   d. The unit must utilize a 120VAC 60Hz source.
   e. Mount the strobe light and integrated horn on the top of the horn and lights enclosure.
   f. Use Edwards Signaling, beacon with horn flashing xenon 95 series P/N: 95A-N5 or approved equal.

2.10 CONDUIT

A. RIGID STEEL CONDUIT

1. Rigid steel conduit shall be heavy wall, hot-dip galvanized, conforming to ANSI C80.1, and manufactured in accordance with UL 6.

B. LIQUID TIGHT FLEXIBLE METAL CONDUIT

1. Liquid tight flexible metal conduit shall be hot dip galvanized steel, covered with a moisture proof polyvinyl chloride jacket, and UL labelled.

C. CONDUIT FITTINGS AND BOXES

1. Galvanized or cadmium plated, threaded, malleable iron boxes and fittings shall be manufactured by Crouse Hinds, Appleton, or O Z Gedney.
2. Rigid PVC device boxes and fittings shall be manufactured by Carlon or Cantex.
3. Sheet steel device boxes shall be manufactured by Appleton, Raco, or Steel City.
4. Hub arrangements on threaded fittings shall be the most appropriate for the conduit arrangement to avoid unnecessary bends and fittings.

2.11 WIRE & CABLES

A. SOOW CABLE

1. SOOW cable shall be rated for 600V, 90 deg C.
2. SOOW cable shall be UL approved.
3. Conductor material shall be bare annealed copper; 26/30 stranded in accordance with ASTM B8
4. Individual conductor insulation shall be Ethylene Propylene Diene Monomer rubber (EDPM).
5. Jacket material shall be Chlorinated Polyethylene (CPE).
6. Manufacturers shall be Okonite, Southwire, General Cable, Allied Cable, or approved equal.

B. VFD CABLE

1. VFD motor cable shall be Type 1 shielded VFD rated cable with 4 XLPE insulated tinned copper conductors (3 phases + dedicated ground wire) inside a 100 % overall shield with drain wire.
2. VFD cable shall be rated to 2000V, 90 deg C.
3. VFD cable shall be UL approved.
4. Manufacturers shall be Okonite, Southwire, General Cable, Allied Cable, or approved equal.

2.12 PANEL HEATER

The panel heater is mounted on the inside of the electrical enclosure. This heater ensures that the interior of the electrical enclosure remains dry and free of any visible condensation or moisture.

1. The panel heater shall maintain the temperature of the interior of the electrical enclosure at a minimum of 50 degrees Fahrenheit (dew point) when the outside air temperatures are as low as 25 degrees Fahrenheit.
2. The Contractor shall be responsible to calculate the required panel heater output wattage and size the heater accordingly to maintain the conditions specified in item 1 of this section.
3. The panel heater shall operate on a power source of 120 VAC, 60 Hz.
4. The panel heater shall be equipped with a built-in adjustable thermostat. The thermostat shall be adjustable through a temperature range from 0 degrees to 100 degrees Fahrenheit.
5. The panel heater shall be equipped with a ball bearing fan to circulate the air within the enclosure.
6. Use Hoffman DAH series panel heaters or approved equal.

2.13 MODULAR CONNECTORS

A modular electrical plug is provided as a quick disconnecting means for the corded pendant umbilical cable.

1. The Contractor shall install a quick disconnect modular plug on the end of the corded pendant umbilical cable. This plug shall mate with the connector base mounted on the electrical panel.
2. The Contractor shall provide a latching protective cover for the connector base to provide weather protection when the corded pendant is not connected.
3. The modular plug and base shall each have a 10 circuit insert. The current rating for each circuit of the insert shall be 16 A and 250 V. The pins of the inserts shall have screw terminals with clamps for securing the wires. Use of crimp on terminals is not allowed.
4. The contractor shall install cable gland at the connector hood. The gland shall have rubber seal to grip the cable and provide an IP69 rating.
5. Use Harting Industrial Connectors Han series EMC/B hoods, housings and inserts or approved equal.

2.14 ROTARY CAM SWITCHES

The hoist rotary cam switches limit the number of hoist drum rotations on the Mayfield Draft Tube Gate Hoist system.

If the drum turns too many times in the up direction, the lifting device can contact the drum and damage the hoist cables. If the drum turns too many times in the down direction, the hoist cable can begin winding on the wrong side of the hoist drum causing the lifting device to begin going back up, even though the drum is rotating in the down direction.

1. The rotary cam switch assembly shall provide 4 DPDT snap-action switches. Each switch cam shall be independently adjustable.
2. The switches shall be rated for 15 amps for operation at 600 V.
3. The rotary cam switch assembly shall be housed in an aluminum enclosure with a NEMA 4 rating.
4. The rotary cam switch assembly shall provide dual keyed input shafts for either left-hand or right-hand connection.
5. The rotary cam switch assembly shall have a 20.5 to 1 gear ratio.
6. Use a Hubbell Gleason rotary cam switch, part number 55-4E-4SP-WB-20, **no exceptions.**

PART 3 EXECUTION

3.1 PANEL FABRICATION

A. COMPONENT SPACING

1. The panel components shall be placed within the panel to ensure adequate room for proper air circulation and cooling per the component manufacturer's recommendations.
2. Separation between terminal blocks, components and plastic wireways shall provide sufficient clearance to view wire labels, and to allow for system maintenance (terminating and disconnecting wire connections).
3. All components shall be mounted in accordance with manufacturer's recommendations using all designated mounting holes and locations.
4. Contractor shall use type and number of fasteners as recommended by the component manufacturer.

B. GROUNDING

1. The Contractor shall provide a ground bus bar inside the electrical cabinet.
2. The incoming AC power feeder circuit shall be grounded at this bus bar.
3. One leg of the secondary side of the transformer (the 120 VAC control power) shall also be grounded to the bus bar to form a neutral leg.
4. All externally mounted components (motors, lights, horns, switches, transformers, etc) shall have a dedicated ground wire pulled from the ground bus bar to the device.
5. If internally mounted devices are equipped with a grounding connection terminal (PE), a separate grounding conductor shall be pulled from the ground bus bar to the device (Powerflex Drive, cabinet heater, etc).

C. CONFIGURATION (VFD)

1. The Contractor shall properly configure the VFD for use in this application. Required motor nameplate information shall be set in the drive parameters.
2. The Contractor shall configure the drive to provide 3 second acceleration and deceleration profiles
3. The drive shall be configured to provide two speeds of operation. Speed selection shall be made by changing the state of a drive digital input.
4. The Contractor shall configure the drive's relay output to signal that the motor is moving in either direction at a non-zero speed. This output will be used to control the motor brake.
5. Drive parameters shall be electronically recorded. Final drive settings at completion and delivery of the system shall be supplied to the City's engineer and included in the O&M manual.

D. WIRE GROUPS

1. All wiring shall be grouped or cabled and firmly supported inside the panel.
2. Wiring shall be bundled in groups and bound with nylon cable ties or routed in Panduit or similar nonmetallic slotted ducts.
3. Wire ducts (Panduit) shall be readily accessible within the panel, with removable covers, and with space equal to at least 40 percent of the depth of the duct remaining available for future use after completion of installation and field wiring.
4. Sufficient space shall be provided between cable groups or ducts and terminal blocks for easy installation or removal of cables.

3.2 CONDUIT ROUTING AND INSTALLATION

1. Design the conduit runs to allow disassembly at the shipping break down points and re-assembly in the field. The shipping breakdown information is shown on Drawing MK224.
2. All conduits shall enter outdoor exposed enclosures from the bottom; top and side entry is not allowed.
3. Exposed conduit shall be installed either parallel or perpendicular to structural members and surfaces.
4. Two (2) or more conduits in the same general routing shall be parallel, with symmetrical bends.
5. All conduits that enter enclosures shall be terminated with acceptable fittings that will not affect the NEMA rating of the enclosure.
6. Use rigid steel conduit for all external conduit runs from the electrical cabinet to field devices.
7. Terminations and connections of rigid steel and intermediate metal conduit shall be taper threaded.
8. Conduits shall be reamed free of burrs and shall be terminated with conduit bushings

9. Once the rigid steel conduit run is within 24 inches from a field device or motor, transition from rigid steel conduit to liquid tight flexible metal conduit (Seal-Tite) conduit to allow flexibility to make/unmake connections to cable reels, motors, switches, and junction boxes.
10. After cable or wiring has been installed and connected, conduit shall be blown out to remove all water then ends shall be sealed by forcing non-hardening sealing compound into the conduits to a depth at least equal to the conduit diameter.
11. Use cast iron, zinc plated, conduit bodies Type LB, LR, and LL, to facilitate the breakdown of conduit runs for shipping or to allow intricate conduit runs to conform to the odd angles and shapes of the system frame geometry.
12. Conduit runs shall be secured to the system frame in accordance with the NEC requirements using one hole, zinc plated iron clamps with an iron clamp back.
13. Use zinc plated fasteners to secure the conduit.
14. Use grounding Myers hubs on all conduit connections at electrical panels and junction boxes. Hub shall have insulated throat with bonding lock nut or ground screw and be manufactured by Appleton, O-Z Gedney, or Crouse-Hinds.

3.3 FACTORY ACCEPTANCE TESTING

1. After completion of construction, installation and wiring of the Mayfield Draft Tube Gate Hoist control system, the Contractor must organize and schedule a Factory Acceptance Test (FAT) visit. This shop visit will consist of a visual inspection and operational tests of the complete and fully assembled system covered under this Specification.
2. The FAT will confirm proper operation of the system. The FAT will confirm and verify the following items before the system can be shipped. Any issues noted during the FAT will be corrected by the Contractor prior to shipment. The City will determine the need to repeat any portion of the FAT after corrections have been made.
    a. A check to ensure components are placed according to the specification drawings, the Contractors layout drawings and in accordance with the component manufacturers recommendations.
    b. A thorough wire check to ensure the system is wired according to the Contractor provided wiring diagrams.
    c. A power-up of the system. The panel will be powered up with circuit breakers and fuses open. With power supplied to the mains, the circuit breakers and fuses will be closed, one-by-one, to confirm there are no wiring errors or short circuits. Measurements will be taken with a voltmeter to confirm proper voltages are available.
    d. These tests will be performed while the system is operated using the radio control system.

i. *The ability to close and open the Main Line Contactor (MLC) from the handheld transmitter will be verified.*
ii. *When the MLC is energized, confirm that the warning horn sounds and that the red warning light is illuminated.*
iii. *Travel drive operation will be verified in both directions.*
iv. *Travel drive acceleration and deceleration profiles will be confirmed.*
v. *When the travel drive is in motion, confirm that the amber strobe light is flashing.*
vi. *When the travel drive is in motion, confirm that the travel warning horn emits a pulsing sound.*
vii. *The hoist drive motion in the upward direction will be verified. Confirm the hoist moves upward until the up travel limit switch is engaged and then stops moving upward.*
viii. *The hoist drive motion in the downward direction will be verified. Confirm the hoist moves downward until the down travel limit switch is engaged and then stops moving downward.*

e. <u>These tests will be performed while the system is operated using the corded pendant.</u>

i. *The ability to close and open the Main Line Contactor (MLC) from the pendant will be verified.*
ii. *When the MLC is energized, confirm that the red warning light is illuminated.*
iii. *Travel drive operation will be verified in both directions.*
iv. *Travel drive acceleration and deceleration profiles will be confirmed.*
v. *When the travel drive is in motion, confirm that the amber strobe light is flashing.*
vi. *When the travel drive is in motion, confirm that the travel warning horn emits a pulsing sound.*
vii. *The hoist drive motion in the upward direction will be verified. Confirm the hoist moves upward until the up travel limit switch is engaged and then stops moving upward.*
viii. *The hoist drive motion in the downward direction will be verified. Confirm the hoist moves downward until the down travel limit switch is engaged and then stops moving downward.*

3.4 SHIPPING & DELIVERY

1. After completion and approval of a Factory Acceptance Test (FAT) the Contractor must disassemble and package the hoist as shown in “Disassembled for Shipping” drawings (Drawing MK224).

   a. The contractor will be responsible for obtaining all shipping material/expendables.

   b. Cables exiting the Main Electrical Panel through flex seal, conduit, or bare will be disconnected on both ends, and packaged individually in a labeled container or bag.

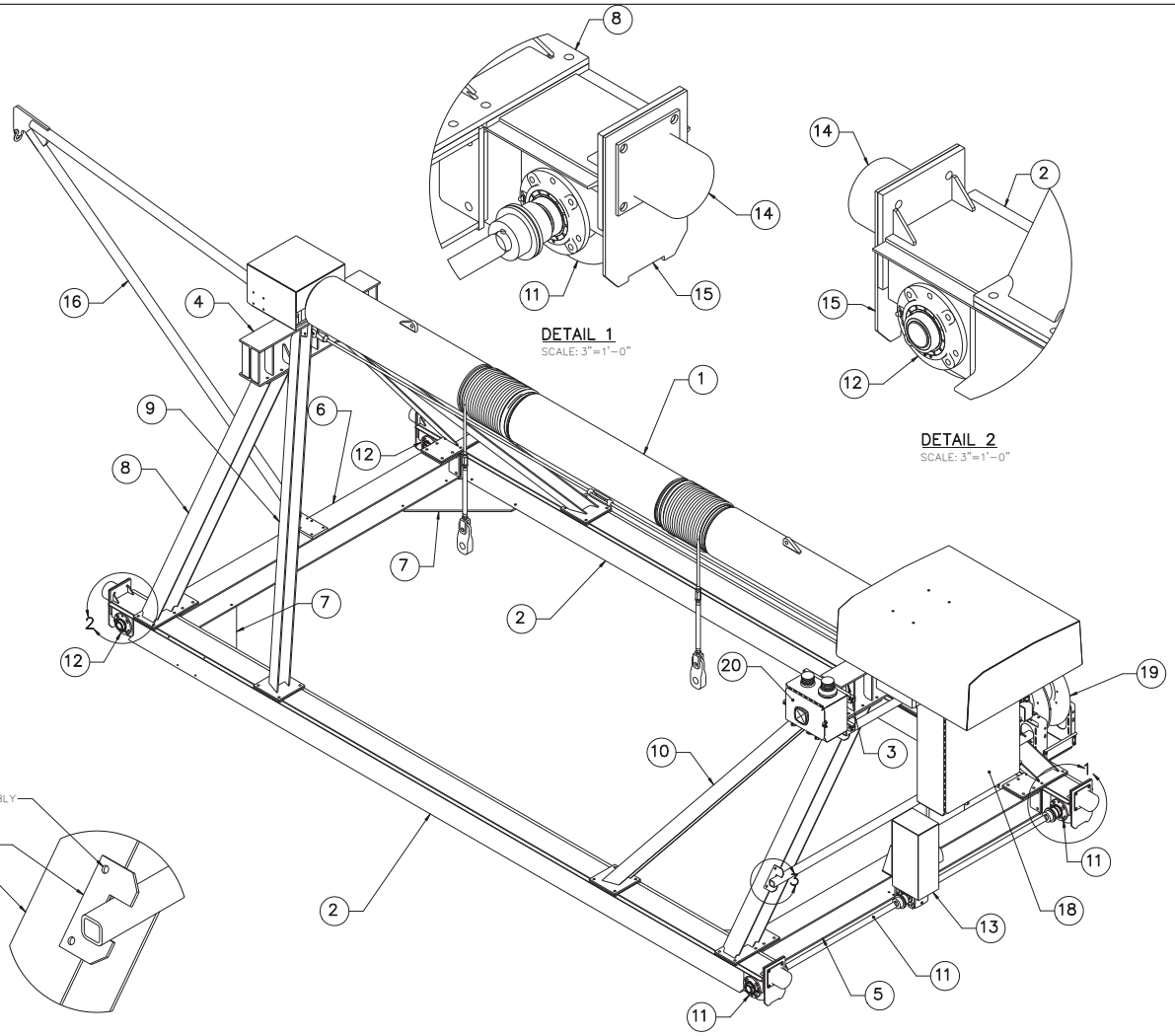
   c. All conduit, flex seal, and hardware removed and unfastened to achieve the “Disassembled for Shipping” drawings shall be packaged in a labeled container or bag.

d. Conduits shall be capped during shipping to prevent entrance of dirt, trash, and water.

e. The cable reel and cable reel mount shall be removed from the gantry hoist and packaged in a labeled container or bag.

END OF SECTION

APPENDIX A – DRAWINGS & SAMPLE DOCUMENTS



ITEM NO.	QTY.	TPU Part No.	PART NO.	MFR	DESCRIPTION
20	1	MK223-2			HORN AND LIGHTS ELECTRICAL BOX ASSEMBLY
19	1	MK222-1			CABLE REEL ASSEMBLY
18	1	MK223-1			ELECTRICAL CABINET SUPPORT ASSEMBLY
17	1	MK219-2			THREADED ROD ASSEMBLY
16	1	MK220-1			JIB ASSEMBLY
15	4	MK219-1			RAIL SWEEP
14	4		KWR-5.0	KASTALON	BUMPER
13	1	MK218-1			TRAVEL DRIVE MOTOR COVER
12	2	MK217-2			GANTRY IDLER WHEEL ASSEMBLY
11	1	MK216-1			TRAVEL DRIVE ASSEMBLY
10	2	MK215-4			BRACE, LEFT HAND
9	2	MK215-3			BRACE, RIGHT HAND
8	4	MK215-2			LEG
7	4	MK215-1			GANTRY FRAME GUSSET PLATE
6	1	MK214-2			END TIE - IDLER END
5	1	MK214-1			END TIE - DRIVING END
4	1	MK213-2			TOP CHORD - IDLER END
3	1	MK213-1			TOP CHORD - DRIVER END
2	2	MK210			GANTRY TRUCK
1	1	MK206			HOIST ASSEMBLY

DRAWING INDEX

Drawing Number	Title
MK205-1	COVER SHEET & DRAWING INDEX
MK205-2	PLAN, ELEVATION & DETAILS
MK206-1	HOIST ASSEMBLY
MK206-2	HOIST REDUCER
MK207-1	DRUM WELDMENT & MACHINING
MK207-2	DRUM WELDMENT & MACHINING
MK208	DRUM ASSEMBLY PARTS
MK209	DRUM ASSEMBLY PARTS
MK210	GANTRY TRUCK WELDMENT
MK211	TRUCK WELDMENT DETAIL ITEMS
MK212	TRUCK MACHINING
MK213	GANTRY TOP CHORDS
MK214	END TIES
MK215	GUSSET PLATE, LEG & BRACE
MK216-1	TRAVEL DRIVE ASSEMBLY
MK216-2	TRAVEL DRIVE GEARMOTOR
MK217	WHEEL ASSEMBLY & SHAFT
MK218	TRAVEL DRIVE MOTOR COVER
MK219	RAIL SWEEP & THREADED ROD ASS'Y
MK220	JIB ASSEMBLY & PARTS
MK221	JIB WELDMENT
MK222	CABLE REEL ASSEMBLY AND PARTS
MK223	ELECTRICAL CABINET ASSEMBLY
MK224	SHIPPING COMPONENTS
MW1010-1	480 VAC POWER SCHEMATIC
MW1010-2	120VAC CONTROL SCHEMATIC

REFERENCE DRAWING:

MK224 SHIPPING COMPONENTS

NOTES:

1. USE ASTM A325 GALVANIZED FOR 1/2 DIAMETER FASTENERS AND LARGER, AND A307 FOR SMALLER FASTENERS.
2. FULLY ASSEMBLE HOIST BEFORE GALVANIZING, AND CONTACT THE CITY FOR ENGINEERING INSPECTION PRIOR TO DISASSEMBLY AND GALVANIZING.
3. FINAL ASSEMBLE THREADED FASTENERS WITH SILVER GRADE ANTI-SEIZE LUBRICANT.

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

REV. NO. 0

COWLITZ HYDROELECTRIC PROJECT

MAYFIELD POWERHOUSE
DRAFT TUBE GATE HOIST
COVER SHEET & DRAWING INDEX

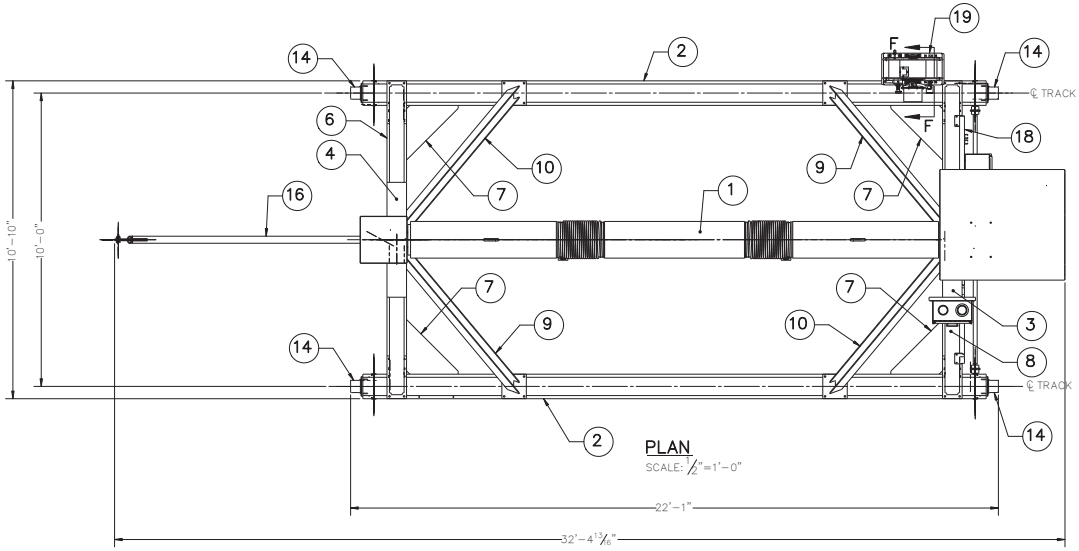
REVIEWED	DRAWN	STAMPED
	KAJ	SJB
APPROVED	12/29/2021 DATE	1 1/2"=1'-0" SCALE
Nathan L. Manning		DRAWING NO. MK205-1

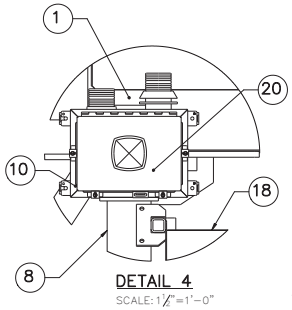
Belvin, Steve

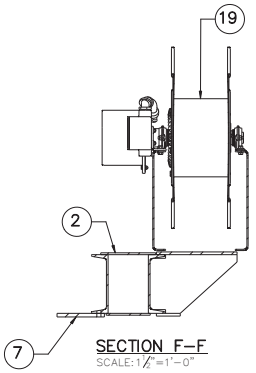
Digitally signed by Nathan L. Manning
DN: cn=Nathan L. Manning, o=Tacoma Power, ou=Engineering, email=nmanning@tacomapower.com, c=US
Reason: I am approving this document
Date: 2022.04.22 10:58:28-07'00'

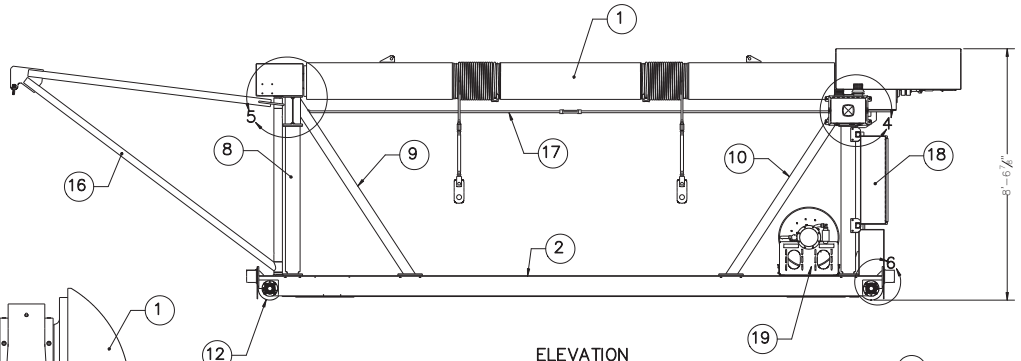
MK205-Gantry Frame Ass'y.SLDDRW

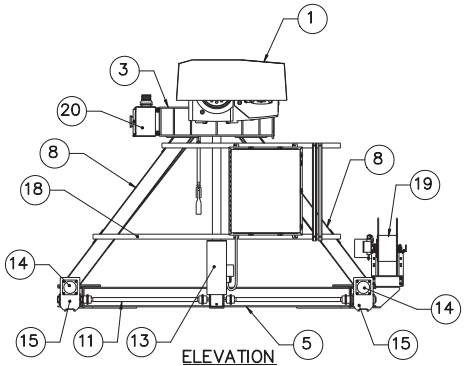
4/21/2022 11:33 AM

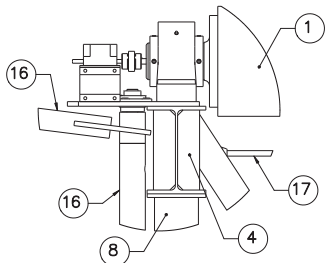




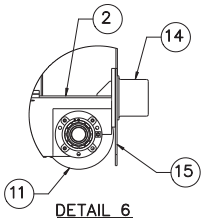








NOTE: LIMIT SWITCH COVER NOT SHOW FOR CLARITY.



