Sheldon Neeley
Mayor

REQUEST FOR PROPOSALS

PROPOSAL NO. 24000532

SCOPE OF WORK:

The City of Flint, Finance Department of Purchases & Supplies, is soliciting sealed bids for providing:

TORREY ROAD BOOSTER STATION ENGINEERING SERVICES

Per the attached additional requirements**.**

If your firm is interested in providing the requested services, please submit:

Submit to City:
1 original, printed, signed, original proposals and signed addenda
2 additional copies unbound
1 electronic copy

Please follow the following bid timeline.

Questions

All written questions shall be directed to Lauren Rowley, Purchasing Manager by **Tuesday, February 20, 2024, by 10am EST** to lrowley@cityofflint.com.

Mandatory Pre-Bid Meeting

A mandatory pre-bid conference will take place **Monday, February 19, 2024, at 10am in the McKenzie Conference Room, 2nd floor of Flint City Hall at 1101 S. Saginaw Street, Flint, MI, 48502.** This meeting is to answer any questions contractors may have and give a brief presentation. Please submit a letter of intent to attend to Scott Dungee, Water Plant Supervisor at sdungee@cityofflint.com by **Friday, February 16, 2024, at 2pm. Site visits can also be coordinated upon request through Scott Dungee, Water Plant Supervisor at sdungee@cityofflint.com.** Failure to participate in this meeting may result in the disqualification of your bid.

Bid Submission Requirements

1. The mail in **HARD COPY** with the original signature (signed documents) must be received by **Monday, March 4, 2024, by 11:00 A.M. (EST), City of Flint, Finance Department - Division of Purchases and Supplies, 1101 S. Saginaw St., Room 203, Flint, MI, 48502.** Bids must be in a sealed envelope clearly identifying the proposal name and proposal number.
2. **Electronic Copy**, please email to **PurchasingBids@cityofflint.com** by **Monday, March 4, 2024, by 11:00 A.M.** (EST). Pease note that in the subject line of the email, type in the proposal name and number.
3. Faxed bids are not accepted.
4. Both mail in proposal and electronic submittal must be received by due date and time.

Bid Opening

Bids will be opened publicly at the McKenzie Conference Room on the 2nd floor of Flint City Hall. The public is welcome to join in person or via Google Meet.

Google Meet Information

Bid Opening - Torrey Road Booster Station Engineering Svs
Monday, March 4
Time zone: America/New_York
Google Meet joining info
Video call link: https://meet.google.com/mpp-ibee-hte
Or dial: (US) +1 386-866-5497 PIN: 338 399 448#
More phone numbers: https://tel.meet/mpp-ibee-hte?pin=6724323053713

PLEASE NOTE: When dropping off a bid, please do not put bids in drop boxes on the outside of City Hall. Please call if you have any questions and need to drop off a bid.

All additional proposal documents, requirements, addendums, specifications, and plans/drawings (if utilized) are available on the Purchasing page of the City of Flint's web site at https://www.cityofflint.com/purchasing/.

Effective immediately upon release of these Bidding Documents, and until notice of contract award, all official communications from proposers regarding the requirements of this Bid shall be directed to:

Lauren Rowley
810-766-7340
lrowley@cityofflint.com

The City, or designee, shall distribute all official changes, modifications, responses to questions or notices relating to the requirements of this Bid. Addendum to this Bid may be developed and shared with all Vendors. Any other information of any kind from any other source shall not be considered official, and proposers relying on other information do so at their own risk.

NOTICE TO VENDOR Offers, subject to the conditions made a part hereof, will be received atthis office, ***1101 S. Saginaw St., Flint, Ml 48502 for the following:***

City of Flint has partnered with BidNet as part of the MITN Purchasing Group (branded page link) to post bid opportunities to this site. As a vendor, you can register with the MITN Purchasing Group and be sure that you see all available bids and opportunities. By selecting automatic bid notification, your company will receive emails once the City of Flint has a bid opportunity that matches your company's business. In addition, the site handles bid opportunities, RFPs, and RFQs for other member governmental agencies throughout Michigan. City of Flint looks forward to providing you with more bid information and simplifying the entire bid, proposal, and quote processes for everyone involved. We appreciate your cooperation and welcome your participation. If you need help registering, please call the MITN Purchasing Group support department toll free 1-800-835-4603 option #2.