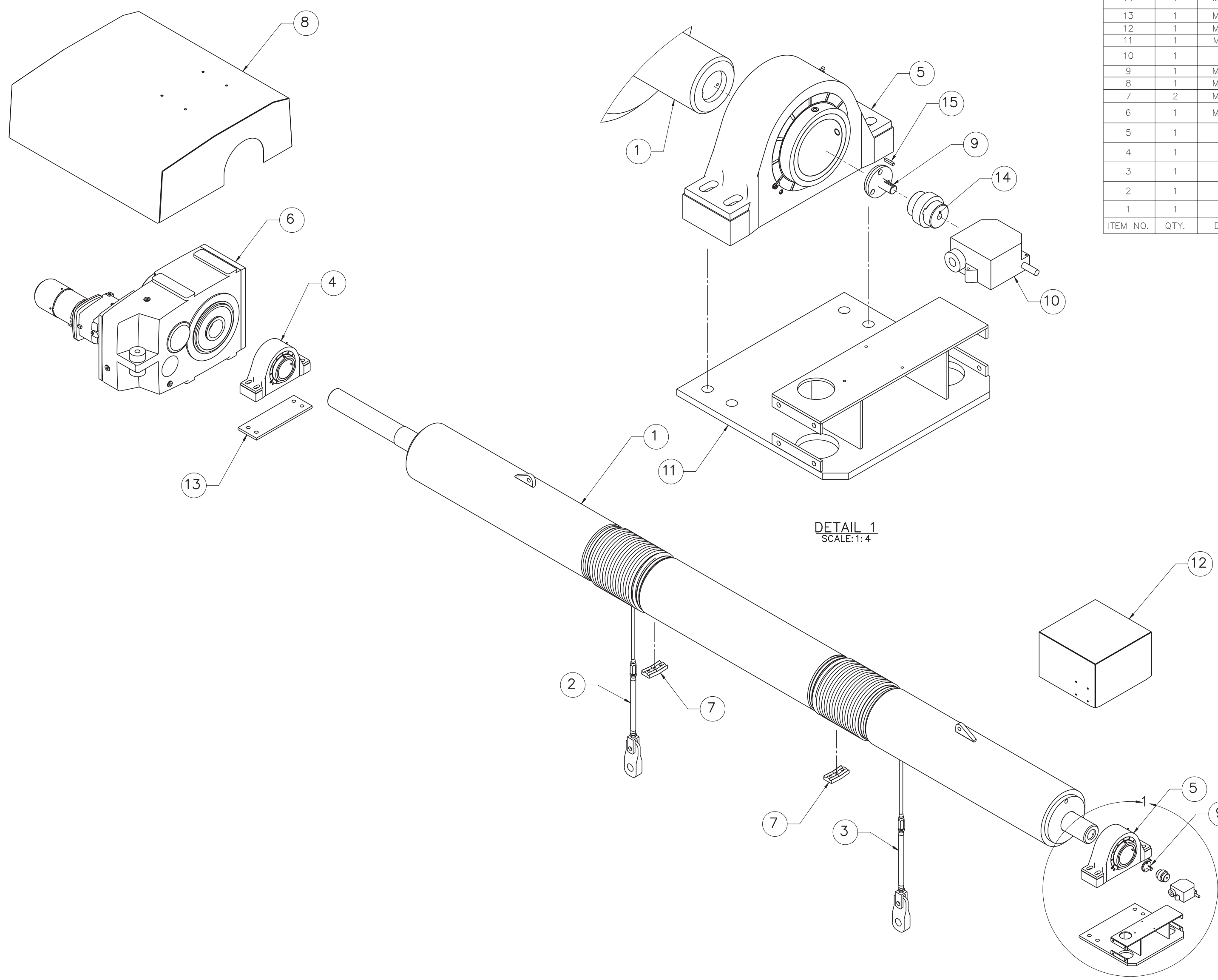
REFERENCE DRAWING

MK205-1 COVER SHEET & DRAWING INDEX

NOTE:

SEE DRAWING MK205-1 FOR GENERAL NOTES

MACHINING TOLERANCES UNLESS OTHERWISE NOTED: FRACTIONAL ±1/64, DECIMAL ±.010, ANGLE ±1°-0"	CITY OF TACOMA DEPARTMENT OF PUBLIC UTILITIES LIGHT DIVISION
REV. NO. 0	COWLITZ HYDROELECTRIC PROJECT MAYFIELD POWERHOUSE DRAFT TUBE GATE HOIST PLAN, ELEVATION & DETAILS
Belvin, Steve	REVIEWED: Nathan L. Manning; DRAWN: KAJ; STAMPED: SJB; DATE: 12/29/2021; SCALE: 1 1/2"=1'-0"; APPROVED: Nathan L. Manning; DRAWING NO: MK205-2



ITEM NO.	QTY.	DRAWING	DESCRIPTION	MFR PART NO.	MFR
15	1	MK208-5	KEY, STAINLESS	98530A177SS	McMASTER-CARR
14	1	MK208-8	JAW IN SHEAR COUPLING		LOVEJOY
13	1	MK208-7	BEARING BASE PL		
12	1	MK209-2	LIMIT SWITCH COVER		
11	1	MK209-1	LIMIT SWITCH BASE		
10	1		LIMIT SWITCH	55-4E-4SP-WB-20	HUBBELL
9	1	MK208-4	STUB SHAFT EXTENSION		
8	1	MK208-3	DRIP COVER		
7	2	MK208-2	ROPE CLAMP		
6	1	MK206-2	GEAR MOTOR	SEE DRAWING	NORD
5	1		PILLOW BLOCK BEARING EXPANSION UNIT	PE-B22580FH	REXNORD
4	1		PILLOW BLOCK BEARING FIXED UNIT	P-B22580FH	REXNORD
3	1	MK208	TURNBUCKLE ASSEMBLY - LEFT		
2	1	MK208	TURNBUCKLE ASSEMBLY - RIGHT		
1	1	MK207	DRUM		

NOTES:

1. REEVE ROPES SUCH THAT THERE IS ONE EMPTY GROOVE WHEN HOIST IS FULLY RAISED, FOR ROPE STRETCH.
2. LIMIT SWITCH COMES SUPPLIED WITH A NO. 404 WOODRUFF KEY.

REFERENCE DRAWING

MK205-1 COVER SHEET & DRAWING INDEX

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

REV. NO. 0

STEVEN J. BELVIN
STATE OF WASHINGTON
27027
REGISTERED PROFESSIONAL ENGINEER

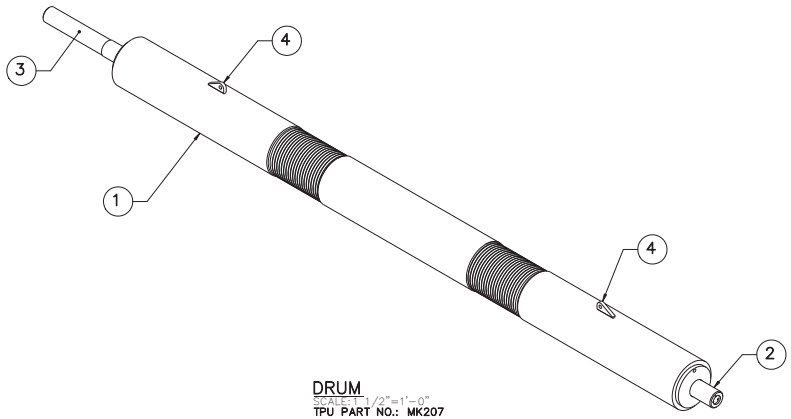
Belvin, Steve
Digitally signed by Belvin, Steve
DN:
E=SBelvin@cityoftacoma.org,
CN="Belvin, Steve", OU=GEN,
OU=Users, OU=POWER,
OU=TPU, OU=COT,
DC=Tacoma, DC=lcl
Date: 2022.04.21
15:32:23-07'00'

COWLITZ HYDROELECTRIC PROJECT
MAYFIELD POWERHOUSE
DRAFT TUBE GATE HOIST
HOIST ASSEMBLY

REVIEWED	DRAWN	STAMPED
	KAJ	SJB
	1/12/2022 (DATE)	AS SHOWN (SCALE)

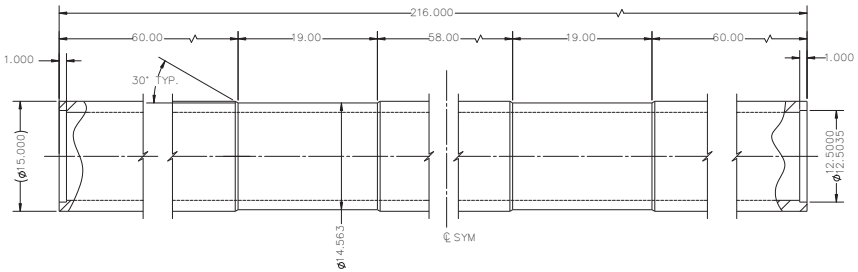
APPROVED
Nathan L. Manning
Digitally signed by Nathan L. Manning
DN: C=US,
E=nmanning@cityoftacoma.org,
CN=Nathan L. Manning
Reason: I am approving this document
Contact Info: 253-625-1015
Date: 2022.04.22 13:58:28-07'00'

DRAWING NO.
MK206-1

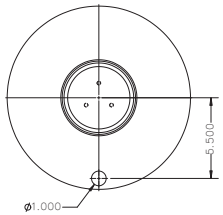


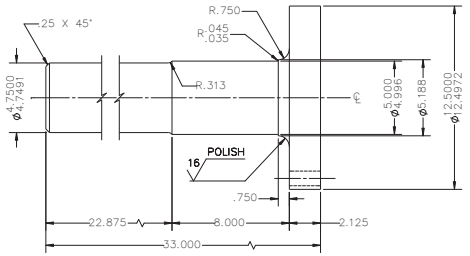
DRUM
SCALE: 1 1/2"=1'-0"
TPU PART NO.: MK207

ITEM NO.	QTY.	DESCRIPTION	MATERIAL	LENGTH
4	2	PL 1"	ASTM A572, GRADE 50	
3	1	RB ø13"	HR 8620	
2	1	RB ø13"	HR 8620	
1	1	ø15" X1.5 WALL PIPE	ASTM A53, GRADE 'B'	216

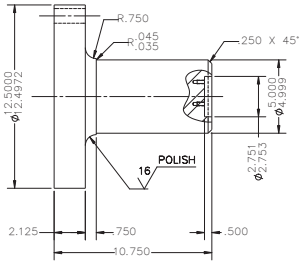


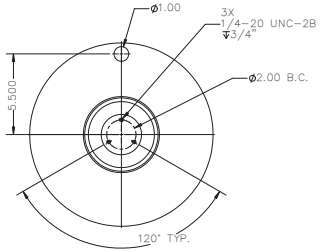
1 DETAIL ITEM
SCALE: 1 1/2"=1'-0"



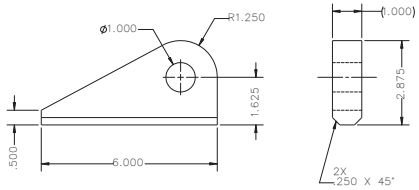


3 DETAIL ITEM
SCALE: 3"=1'-0"





2 DETAIL ITEM
SCALE: 3"=1'-0"



4 DETAIL ITEM
SCALE: HALF

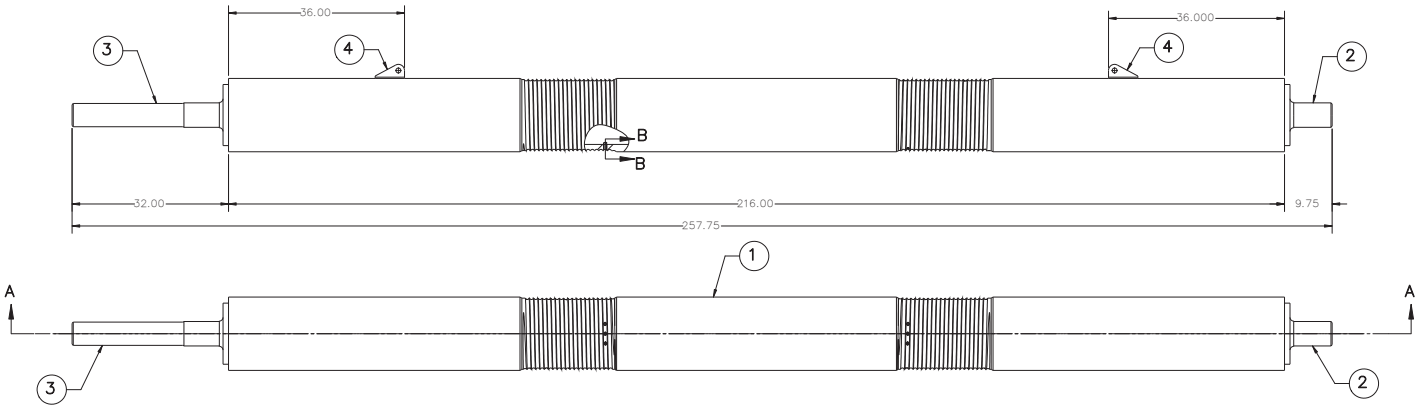
REFERENCE DRAWING

MK206-1 DRUM ASSEMBLY

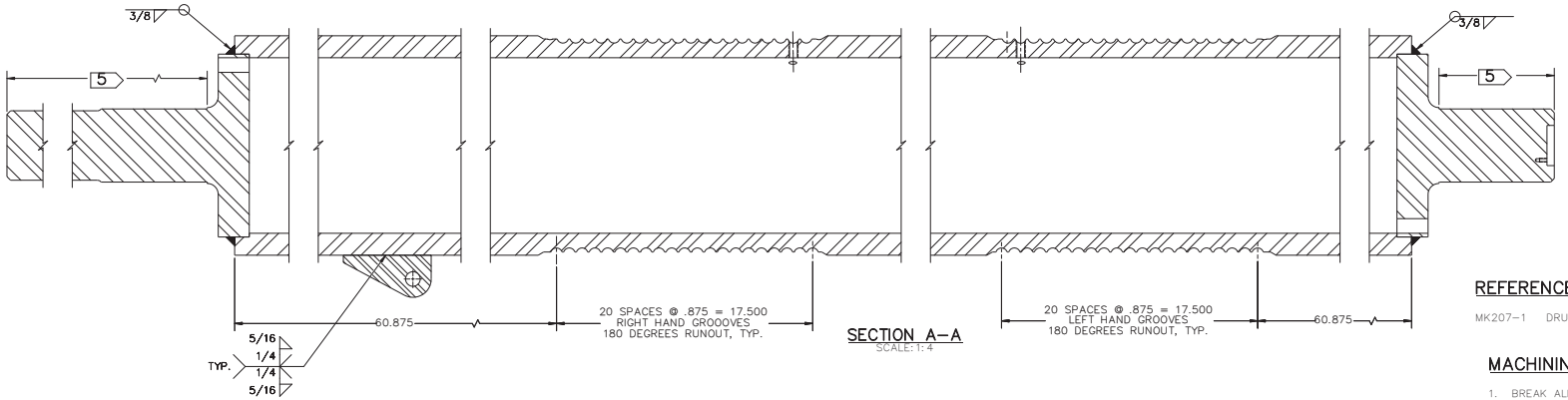
MACHINING NOTES:

1. BREAK ALL SHARP EDGES.
2. MAKE NO MATERIAL SUBSTITUTIONS WITHOUT APPROVAL OF THE ENGINEER.
3. FINISH $\frac{125}{}$ ALL OVER UNLESS NOTED OTHERWISE.

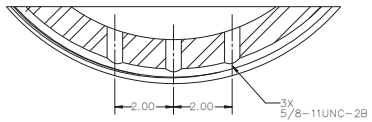
MACHINING TOLERANCES UNLESS OTHERWISE NOTED:	CITY OF TACOMA DEPARTMENT OF PUBLIC UTILITIES LIGHT DIVISION
FRACTIONAL ±1/64 DECIMAL ±.010 ANGLE ±1-0"	
REV. NO. 0	COWLITZ HYDROELECTRIC PROJECT MAYFIELD POWERHOUSE DRAFT TUBE GATE HOIST DRUM WELDMENT & MACHINING
Belvin, Steven	REVIEWED APPROVED Nathan L. Manning DRAWN KAJ STAMPED SJB DATE 12-29-2021 SCALE AS SHOWN DRAWING NO. MK207-1



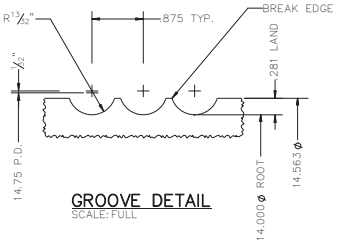
DRUM MACHINING
SCALE: 1" = 1'-0"



SECTION A–A
SCALE: 1:4



SECTION B–B
SCALE: HALF



GROOVE DETAIL
SCALE: FULL

NOTES:

1. DRILL AND TAP CENTER HOLE FIRST, BOLT ROPE CLAMP TO DRUM USING ROUND BAR MATCHING THE SIZE OF THE ROPE (Ø3/4") AS SPACERS. MATCH DRILL ROPE CLAMP AND DRUM WITH THREAD PILOT HOLE DIAMETER. SPOTFACE THE CLAMP, THEN SEPARATE & FINISH MACHINE BOTH PARTS SEPARATELY.
2. MAKE NO SUBSTITUTIONS OR MODICATIONS WITHOUT APPROVAL OF THE ENGINEER.
3. ALL WELDING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF AWS PUBLICATION D1.1, WELD METAL SHALL BE E70XX OR E71XX MATERIAL.
4. .100% VT ALL WELDS. MT WELDS TO ITEMS 2&3.
5. MASK OFF THIS AREA FOR GALVANIZING BY PAINTING WITH ZINC STOP-OFF BY ZYP COATINGS, OR EQUAL.
6. CHASE THREADS WITH TAP AFTER GALVANIZING.
7. FINISH TO BE HOT DIP GALVANIZE.
8. 180° GROOVE RUNOUT ALLOWANCE.

REFERENCE DRAWING

MK207-1 DRUM WELDMENT & MACHINING

MACHINING NOTES:

1. BREAK ALL SHARP EDGES.
2. MAKE NO MATERIAL SUBSTITUTIONS WITHOUT APPROVAL OF THE ENGINEER.
3. FINISH 125 ALL OVER UNLESS NOTED OTHERWISE.

MACHINING TOLERANCES UNLESS OTHERWISE NOTED:	
FRACTIONAL	±1/64
DECIMAL	±.010
ANGLE	±1-0"

REV. NO. 0

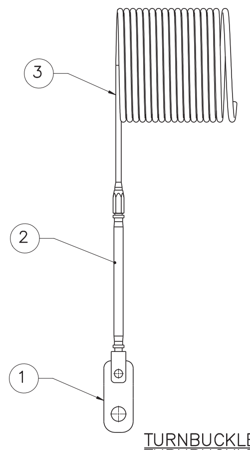
CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

COWLITZ HYDROELECTRIC PROJECT
MAYFIELD POWERHOUSE
DRAFT TUBE GATE HOIST
DRUM WELDMENT & MACHINING

REVIEWED	DRAWN	STAMPED
	KAJ	SJB
APPROVED	12-29-2021	AS SHOWN
Nathan L. Manning	DATE	SCALE

DRAWING NO.
MK207-2

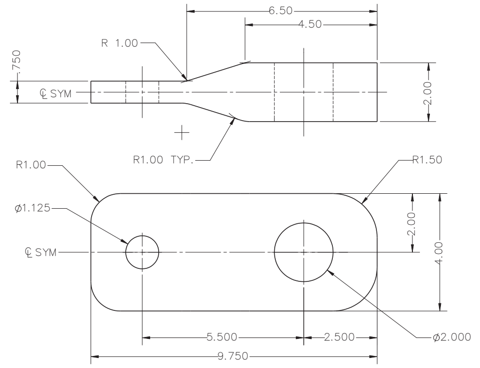
Belvin, Steve



TURNBUCKLE ASSEMBLY – RIGHT (SHOWN)
TURNBUCKLE ASSEMBLY – LEFT (OPP. HAND)

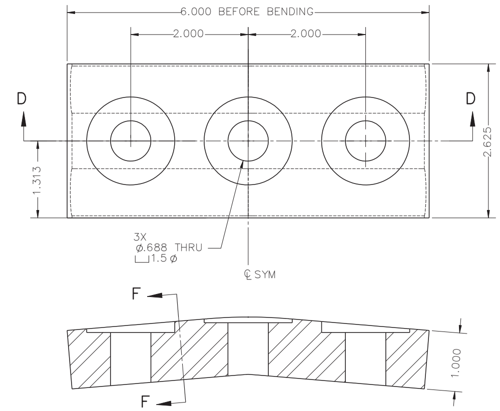
SCALE: 1:8
TPU PART NO.: MK208
NOTE: QUANTITIES ARE FOR ONE ASSEMBLY

ITEM NO.	QTY.	TPU PART NO.	DESCRIPTION	MFR	MFR PART NO.
3	1		3/4 DIA. X 72FT. 6 X 37 IWRC RRL TYPE 304 STAINLESS WIRE ROPE MIN. BREAKING STRENGTH 44,400 LBS.		
2	1		TURNBUCKLE	ELECTROLINE	IS-475
1	1	MK208-1	LIFT LUG		



1 LIFT LUG

SCALE: HALF
TPU PART NO.: MK208-1
MATERIAL: ASTM A576 GR 1040/45 HR



SECTION D–D

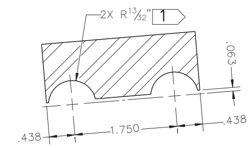
SCALE: 1:1

ROPE CLAMP

SCALE: FULL
TPU PART NO.: MK208-2
MATERIAL: ASTM A-36
FINISH: HOT DIP GALVANIZE

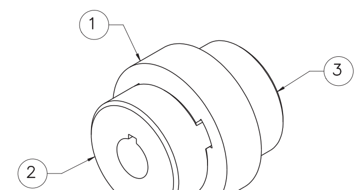
ROPE CLAMP NOTES:

1. MACHINE TWO GROOVES
2. CENTER PUNCH ALL THREE HOLES.
3. DRILL CENTER HOLE ONLY.
4. BEND CLAMP
5. SPOTFACE CENTER HOLE ONLY.
6. BOLT TO DRUM USING ROUND BARS AS SPACERS. (MATCHING THE ROPE DIAMETER) AND FINAL MACHINE TWO HOLES AND SPOTFACE IN CONJUNCTION WITH THE DRUM.
7. MACHINING ITEM FROM A LARGER PIECE WITHOUT BENDING IS AN OPTION. USE CONSTANT RADIUS EQUAL TO THE DRUM PITCH RADIUS. +1/32.



SECTION F–F

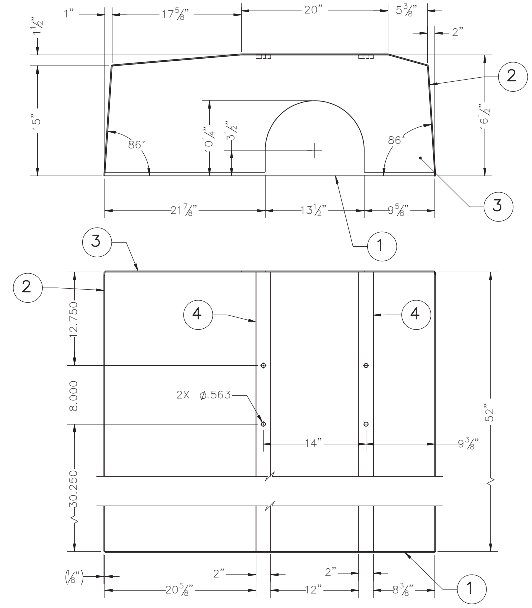
SCALE: 1:1



JAW IN SHEAR COUPLING

SCALE: FULL
TPU PART NO.: MK208-8

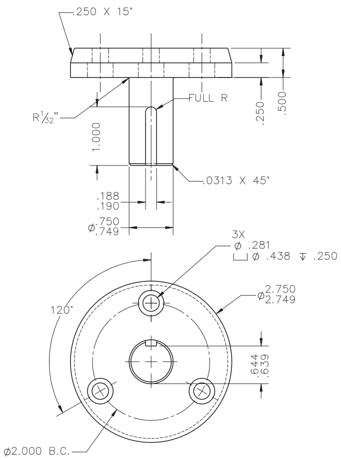
ITEM NO.	QTY.	DESCRIPTION	MFR	MFR PART NO.
3	1	UPPER JAW COUPLING HUB L090	LOVEJOY	685144-26087
2	1	UPPER JAW COUPLING HUB L090	LOVEJOY	685144-10773
1	1	JAW IN SHEAR SPACER	LOVEJOY	LS090



DRIP COVER

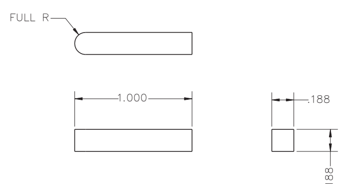
SCALE: 1:8
MATERIAL: STAINLESS STEEL
TPU PART NO.: MK208-3
CONTINUOUS WELD PER AWS D1.1

ITEM NO.	QTY.	DESCRIPTION	LENGTH
4	2	FB 1/2 x2	51
3	1	PL 1/8"	
2	1	PL 1/8"	
1	1	PL 1/8"	



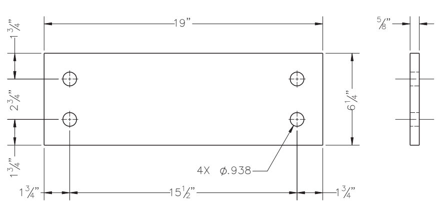
STUB SHAFT EXTENSION

SCALE: FULL
TPU PART NO.: MK208-4
MATERIAL: 17-4 PH H1075



KEY, STAINLESS

SCALE: 2:1
TPU PART NO.: MK208-5
MATERIAL: 316 STAINLESS STEEL
McMASTER CARR P/N 98530A177



BEARING BASE PL

SCALE: 1:4
TPU PART NO.: MK208-7
MATERIAL: ASTM A36

MACHINING NOTES:

1. BREAK ALL SHARP EDGES.
2. MAKE NO MATERIAL SUBSTITUTIONS WITHOUT APPROVAL OF THE ENGINEER.
3. FINISH 125 √ ALL OVER UNLESS NOTED OTHERWISE.

REFERENCE DRAWING

MK206-1 DRUM ASSEMBLY

MACHINING TOLERANCES UNLESS OTHERWISE NOTED:
FRACTIONAL ±1/64
DECIMAL ±.010
ANGLE ±1-0°

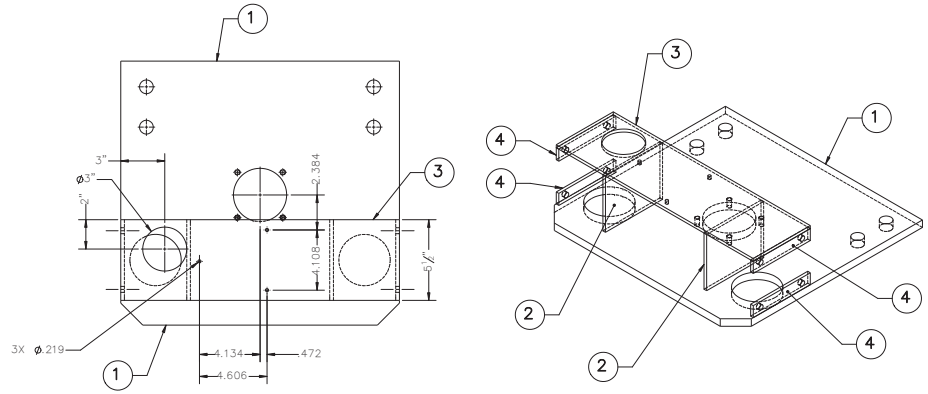
REV. NO. 0

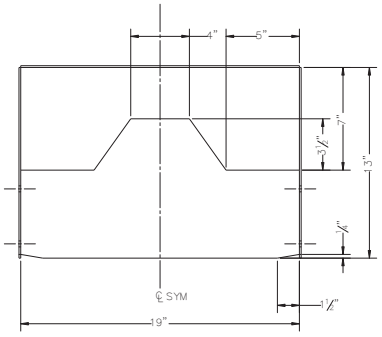
CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

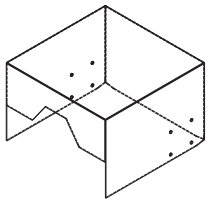
COWLITZ HYDROELECTRIC PROJECT
MAYFIELD POWERHOUSE
DRAFT TUBE GATE HOIST
DRUM ASSEMBLY PARTS

REVIEWED: Belvin, Steve
APPROVED: Nathan L. Manning

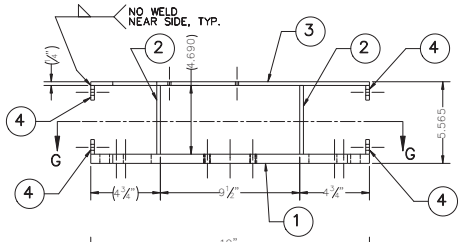
DRAWN: KAJ | STAMPED: SJB
DATE: 1/3/2022 | SCALE: AS SHOWN
DRAWING NO. MK208

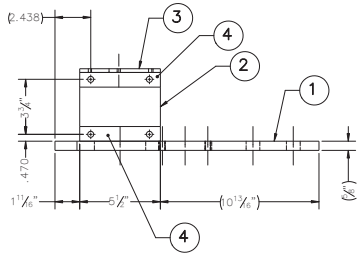


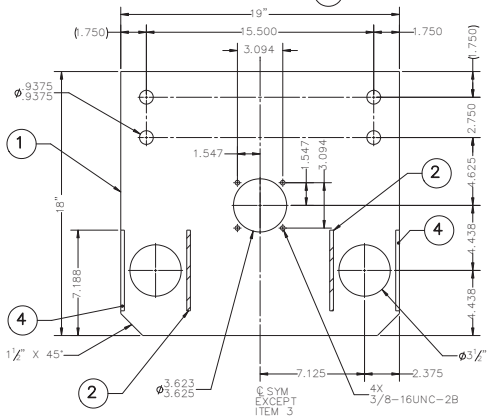




ISOMETRIC VIEW
SCALE: 1 1/2" =1'-0"

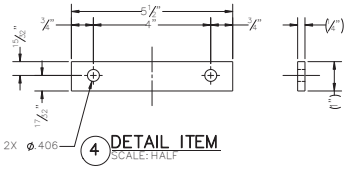




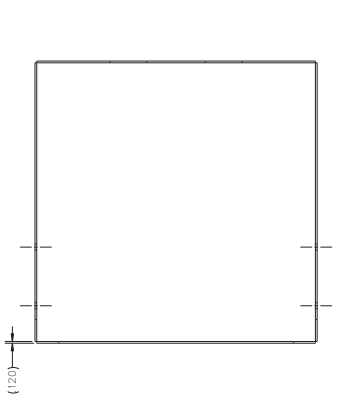


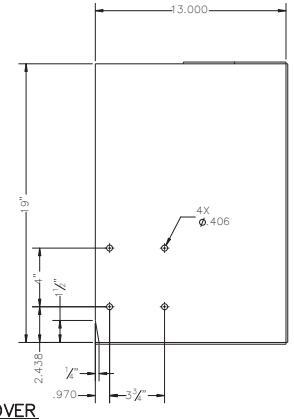
SECTION G-G

LIMIT SWITCH BASE
SCALE: 1:4
TPU PART NO.: MK209-1
MATERIAL: ASTM A36



DETAIL ITEM
SCALE: HALF





LIMIT SWITCH COVER
SCALE: 1:4
TPU PART NO.: MK209-2
MATERIAL: AISI 304 STAINLESS

REFERENCE DRAWING

MK206-1 DRUM ASSEMBLY

ITEM NO.	QTY.	DESCRIPTION	LENGTH
4	4	FB 0.25 x 5.5	1
3	1	FB 0.25 x 5.5	19
2	2	FB 0.25 x 5.5	4.69
1	1	PL 5/8"	

MACHINING NOTES:

1. BREAK ALL SHARP EDGES.
2. MAKE NO MATERIAL SUBSTITUTIONS WITHOUT APPROVAL OF THE ENGINEER.
3. FINISH 125 ALL OVER UNLESS NOTED OTHERWISE.

NOTES

1. MAKE NO SUBSTITUTIONS OR MODIFICATIONS WITHOUT APPROVAL OF THE ENGINEER.
2. ALL WELDING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF AWS PUBLICATION D1.1. WELD METAL SHALL BE E70XX OR E71XX MATERIAL FOR CARBON STEEL.
3. REMOVE ALL WELD SPLATTER AND GRIND SMOOTH ALL ARC STRIKES. REMOVE AND GRIND SMOOTH ALL TEMPORARY WELDS.
4. GRIND SMOOTH ALL SHARP EDGES AND CORNERS.
5. 100% VT ALL WELDS.
6. MATERIAL: ASTM A36

WELDS NOT SHOWN SHALL BE CONTINUOUS BOTH SIDES

THICKEST PLATE:	$t \leq \frac{3}{4}$	$\frac{3}{4} < t \leq 1\frac{1}{2}$	$1\frac{1}{2} < t \leq 2\frac{1}{4}$	$2\frac{1}{4} < t$
WELD (AWS D1.1)	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{5}{16}$

MACHINING TOLERANCES UNLESS OTHERWISE NOTED:
FRACTIONAL ±1/64
DECIMAL .X ±.1 .XX ±.010
ANGLE ±1°-0"

REV. NO. 0

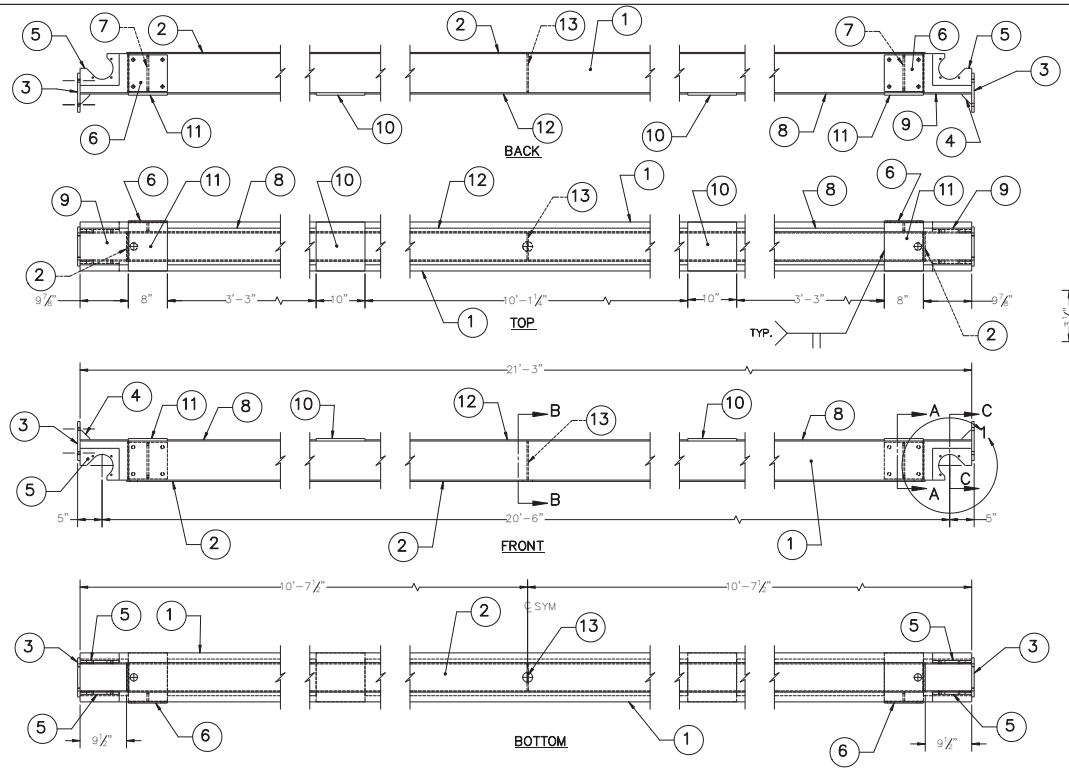
Belvin, Steve

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

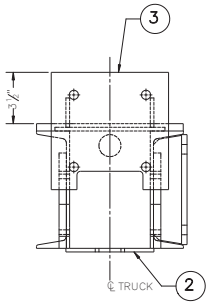
COWLITZ HYDROELECTRIC PROJECT
MAYFIELD POWERHOUSE
DRAFT TUBE GATE HOIST
DRUM ASSEMBLY PARTS

REVIEWED	DRAWN	STAMPED
	KAJ	SJB
APPROVED	DATE	SCALE
Nathan L. Manning	1/12/2022	AS SHOWN

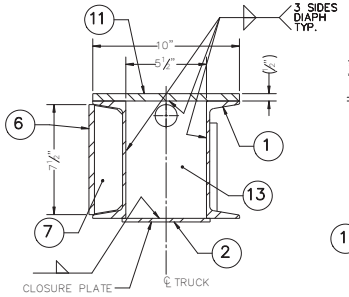
DRAWING NO.
MK209



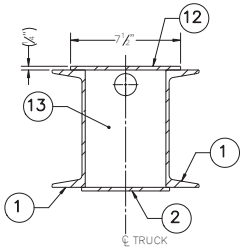
GANTRY TRUCK
SCALE: 1"=1'-0"
TPU PART NO.: MK210



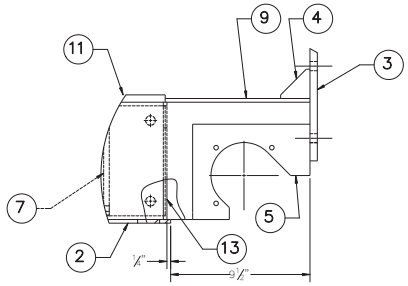
END VIEW
SCALE: 3"=1'-0"



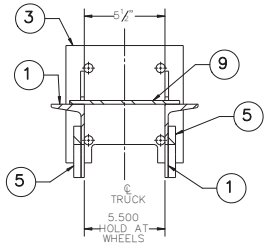
SECTION A–A
SCALE: 3"=1'-0"



SECTION B–B
SCALE: 3"=1'-0"



DETAIL 1
SCALE: 3"=1'-0"



SECTION C–C
SCALE: 3"=1'-0"

ITEM NO.	QTY.	DETAILED	DESCRIPTION	LENGTH
13	3	Y/MK211	FB 0.25 x 5.5	8"
12	1	N	FB 1/4 x7 1/2"	10'-1 1/4"
11	2	N	PL 1/2"	
10	2	N	PL 1/2"	
9	2	N	FB 1/4 x7 1/2"	9 7/8"
8	2	N	FB 1/4 x7	3'-3"
7	2	Y/MK211	PL 3/8	
6	2	Y/MK211	PL 3/8	
5	4	Y/MK211	PL 1/2	
4	4	Y/MK211	PL 1/4	
3	2	Y/MK211	FB 1/2 x8	8"
2	1	Y/MK211	FB 1/4 x 6	19'-8"
1	2	Y/MK211	C8x11.5	21'-3"

NOTES

1. MAKE NO SUBSTITUTIONS OR MODIFICATIONS WITHOUT APPROVAL OF THE ENGINEER.
2. ALL WELDING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF AWS PUBLICATION D1.1. WELD METAL SHALL BE E70XX OR E71XX MATERIAL.
3. REMOVE ALL WELD SPLATTER AND GRIND SMOOTH ALL ARC STRIKES. REMOVE AND GRIND SMOOTH ALL TEMPORARY WELDS.
4. GRIND SMOOTH ALL SHARP EDGES AND CORNERS.
5. 100% VT ALL WELDS.
6. MATERIAL: ASTM A36
7. FINISH: HOT DIP GALVANIZE

WELDS NOT SHOWN SHALL BE CONTINUOUS BOTH SIDES

THICKEST PLATE:	$t \le \frac{1}{4}$	$\frac{1}{4} < t \le \frac{1}{2}$	$\frac{1}{2} < t \le \frac{3}{4}$	$\frac{3}{4} < t$
WELD (AWS D1.1)	$\frac{1}{8}$	$\frac{5}{16}$	$\frac{1}{4}$	$\frac{5}{16}$

REFERENCE DRAWINGS:

MK205–1 COVER SHEET & DRAWING INDEX
MK211 TRUCK WELDMENT DETAIL ITEMS
MK212 TRUCK MACHINING

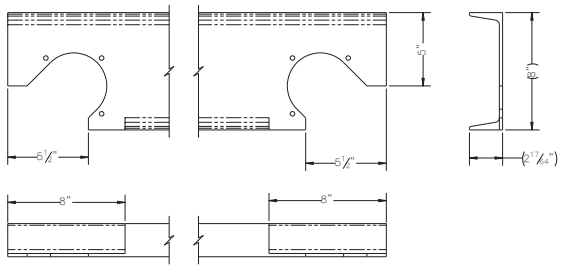
CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

REV. NO. 0

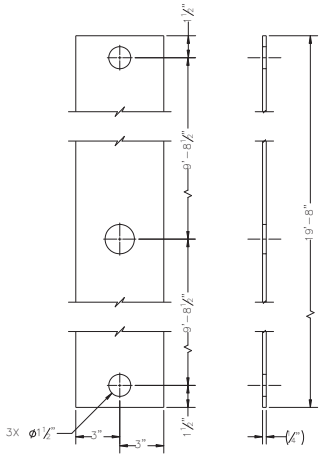
COWLITZ HYDROELECTRIC PROJECT
MAYFIELD POWERHOUSE
DRAFT TUBE GATE HOIST
TRUCK WELDMENT

REVIEWED	DRAWN	STAMPED
	KAJ	SJB
APPROVED	1/3/2022 DATE	AS SHOWN SCALE
Nathan L. Manning		DRAWING NO. MK210

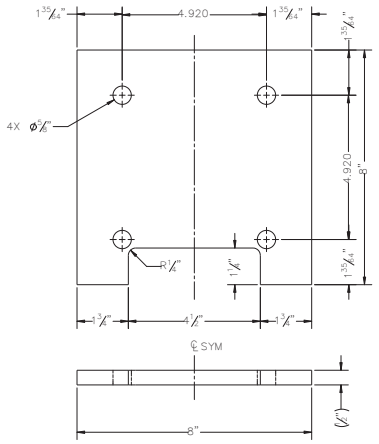
Belvin, Steve



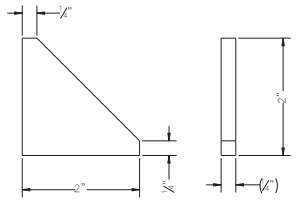
1 DETAIL ITEM
SCALE: 3"=1'-0"
NOTE: NEAT BURN WHEEL CUT OUTS TO 1/2" UNDERSIZE. SEE MK212 FOR FINAL DIMENSIONS



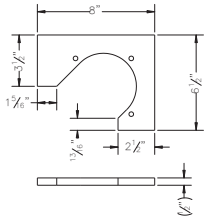
2 DETAIL ITEM
SCALE: 3"=1'-0"



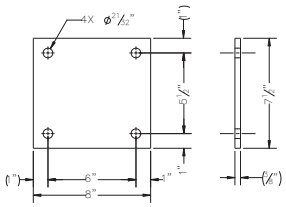
3 DETAIL ITEM
SCALE: HALF



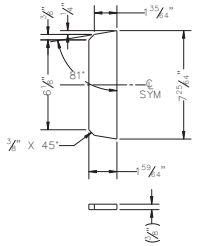
4 DETAIL ITEM
SCALE: FULL



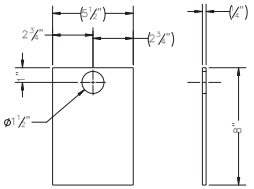
5 DETAIL ITEM
SCALE: 3"=1'-0"
NOTE: NEAT BURN WHEEL CUT OUTS TO 1/2" UNDERSIZE. SEE MK212 FOR FINAL DIMENSIONS



6 DETAIL ITEM
SCALE: 3"=1'-0"



7 DETAIL ITEM
SCALE: 3"=1'-0"



13 DETAIL ITEM
SCALE: 3"=1'-0"

NOTE:

FOR GENERAL NOTES SHEE DRAWING MK210

REFERENCE DRAWINGS:

MK205-1	COVER SHEET & DRAWING INDEX
MK210	TRUCK WELDMENT
MK212	TRUCK MACHINING

MACHINING TOLERANCES UNLESS OTHERWISE NOTED:
FRACTIONAL ±1/64
DECIMAL ±.010
ANGLE ±1°-0"

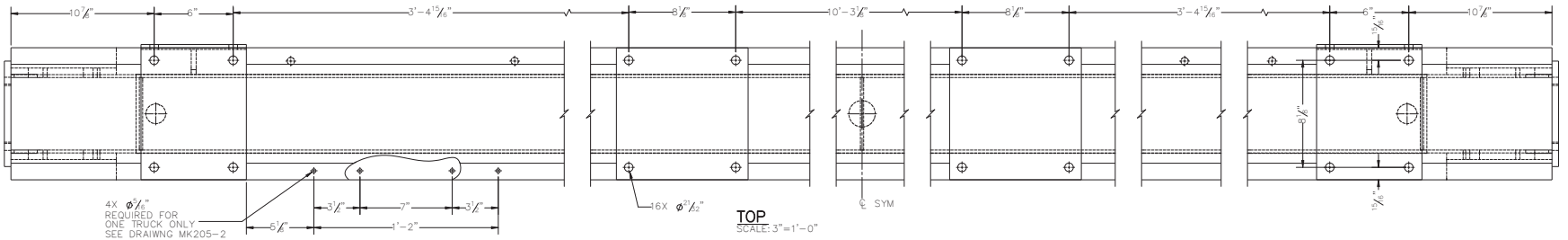
REV. NO. 0

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

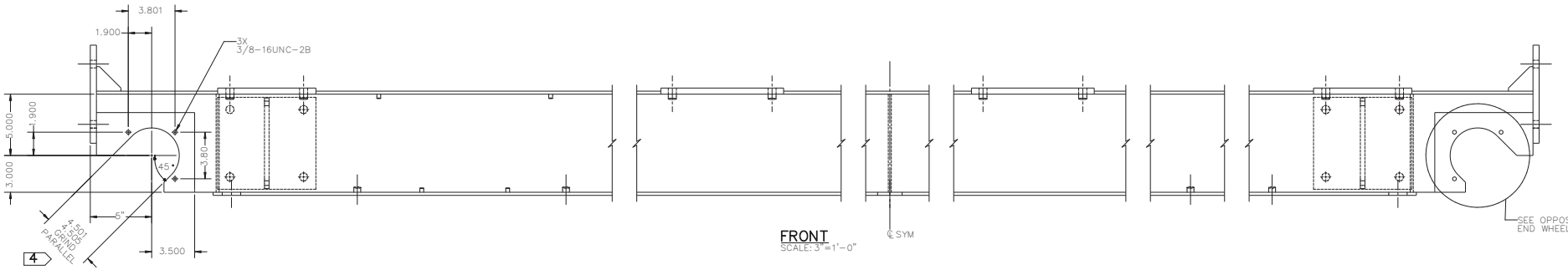
COWLITZ HYDROELECTRIC PROJECT
MAYFIELD POWERHOUSE
DRAFT TUBE GATE HOIST
TRUCK WELDMENT DETAIL ITEMS

REVIEWED	DRAWN	STAMPED
	KAJ	SJB
APPROVED	1/3/2022 DATE	AS SHOWN SCALE
Nathan L. Manning		DRAWING NO. MK211

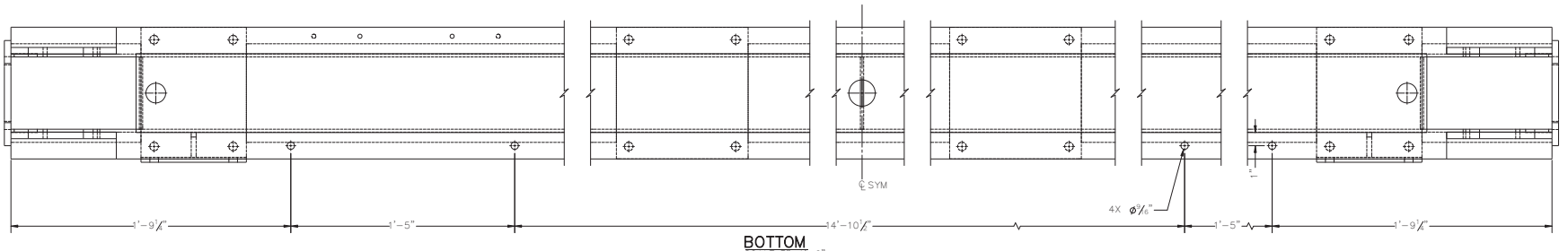
Belvin, Steven W.



TOP
SCALE: 3"=1'-0"



FRONT
SCALE: 3"=1'-0"



BOTTOM
SCALE: 3"=1'-0"

REFERENCE DRAWINGS:

MK205-1	COVER SHEET & DRAWING INDEX
MK210	TRUCK WELDMENT
MK211	TRUCK WELDMENT DETAIL ITEMS

MACHINING NOTES:

1. BREAK ALL SHARP EDGES.
2. MAKE NO MATERIAL SUBSTITUTIONS WITHOUT APPROVAL OF THE ENGINEER.
3. FINISH 125 ALL OVER UNLESS NOTED OTHERWISE.
4. MACHINE BOTH SIDES IN ONE SETUP

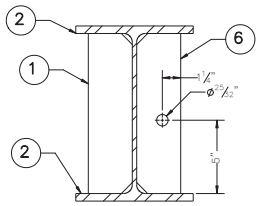
MACHINING TOLERANCES UNLESS OTHERWISE NOTED:	
FRACTIONAL	±1/64
DECIMAL	±.010
ANGLE	±1°
REV. NO.	0

Belvin, Steve

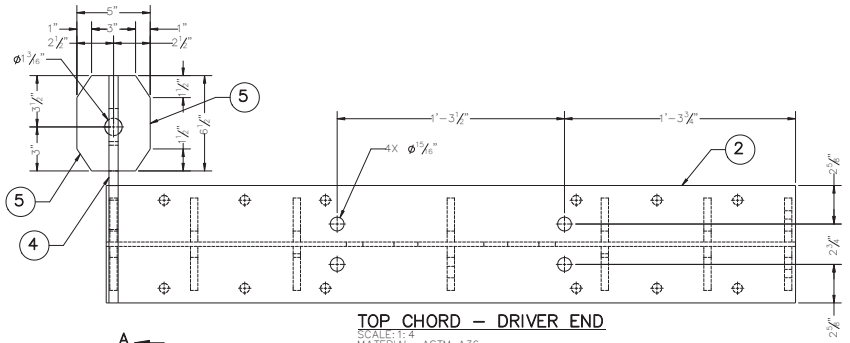
CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

COWLITZ HYDROELECTRIC PROJECT
MAYFIELD POWERHOUSE
DRAFT TUBE GATE HOIST
TRUCK MACHINING

REVIEWED	DRAWN	STAMPED
	KAJ	SJB
APPROVED	1/3/2022	AS SHOWN
Nathan L. Manning	DATE	SCALE
	DRAWING NO.	MK212

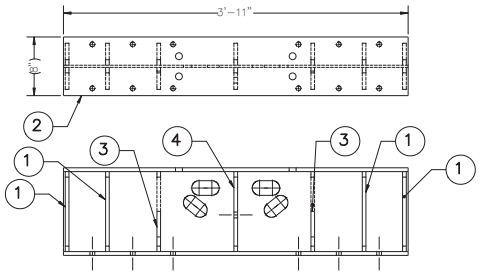


SECTION F–F
SCALE: 3"=1'–0"



TOP CHORD – DRIVER END
SCALE: 1: 4
MATERIAL: ASTM A36
TPU PART NO. : MK213–1
SCALE: 3"=1'–0"

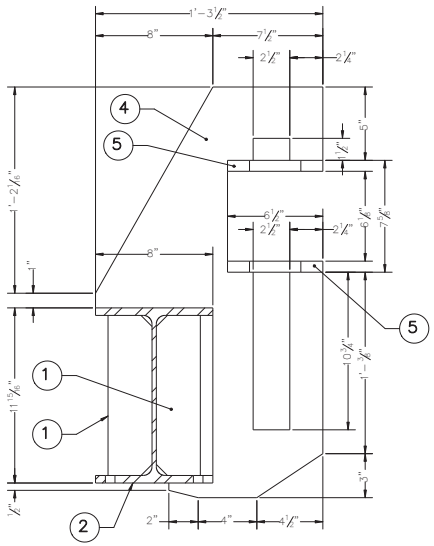
ITEM NO.	QTY.	DESCRIPTION	LENGTH
7	2	FB 0.5 x 3	10 29/32"
6	1	FB 0.5 x 3	10 29/32"
5	2	PL 3/4"	
4	1	PL 5/8"	
3	2	FB 0.5 x 3	5 1/2"
2	1	W12x40	3'–11"
1	9	FB 0.5 x 3	10 29/32"



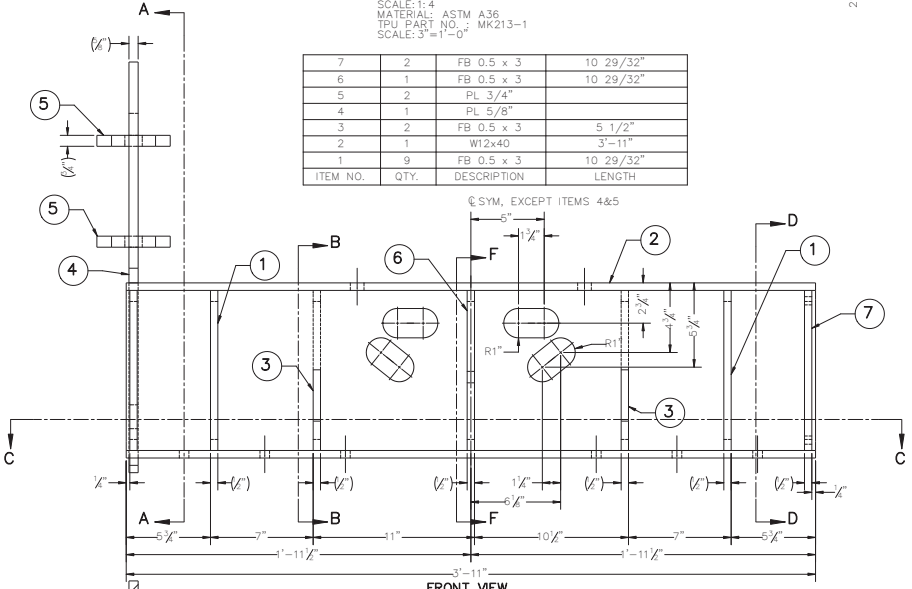
FOR ALL DETAILS AND DIMENSIONS SEE TOP CHORD–DRIVER END

TOP CHORD – IDLER END
SCALE: 1: 8
MATERIAL: ASTM A36
TPU PART NO. : MK213–2
SCALE: 3"=1'–0"

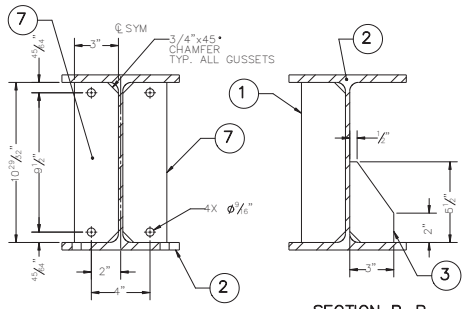
ITEM NO.	QTY.	DESCRIPTION	LENGTH
4	1	FB 0.5 x 3	10 29/32"
3	2	FB 0.5 x 3	5 1/2"
2	1	W12x40	3'–11"
1	11	FB 0.5 x 3	10 29/32"



SECTION A–A
SCALE: 3"=1'–0"

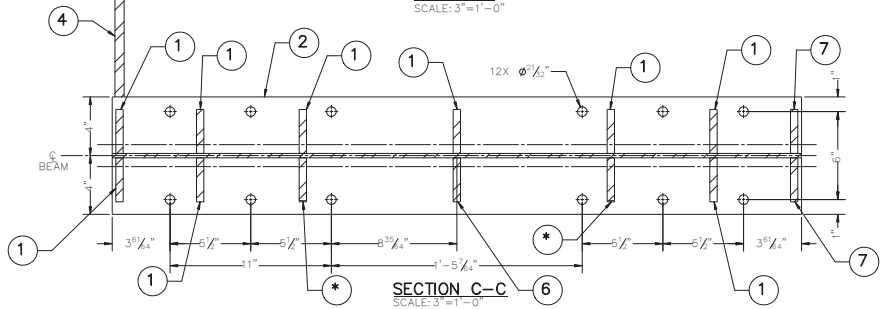


FRONT VIEW
SCALE: 3"=1'–0"



SECTION D–D
SCALE: 3"=1'–0"

SECTION B–B
SCALE: 3"=1'–0"



SECTION C–C
SCALE: 3"=1'–0"