Link to City of Flint open solicitations:
MITN Purchasing Group (branded page link)

INSTRUCTIONS TO VENDORS

1) **PRE-BID INFORMATION AND QUESTIONS:** Each bid that is timely received will be evaluated on its merit and completeness of all requested information. In preparing bids, Bidders are advised to rely only upon the contents of this Request for Proposals (RFP) and accompanying documents and any written clarifications or addenda issued by the City of Flint. If a Bidder finds a discrepancy, error or omission in the RFP package, or requires any written addendum thereto, the Bidder is requested to notify the Purchasing contact noted on the cover of this RFP, so that written clarification may be sent to all prospective Bidders. **THE CITY OF FLINT IS NOT RESPONSIBLE FOR ANY ORAL INSTRUCTIONS**. All questions must be submitted in writing to the Finance Department of

Purchases and Supplies before any pre-bid deadline (if specified) or at least one (1) week prior to the proposal opening date indicated on the front of this document.

2) **RFP MODIFICATIONS:** The City of Flint has the right to correct, modify or cancel the RFP, in whole or in part, or to reject any Bid, in whole or in part, within the discretion of the City of Flint, or their designee. If any such changes are made, all known recipients of the RFP will be sent a copy of such changes. If any changes are made to this RFP document by any party other than the City of Flint, the original document in the City of Flint's files takes precedence.

3) **PROPOSAL SUBMISSION:**

   a) The Bidder must include the following items, or the proposal may be deemed non-responsive:

      i) All forms contained in this RFP, fully completed.

   b) Bids must be submitted to the Finance Department of Purchases and Supplies, City of Flint, 1101 S. Saginaw Street, Room 203, Flint, Michigan 48502 by the date and time indicated as the deadline**.** The Purchasing Department time stamp will determine the official receipt time. It is each Bidder's responsibility to insure that their proposal is time stamped by the Purchasing Department by the deadline. This responsibility rests entirely with the Bidder, regardless of delays resulting from postal handling or for any other reasons. Proposals will be accepted at any time during the normal course of business only, said hours being 8:00 a.m. to 5:00 p.m. local time, Monday through Friday, legal holidays as exception.

   c) Bids must be enclosed in a sealed, non-transparent envelope, box or package, and clearly marked on the outside with the following: RFP Title, RFP Number, Deadline and Bidder's name.

   d) Submission of a bid establishes a conclusive presumption that the Bidder is thoroughly familiar with the Request for Proposals (RFP), and that the Contractor understands and agrees to abide by each and all of the stipulations and requirements contained therein.

   e) All prices and notations must be typed or printed in ink. No erasures are permitted. Mistakes may be crossed out and corrections must be initialed in ink by the person(s) signing the bid.

   f) Proposals sent by email, facsimile, or other electronic means will not be considered unless specifically authorized in this RFP.

   g) All costs incurred in the preparation and presentation of the bid are the Bidder's sole responsibility; no pre-bid costs will be reimbursed to any Bidder. All documentation submitted with the proposal will become the property of the City of Flint.

   h) Proposals must be held firm for a minimum of 120 days.

4) **EXCEPTIONS:** Bidder shall clearly identify any proposed deviations from the Terms or Scope in the Request for Proposals. Each exception must be clearly defined and referenced to the proper paragraph in this RFP. The exception shall include, at a minimum, the proposed substitute language and opinion as to why the suggested substitution will provide equivalent or better service and performance. If no exceptions are noted in the bid, the City of Flint will assume complete conformance with this specification and the successful Bidder will be required to perform accordingly. Bids not meeting all requirements may be rejected.

5) **DUPLICATE BIDS:** No more than one (1) bid from any Bidder including its subsidiaries, affiliated companies and franchises will be considered by the City of Flint. In the event multiple proposals are submitted in violation of this provision, the City will have the right to determine which bid will be considered or, at its sole option, reject all such multiple proposals.

6) **WITHDRAWAL:** Bids may only be withdrawn by written notice prior to the date and time set for the opening of bids. No bid may be withdrawn after the deadline for submission.