REFERENCE DRAWINGS

MK205–1 COVER SHEET & DRAWING INDEX

NOTES

1. MAKE NO SUBSTITUTIONS OR MODIFICATIONS WITHOUT APPROVAL OF THE ENGINEER.
2. ALL WELDING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF AWS PUBLICATION D1.1. WELD METAL SHALL BE E70XX OR E71XX MATERIAL.
3. REMOVE ALL WELD SPLATTER AND GRIND SMOOTH ALL ARC STRIKES. REMOVE AND GRIND SMOOTH ALL TEMPORARY WELDS.
4. GRIND SMOOTH ALL SHARP EDGES AND CORNERS.
5. 100% VT ALL WELDS.
6. MATERIAL: ASTM A36
7. FINISH: HOT DIP GALVANIZE

WELDS NOT SHOWN SHALL BE CONTINUOUS BOTH SIDES

THICKEST PLATE:	t ≤ 1/4	1/4 < t ≤ 1/2	1/2 < t ≤ 3/4	3/4 < t
WELD (AWS D1.1)	1/4	5/16	1/4	5/16

MACHINING TOLERANCES UNLESS OTHERWISE NOTED:
FRACTIONAL ±1/64
DECIMAL ±.010
ANGLE ±1°–0"

REV. NO. 0

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

COWLITZ HYDROELECTRIC PROJECT
MAYFIELD POWERHOUSE
DRAFT TUBE GATE HOIST
GANTRY TOP CHORDS

REVIEWED	DRAWN	STAMPED
	KAJ	SJB
APPROVED	DATE	SCALE
Nathan L. Manning	1/4/2021	AS SHOWN

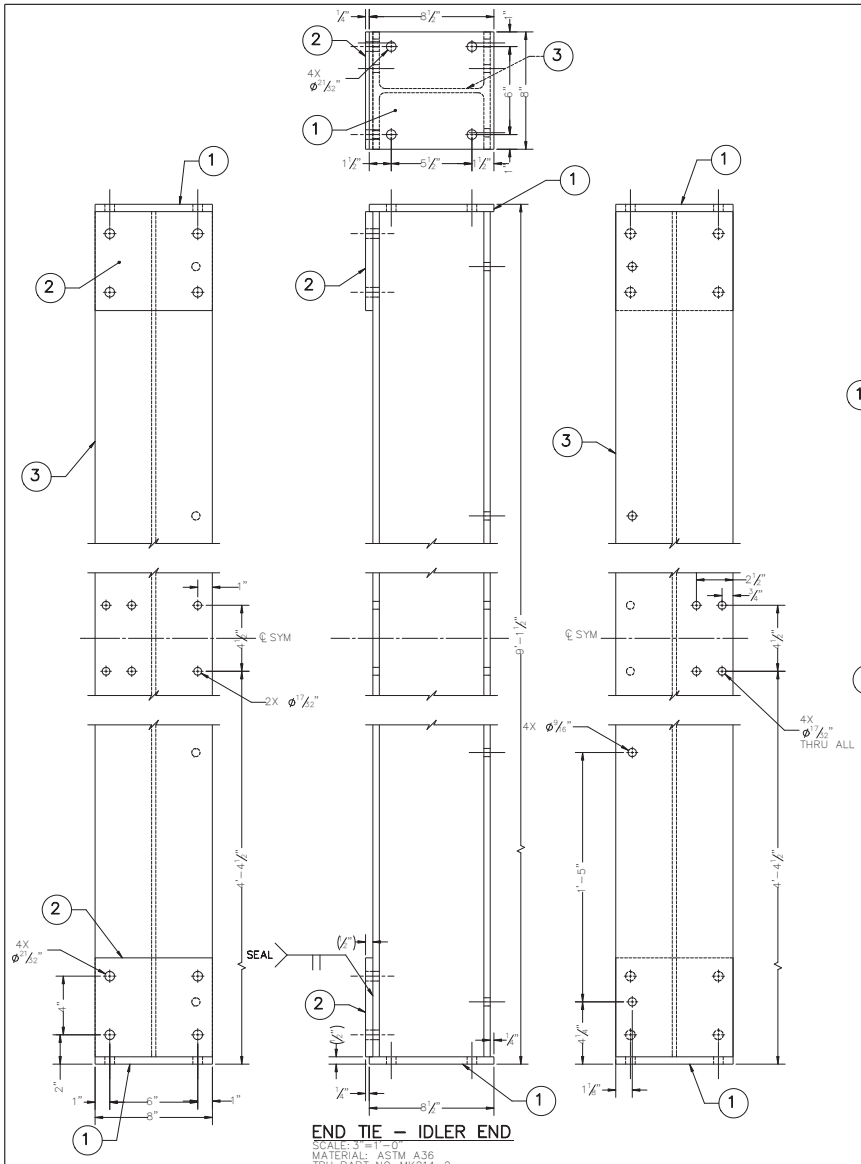
DRAWING NO.
MK213

Belvin, Steven J.

Digitally signed by Nathan L. Manning
DN: CN=Nathan L. Manning, O=TPU, OU=Engineering, E=nmanning@cityoftacoma.org, C=US
Reason: I am approving this document
Date: 2022.04.22 14:05:13-07'00'

MK213-Gantry top chord.SLDDRW

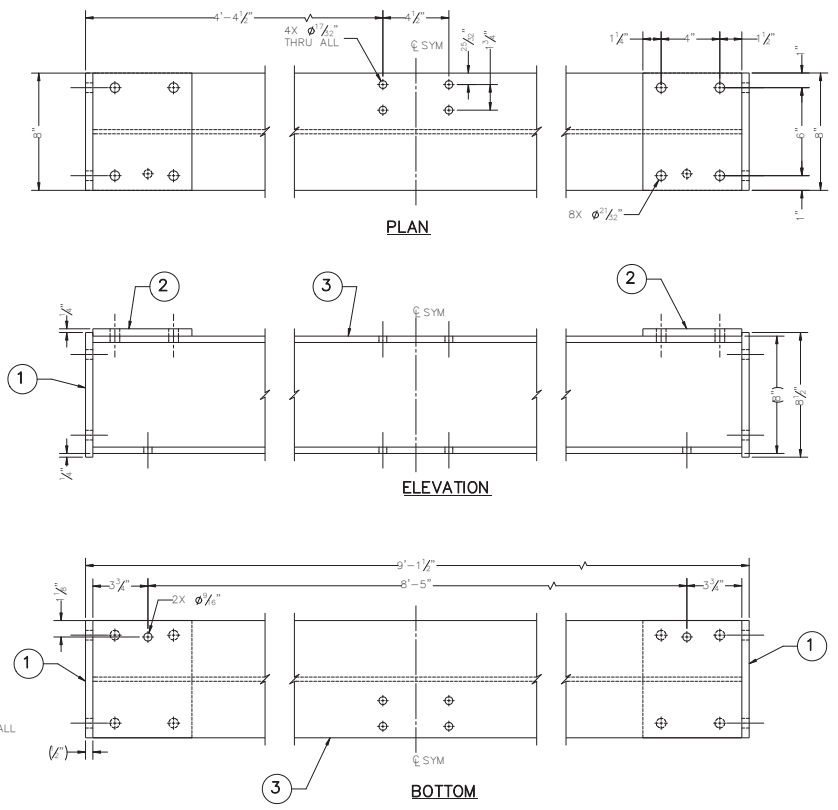
4/21/2022 11:51 AM



END TIE – IDLER END

SCALE: 3"=1'-0"
MATERIAL: ASTM A36
TPU PART NO.: MK214-2

ITEM NO.	QTY.	DESCRIPTION	LENGTH
3	1	W8x31	9'– 1/2"
2	2	FB 0.5 x 8	6 3/4"
1	2	FB 0.5 x 8	8 1/2"



END TIE – DRIVING END

SCALE: 3"=1'-0"
MATERIAL: ASTM A36
TPU PART NO.: MK214-1

ITEM NO.	QTY.	DESCRIPTION	LENGTH
3	1	W8x31	9'– 1/2"
2	2	FB 0.5 x 8	6 3/4"
1	2	FB 0.5 x 8	8 1/2"

REFERNCE DRAWINGS:

MK205–1 COVER SHEET & DRAWING INDEX

NOTES

1. MAKE NO SUBSTITUTIONS OR MODIFICATIONS WITHOUT APPROVAL OF THE ENGINEER.
2. ALL WELDING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF AWS PUBLICATION D1.1. WELD METAL SHALL BE E70XX OR E71XX MATERIAL.
3. REMOVE ALL WELD SPLATTER AND GRIND SMOOTH ALL ARC STRIKES. REMOVE AND GRIND SMOOTH ALL TEMPORARY WELDS.
4. GRIND SMOOTH ALL SHARP EDGES AND CORNERS.
5. 100% VT ALL WELDS.
6. MATERIAL: ASTM A36
7. FINISH: HOT DIP GALVANIZE

WELDS NOT SHOWN SHALL BE CONTINUOUS BOTH SIDES

THICKEST PLATE:	$t \leq 3/4$	$3/4 < t \leq 1/2$	$1/2 < t \leq 3/4$	$3/4 < t$
WELD (AWS D1.1)	5/16	3/8	1/2	5/8

MACHINING TOLERANCES UNLESS OTHERWISE NOTED:
FRACTIONAL ±1/64
DECIMAL ±.010
ANGLE ±1°

REV. NO. 0

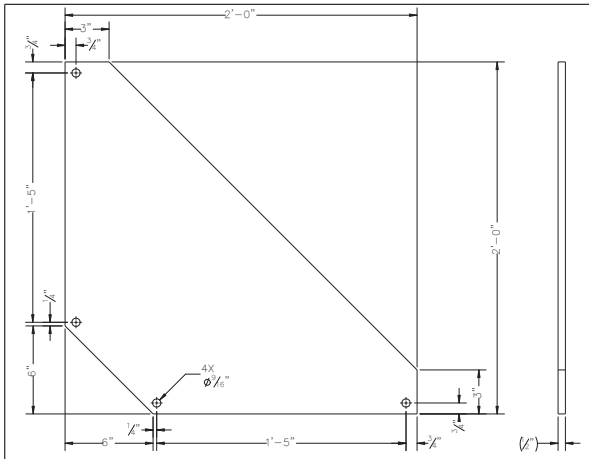
CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

COWLTIZ HYRDOELECTRIC PROJECT
MAYFIELD POWERHOUSE
DRAFT TUBE GATE HOIST
END TIES

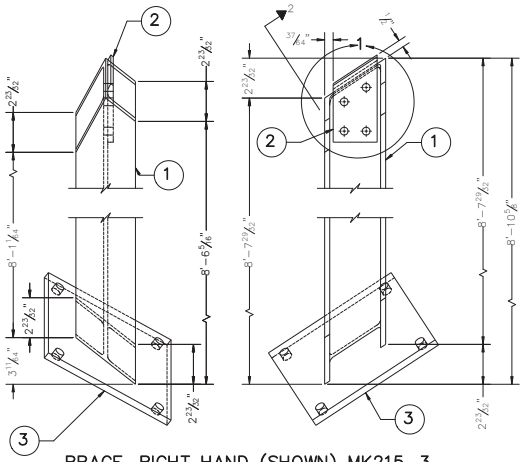
REVIEWED	DRAWN	STAMPED
	KAJ	SJB
APPROVED	DATE	SCALE
Nathan L. Manning	1/5/2021	AS SHOWN
	DRAWING NO.	
	MK214	

Belvin, Steve

Digitally signed by Nathan L. Manning
DN: CN=Nathan L. Manning, E=NManning@cityoftacoma.org, O=Nathan L. Manning
Reason: I am approving this document
Date: 2022-04-22 14:00:26-07'00'

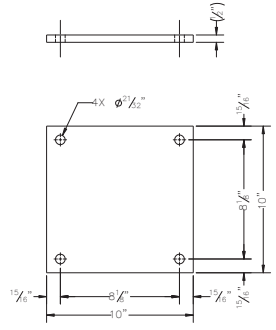


GANTRY FRAME GUSSET PLATE
SCALE: 3"=1'-0"
MATERIAL: ASTM A36
TPU Part No.: MK215-1

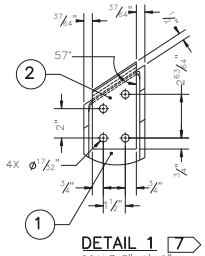


BRACE, RIGHT HAND (SHOWN) MK215-3
BRACE, LEFT HAND (NOT SHOWN) MK215-4
SCALE: 3"=1'-0"
MATERIAL: ASTM A36
TPU Part No.: MK215-3
TPU Part No.: MK215-4 SIM, OPPOSITE HAND

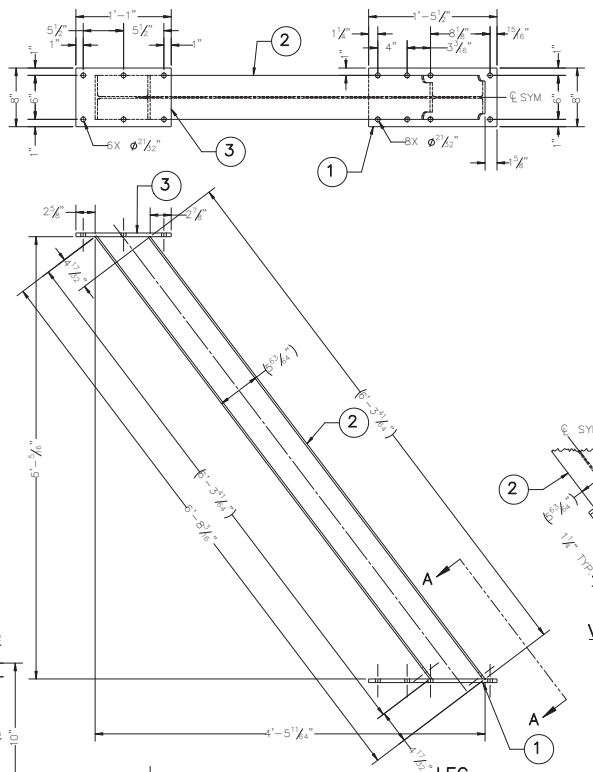
ITEM NO.	QTY.	DESCRIPTION	LENGTH
3	1	FB 0.5 x 8	10"
2	1	FB 0.375 x 3	5 61/64"
1	1	W4x13	8'-10 5/8"



3 DETAIL ITEM
SCALE: 3"=1'-0"

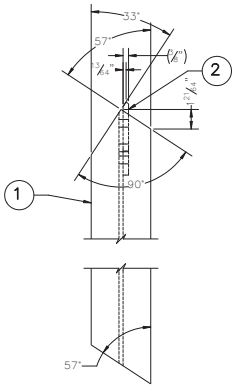


DETAIL 1 7
SCALE: 3"=1'-0"

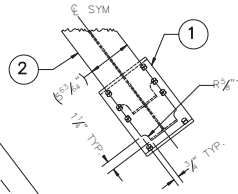


LEG
SCALE: 3"=1'-0"
MATERIAL: ASTM A36
TPU Part No.: MK215-2

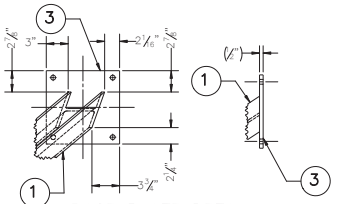
ITEM NO.	QTY.	DESCRIPTION	LENGTH
3	1	FB 0.5 x 8	1'-1"
2	1	W6x15	6'-8 3/16"
1	1	FB 0.5 x 8	1'-5 1/2"



VIEW 2
SCALE: 3"=1'-0"



VIEW A-A

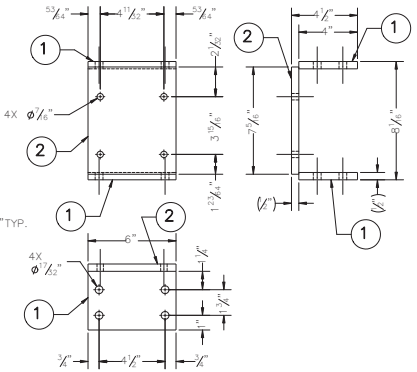


BASE PLATE DETAIL 7
SCALE: 1½"=1'-0"

WELDS NOT SHOWN SHALL BE CONTINUOUS BOTH SIDES

THICKEST PLATE:	t ≤ ¼	¼ < t ≤ ½	½ < t ≤ ¾	¾ < t
WELD (AWS D1.1)	¼ V	5/16 V	¼ V	5/16 V

NOTES
1. MAKE NO SUBSTITUTIONS OR MODIFICATIONS WITHOUT APPROVAL OF THE ENGINEER.
2. ALL WELDING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF AWS PUBLICATION D1.1. WELD METAL SHALL BE E70XX OR E71XX MATERIAL.
3. REMOVE ALL WELD SPLATTER AND GRIND SMOOTH ALL ARC STRIKES. REMOVE AND GRIND SMOOTH ALL TEMPORARY WELDS.
4. GRIND SMOOTH ALL SHARP EDGES AND CORNERS.
5. 100% VT ALL WELDS.
6. MATERIAL: ASTM A36
7. BOLT KNIFE PLATE TO BRACE BEFORE WELDING. UNBOLT FOR SHIPPING. SIMILARLY BOLT BASE PLATE TO TRUCK BEFORE WELDING.
8. FINISH HOT DIP GALVANIZE.



TRAVEL DRIVE REDUCER BRACKET
SCALE: 3"=1'-0"
TPU PART NO.: MK215-5

ITEM NO.	QTY.	DESCRIPTION	LENGTH
2	1	FB 0.5 x 6	7 5/16"
1	2	FB 0.5 x 6	4"

REFERENCE DRAWING

MK205-1 COVER SHEET & DRAWING INDEX

MACHINING TOLERANCES UNLESS OTHERWISE NOTED:
FRACTIONAL ±1/64
DECIMAL ±.010
ANGLE ±1°

REV. NO. 0

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

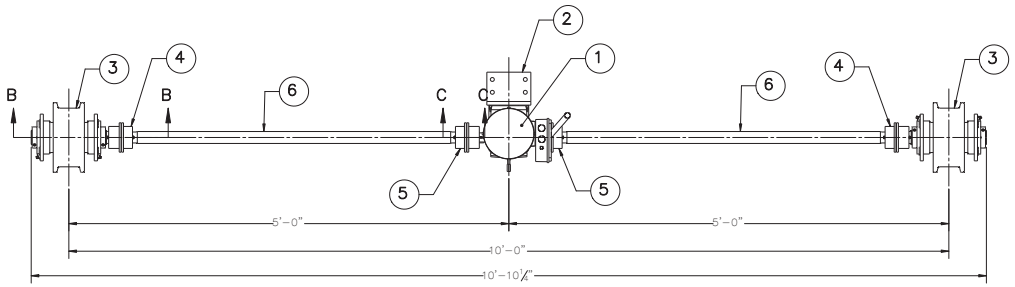
COWLITZ HYDROELECTRIC PROJECT
MAYFIELD POWERHOUSE
DRAFT TUBE GATE HOIST
GUSSET PLATE, LEG & BRACE

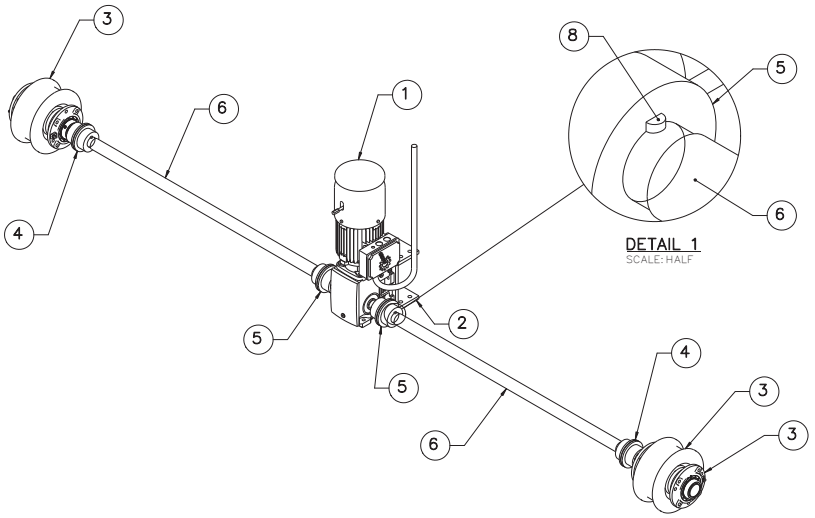
REVIEWED	DRAWN	STAMPED
	KAJ	SJB
APPROVED	DATE	SCALE
Nathan L. Manning	1/5/2022	AS SHOWN
		DRAWING NO. MK215

Belvin, Steve

MK215-Gantry Frame Gusset PLSLDDRW

4/21/2022 3:03 PM

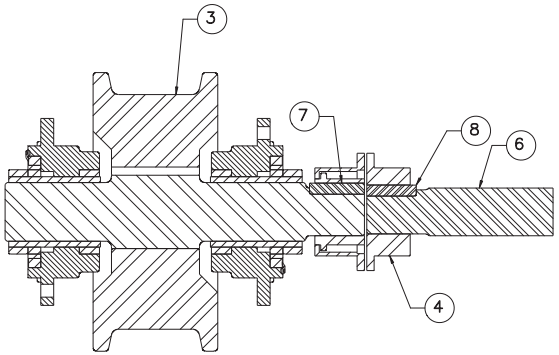




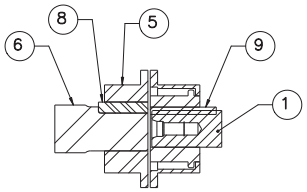
DETAIL 1
SCALE: HALF

TRAVEL DRIVE ASSEMBLY
SCALE: 1" = 1'-0"
TPU PART NO. MK216-1

ITEM NO.	QTY.	TPU PART NO.	MFR	MFR PART NO.	DESCRIPTION
10	1				TROLLEY DRIVE MOTOR CABLE
9	2	MK216-4	McMASTER-CARR	98530A136	KEY, STAINLESS
8	4	MK216-2	McMASTER-CARR	98530A165	KEY, STAINLESS
7	2	MK216-3	McMASTER-CARR	98530A165	KEY, STAINLESS
6	2	MK217-3			TRAVEL DRIVE SHAFT
5	2	MK217-5	AMERIDRIVES	FS201 1/4	FLEXIBLE COUPLING
4	2	MK217-4	AMERIDRIVES	FS201 1/4	FLEXIBLE COUPLING
3	2	MK217-1			GANTRY DRIVE WHEEL ASSEMBLY
2	1	MK215-5			TRAVEL DRIVE REDUCER BRACKET
1	1	MK216-2	NORD	SK 12063LX - 90LP/4 CUS BRE20 HL IP66 RD	TRAVEL DRIVE GEARMOTOR



SECTION B-B
SCALE: HALF



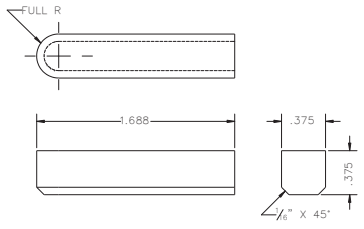
SECTION C-C
SCALE: HALF

MACHINING NOTES:

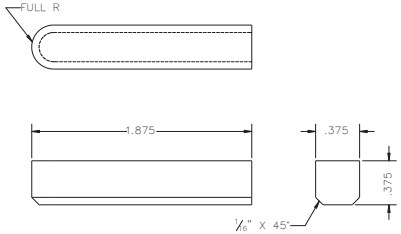
1. BREAK ALL SHARP EDGES.
2. MAKE NO MATERIAL SUBSTITUTIONS WITHOUT APPROVAL OF THE ENGINEER.
3. FINISH 125 ALL OVER UNLESS NOTED OTHERWISE.

REFERENCE DRAWING

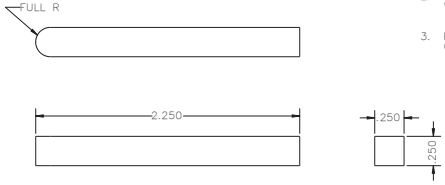
MK205-1 COVER SHEET & DRAWING INDEX



KEY, STAINLESS
SCALE: FULL
TPU PART NO.: MK216-2



KEY, STAINLESS
SCALE: FULL
TPU PART NO.: MK216-3



KEY, STAINLESS
SCALE: FULL
TPU PART NO.: MK216-4

MACHINING TOLERANCES UNLESS OTHERWISE NOTED:
FRACTIONAL ±1/64
DECIMAL ±.010
ANGLE ±1°-0"

REV. NO. 0

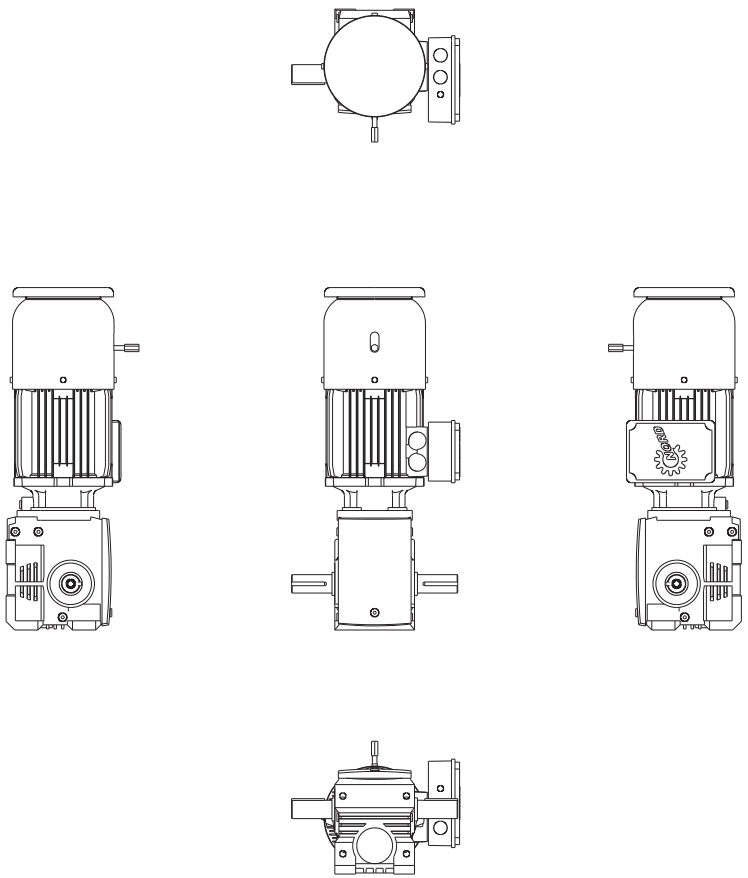
Belvin, Steve

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

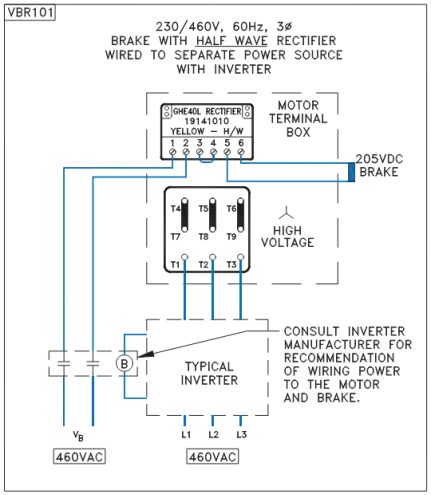
COWLITZ HYDROELECTRIC PROJECT
MAYFIELD POWERHOUSE
DRAFT TUBE GATE HOIST
TRAVEL DRIVE ASSEMBLY

REVIEWED	DRAWN	STAMPED
	KAJ	SJB
APPROVED	1/10/2022	AS SHOWN
Nathan L. Manning	DATE	SCALE

DRAWING NO.
MK216-1



TRAVEL DRIVE GEARMOTOR
SCALE: 3" = 1'-0"



BRAKE RECTIFIER WIRING DIAGRAM

NORD DRIVESYSTEMS

Quote ID 7UK33A.0
Reference
Date 1/11/2022

To	myNORD - Guest US .	**From**	PO Box 367 800 Nord Drive Waunakee, WI 53597
Phone	+1 608-849-7300	**Phone**	Toll free: (888) 314-6673
Fax		**Fax**	(800) 373-6673
Email	info.us@nord.com	**Email**	quotes.us@nord.com

Line Item	1
Line Item Ref.	
Product Name	Helical Worm Gearmotor with Brake
Model Type	SK 12063LX - 90LP/4 CUS BRE20 HL IP66 SH RD AICM

Gear Box		**Motor**		**Configuration**	
Output Speed	69 rpm	**Power**	2 hp	**Mounting Pos**	M4
Ratio	25.15	**Voltage**	230/460 V	**Shaft Loc**	A and B Side
Input Speed	1730 rpm	**Frequency**	60 Hz	**Flange Location**	
Service Factor	1.4	**Motor SF**	1.15	**Term Box Pos**	1
AGMA Class	II	**Current**	5.6 / 2.8 A	**Conduit Entry**	IV
Output Torque	1538 lb-in	**Motor Speed**	1730 rpm	**Brake Lever Loc**	HL2
Overhung load	1147 lb	**Duty**	S1 - Continuous	**Mech Var Loc**	-
Axial Load	1720 lb	**Insulation Class**	F	**Paint Coating**	NSD5+
Output Shaft	Solid Double Shaft	**Enclosure**	TEFC - IP66	**Paint Color**	Stainless Steel Gray
Output Shaft Dia	1.250"X2.75"	**Brake Torque**	20 Nm	**Lubricant**	VG680-SYN-PAO
Input Shaft Dia		**Brake Voltage**	460 VAC / 205 VDC	**Lubrication Qty**	1.69 qt
Flange size		**Rectifier**	GHE40V	**Base Weight**	81 lb

Gearbox Options	**Motor Options**	**Miscellaneous Options**
Magnetic Drain Plug **(MDP)**	110 Volt Anti-Condensation Heater **(SH)**	Synthetic Polyalphaolefin Oil
Oil Sight Glass **(OSG)**	IP66 Brake **(BIP66)**	Stainless Steel Nameplate
Standard Shaft Seal	Canopy Drip Cover **(RD)**	Nameplate with Customer Material Number
Autovent **(DR)**	Standard Line Powered - Inverter Capable	
Cast-Iron Housing	Precima Brake	
	Standard Braking (AC Switching)	
	Additional Insulation **(AICM)**	
	Hand Release Lever **(HL)**	
	Inverter Duty Motor	
	Potted Brake Rectifier	
	IE3 **(PE)**	
	Inverter Duty Capable - 10:1 (60 - 6Hz)	
	Constant Torque Speed Range (CSA Pending)	
	Brake Mechanical Release Lever	
	Epoxy Dipped Windings **(EP)**	
	NEMA Electrical UL/CSA **(CUS)**	
	Class H Motor Insulation **(ISO H)**	
	IP66 **(IP66)**	
	Terminal Box Sealed with Resin **(KKV)**	
	Separate Brake Power	

Notes

REFERENCE DRAWING

MK205-1	COVER SHEET & DRAWING INDEX
MK216-1	TRAVEL DRIVE ASSEMBLY
MW1010-1	480 VAC POWER SCHEMATIC

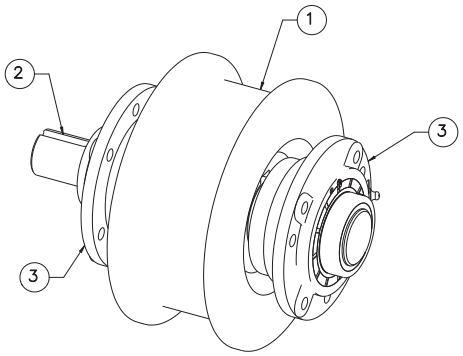
CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

REV. NO. 0

COWLTIZ HYDROELECTRIC PROJECT
MAYFIELD POWERHOUSE
DRAFT TUBE GATE HOIST
TRAVEL DRIVE GEARMOTOR

Belvin, Steve

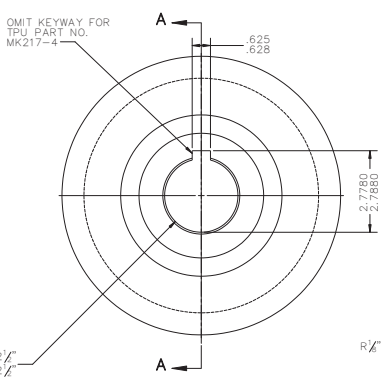
SUBMITTED	DRAWN	STAMPED
	KAJ	SJB
APPROVED	1/10/2022 DATE	AS SHOWN SCALE
Nathan L. Manning	DRAWING NO.	MK216-2

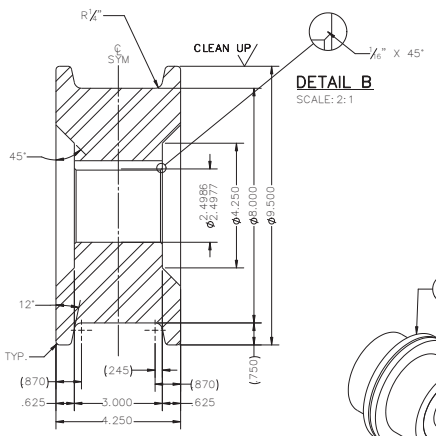


GANTRY DRIVE WHEEL ASSEMBLY

SCALE: HALF
TPU PART NO.: MK217-1

ITEM NO.	QTY.	TPU PART NO.	MFR	MFR PART NO.	DESCRIPTION
3	2		REXNORD	FC-B22432H	FLANGED CARTRIDGE UNIT
2	1	MK217-5			IDLER WHEEL SHAFT
1	1	MK217-3			WHEEL, DIA 8", RAIL ASCE 70#

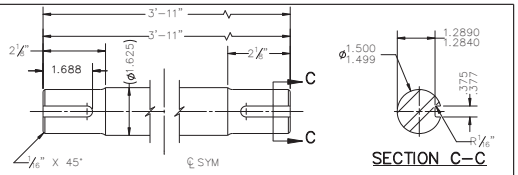




SECTION A–A

DETAIL B

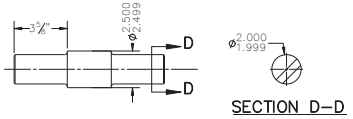
SCALE: 2:1



TRAVEL DRIVE SHAFT

SCALE: HALF
TPU PART NO.: MK217-3
MATERIAL: 17-4 PH H1075

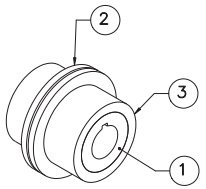
SECTION C–C



IDLER WHEEL SHAFT

SCALE: 3"=1'-0"
TPU PART NO.: MK217-6

SECTION D–D



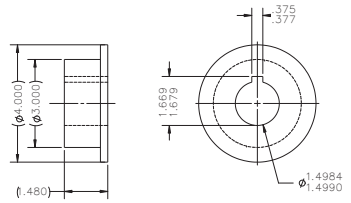
WHEEL, DIA 8", RAIL ASCE 70#

SCALE: HALF
TPU PART NO.: MK217-3 & MK217-4
MATERIAL: ASTM A322 4340/45, HT TO 321 BHN MIN AT DEPTH OF TREAD.
FINISH: HOT DIP GALVANIZE, MACHINE BORE AFTER GALVANIZING

FLEXIBLE COUPLING

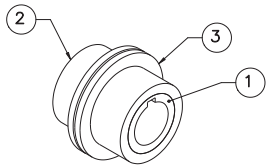
SCALE: HALF
PART NO.: MK217-5

ITEM NO.	QTY.	DESCRIPTION	DETAILED
3	1	FLEX HALF, COVER FS201 1/4	N
2	1	FS201 1/4 RIGID GEAR COUPLING HALF	Y
1	1	FS201 1/4 FLEXIBLE GEAR COUPLING HALF	Y



2 FS201 1/4 RIGID GEAR COUPLING HALF

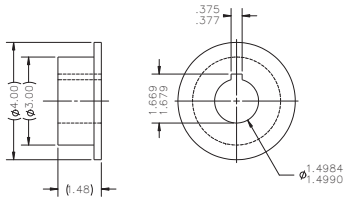
SCALE: HALF



FLEXIBLE COUPLING

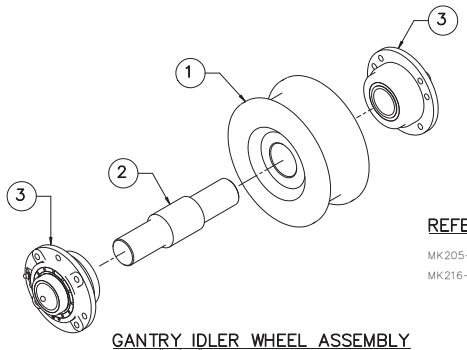
SCALE: HALF
TPU PART NO: MK217-4

ITEM NO.	QTY.	DESCRIPTION	DETAILED
3	1	FLEX HALF, COVER FS201 1/4	N
2	1	FS201 1/4 RIGID GEAR COUPLING HALF	Y
1	1	FS201 1/4 FLEXIBLE GEAR COUPLING HALF	Y



2 FS201 1/4 RIGID GEAR COUPLING HALF

SCALE: HALF



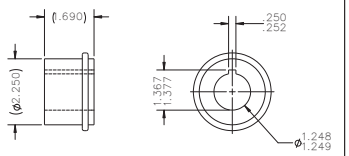
GANTRY IDLER WHEEL ASSEMBLY

SCALE: 3"=1'-0"
TPU PART NO.: MK217-2

ITEM NO.	QTY.	TPU Part No.	MFR	MFR PART NO.	DESCRIPTION
3	2		REXNORD	FC-B22432H	FLANGED CARTRIDGE UNIT
2	1	MK217-6			IDLER WHEEL SHAFT
1	1	MK217-4			WHEEL, DIA 8", RAIL ASCE 70#

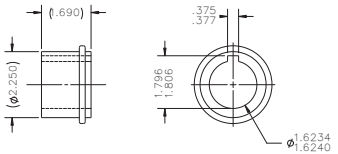
REFERENCE DRAWING

MK205-1 COVER SHEET & DRAWING INDEX
MK216-1 TRAVEL DRIVE ASSEMBLY



1 FS201 1/4 FLEXIBLE GEAR COUPLING HALF

SCALE: HALF



1 FS201 1/4 FLEXIBLE GEAR COUPLING HALF

SCALE: HALF

MACHINING NOTES:

1. BREAK ALL SHARP EDGES.
2. MAKE NO MATERIAL SUBSTITUTIONS WITHOUT APPROVAL OF THE ENGINEER.
3. FINISH 125 ALL OVER UNLESS NOTED OTHERWISE.

MACHINING TOLERANCES UNLESS OTHERWISE NOTED:
FRACTIONAL ±1/64
DECIMAL ±.010
ANGLE ±1°-0"

REV. NO. 0

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

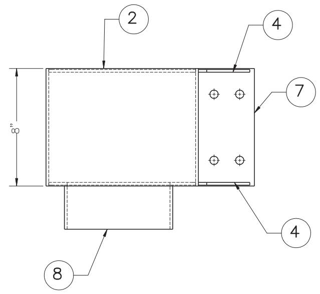
COWLTIZ SALMON HATCHERY
MAYFIELD POWERHOUSE
DRAFT TUBE GATE HOIST
WHEEL ASSEMBLY & SHAFT

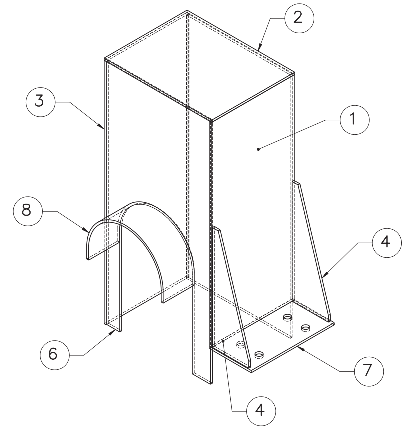
REVIEWED
Belvin, Steve
APPROVED
Nathan L. Manning

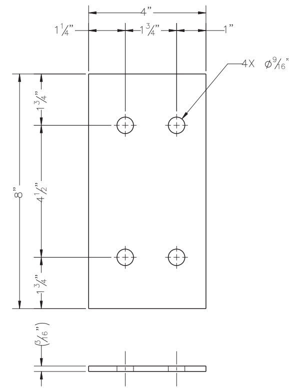
DRAWN: KAJ
STAMPED: SJB
DATE: 1/10/2022
SCALE: AS SHOWN
DRAWING NO.: MK217

MK217-Wheel Assembly.SLDDRW

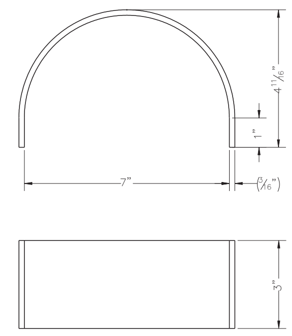
3/21/2022 12:08 PM



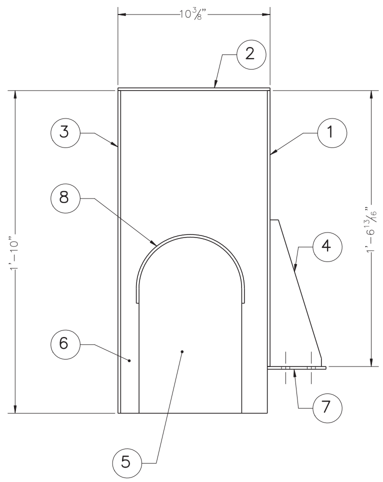


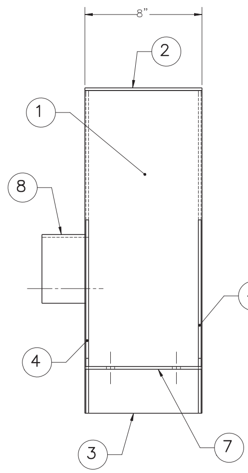


DETAIL ITEM 7
SCALE: HALF

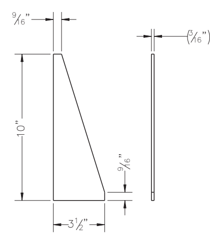


DETAIL ITEM 8
SCALE: HALF

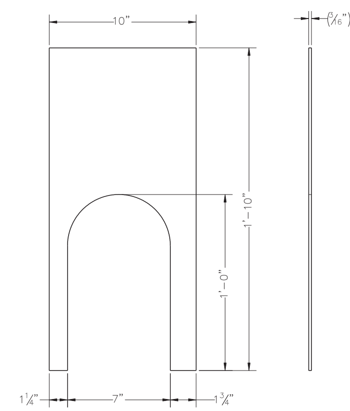




TRAVEL DRIVE MOTOR COVER
SCALE: 3"=1'-0"
TPU PART NO.: MK218-1



DETAIL ITEM 4
SCALE: 3"=1'-0"



DETAIL ITEM 6
SCALE: 3"=1'-0"

REFERENCE DRAWINGS

MK205-1 COVER SHEET & DRAWING INDEX

ITEM NO.	QTY.	DESCRIPTION	LENGTH	DETAILED?
8	1	FB .1875 X 3		
7	1	FB 0.1875 x 8	4"	
6	1	FB 0.1875 x 10	1'-10"	Y
5	1	FB 0.1875 x 10	1'-10"	N
4	2	FB 0.1875 x 3.5	10"	Y
3	1	FB 0.1875 x 8	1'-10"	N
2	1	FB 0.1875 x 8	10 3/8"	N
1	1	FB 0.1875 x 8	1'-6 13/16"	N

NOTES
1. MAKE NO SUBSTITUTIONS OR MODIFICATIONS WITHOUT APPROVAL OF THE ENGINEER.
2. ALL WELDING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF AWS PUBLICATION D1.1. WELD METAL SHALL BE 308 OR 308L MATERIAL.
3. REMOVE ALL WELD SPLATTER AND GRIND SMOOTH ALL ARC STRIKES. REMOVE AND GRIND SMOOTH ALL TEMPORARY WELDS.
4. GRIND SMOOTH ALL SHARP EDGES AND CORNERS.
5. 100% VT ALL WELDS.
6. MATERIAL: 304 STAINLESS

WELDS NOT SHOWN SHALL BE CONTINUOUS BOTH SIDES

THICKEST PLATE:	$t \le 1/4$	$1/4 < t \le 1/2$	$1/2 < t \le 3/4$	$3/4 < t$
WELD (AWS D1.1)	1/8	3/16	1/4	5/16

MACHINING TOLERANCES UNLESS OTHERWISE NOTED:
FRACTIONAL ±1/64
DECIMAL ±.010
ANGLE ±1-0"

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

REV. NO. 0

COWLITZ HYDROELECTRIC PROJECT
MAYFIELD POWERHOUSE
DRAFT TUBE GATE HOIST
TRAVEL DRIVE MOTOR COVER

STEVEN J. BELVIN, STATE OF WASHINGTON, REGISTERED PROFESSIONAL ENGINEER

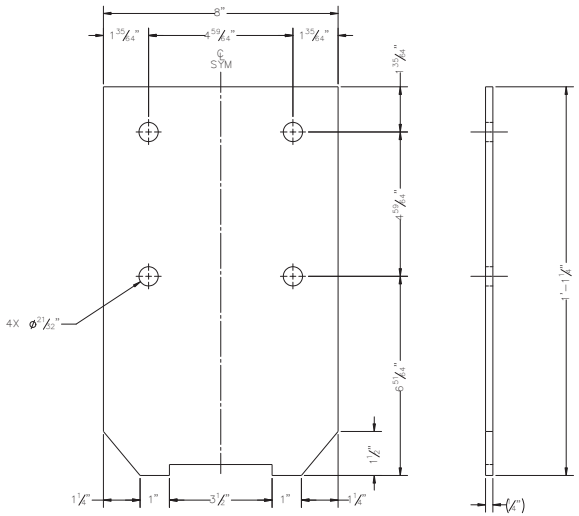
Belvin, Steve — Digitally signed by Belvin, Steve, Date: 2022.04.21 15:48:46-07'00'

REVIEWED

APPROVED: Nathan L. Manning — Digitally signed by Nathan L. Manning, Reason: I am approving this document, Date: 2022.04.22 14:04:33-07'00'

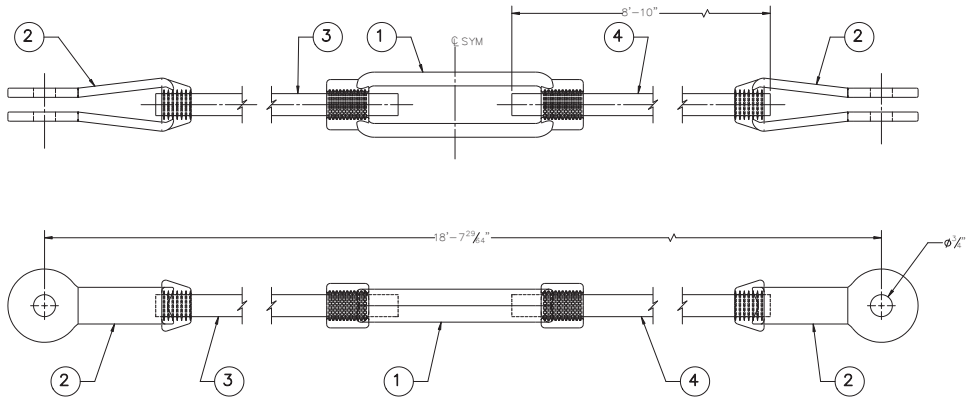
DRAWN	STAMPED
KAJ	SJB
DATE: 1/10/2022	SCALE: AS SHOWN

DRAWING NO. MK218



RAIL SWEEP

SCALE: HALF
MATERIAL: ASTM A36
TPU PART NO.: MK219-1
FINISH: HOT DIP GALVANIZE



THREADED ROD ASSEMBLY

SCALE: 3 =1-0"
TPU PART NO.: MK219-2
FINISH: HOT DIP GALVANIZE
SEE PORTLAND BOLT AND MANUFACTURING, QUOTE NO. 167218

ITEM NO.	QTY.	DESCRIPTION	MFR
4	1	ROD, 3/4 X 106 1/2, ASTM A36, 5" RH AND 5" LH THREADS	
3	1	ROD, 3/4 X 106 1/2, ASTM A36, 5" THREAD EACH END	
2	2	CLEVIS NO. 2 1/2, ASTM A668, 3/4 RH TAP, 3/4 GRIP, 3/4 PIN	CLEVELAND CITY FORGE
1	1	FORGED TURNBUCKLE, 3/4 x 6 ASTM F1145 CLASS 'A'	CLEVELAND CITY FORGE

REFERENCE DRAWING

MK205-1 COVER SHEET & DRAWING INDEX

MACHINING TOLERANCES UNLESS OTHERWISE NOTED:
FRACTIONAL ±1/64
DECIMAL ±.010
ANGLE ±1-0"

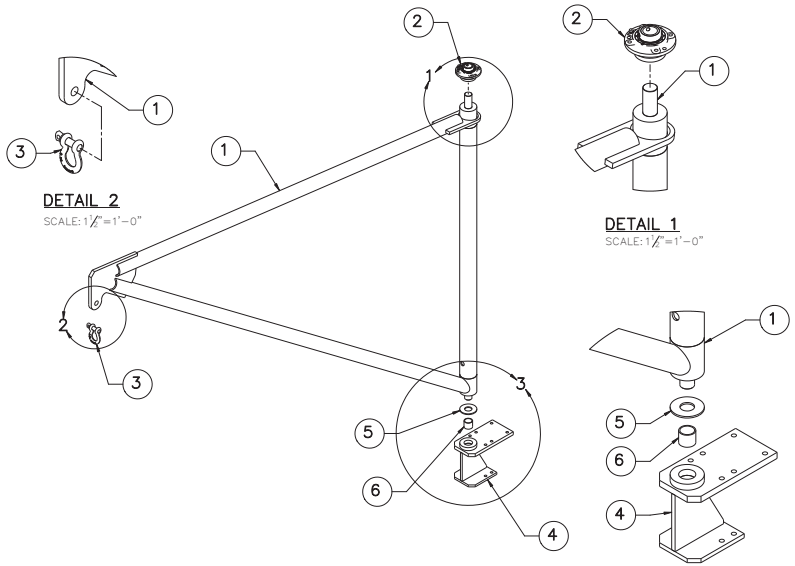
REV. NO. 0

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

COWLITZ HYDROELECTRIC PROJECT
MAYFIELD POWERHOUSE
DRAFT TUBE GATE HOIST
RAIL SWEEP & THREADED ROD ASS'Y

REVIEWED	DRAWN	STAMPED
	KAJ	SJB
APPROVED	1/12/2022	AS SHOWN
Nathan L. Manning	DATE	SCALE
	DRAWING NO.	MK219

Belvin, Steve



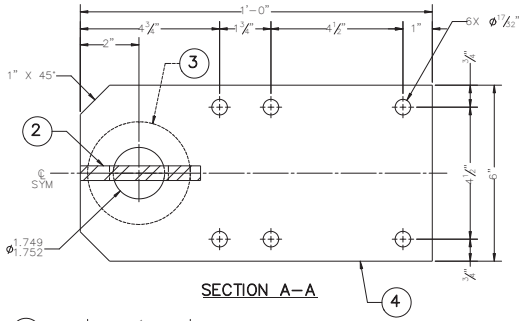
DETAIL 2
SCALE: 1½"=1'-0"

DETAIL 1
SCALE: 1½"=1'-0"

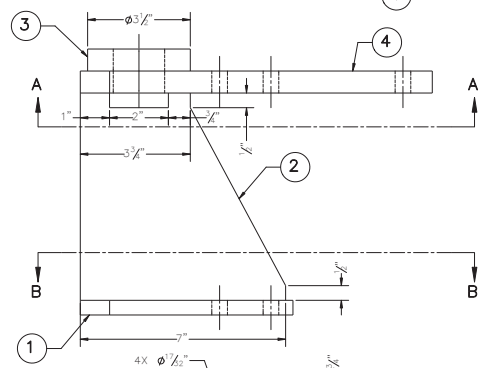
DETAIL 3
SCALE: 1½"=1'-0"

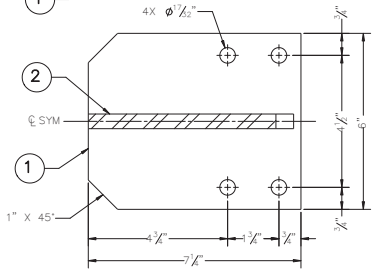
JIB ASSEMBLY
SCALE: 1"=1'-0"
TPU PART NO.: MK220-1

ITEM NO.	QTY.	TPU Part No.	MFR	PART NO.	DESCRIPTION
6	1		SYMMCO	SS-4856-24	PLAIN BEARING
5	1		SYMMCO	ST-48112-6	SYMMCO THRUST BEARING
4	1	MK220-2			JIB LOWER BRACKET
3	1		CROSBY	CROSBY_G-209A_0_63_1017516	ANCHOR SHACKLE 5/8 509
2	1		REXNORD	FC-B22424H	SHERICAL BEARING
1	1	MK221			JIB WELDMENT

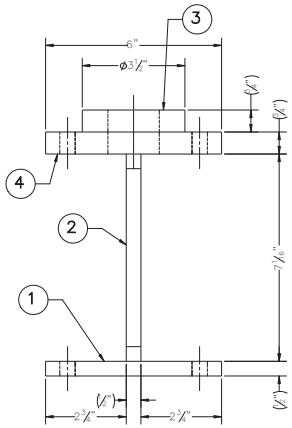


SECTION A-A





SECTION B-B



JIB LOWER BRACKET
SCALE: 3"=1'-0"
TPU PART NO.: MK220-2

ITEM NO.	QTY.	DESCRIPTION	LENGTH
4	1	FB 0.75 x 6	1'
3	1	PL 3/4	
2	1	FB 0.5 x 6	7 1/16"
1	1	FB 0.5 x 6	7 1/4"

REFERENCE DRAWINGS

MK205-1 COVER SHEET & DRAWING INDEX
MK221 JIB WELDMENT

NOTES

1. MAKE NO SUBSTITUTIONS OR MODIFICATIONS WITHOUT APPROVAL OF THE ENGINEER.
2. ALL WELDING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF AWS PUBLICATION D1.1. WELD METAL SHALL BE E70XX OR E71XX MATERIAL.
3. REMOVE ALL WELD SPLATTER AND GRIND SMOOTH ALL ARC STRIKES. REMOVE AND GRIND SMOOTH ALL TEMPORARY WELDS.
4. GRIND SMOOTH ALL SHARP EDGES AND CORNERS.
5. 100% VT ALL WELDS.
6. MATERIAL: ASTM A36
7. FINISH HOT DIP GALVANIZE

WELDS NOT SHOWN SHALL BE CONTINUOUS BOTH SIDES

THICKEST PLATE:	$t \leq \frac{1}{4}$	$\frac{1}{4} < t \leq \frac{1}{2}$	$\frac{1}{2} < t \leq \frac{3}{4}$	$\frac{3}{4} < t$
WELD (AWS D1.1)	$\frac{3}{16}$	$\frac{5}{16}$	$\frac{1}{2}$	$\frac{5}{8}$