7) **REJECTION/GOOD STANDING:** The City of Flint reserves the right to reject any or all bids, or to accept or reject any bid in part, and to waive any minor informality or irregularity in bids received if it is determined by the City of Flint, or their designee, that the best interest of the City will be served by doing so. No bid will be considered from any person, firm or corporation in arrears or in default to the City on any contract, debt, taxes or other obligation, or if the Bidder is debarred by the City of Flint from consideration for a contract award pursuant to Section 18-21.5 (d) of Article IV of the "Purchasing Ordinance of the City of Flint".

8) **PROCUREMENT POLICY:** Procurement for the City of Flint will be handled in a manner providing fair opportunity to all businesses. This will be accomplished without abrogation or sacrifice of quality and as determined to be in the best interest of the City. The City of Flint and their officials have the vested authority to execute a contract, subject to City Council and Mayoral approval where required.

9) **BID SIGNATURES:** Bids must be signed by an authorized official of the Bidder. Each signature represents binding commitment upon the Bidder to provide the goods and/or services offered to the City of Flint if the Bidder is determined to be the lowest Responsive and Responsible Bidder.

10) **CONTRACT AWARD/SPLIT AWARDS:** The City of Flint reserves the right to award by item and/or group of items. The Bidder to whom the award is made will be notified at the earliest possible date. Tentative acceptance of the bid, intent to recommend award of a contract and actual award of the contract will be provided by written notice sent to the Bidder at the address designated in the bid if a separate Agreement is required to be executed. After a final award of the Agreement by the City of Flint, the Contractor/Vendor must execute and perform said Agreement. All proposals must be firm for at least 120 days from the due date of the proposal. If, for any reason, a contract is not executed with the selected Bidder within 14 days after notice of recommendation for award, then the City may recommend the next lowest responsive and responsible Bidder.

11) **NO RFP RESPONSE:** Bidders who receive this RFP but who do not submit a bid should return this RFP package stating "No Bid" and are encouraged to list the reason(s) for not responding. Failure to return this form may result in removal of the Bidder's name from all future lists.

12) **FREEDOM OF INFORMATION ACT (FOIA) REQUIREMENTS:** Bids are subject to public disclosure after the deadline for submission in accordance with state law.

13) **ARBITRATION:** Contractor/Vendor agrees to submit to arbitration all claims, counterclaims, disputes and other matters in question arising out of or relating to this agreement or the breach thereof. The Contractor's/Vendor's agreement to arbitrate shall be specifically enforceable under the prevailing law of any court having jurisdiction to hear such matters. Contractor's/Vendor's obligation to submit to arbitration shall be subject to the following provisions:

    a) Notice of demand for arbitration must be submitted to the City in writing within a reasonable time after the claim, dispute or other matter in question has arisen. A reasonable time is hereby determined to be fourteen (14) days from the date the party demanding the arbitration knows or should have known the facts giving rise to their claim, dispute or question. In no event may the demand for arbitration be made after the time when institution of legal or equitable proceedings based on such claim dispute or other matters in question would be barred by the applicable statute of limitation.

    b) Within fourteen (14) days from the date that demand for arbitration is received by the City, each party shall submit to the other the name of one person to serve as an arbitrator. The two arbitrators together shall then select a third person, the three together shall then serve as a panel in all proceedings. Any decision concurred in by a majority of the three shall be a final binding decision.

    c) The final decision rendered by said arbitrators shall be binding and conclusive and shall be subject to

specific enforcement by a court of competent jurisdiction.

d) The costs of the arbitration shall be split and borne equally between the parties and such costs are not subject to shifting by the arbitrator.

e) This provision shall survive the expiration or termination of this Agreement in perpetuity.

14) **BID HOLD:** The City of Flint may hold bids for a period of one hundred twenty (120) days from opening, for the purpose of reviewing the results and investigating the qualifications of bidders prior to making an award.

15) **NONCOMPLIANCE:** Failure to deliver in accordance with specifications will be cause for the City of Flint and they may cancel the contract or any part thereof and purchase on the open market, charging any additional cost to the Contractor/Vendor.

16) **DISCLAIMER OF CONTRACTUAL RELATIONSHIP:** Nothing contained in these documents shall create any contractual relationship between the City and any Subcontractor or Sub-subcontractor.