MACHINING TOLERANCES UNLESS OTHERWISE NOTED:
FRACTIONAL ±1/64
DECIMAL ±.010
ANGLE ±1°-0"

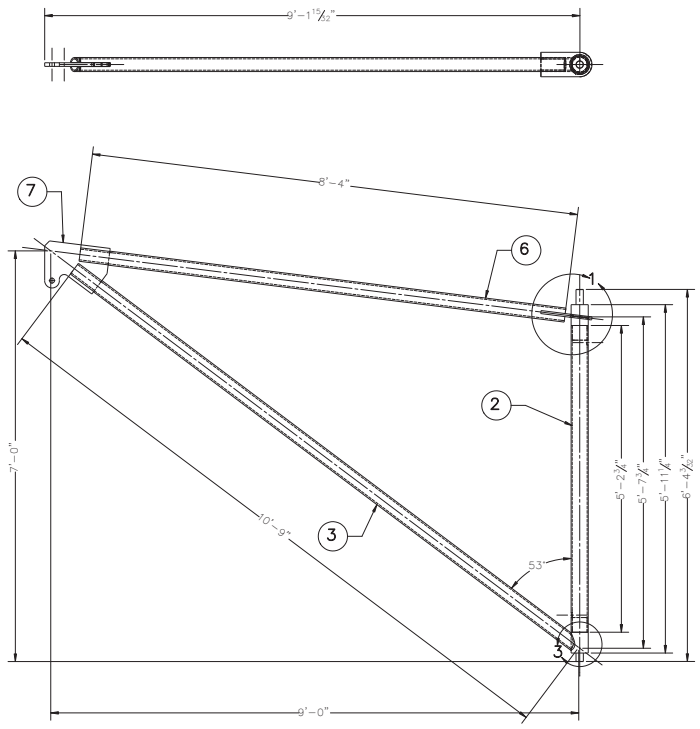
REV. NO. 0

Belvin, Steve

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

COWLITZ HYDROELECTRIC PROJECT
MAYFIELD POWERHOUSE
DRAFT TUBE GATE HOIST
JIB ASSEMBLY & PARTS

REVIEWED	DRAWN	STAMPED
	KAJ	SJB
APPROVED	1/13/2022 DATE	AS SHOWN SCALE
Nathan L. Manning		DRAWING NO. MK220



JIB WELDMENT
SCALE: 1"=1'-0"
TPU PART NO.: MK221

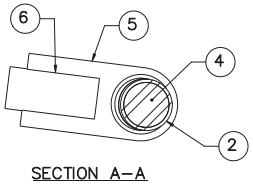
ITEM NO.	QTY.	DESCRIPTION	LENGTH	MATERIAL
7	1	PL 3/4"		ASTM A36
6	1	PIPE 2 1/2 INCH SCH 80	8'-4"	ASTM A53 GRADE 'B'
5	1	PL 5/8"		ASTM A36
4	1	RB 3 1/2" DIA.	10 3/8"	ASTM A108
3	1	PIPE 2 1/2 INCH SCH 80	10'-8 1/4"	ASTM A53 GRADE 'B'
2	1	PIPE 3 INCH SCH 40	5'-2 3/4"	ASTM A53 GRADE 'B'
1	1	RB 3 1/2" DIA.	9"	ASTM A108

NOTES

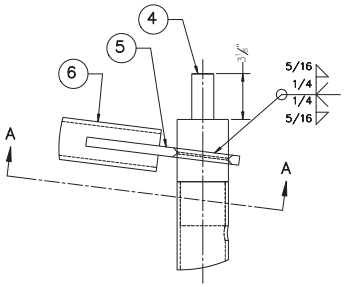
1. MAKE NO SUBSTITUTIONS OR MODIFICATIONS WITHOUT APPROVAL OF THE ENGINEER.
2. ALL WELDING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF AWS PUBLICATION D1.1. WELD METAL SHALL BE E70XX OR E71XX MATERIAL.
3. REMOVE ALL WELD SPLATTER AND GRIND SMOOTH ALL ARC STRIKES. REMOVE AND GRIND SMOOTH ALL TEMPORARY WELDS.
4. GRIND SMOOTH ALL SHARP EDGES AND CORNERS.
5. 100% VT ALL WELDS.
6. MATERIAL: ASTM A36
7. FINISH HOT DIP GALVANIZE

WELDS NOT SHOWN SHALL BE CONTINUOUS BOTH SIDES

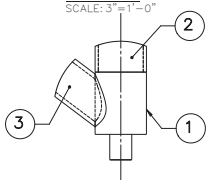
THICKEST PLATE:	$t \leq \frac{1}{4}$	$\frac{1}{4} < t \leq \frac{1}{2}$	$\frac{1}{2} < t \leq \frac{3}{4}$	$\frac{3}{4} < t$
WELD (AWS D1.1)	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{1}{4}$	$\frac{5}{16}$



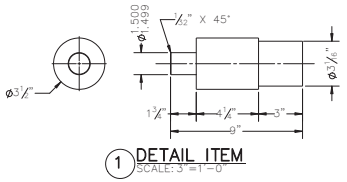
SECTION A–A



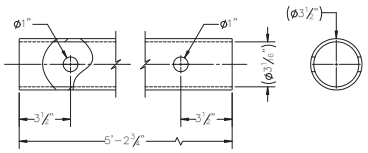
DETAIL 1
SCALE: 3"=1'-0"



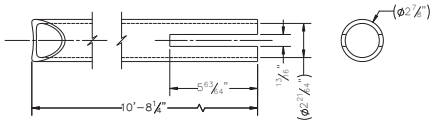
DETAIL 3
SCALE: 3"=1'-0"



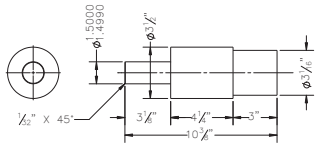
1 DETAIL ITEM
SCALE: 3"=1'-0"



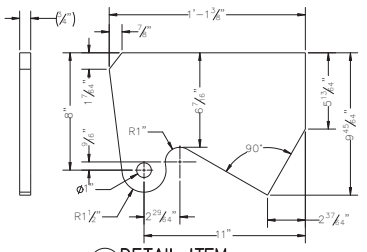
2 DETAIL ITEM
SCALE: 3"=1'-0"



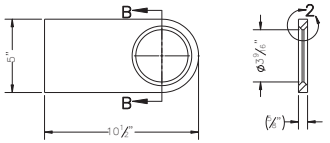
3 DETAIL ITEM
SCALE: 3"=1'-0"



4 DETAIL ITEM
SCALE: 3"=1'-0"

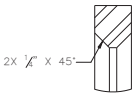


7 DETAIL ITEM
SCALE: 3"=1'-0"

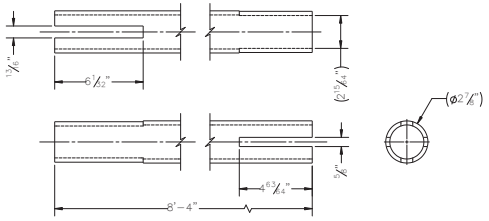


SECTION B–B

5 DETAIL ITEM
SCALE: 3"=1'-0"



DETAIL 2



6 DETAIL ITEM
SCALE: 3"=1'-0"

REFERENCE DRAWINGS

MK205–1 COVER SHEET & DRAWING INDEX
MK220 JIB ASSEMBLY & PARTS

MACHINING TOLERANCES UNLESS OTHERWISE NOTED:
FRACTIONAL ±1/64
DECIMAL ±.010
ANGLE ±1°–0"

REV. NO. 0

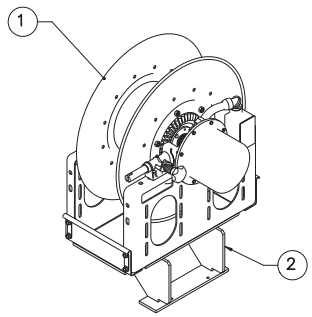
CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

COWLITZ HYDROELECTRIC PROJECT
MAYFIELD POWERHOUSE
DRAFT TUBE GATE HOIST
JIB WELDMENT

REVIEWED	DRAWN	STAMPED
	KAJ	SJB
APPROVED	1/13/2022	AS SHOWN
Nathan L. Manning	DATE	SCALE

DRAWING NO.
MK221

Belvin, Steve

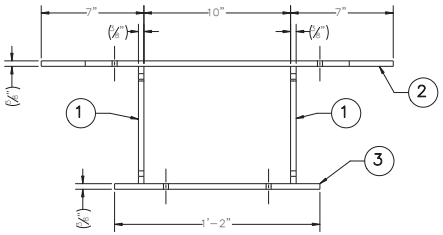


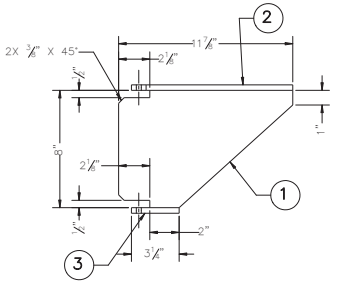
CABLE REEL ASSEMBLY

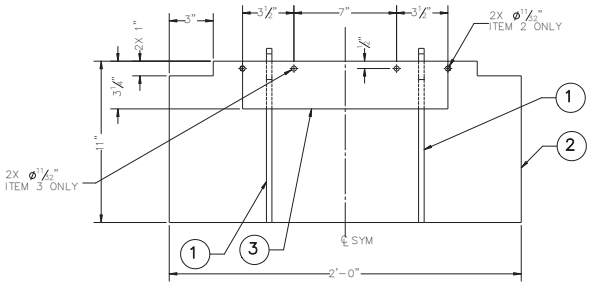
SCALE: 1½"=1'-0"

2	1	MK222-2			CABLE REEL MOUNT BRACKET
1	1	–	HANNAY	6616-25-26	CABLE REEL
ITEM NO.	QTY.	TPU Part No.	MFR	MFR PART NO.	DESCRIPTION

NOTE: ALSO PURCHASE CABLE REEL 661-25-26 WITH ACCESSORY 'B2' ROLLERS, QUANTITY TWO (2) ROLLER SETS.







CABLE REEL MOUNT BRACKET

SCALE: 3"=1'-0"
TPU PART NO.: MK222-2
MATERIAL: ASTM A36 Steel
FINISH: HOT DIP GALVANIZE

3	1	PL 3/8"
2	1	PL 3/8"
1	2	PL 3/8"
ITEM NO.	QTY.	DESCRIPTION

REFERENCE DRAWING

MK205-1 COVER SHEET & DRAWING INDEX

NOTES

1. MAKE NO SUBSTITUTIONS OR MODIFICATIONS WITHOUT APPROVAL OF THE ENGINEER.
2. ALL WELDING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF AWS PUBLICATION D1.1. WELD METAL SHALL BE E70XX OR E71XX MATERIAL.
3. REMOVE ALL WELD SPLATTER AND GRIND SMOOTH ALL ARC STRIKES. REMOVE AND GRIND SMOOTH ALL TEMPORARY WELDS.
4. GRIND SMOOTH ALL SHARP EDGES AND CORNERS.
5. 100% VT ALL WELDS.
6. MATERIAL: ASTM A36

WELDS NOT SHOWN SHALL BE CONTINUOUS BOTH SIDES

THICKEST PLATE:	$t \leq \frac{1}{4}$	$\frac{1}{4} < t \leq \frac{1}{2}$	$\frac{1}{2} < t \leq \frac{3}{4}$	$\frac{3}{4} < t$
WELD (AWS D1.1)	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{1}{2}$	$\frac{5}{16}$

MACHINING TOLERANCES UNLESS OTHERWISE NOTED:
FRACTIONAL ±1/64
DECIMAL ±.010
ANGLE ±1°

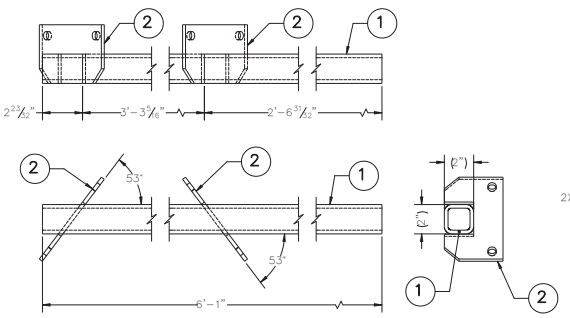
REV. NO. 0

Belvin, Steve

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

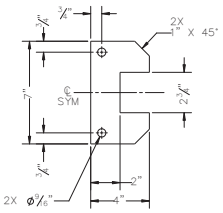
COWLITZ HYDROELECTRIC PROJECT
MAYFIELD POWERHOUSE
DRAFT TUBE GATE HOIST
CABLE REEL ASS'Y & PARTS

REVIEWED	DRAWN: KAJ	STAMPED: SJB
APPROVED: Nathan L. Manning	DATE: 1/18/2022	SCALE: AS SHOWN
		DRAWING NO.: MK222

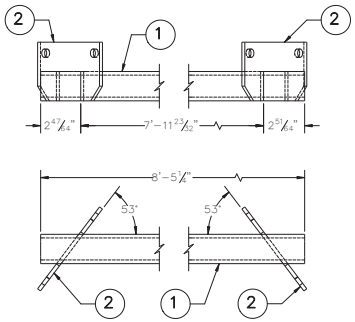


ELECTRICAL CABINET SUPPORT, UPPER 3
SCALE: 3"=1'-0"

ITEM NO.	QTY.	DESCRIPTION	LENGTH
2	2	FB 0.25 x 4	7"
1	1	TS2x2x0.25	6'-1"

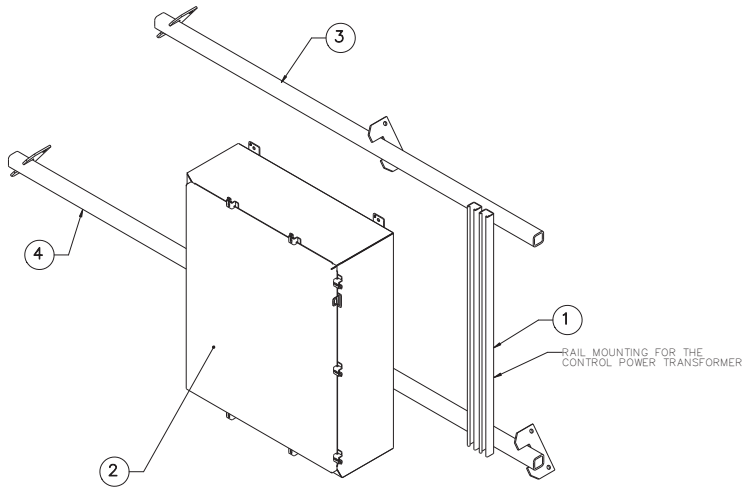


2 DETAIL ITEM



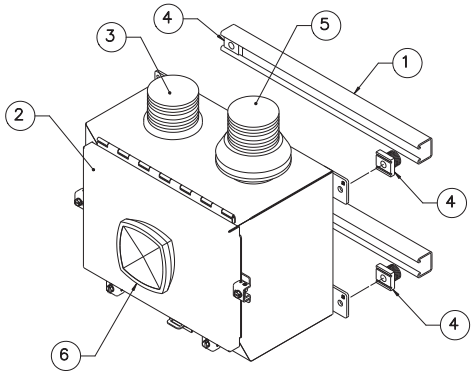
ELECTRICAL CABINET SUPPORT, LOWER 3
SCALE: 3"=1'-0"

ITEM NO.	QTY.	DESCRIPTION	LENGTH
2	2	FB 0.25 x 4	7"
1	1	TS2x2x0.25	8'-5 1/4"



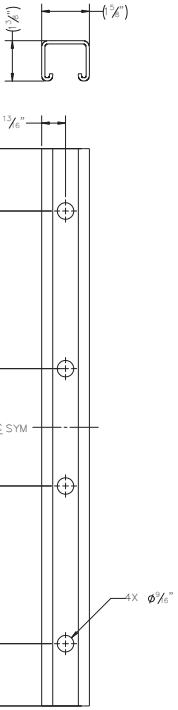
ELECTRICAL CABINET SUPPORT ASSEMBLY
SCALE: 1 1/2"=1'-0"
TPU PART NO.: MK223-1

ITEM NO.	QTY.	DESCRIPTION	PART NO.	MFR
4	1	ELECTRICAL CABINET SUPPORT, LOWER		
3	1	ELECTRICAL CABINET SUPPORT, UPPER		
2	1	ELECTRICAL CABINET	A36H3010SSLP	HOFFMAN
1	2	SUPERSTRUT C-100 SERIES STAINLESS CHANNEL	SERIES C-1000	SUPERSTRUT



HORN AND LIGHTS ELECTRICAL BOX ASSEMBLY
SCALE: 3"=1'-0"
TPU PART NO.: MK223-2

ITEM NO.	QTY.	DESCRIPTION	PART NO.	MFR
6	1	WARNING HORN	876-N53	EDWARDS SIGNALS
5	1	STORBE WITH INTREGRATED HORN	95A-N5	EDWARDS SIGNALS
4	4	SPRING NUT	A-100	SUPERSTRUT
3	1	LIGHT, STEADY-ON	105SINHR-N5	EDWARDS SIGNALS
2	1	ELECTRICAL CABINET	A16H12BLP	HOFFMAN
1	2	SUPERSTRUT C-1000 STAINLESS CHANNEL	SERIES C-1000	SUPERSTRUT



1 SUPERSTRUT C-1000 FRAMING CHANNEL
SCALE: HALF

REFERENCE DRAWING

MK205-1 COVER SHEET & DRAWING INDEX

NOTES:

1. FABRICATED MATERIAL TO BE ASTM A36 AND ASTM A500 GRANDE 'B', WELDS PER AWS D1.1
2. FINISH: HOT DIP GALVANIZE
3. BOLT PLATES TO GANTRY LEGS, TACK TUBES IN PLACE, UNBOLT AND WELD-OUT.

MACHINING TOLERANCES UNLESS OTHERWISE NOTED:
FRACTIONAL ±1/64
DECIMAL ±.010
ANGLE ±1°

REV. NO. 0

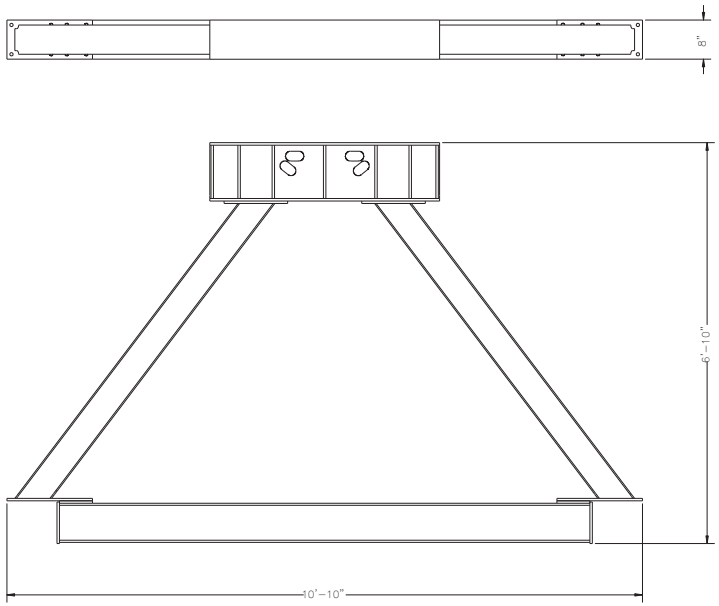
Belvin, Steve

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

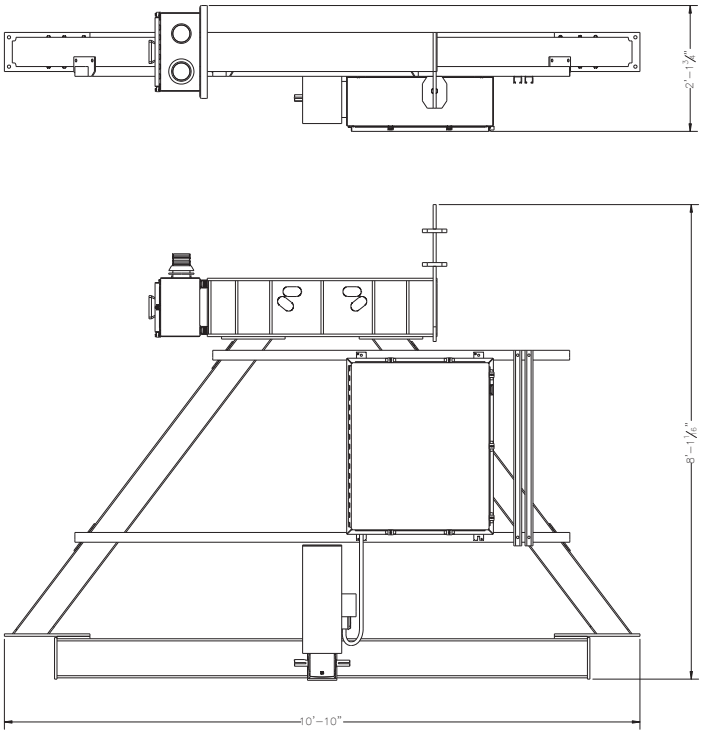
COWLITZ HYDROELECTRIC PROJECT
MAYFIELD POWERHOUSE
DRAFT TUBE GATE HOIST
ELECTRICAL CABINET ASSEMBLY

REVIEWED	DRAWN	STAMPED
	KAJ	SJB
APPROVED	1/20/2022	AS SHOWN
Nathan L. Manning	DATE	SCALE

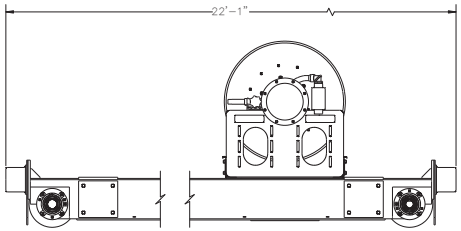
DRAWING NO.
MK223



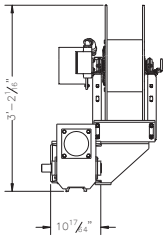
SHIPPING PIECE 1
SCALE: 1"=1'-0"

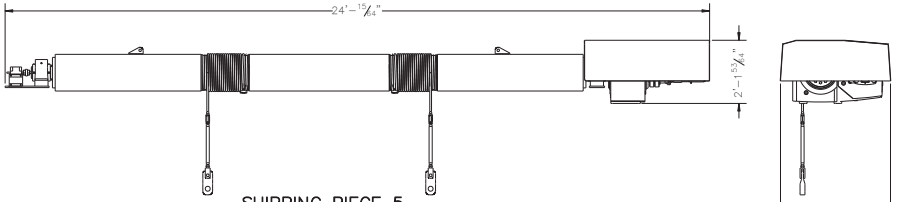


SHIPPING PIECE 2
SCALE: 1"=1'-0"

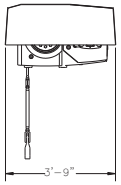


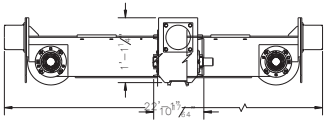
SHIPPING PIECE 3
SCALE: 1"=1'-0"





SHIPPING PIECE 5
SCALE: 1/4"=1'-0"





SHIPPING PIECE 4
SCALE: 1"=1'-0"

NOTE:

THIS DRAWING PROVIDES A SUGGESTED BREAKDOWN FOR SHIPPING THAT PROVIDES FOR A MINIMAL DISSASSEMBLY OF ELECTRICALLY CONNECTED ITEMS. ELECTRICAL CONDUIT LAYOUT AND DESIGN SHOULD HAVE BREAKDOWN FOR SHIPPING IN MIND FROM THE BEGINNING. THE DRAWING IS NOT A COMPREHENSIVE SHIPPING BREAKDOWN.