17) **ERRORS AND OMISSIONS:** Bidder is not permitted to take advantage of any obvious errors or omissions in specifications**.**

18) **INTERPRETATION:** In the event that any provision contained herein shall be determined by a court of competent jurisdiction or an appropriate administrative tribunal to be contrary to the provision of law or to be unenforceable for any reason, then, to the extent necessary and possible to render the remainder of this Agreement enforceable, such provision may be modified or severed by such court or administrative tribunal having jurisdiction over this Agreement and the interpretation thereof, or the parties hereto, so as to, as nearly as possible, carry out the intention of the parties hereto, considering the purpose of the entire Agreement in relation to such provision.

19) **LAWS AND ORDINANCES:** The Bidder shall obey and abide by all of the laws, rules and regulations of the Federal Government, State of Michigan, Genesee County and the City of Flint, applicable to the performance of this Agreement, including, but not limited to, labor laws, and laws regulating or applying to public improvement, local government, and its operational requirements.

~~20) **LOCAL PREFERENCE:** Contractors/bidders located within the corporate city limits of Flint, Michigan may be given a seven percent (7%) competitive price advantage. Additionally, if the lowest responsible bidder is not located within the limits of the City of Flint, but is located within the County of Genesee, and said bidder does not exceed the bid of the lowest non-local bidder by more than three and one-half percent (3-1/2%), then said lowest Genesee County bidder may be determined to be the lowest responsible bidder, and make the award to such Genesee County bidder accordingly, subject to the approval of the City Council. If the lowest non-local bidder does not exceed that of any Proposers/bidders by (7%) inside the City of Flint or (3-1/2%) inside the County of Genesee, then the Purchasing Director shall be allowed to request that the lowest local vendor match the price offered by the lowest non-local vendor.~~

21) **MATERIAL WORKMANSHIP AND STANDARDS OF PERFORMANCE:** The Bidder agrees to exercise independent judgment and to complete performance under this Agreement in accordance with sound professional practices. In entering into this Agreement, the City is relying upon the professional reputation, experience, certification and ability of the Bidder by her/him/themselves or by others employed by her/him/them and working under their direction and control. The continued effectiveness of this Agreement during its term or any renewal term shall be contingent, in part, upon the Bidder maintaining her/his/their operating qualifications in accordance with the requirements of federal, state and local laws. All materials furnished must be new, of latest model and standard first grade quality, or best workmanship and design, unless otherwise expressly specified. Bidder, if required, must furnish satisfactory evidence of quality materials; offers of

experimental or unproven equipment may be disregarded.

22) **MODIFICATIONS/CHANGES:** Any modification to this agreement must be in writing and signed by the authorized employee, officer, board or council representative authorized to make such modifications pursuant to the State law and local ordinances.

23) **NON-COLLUSION:** The Bidder acknowledges that by signing this document that she/he/they is/are duly authorized to make said offer on behalf of the company she/he/they represent(s) and that said bid is genuine and not sham or collusive and not made in the interests or on behalf of any person not therein named, and that she/he/they and said bidder have not directly induced or solicited any other person(s) or corporation to refrain from responding to this solicitation and that she/he/they and said bidder have not in any manner sought by collusion to secure to themselves and said bidder any advantage over any other bidder.

24) **NON-DISCRIMINATION:** Pursuant to the requirements of 1976 P.A. 453 (Michigan Civil Rights Act) and 1976 P.A. 220 (Michigan Handicapped Rights Act), the local unit and its agent agree not to discriminate against any employee or applicant for employment with respect to hire, tenure, terms, conditions, or privileges of employment or a matter directly or indirectly related to employment because of race, color, religion, national origin, age, sex, height, weight, marital status or because of a handicap that is unrelated to the person's ability to perform the duties of nondiscrimination provision identical to this provision and binding upon any and all contractors and subcontractors. A breach of this covenant shall be regarded as a material breach of this contract.

25) **SUBCONTRACTING:** No subcontract work shall be started prior to the written approval of the subcontractor by the City. The City reserves the right to accept or reject any subcontractor.

26) **UNION COMPLIANCE:** Bidder agrees to comply with all regulations and requirements of any national or local union(s) that may have jurisdiction over any of the materials, facilities, services or personnel to be furnished by the City.

27) **WAIVER:** Failure of the City to insist upon strict compliance with any of the terms, covenants or conditions of this Agreement shall not be deemed a waiver of that term, covenant or condition or of any other term, covenant or condition. Any waiver or relinquishment of any right or power hereunder at any one or more times shall not be deemed a waiver or relinquishment of that right or power at any other time.

28) **CITY INCOME TAX WITHHOLDING:** Contractor and any subcontractor engaged in this contract shall withhold from each payment to his employees the City income tax on all of their compensation subject to tax, after giving effect to exemptions, as follows:

    a) Residents of the City:
    At a rate equal to 1% of all compensation paid to the employee who is a resident of the City of Flint.

    b) Non-residents:
    At a rate equal to 1/2% of the compensation paid to the employee for work done or services performed in the City of Flint.

    These taxes shall be held in trust and paid over to the City of Flint in accordance with City ordinances and State law. Any failure to do so shall constitute a substantial and material breach of this contract.

29) **CONTRACT DOCUMENTS:** The invitation for proposal, instructions to proposal, proposal, affidavit, addenda (if any), statement of Bidder's qualifications (when required), general conditions, special conditions, performance bond, labor and material payment bond, insurance certificates, technical specifications, and drawings, together with this agreement, form the contract, and they are as fully a part of the contract as if attached hereto or repeated herein.

30) **DISCLAIMER OF CONTRACTUAL RELATIONSHIP WITH SUBCONTRACTORS:** Nothing contained in the Contract

Documents shall create any contractual relationship between the City and any Subcontractor or Sub-subcontractor.

31) **EFFECTIVE DATE:** Any agreement between the City and the Bidder shall be effective upon the date that it is executed by all parties hereto.

32) **FORCE MAJURE:** Neither party shall be responsible for damages or delays caused by Force Majeure nor other events beyond the control of the other party and which could not reasonably have anticipated the control of the other party and which could not reasonably have been anticipated or prevented. For purposes of this Agreement, Force Majeure includes, but is not limited to, adverse weather conditions, floods, epidemics, war, riot, strikes, lockouts, and other industrial disturbances; unknown site conditions, accidents, sabotage, fire, and acts of God. Should Force Majeure occur, the parties shall mutually agree on the terms and conditions upon which the services may continue.

33) **INDEMNIFICATION:** To the fullest extent permitted by law, Bidder agrees to defend, pay on behalf of, indemnify, and hold harmless the City of Flint, its elected and appointed officials, employees and volunteers and others working on behalf of the City of Flint, including the Project Manager, against any and all claims, demands, suits, or losses, including all costs connected therewith, and for any damages which may be asserted, claimed, or recovered against or from the City of Flint, its elected and appointed officials, employees, volunteers or others working on behalf of the City of Flint, by reason of personal injury, including bodily injury or death and/or property damage, including loss of use thereof, which may arise as a result of Bidder's acts, omissions, faults, and negligence or that of any of his employees, agents, and representatives in connection with the performance of this contract. Should the Bidder fail to indemnify the City in the above-mentioned circumstances, the City may exercise its option to deduct the cost that it incurs from the contract price forthwith. These provisions shall survive the termination or expiration of any agreement entered into as a result of this request.

34) **INDEPENDENT CONTRACTOR:** No provision of this contract shall be construed as creating an employer-employee relationship. It is hereby expressly understood and agreed that Bidder is an "independent contractor" as that phrase has been defined and interpreted by the courts of the State of Michigan and, as such, Bidder is not entitled to any benefits not otherwise specified herein.

35) **NO THIRD-PARTY BENEFICIARY:** No contractor, subcontractor, mechanic, material man, laborer, vendor, or other person dealing with the principal Contractor shall be, nor shall any of them be deemed to be, third-party beneficiaries of this contract, but each such person shall be deemed to have agreed (a) that they shall look to the principal Contractor as their sole source of recovery if not paid, and (b) except as otherwise agreed to by the principal Contractor and any such person in writing, they may not enter any claim or bring any such action against the City under any circumstances. Except as provided by law, or as otherwise agreed to in writing between the City and such person, each such person shall be deemed to have waived in writing all rights to seek redress from the City under any circumstances whatsoever.