REFERENCE DRAWING

MK205-1 COVER SHEET & DRAWING INDEX

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

COWLITZ HYDROELECTRIC PROJECT
MAYFIELD POWERHOUSE
DRAFT TUBE GATE HOIST
SHIPPING COMPONENTS

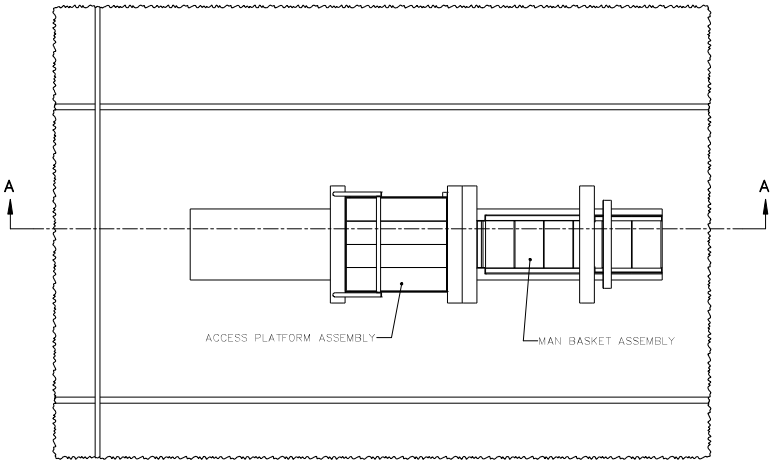
REV. NO. 0

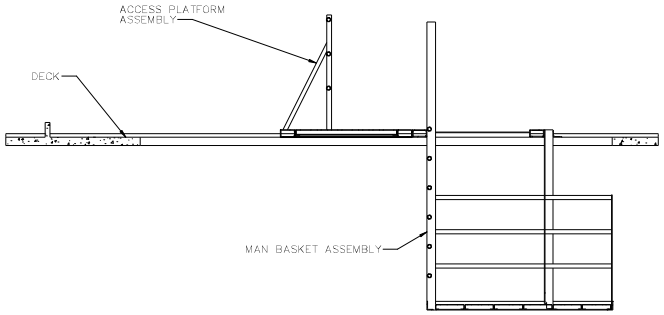
REVIEWED: Belvin, Steve

APPROVED: Nathan L. Manning

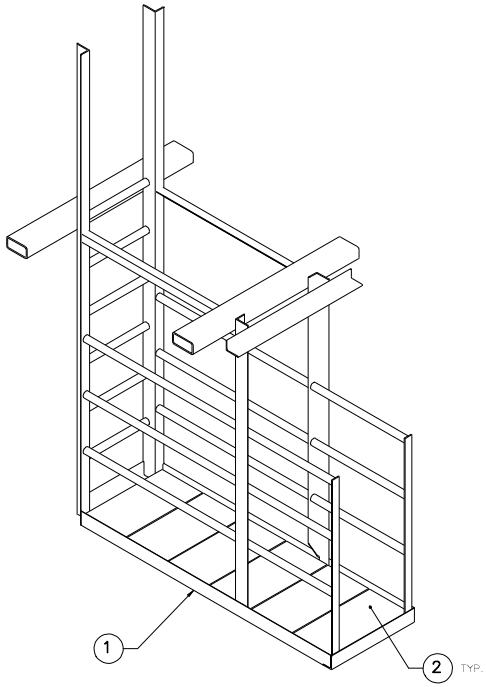
DRAWN: KAJ
STAMPED: SJB
DATE: 2/11/2022
SCALE: AS SHOWN

DRAWING NO: MK224



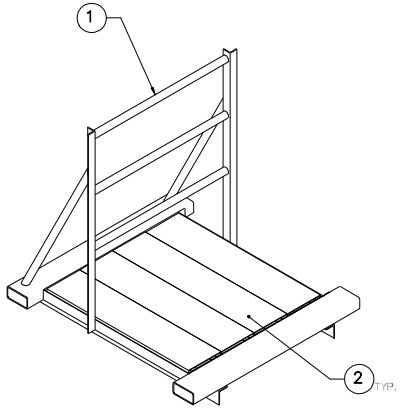


SECTION A–A



MAN BASKET ASSEMBLY
SCALE: 1"=1'-0"

ITEM NO.	QTY.	DESCRIPTION	VENDOR	MFR PART NO
2	6	GRATING PLANK 11 3/4" WIDE x2" DEEP	McNICHOLS	2405151410
1	1	MAN BASKET WELDMENT		



ACCESS PLATFORM ASSEMBLY
SCALE: 1"=1'-0"

ITEM NO.	QTY.	DESCRIPTION	VENDOR	MFR PART NO
2	4	GRATING PLANK 11 3/4" WIDE x2" DEEP	McNICHOLS	2404201410
1	1	MAN BASKET ACCESS PLATFORM		

REFERENCE DRAWINGS

MK231 MAN BASKET WELDMENT
MK232 MAN BNASKET DETAIL ITEMS
MK233 ACCESS PLATFORM WELDMENT

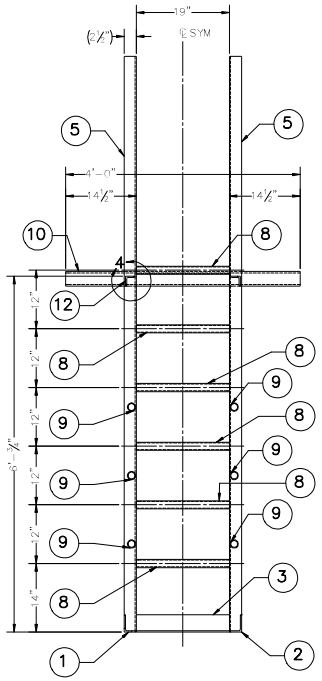
CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

REV. NO. 0

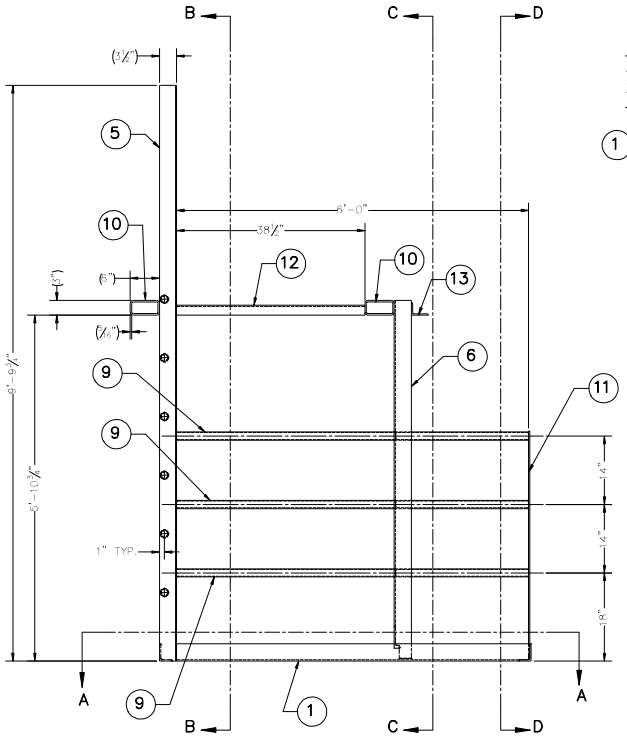
COWLITZ HYDROELECTRIC PROJECT
MAYFIELD DRAFT TUBE GATE SLOT ACCESS EQUIPMENT
MAN BASKET & ACCESS PLATFORM

REVIEWED: Henry, Jason
DRAWN: KAJ
STAMPED: TDN
DATE: 04/15/2022
SCALE: AS SHOWN
APPROVED:
DRAWING NO.: MK230

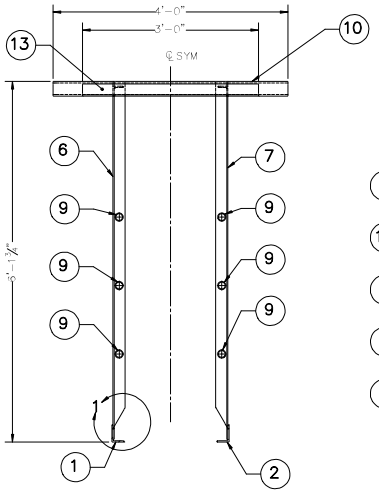
4/28/2022



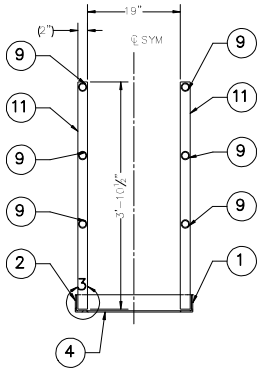
SECTION B-B



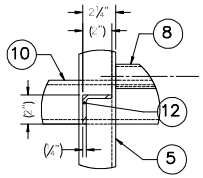
ELEVATION
SCALE: 1"=1'-0"



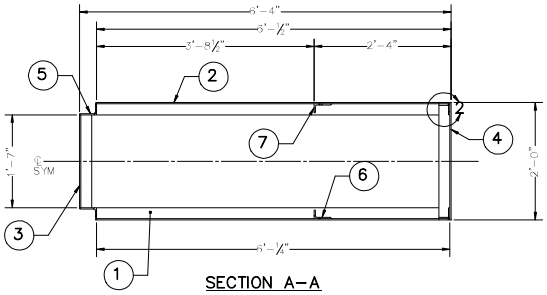
SECTION C-C



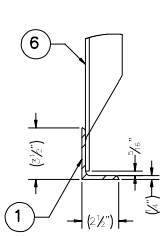
SECTION D-D



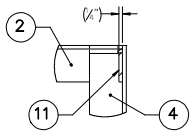
DETAIL 4
SCALE: 3"=1'-0"



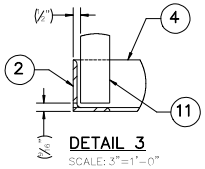
SECTION A-A



DETAIL 1
SCALE: 3"=1'-0"



DETAIL 2
SCALE: 3"=1'-0"



DETAIL 3
SCALE: 3"=1'-0"

ITEM NO.	QTY.	DESCRIPTION	LENGTH	DETAILED
13	1	L3.5x2.5x0.25	3'-0"	NO
12	2	L2x2x0.25	3'-2 1/2"	NO
11	2	FB 0.25 x 2	3'-10 1/2"	NO
10	2	HSS6x3x0.3125	4'-0"	NO
9	6	SCHD 40 PIPE 1 1/4"	6'-0"	NO
8	6	SCHD 40 PIPE 1 1/4"	1'-7"	NO
7	1	L3.5x2.5x0.25	6'-1 1/4"	YES/MK232
6	1	L3.5x2.5x0.25	6'-1 3/16"	YES/MK232
5	2	L3.5x2.5x0.25	9'-9 3/4"	NO
4	1	L3.5x2.5x0.25	2'-0"	NO
3	1	L3.5x2.5x0.25	1'-7"	NO
2	1	L3.5x2.5x0.25	6'- 1/4"	YES/MK232
1	1	L3.5x2.5x0.25	5'- 1/4"	YES/MK232

NOTES

1. MAKE NO SUBSTITUTIONS OR MODIFICATIONS WITHOUT APPROVAL OF THE ENGINEER.
2. ALL WELDING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF AWS PUBLICATION D1.1. WELD METAL SHALL BE E70XX OR E71XX MATERIAL.
3. REMOVE ALL WELD SPLATTER AND GRIND SMOOTH ALL ARC STRIKES. REMOVE AND GRIND SMOOTH ALL TEMPORARY WELDS.
4. GRIND SMOOTH ALL SHARP EDGES AND CORNERS.
5. 100% VT ALL WELDS.
6. MATERIAL: ASTM A36

WELDS NOT SHOWN SHALL BE CONTINUOUS BOTH SIDES

THICKEST PLATE:	$t \leq \frac{1}{4}$	$\frac{1}{4} < t \leq \frac{1}{2}$	$\frac{1}{2} < t \leq \frac{3}{4}$	$\frac{3}{4} < t$
WELD (AWS D1.1)	$\frac{1}{8}$	$\frac{5}{16}$	$\frac{1}{4}$	$\frac{5}{16}$

REFERENCE DRAWINGS

MK230 MAN BASKET & ACCESS PLATFORM
MK232 ACCESS PLATFORM DETAIL ITEMS

MACHINING TOLERANCES UNLESS OTHERWISE NOTED:
FRACTIONAL ±1/64
DECIMAL ±.010
ANGLE ±1°

REV. NO. 0

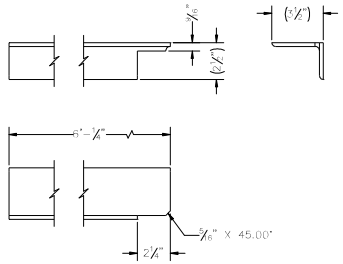
4/28/2022

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

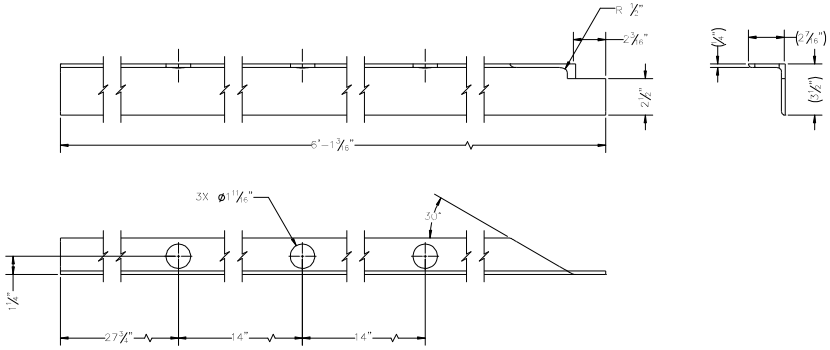
COWLITZ HYDROELECTRIC PROJECT

MAYFIELD DRAFT TUBE GATE SLOT ACCESS EQUIPMENT MAN BASKET WELDMENT

REVIEWED	DRAWN	STAMPED
Henry, Jason	KAJ	TDN
APPROVED	04/15/2022 DATE	AS SHOWN SCALE
	DRAWING NO.	MK231



1 2 DETAIL ITEM 2 (SHOWN)
DETAIL ITEM 1 OPPOSITE HAND (NOT SHOWN)
SCALE: 3"=1'-0"



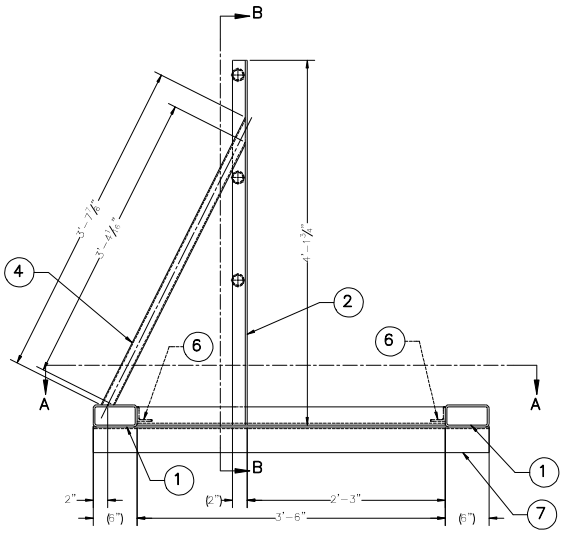
6 7 DETAIL ITEM 6 (SHOWN)
ITEM 7 OPPOSITE HAND (NOT SHOWN)
SCALE: 3"=1'-0"

REFERENCE DRAWINGS

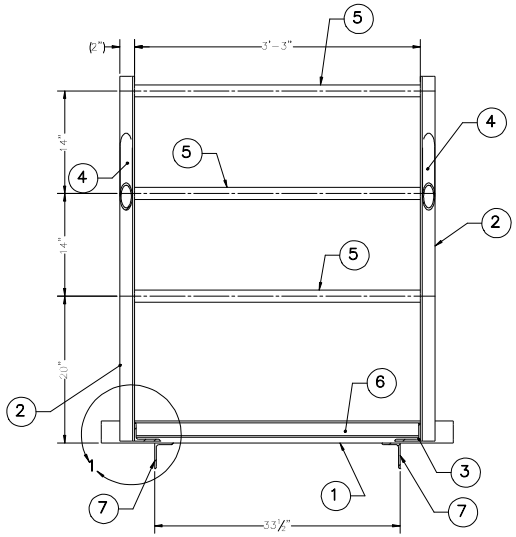
MK230 MAN BASKET & ACCESS PLATFORM
MK231 MAN BASKET WELDMENT

MACHINING TOLERANCES UNLESS OTHERWISE NOTED: FRACTIONAL ±1/64 DECIMAL ±.010 ANGLE ±1'-0"	CITY OF TACOMA DEPARTMENT OF PUBLIC UTILITIES LIGHT DIVISION
REV. NO. 0	COWLITZ HYDROELECTRIC PROJECT
4/28/2022	MAYFIELD DRAFT TUBE GATE SLOT ACCESS EQUIPMENT MAN BASKET DETAIL ITEMS
REVIEWED Henry, Jason	DRAWN KAJ / STAMPED TDN
APPROVED	04/15/2022 DATE / AS SHOWN SCALE
	DRAWING NO. MK232

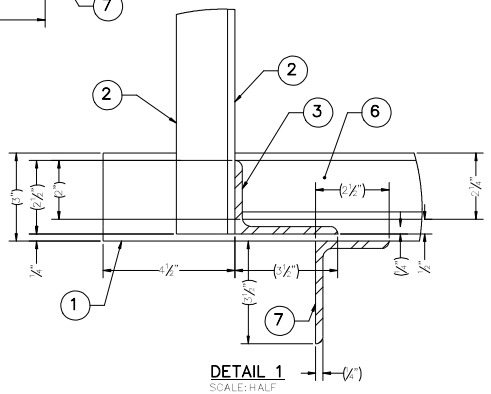
ITEM NO.	QTY.	DESCRIPTION	LENGTH
7	2	L3.5x2.5x0.25	4'-6"
6	2	L2x2x0.25	3'-4 1/2"
5	3	SCHD 40 PIPE 1 1/4"	3'-3"
4	2	SCHD 40 PIPE 1 1/4"	3'-7 7/8"
3	2	L3.5x2.5x0.25	3'-6"
2	2	L2x2x0.25	4'-1 3/4"
1	2	HSS6x3x0.25	4'-0"



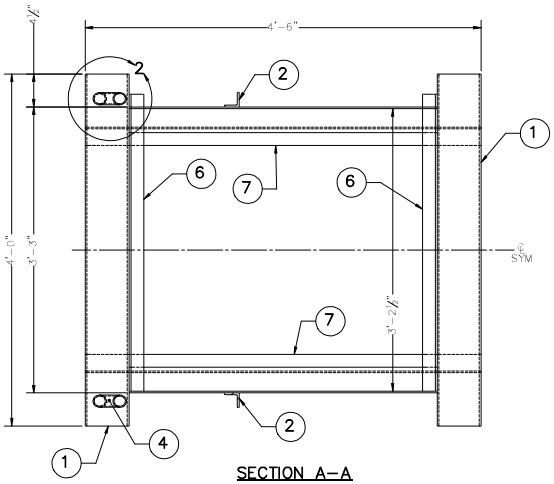
ELEVATION
SCALE: 1½"=1'-0"



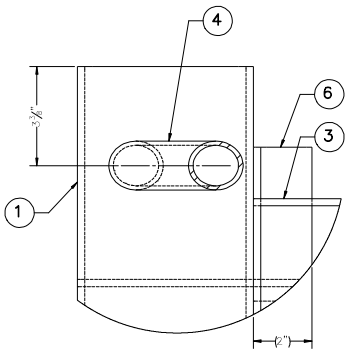
SECTION B–B



DETAIL 1
SCALE: HALF



SECTION A–A
SCALE: 1½"=1'-0"



DETAIL 2
SCALE: HALF

REFERENCE DRAWINGS

MK230 MAN BASKET & ACCESS PLATFORM

NOTES

1. MAKE NO SUBSTITUTIONS OR MODIFICATIONS WITHOUT APPROVAL OF THE ENGINEER.
2. ALL WELDING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF AWS PUBLICATION D1.1. WELD METAL SHALL BE E70XX OR E71XX MATERIAL.
3. REMOVE ALL WELD SPLATTER AND GRIND SMOOTH ALL ARC STRIKES. REMOVE AND GRIND SMOOTH ALL TEMPORARY WELDS.
4. GRIND SMOOTH ALL SHARP EDGES AND CORNERS.
5. 100% VT ALL WELDS.
6. MATERIAL: ASTM A36

WELDS NOT SHOWN SHALL BE CONTINUOUS BOTH SIDES

THICKEST PLATE:	$t \leq \frac{1}{4}$	$\frac{1}{4} < t \leq \frac{1}{2}$	$\frac{1}{2} < t \leq \frac{3}{4}$	$\frac{3}{4} < t$
WELD (AWS D1.1)	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{1}{2}$	$\frac{5}{8}$

MACHINING TOLERANCES UNLESS OTHERWISE NOTED:
FRACTIONAL ±1/64
DECIMAL ±.010"
ANGLE ±1°

REV. NO. 0

4/28/2022

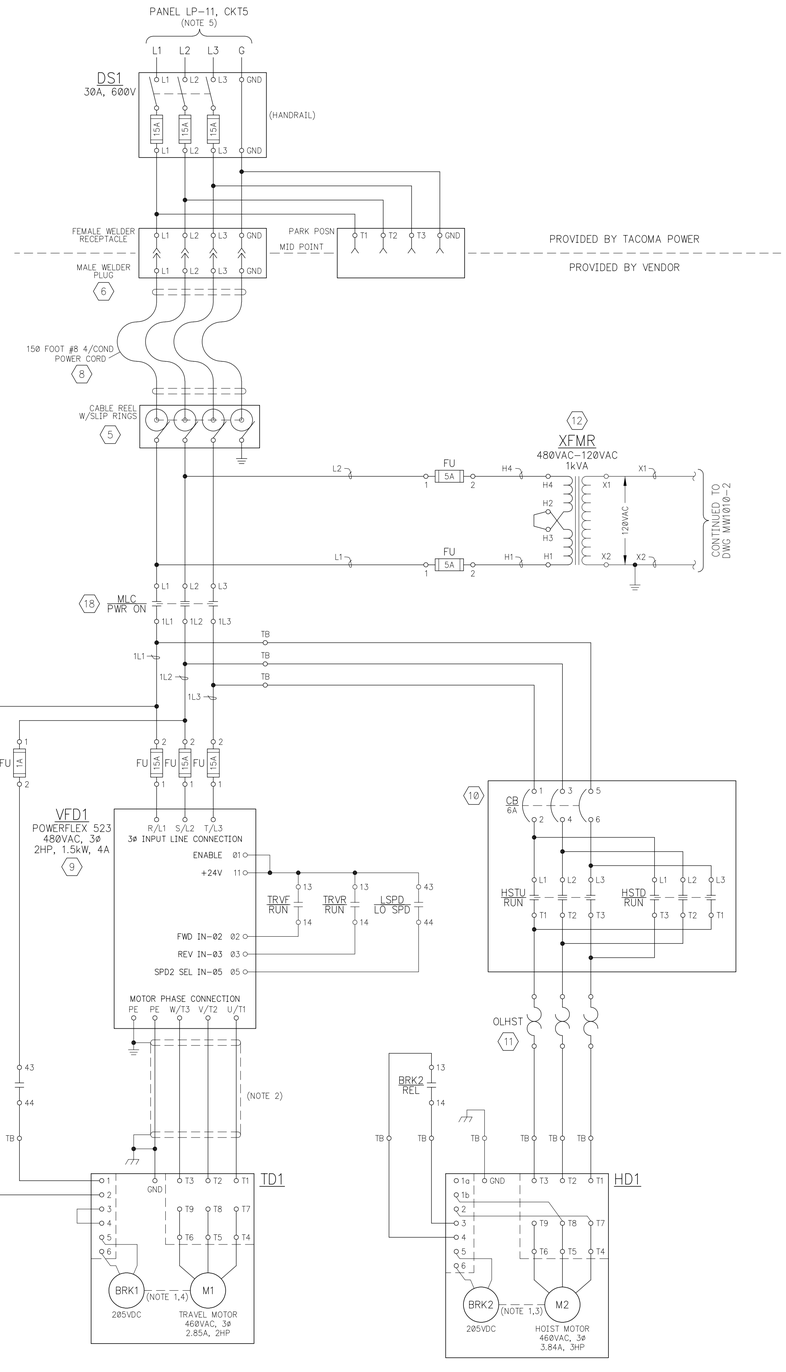
CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

COWLITZ HYDROELECTRIC PROJECT

MAYFIELD DRAFT TUBE GATE SLOT
ACCESS EQUIPMENT
ACCESS PLATFORM WELDMENT

REVIEWED	DRAWN	STAMPED
Henry, Jason	KAJ	TDN
DATE	04/15/2022	AS SHOWN
APPROVED	SCALE	

DRAWING NO. MK233



DRAWING REFERENCES

MK205-1	DRAFT TUBE GATE HOIST
MK206-1	HOIST ASSEMBLY
MK216-1	TRAVEL DRIVE ASSEMBLY
ML1506	ELECTRICAL POWER PANELS LAYOUT
MW1010-2	DRAFT TUBE GATE HOIST 120VAC CONTROL SCHEMATIC

LEGEND

⟨#⟩	INDICATES BILL OF MATERIAL ITEM NUMBER SEE APPENDIX C OF THE SPECIFICATION
BRK#	BRAKE
CB	CIRCUIT BREAKER
DS#	FUSED DISCONNECT
FU	FUSE
HD#	HOIST DRIVE
HSTD	HOIST TRAVEL DOWN
HSTU	HOIST TRAVEL UP
LSPD	LOW SPEED
M#	MOTOR
MLC	MAIN LINE CONTACTOR
OLHST	HOIST OVERLOAD
REL	RELEASE
TD#	TRAVEL DRIVE
TRVF	TRAVEL FORWARD
TRVR	TRAVEL REVERSE
VFD#	VARIABLE FREQUENCY DRIVE
XFMR	TRANSFORMER

NOTES

1. MECHANICALLY CONNECTED.
2. SHIELDED OR ARMORED CABLE WITH PVC JACKET.
3. HOIST BRAKING METHOD: NORD GU10ØD, STANDARD RELEASE, FAST STOP
4. TRAVEL BRAKING METHOD: NORD VBR101
5. CIRCUIT BREAKER IN LP-11 WILL BE PROVIDED BY TACOMA POWER AND SIZED PER MANUFACTURER.
6. ALL WIRE SIZES, FUSE, AND BREAKER SIZES SHALL BE DETERMINED BY THE MANUFACTURER.

FOR BIDDING PURPOSES ONLY

REVISION NO. 0

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

MAYFIELD POWERHOUSE
DRAFT TUBE GATE HOIST 460VAC POWER SCHEMATIC

SUBMITTED		DRAWN	STAMPED
—		VAF	—
		DATE	
		—	
APPROVED		DRAWING NO.	
—		MW1010-1	

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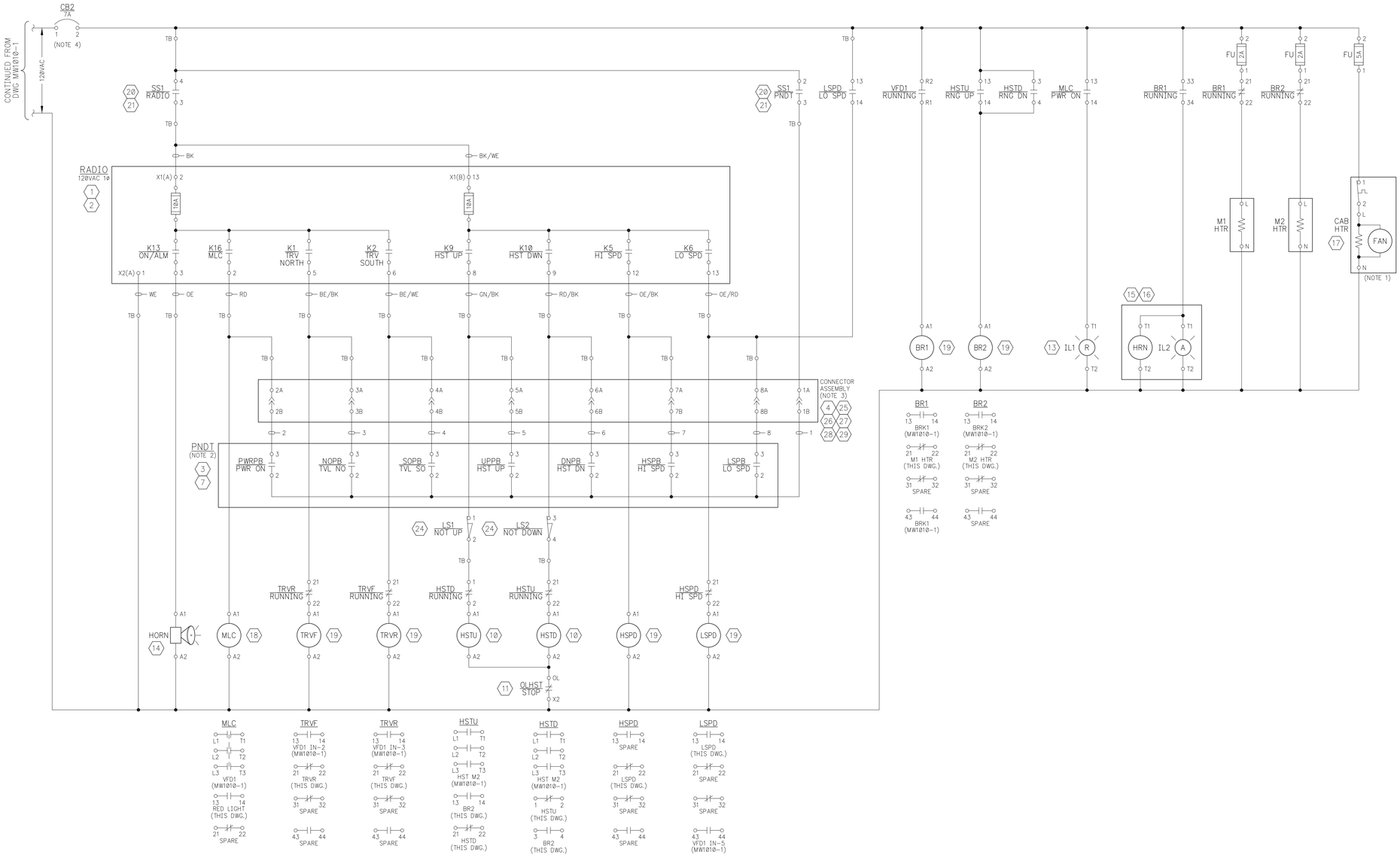

DRAWING REFERENCES

ML1506	ELECTRICAL POWER PANELS LAYOUT
MW1010-1	DRAFT TUBE GATE HOIST 460VAC POWER SCHEMATIC

LEGEND

⟨#⟩	INDICATES BILL OF MATERIAL ITEM NUMBER SEE APPENDIX C OF THE SPECIFICATION
BRK#	BRAKE
DNPB	HOIST DOWN PUSH BUTTON
FU	FUSE
HSPB	HIGH SPEED PUSH BUTTON
HSPD	HIGH SPEED
HSTD	HOIST TRAVEL DOWN
HSTU	HOIST TRAVEL UP
HTR	HEATER
LS#	LIMIT SWITCH
LSPB	LOW SPEED PUSH BUTTON
LSPD	LOW SPEED
MLC	MOTOR CONTACTOR
NOPB	NORTH PUSH BUTTON
OLHST	HOIST OVERLOAD
PNDT	PENDANT
PWRPB	POWER ON PUSH BUTTON
SOPB	SOUTH PUSH BUTTON
SS#	SELECTOR SWITCH
TRVF	TRAVEL FORWARD
TRVR	TRAVEL REVERSE
UPPB	HOIST UP PUSH BUTTON
VFD#	VARIABLE FREQUENCY DRIVE

NOTES

1. SPACE HEATER USED MUST BE 400W MINIMUM.
2. PENDANT WILL BE UNPLUGGED AND STOWED AWAY, UNLESS NEEDED FOR OPERATING THE MACHINE DUE TO FAILED WIRELESS CONTROLS.
3. MODULAR CONNECTOR ASSEMBLY INCLUDING: BASE HOUSING, CABLE GLAND, PROTECTIVE COVER, HOOD, MALE INSERT, & FEMALE INSERT. SEE BILL OF MATERIAL ITEM NUMBERS 4, 25, 26, 27, 28, & 29.
4. ALL WIRE SIZES, FUSE, AND BREAKER SIZES SHALL BE DETERMINED BY THE MANUFACTURER.

FOR BIDDING PURPOSES ONLY

REVISION NO. 0

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

MAYFIELD POWERHOUSE
DRAFT TUBE GATE HOIST
120VAC CONTROL
SCHEMATIC

SUBMITTED	DRAWN	STAMPED
—	VAF	—
	DATE: —	
APPROVED: —	DRAWING NO.	MW1010-2

FILED IN: C:\Users\vfernando\OneDrive - City of Tacoma\Documents\Workspace\MW1010-2.dwg SAVED: vfernando 4/22/2022 3:21 PM PLOTTED: Fernando, Victor 4/27/2022 2:44 PM

CONTRACT

Resolution No.
Contract No.

This Contract is made and entered into effective this _____ day of Choose an item. 20 , ("Effective Date") by and between the City of Tacoma, a Municipal Corporation of the State of Washington ("City"), and ("Contractor").

That in consideration of the mutual promises and obligations hereinafter set forth the Parties hereto agree as follows:

I. Contractor shall fully execute and diligently and completely perform all work and provide all services and deliverables described herein and in the items listed below each of which are fully incorporated herein and which collectively are referred to as "Contract Documents":

1. Specification No. and together with all authorized addenda.
2. Contractor's submittal (or specifically described portions thereof) dated submitted in response to Specification No. and .
3. Describe with specific detail and list separately any other documents that will make up the contract (fee schedule, work schedule, authorized personnel etc.) or any other additional items mutually intended to be binding upon the parties.

Remove this paragraph and #1 and #2 if there are no additional attachments to the contract (attachments would be things other than a specific, contract, or bonds).

In the event of a conflict or inconsistency between the terms and conditions contained in this document entitled Contract and any terms and conditions contained the above referenced Contract Documents the following order of precedence applies with the first listed item being the most controlling and the last listed item the least controlling:

1. Contract
2. List remaining Contract Documents in applicable controlling order.

II. The total price to be paid by City for Contracts full and complete performance hereunder may not exceed: , plus applicable sales tax.

III. Contractor agrees to accept as full payment hereunder the amounts specified herein and in Contract Documents, and the City agrees to make payments at the times and in the manner and upon the terms and conditions specified. Except as may be otherwise provided herein or in Contract Documents Contractor shall provide and bear the expense of all equipment, work and labor of any sort whatsoever that may be required for the transfer of materials and for constructing and completing the work and providing the services and deliverables required by this Contract.

IV. Contractor acknowledges, and by signing this Contract agrees, that the Indemnification provisions set forth in the controlling Contract Documents, including the Industrial Insurance immunity waiver (if applicable), are totally and fully part of this Contract and, within the context of the competitive bidding laws, have been mutually negotiated by the Parties hereto.

V. Contractor and for its heirs, executors, administrators, successors, and assigns, does hereby agree to the full performance of all the requirements contained herein and in Contract Documents.

VI. It is further provided that no liability shall attach to City by reason of entering into this Contract, except as expressly provided herein.

IN WITNESS WHEREOF, the Parties hereto have accepted and executed, as of the Effective Date stated above, which shall be Effective Date for bonding purposes as applicable.

CITY OF TACOMA:	CONTRACTOR:
By: _____	By: _____
Enter title of dept or div staff w/auth to sign for this $ amt	*Signature*
By: _____	_____
Choose an item.	*Printed Name*

By: _____ _____

Director of Finance *Title*

APPROVED AS TO FORM:

By: _____

City Attorney

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

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: _____ Initiated By: _____
(Supporting Documentation) *(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: _____ Response By: _____
(Supporting Documentation) *(Name)*

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

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

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:

APPENDIX B – MAYFIELD DRAFT TUBE GATE HOIST DOSO

Appendix B

Mayfield Draft Tube Gate Hoist System

Description of System Operation (DOSO)

REFERENCE DRAWINGS

1. ML1506 – Electrical Power Panel Layout
2. MW1010-1 – Draft Tube Gate Hoist 460VAC Power Schematic
3. MW1010-2 – Draft Tube Gate Hoist 120VAC Control Schematic

SYSTEM DESCRIPTION

The Mayfield Draft Tube Gate Hoist is designed to lift and lower Draft Tube stop logs located on the downstream (river) side of Mayfield Powerhouse for Generating Units 41, 42, 43, and 44. This hoist assembly traverses north/south along steel rails embedded in the concrete roadway behind the powerhouse.

After the roadway grate has been removed (manual process by operators), the Hoist is positioned over the open bay by the operator using the electric motor travel drive system.

Stop logs are hoisted by engaging a specially designed lifting adapter. The adapter is suspended from the ends of the two hoist cables. The logs are free to travel up or down in embedded vertical tracks that guide them at each end of the stop log. The hooks are lowered by the operator, using the electric motor drive system, until they engage the lifting lugs on top of the

stop logs. The logs are normally stored in the raised position when normal outflow from the generators is required. The logs are taken from the storage position and lowered in to position to block flow from the river back into the powerhouse and the Draft Tube area. After the stop logs have been set to block flow, maintenance personnel can then pump out the area and work below the water line inside the generator Draft Tube area (runner inspections, etc.).

The Mayfield Draft Tube Gate Hoist is controlled by a hard-wired, relay based electrical system. There is no PLC or programmable logic in this control system.

SYSTEM POWER

1. Disconnect Switch

480 VAC power to operate the Draft Tube Gate Hoist is provided from the Mayfield LP-11 power panel located inside the powerhouse. Power from LP-11 is routed to a fused disconnect located at roughly the mid-travel position of the Draft Tube Gate Hoist. This disconnect is mounted at the handrail on the downstream side of the roadway.

This disconnect provides a way to locally isolate the power going to the Draft Tube Gate Hoist and serves as lockout/tagout (LOTO) point. The disconnect should be switched off whenever plugging/unplugging the power cord at one of the welder receptacles.

2. Welder Plugs

The welder plug provides a means to physically connect the Draft Tube Gate Hoist to the facility power source. The welder plug is 3 wire 4 pole and rated for 30 amps. It provides a convenient way to isolate power from the Draft Tube Gate Hoist.

Two welder plug locations are provided. One is located at the northern end of the hoist travel area. The other plug is located at roughly the mid-travel position near the disconnect switch. When connected to the mid-travel plug, the Draft Tube Gate Hoist can reach all the required lifting positions without having to plug/unplug the power cord. When the hoist assembly is not in use, it will be parked at the north end of the area. At that location, the hoist is plugged in to the park position welder plug so that 120 VAC power is available to run the motor heaters and the cabinet space heater.

3. Power Cord

The Draft Tube Gate Hoist receives power from the facility through a flexible multi-conductor cable. The cable has a tough, abrasion-resistant cover to protect the conductors as the cable gets drug along the ground when the hoist is re-positioned. This cable used for this application is #8 AWG 4-Conductor Type SOOW cable. The power cord is long enough to allow the hoist to reach all the required lifting positions while connected to the mid-travel welder plug (approximately 150 foot long cable).

When the Draft Tube Gate Hoist is parked and not in use, the power cord is wound on to the cable reel for storage. Only a short length is exposed to allow the hoist to connect to the park-position welder plug.

4. Cable Reel

The cable reel is mounted on the side of the Draft Tube Gate Hoist near to the handrail. The cable reel is equipped with slip rings to allow the power cord to be wound/unwound from the cable reel while still passing current to the hoist. The operator uses a hand crank to wind the power cord on to the reel. To pay the power cord off the reel simply loosen the holding brake and pull the power cord off the reel. The reel is also equipped with utility hose reels (guide roller set) to ensure that the power cord does not rub on the metal frame of the cable reel when the power cord pays in /out from the reel.

CONTROL OPTIONS

1. Radio Control

Two control options are available to the operator. The primary control option for the Draft Tube Gate Hoist is to use the radio control (wireless) system. This wireless system is manufactured by Remtron, a division of Cattron Corporation. The wireless control unit consists of two major components; a handheld, portable, battery-powered transmitter and an equipment mounted 120 VAC powered receiver unit.

The operator uses the handheld transmitter to issue commands to the Draft Tube Gate Hoist. The receiver unit interprets the operator commands from the handheld transmitter and switches its embedded control relays to produce the desired action from the Draft Tube Gate Hoist.

The receiver unit is housed in a NEMA 12 housing. To protect the receiver unit from the weather, the receiver unit has been placed inside the electrical enclosure. This location shields the standard flexible “rubber duck” antenna from signals from the handheld transmitter. For this reason, the flexible rubber duck antenna has been replaced with a remote mounted antenna kit from Remtron. The remote antenna is mounted on the outside of the electrical enclosure and provides a clear path to receive signals from the handheld transmitter.

2. Corded Pendant

The secondary control option available to the operator is the corded control pendant. The corded pendant is a backup for the radio control system, should the radio system fail. The corded pendant typically is disconnected and stored in a safe place within the powerhouse. The corded pendant is equipped a flexible umbilical cable. The umbilical cable is terminated on one end with a modular plug that mates with a matching socket mounted on the electrical cabinet.

3. Selector Switch

Too ensure that only one of the two control options is in command of the Draft Tube Gate Hoist at any one time, the operator must utilize the Control Selector Switch SS1, mounted on the front of the electrical enclosure. This selector switch has three positions; RADIO – OFF – PENDANT.

In the RADIO position, 120 VAC is sent to the radio receiver unit, mounted inside the electrical cabinet. In this position, no electrical power is sent to the modular plug/socket for the corded pendant. The corded pendant is inoperative.

In the PENDANT position, 120 VAC is sent to the to the modular plug/socket for the corded pendant mounted on the electrical cabinet. In this position, no power is sent to the radio receiver unit. The radio system is inoperative.

In the OFF Position, no power is delivered to either the radio receiver unit or to the corded pendant modular plug/socket. Both the radio system and the corded pendant are inoperative. The operator is unable to issue commands to the Draft Tube Gate Hoist.

POWERING UP THE SYSTEM

1. Control Buttons - Radio system

Before powering up the Draft Tube Gate Hoist system, the operator should ensure that the disconnect switch at the mid span location is switched OFF. This ensures that 480 VAC power at both welder plugs is off. Put the Control Selector Switch SS1 in the OFF position. Pay out the required length of power cord and connect to the appropriate welder plug. Return the disconnect switch to the ON position.

With 480 VAC power now available at the Draft Tube Gate Hoist, put the Control Selector Switch SS1 in the RADIO position. From the handheld transmitter, momentarily press the ON/ALARM button on the transmitter. When the ON/ALARM button is depressed, the Power ON Warning Horn will sound. This action will cause the Main Line Contactor (MLC) to energize in the electrical control cabinet and the Power ON Light will be illuminated. The Draft Tube Gate Hoist is now ready for motion commands from the operator using buttons on the handheld transmitter.

2. Control Buttons - Corded Pendant

As with the radio control system, before using the corded pendant, the operator should connect the power cord to the appropriate welder plug and apply power to the Draft Tube Gate Hoist using the procedure given above for the radio system.

With 480 VAC power now available at the Draft Tube Gate Hoist, confirm the Control Selector Switch SS1 is in the OFF position. Confirm that the mushroom head E-Stop button on the pendant is pushed in (depressed). Connect the corded pendant plug to the modular socket on the electrical cabinet. Once the corded pendant is properly connected, put the Control Selector Switch SS1 in the PENDANT position.

At the pendant, rotate the E-Stop button. the button will pop to the out (engaged) position. This action will cause the Main Line Contactor (MLC) to energize in the electrical control cabinet and the Power ON Light will be illuminated. The Draft Tube Gate Hoist is now ready for motion commands from the operator using buttons on the corded pendant.

3. Warning Horn

The warning horn sounds to alert personnel in the area that the 480 VAC motor power is being applied to the Stoplog Host.

4. Motor Power-On Light

The red motor power-on light is continuously illuminated any time the MLC is energized and 480 VAC motor power is available at the Draft Tube Gate Hoist

TRAVEL DRIVE OPERATION

1. VFD Control

Unlike the hoist drive, the travel drive motion is control by a variable frequency drive (VFD). The VFD allows the travel drive to produce extended acceleration and deceleration move profiles. The extended accel/decel move profiles ensure that there is no wheelspin, skidding, sliding or excessive load swings when positioning the hoist system over the stoplog access areas. The move profiles make it easy to obtain precise positioning.

In addition, the VFD provides two different operating speeds for the travel drive. When the Draft Tube Gate Hoist needs to be moved a long distance to the next hoisting location, the travel drive can be placed in high-speed mode. In high-speed mode, the travel motor ramps up to 60 hertz speed and operates at the maximum available speed.

When the Draft Tube Gate Hoist needs to be moved with greater precision while over the next hoisting location, the travel drive can be placed in low-speed mode. In low-speed mode, the travel motor ramps up to a maximum of 15 hertz and operates at the low-speed setting. This low-speed setting is adjustable by changing parameters in the VFD.

Travel drive direction is determined by energizing the respective TRVF (forward/south) or the TRVR (reverse/north) control relay in the electrical cabinet. These two control

relays are controlled by pressing the Travel direction control buttons on either the handheld transmitter (if in use) or the corded pendant control (if in use).

2. Speed Range Selection

The travel operating speed can be changed by using the Travel speed selection buttons on either the handheld transmitter (if in use) or the corded pendant control (if in use). Travel drive speed is determined by energizing either the LSPD (low speed) or HSPD (high speed) control relay in the electrical cabinet.

The LSPD control relay latches to the ON state when the LO SPD push button on either the handheld transmitter (if in use) or the corded pendant control (if in use) is momentarily pressed. When latched ON, contacts from the LSPD control relay signal the VFD to run in low-speed mode.

To cancel low-speed operation and return to high-speed operation, momentarily press the HI SPD push button on either the handheld transmitter (if in use) or the corded pendant control (if in use). This will release the latched condition of the LSPD control relay (unlatch) and return the VFD to normal high-speed operation.

3. Brake Release and Set

The travel drive motor is equipped with a position holding brake to prevent unwanted motion of the Draft Tube Gate Hoist during a hoisting operation. The brake is mounted directly to the armature shaft of the travel drive motor. This brake requires power to energize the brake coil, overcoming the brake springs and releasing the brake. If power is removed from the brake coil, the springs automatically re-apply the brake to hold position.

An output relay in the VFD is energized anytime the travel drive motor is operating above 0 hertz (motor moving). The VFD output relay controls the BR1 travel motor brake control relay in the electrical cabinet. The BR1 control relay is responsible to turn 480 VAC power ON/OFF to the BRK1 Travel drive brake rectifier. The travel brake rectifier converts incoming AC power to DC to operate the brake coil. The rectifier can operate as a full wave rectifier or as a half wave rectifier. In full wave mode, the brake coil sees 205 VDC. In half wave mode, the brake coil sees 105 VDC. The full/half wave mode is selected by an electrical connection between terminals 3 and 4 on the rectifier module. For the travel drive, it will operate in half wave mode only and a permanent jumper is applied across terminals 3 and 4.

4. Warning Horn and Strobe Light

Anytime the travel drive brake is release and motion has been initiated, a warning horn will sound to alert personnel in the area that the Draft Tube Gate Hoist is traveling. In addition to the warning horn, a high intensity amber strobe light with flash. This ensures that personnel will be warned even if the environment is particularly noisy, such as during a spill event at the Mayfield Powerhouse.

HOIST OPERATION

1. Motor Starter Control

The hoist drive is controlled by an across-the-line combination reversing motor starter. Sets of auxiliary contacts monitor the status of the forward and reverse contactors. The auxiliary contacts are wired in such a way to prevent both contactors from being energized simultaneously.

In addition, the starter includes an electronic overload relay. Should the hoist motor experience mechanical overloading, the overload relay will trip and latch the motor starter in the off state. The overload relay must be manually reset at the starter before the motor can be energized again.

Hoist drive direction is determined by energizing the respective HSTU (hoist up) or the HSTD (hoist down) control relay in the electrical cabinet. These two control relays are controlled by pressing the Hoist direction control buttons on either the handheld transmitter (if in use) or the corded pendant control (if in use).

2. Brake Release and Set

The hoist drive motor is equipped with a position holding brake to prevent unwanted motion of the Hoist during a hoisting operation. The brake is mounted directly to the armature shaft of the hoist drive motor. This brake requires power to energize the brake coil, overcoming the brake springs and releasing the brake. If power is removed from the brake coil, the springs automatically re-apply the brake to hold position.

Since the hoist motor is driven directly from the 480 VAC line, the power to energize the brake is taken directly from the incoming AC power at the motor connection box. The hoist brake rectifier converts incoming AC power to DC to operate the brake coil. The rectifier can operate as a full wave rectifier or as a half wave rectifier. In full wave mode, the brake coil sees 205 VDC. In half wave mode, the brake coil sees 105 VDC. The full/half wave mode is selected by an electrical connection between terminals 3 and 4 on the rectifier module. For the hoist drive, for a split second it will operate in full wave mode until the brake coil has been fully energized (retracted). Once retracted, the BR2 relay will jumper terminals 3 & 4 and the rectifier shifts to have wave mode and holds the coil in the released position. If the brake coil is being held in half wave mode, the brake set operation occurs much more rapidly than if operating in full wave mode. This is an important feature when used on a vertical hoisting operation.

Auxiliary contacts, located in the motor starter, are energized anytime the hoist drive motor is operating (motor energized). The auxiliary contacts control the BR2 hoist motor brake control relay in the electrical cabinet. Contacts from the BR2 control relay are responsible to jumper terminal 3 & 4 to provide full/half wave selection to the brake rectifier.

3. Hoist Travel Limit Switches

The hoist drum is equipped with rotary cam switches to limit the number of revolutions of the cable drum. If the drum turns too many times in the up direction, the lifting device can contact the drum and damage the hoist cables. If the drum turns too many times in the down direction, the hoist cable can begin winding on the wrong side of the hoist drum causing the lifting device to begin going back up, even though the drum is rotating in the down direction.

The purpose of the travel limit switches is to prevent these events from happening. The normally closed up limit switch opens when the hoist reaches the maximum allowable travel in the up direction. Once the up-limit switch opens the HSTU (hoist up) control relay turns off and the motor starter is de-energized. The motor can no longer turn in the up direction. The only option available to the operator is to go down. Once down far enough, the up-limit switch will again go closed and up travel is once again enabled.

The normally closed down-limit switch opens when the hoist reaches the maximum allowable travel in the down direction. Once the down-limit switch opens the HSTD (hoist down) control relay turns off and the motor starter is de-energized. The motor can no longer turn in the down direction. The only option available to the operator is to go up. Once up far enough, the down-limit switch will again go closed and down travel is once again enabled.

HEATERS

1. Motor Heaters

Power to operate the motor heaters is available anytime the Draft Tube Gate Hoist is connected to the welder plugs and the disconnect is turned ON. These 50-watt heaters minimize condensation from forming within the windings of the motor and increase motor life. When the motor is receiving power, the normal current flow produces enough heat in the windings and the heaters do not need to be on. It is when the motors will be idle and not being powered for long periods of time that these heaters play a role.

When a motor's brake is energized (brake released), the brake control relay (BR1 or BR2) will open a normally closed contact cutting power to the appropriate motor heater. When a motor's brake is not energized (brake set), the motor heater will be energized to help minimize condensation.

2. Control Cabinet Heater

The Draft Tube Gate Hoist control system is operated outdoors in a wet and moist environment. This environment often leads to condensation issues within electrical control panels. The Draft Tube Gate Hoist electrical cabinet is equipped with a 400W

space heater. The space heater keeps the temperature above dew point and prevents condensation from forming inside the cabinet.

The space heater is equipped with an internal thermostat to maintain the desired temperature. The space heater fan circulates the warm air uniformly throughout the cabinet to minimize hot or cold spots.

POWERING THE SYSTEM DOWN

1. Park the system

Before powering the Draft Tube Gate Hoist down for an extended period of time (more than a day) raise the lifting adapter to the full up position and return the Draft Tube Gate Hoist to the parked position. Once at the park position, press the OFF/STOP button on the radio transmitter (if in use) or depress the red Emergency Stop button on the corded pendant (if in use). This will open the Main Line Contactor and isolate both 460VAC 3 phase motors, preventing any movement of the hoist. Verify the MLC is open by confirming the Red Motor Power On light is no longer illuminated. Switch disconnect to the OFF position. Unplug from the mid-travel welder plug. Rewind the excess power cord on to the cable reel. Plug the power cord into the park position welder plug.

Return disconnect to the ON position. It is important that disconnect be left in the ON position to ensure that 120 VAC control power is available to operate the motor heaters and the electrical cabinet space heater. Place the Control Selector Switch SS1 in the OFF position.

APPENDIX C – MAYFIELD DRAFT TUBE GATE HOIST BOM

Appendix C

Panel DTF BILL OF MATERIAL

Item	QTY	SUBSITUTION ALLOWED	MANUFACTUER	PART NUMBER	DESCRIPTION
1	1	NO	REMTRON	25S08A	PATRIOT RADIO CONTROL SYSTEM, XMTR & RCVR, 3 MOTION/1 SPEED + HORN + STOP
2	1	NO	REMTRON	2CAB-9110-A002-A	REMOTE ANTENNA KIT, 9 FT COAX CABLE W/ANTENNA CONNECTOR, MOUNTING BRKT
3	1	YES	SCHNEIDER ELECTRIC	XACA67131	PENDANT CONTROL STATION, 6 PUSH BUTTONS, 1 SPEED WITH 1 ESTOP BUTTON
4	1	YES	HARTING	19 00 000 5092	CABLE GLAND, BRASS BODY, NICKLE PLATED, M25 THREAD, 13-18 MM GRIP RANGE
5	1	NO	HANNAY	6616-25-26	CABLE REEL, CRANK REWIND, PINION BRAKE, 3-POLE, 45 A, 600 V, GUIDE ROLLERS
6	1	NO	APPLETON	ACP3034BCRS	POWERTITE 3-PHASE 3 WIRE/4 POLE 30 AMP RATED PLUG
7	20 FT	YES	Wire & Cable Your Way	SOO16S10-20	16 AWG 10-COND SOOW CABLE, BLACK JACKET, 600 V UL RATED, K1 COLOR SCHEME
8	150 FT	YES	Wire & Cable Your Way	SOO8S4UL-150	8 AWG 4-COND SOOW CABLE, BLACK JACKET, 600 V UL RATED, RD BK WE GN
9	1	NO	ALLEN BRADLEY	25A-D4P0N104	POWERFLEX 523 VFD, 480VAC 3-PH INPUT PWR. 2HP 4 AMPS OUTPUT PWR
10	1	YES	ALLEN BRADLEY	107S-ATD3-CB63C	COMB MTR STARTER, REV, C FRAME CONT 4.0-6.3 AMP (3HP) MTR, 2NO/2NC
11	1	YES	ALLEN BRADLEY	193-ED1CB	3-PH E1 PLUS SOLID STATE OVLD W\DIN RAIL ADPTR, CLASS 10, 1.0 - 5.0 A RANGE
12	1	YES	JEFFERSON	411-0071-000	TRANSFORMER, 240/480 VAC PRI, 120/240 VAC SEC, SINGLE PH, ENCAPSULATED, 1KVA,
13	1	YES	EDWARDS SIGNALING	105SINHR-N5	HALOGEN LIGHT ASSY, RED, PLASTIC LENS, NEMA 4X, 120 VAC
14	1	YES	EDWARDS SIGNALING	876-N5[3]	WARNING HORN ASSY, NEMA 4X ENCLOSURE, ADJ OUTPUT, 120 VAC
15	1	YES	EDWARDS SIGNALING	95A-N5	STROBE LIGHT ASSY W/INTEGRATED HORN, AMBER, PLASTIC LENS, NEMA 4X, 120 VAC
16	1	YES	HOFFMAN	A16H1208SSLP	LIGHTS & HORNS, PANEL BOX, STAINLESS STEEL
17	1	YES	HOFFMAN	DAH4001B	ELECTRIC HEATER, 115V, 400W, ALUMINUM, ADJ 0F TO 100F, BALL BEARING FAN.
18	1	YES	ALLEN BRADLEY	300-C0Y9311	CONTACTOR, 3-POLE, 600 V, 45 A CONTACTS, 1 NO/1 NC AUX CONT, 120 VAC COIL
19	6	YES	ALLEN BRADLEY	700-K22Z-D	MINIATURE CONTROL RELAY, 10 A, 600 V CONTACTS, 2 NO/2 NC, 120 VAC COIL
20	1	YES	ALLEN BRADLEY	800T-2KB7B	3-POSITION MAINT SEL SW, METAL TYPE 4/13, STD OPERATOR, 2 NO/2 NC CONT
21	1	YES	ALLEN BRADLEY	800H-W500JE	LEGEND PLATE, WHITE, CUSTOM TXT, ROW1:CONTROL MODE ROW 2:OFF ROW3:PEND RADIO
22	1	YES	HOFFMAN	A36H3012SSLP	PANEL BOX, STAINLESS STEEL
23	1	YES	HOFFMAN	AVDR4SS4	AIR VENT DRAIN PLUG, STAINLESS STEEL
24	1	NO	HUBBELL ELECTRIC	55-4E-4SP-WB-20	GEARED ROTARY LIM SW, 4 DPDT, 15 A 600 V CONTACTS, GEAR-RATIO 20.5:1.
25	1	YES	HARTING	09 62 810 0392	BULKHEAD MOUNTED BASE HOUSING, IP 66 RATED, DUAL LOCK HANDLES, EXTERNAL SEAL
26	1	YES	HARTING	09 62 810 5425	BASE HOUSING PROTECTIVE COVER, IP 65 RATED, DUAL LOCK HANDLES, W/CORD
27	1	YES	HARTING	09 20 010 0446	HOOD, TOP ENTRY, M25 THREAD, IP 65 RATED, DUAL LOCK HANDLES
28	1	YES	HARTING	09 20 010 2614	MALE INSERT, 10 CONTACTS, SCREW TERMINALS, 16A, 250v RATING
29	1	YES	HARTING	09 20 010 2814	FEMALE INSERT, 10 CONTACTS, SCREW TERMINALS, 16A, 250v RATING