36) **NON-ASSIGNABILITY:** Contractor shall not assign or transfer any interest in this contract without the prior written consent of the City provided, however, that claims for money due or to become due to Contractor from the City under this contract may be assigned to a bank, trust company, or other financial institution without such approval. Notice of any such assignment or transfer shall be furnished promptly to the City.

37) **NON-DISCLOSURE/CONFIDENTIALITY:** Contractor agrees that the documents identified herein as the contract documents are confidential information intended for the sole use of the City and that Contractor will not disclose any such information, or in any other way make such documents public, without the express written approval of the City or the order of the court of appropriate jurisdiction or as required by the laws of the State of Michigan.

38) **RECORDS PROPERTY OF CITY:** All documents, information, reports and the like prepared or generated by

Contractor as a result of this contract shall become the sole property of the City of Flint.

39) **SEVERABILITY:** In the event that any provision contained herein shall be determined by a court or administrative tribunal to be contrary to a provision of state or federal law or to be unenforceable for any reason, then, to the extent necessary and possible to render the remainder of this Agreement enforceable, such provision may be modified or severed by such court or administrative tribunal so as to, as nearly as possible, carry out the intention of the parties hereto, considering the purpose of the entire Agreement in relation to such provision. The invalidation of one or more terms of this contract shall not affect the validity of the remaining terms.

40) **TERMINATION:** This contract may be terminated by either party hereto by submitting a notice of termination to the other party. Such notice shall be in writing and shall be effective 30 days from the date it is submitted unless otherwise agreed to by the parties hereto. Contractor, upon receiving such notice and prorated payment upon termination of this contract shall give to the City all pertinent records, data, and information created up to the date of termination to which the City, under the terms of this contract, is entitled.

41) **TIME PERFORMANCE:** Contractor's services shall commence immediately upon receipt of the notice to proceed and shall be carried out forthwith and without reasonable delay.

42) **EVALUATION OF PROPOSAL:** In the City's evaluation of proposals, at minimum: cost, serviceability, financial stability, and all requirements set forth in this document shall be considered as selection and award criteria unless otherwise specified.

43) **PREVAILING WAGE:** When applicable, all work for this project, including that of any subcontractor or sub-subcontractor, must meet Davis-Bacon Act requirements and full prevailing wage. Information on Davis-Bacon reporting and requirements, including payroll reporting, can be found at: **https://www.dol.gov/whd/govcontracts/dbra.htm**

44) **INSURANCE & BONDS:** The bidder whose proposal is accepted will be required to furnish bonds and evidence of insurance within five days from date of Notice of Award. In case of failure or refusal on the part of the bidder to furnish bonds, if required, within the set period, the amount of deposit may be forfeited to the county and the contract may be awarded to the next lowest responsible bidder. Upon the notification of award and approval of the bond, the deposit will be returned to the proposer. The deposit of persons other than the one to whom and award is made will be returned to the person or persons making the proposal immediately after the contract and bonds have been executed.

45) **PROPOSAL SUBMISSION:** Proposals and all information requested of the vendor shall be entered in the appropriate spaces. Failure to do so may disqualify the vendor's offer. An authorized officer or employee of the bidder shall submit the proposal.

46) **PRICES:** Prices proposed shall be for new products in current production unless otherwise specified. Where refurbished or discontinued items are offered they must be clearly identified as such. Prices proposed shall be exclusive of any rebates due the City. Any rebates the City may be entitled to should be shown as a separate line item and include expiration date.
Corrections and/or modifications received after the bid closing time specified will not be accepted. Unit prices prevail.
All prices will be bid F.O.B. DESTINATION, INCLUDE ALL DELIVERY AND ANY ADDITIONAL CHARGES, and remain in effect as specified in the quotation.

47) **AWARD:** Unless otherwise stated in the proposal documents, the City cannot guarantee exclusivity of the contract for the proposed products or services.
Award of the proposal shall be based upon a combination of factors, including but not limited to,

adherence to proposal requirements, references and any other factors that may be in the City's best interest. The City reserves the right to reject any and all bids, and to waive any defect or irregularity in bids. The City reserves the right to accept and separate items in the bid;
and to accept the proposal that in the opinion of the City is to the best advantage and interest of the public we serve. The City also has the right to re-solicit bids if it is deemed to be in the best interest of the City.

The City reserves the right to reject low bids which have major deviations from our specification; to accept a higher quotation which has only minor deviations. By signing the bid, the vendor agrees to accept a split award unless the awarded vendor clearly indicates that it takes exception. The bid will be awarded to that responsible, responsive bidder whose proposal conforms to this solicitation, and will be most advantageous to the City, with regard not only to price, but also to availability of product, location and quality of product considered.

The City reserves the right to award all line items, to make no award or to award on an individual line item basis, whichever is deemed to be in the best interest of the City.

Time of delivery may be a consideration in the award.

48) **ETHICS IN PURCHASING:** Bidders and proposers are required to comply with Flint City Ordinance 3865 in its entirety. It is incumbent upon and the responsibility of the bidder to become familiar with and comply with the Purchasing ordinances as outlined in 3865 covering chapter 18 of the Flint City Ordinances. Bidder/Proposer acknowledges in accordance with Flint City Ordinance Section 18-21.19 Ethics in Purchasing, any and all communication about the bid selection process should be directed to those City employees delegated with the authority with respect to all purchases of goods and services.

Bidder/Proposer acknowledges and agrees that while a procurement is pending, bidders and proposers shall not communicate about the solicitation with any City employee, agent, or elected official, other than the purchasing director or other City personnel identify in the solicitation. This means that bidder and proposer are prohibited from communicating orally or by written communications, including but not limited to voicemail messages, social media, email, in person, among any other form of communication while the award is pending, to the aforementioned, with the exception to those employees designated by the City. If you are unclear about the process, it is your duty and obligation to contact the designated employee(s) for clarification.

Violations of the ethics provision of the ordinance, without regard to if the violation rises to the level of a criminal violation, may subject the bidder or proposer to debarment.

49) **BID PROTESTS:** If Bidder/Proposal believe that they are aggrieved in connection with the solicitation or award of the purchase order or contract, they may protest the action to the City as outlined in Flint City Charter Section 18-21.15.

THE FOLLOWING PAGES MUST BE COMPLETED AND INCLUDED WITH SUBMITTAL IN THE FOLLOWING ORDER.

Purchasing Checklist:

□ Exhibit A - Complete Proposal Submittal with detailed Summary of Pricing
□ Exhibit B –Qualifications and Licenses Requirements
□ Exhibit C – Disclosure of Supplier Responsibility Statement
□ Exhibit D - List of References
□ Exhibit E - Certificate of Insurance
□ Exhibit F – Non-Bidder's Response
□ Exhibit G – City of Flint Affadavit

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❖ EXHIBIT A - SUBMITTAL WITH DETAILED SUMMARY OF PRICING

SCOPE OF WORK ATTACHED BELOW.

EXHIBIT B - QUALIFICATIONS AND LICENSES REQUIREMENTS

Please give a synopsis of your qualifications and experience with this service:

Please list Licenses:

How long have you been in business?

Have you done business with the City of Flint?

If yes, please state the project name.

EXHIBIT C – DISCLOSURE OF SUPPLIER RESPONSIBILITY STATEMENT

1. List any convictions of any person, subsidiary, or affiliate of the company, arising out of obtaining, or attempting to obtain a public or private contract, or subcontract, or in the performance of such contract or subcontract.

2. List any convictions of any person, subsidiary, or affiliate of this company for offenses such as embezzlement, theft, fraudulent schemes, etc. or any other offense indicating a lack of business integrity or business honesty which affect the responsibility of the contractor.

3. List any convictions or civil judgments under state or federal antitrust statutes.

4. List any violations of contract provisions such as knowingly (without good cause) to perform, or unsatisfactory performance, in accordance with the specifications of a contract.

5. List any prior suspensions or debarments by any government agency.

6. List any contracts not completed on time.

7. List any documented violations of federal or state labor laws, regulations or standards, or occupational safety and health rules.

❖ EXHIBIT D – LIST OF REFERENCES: (3) SIMILAR SCOPE OF WORK FROM THE LAST 5 YEARS

Providing the following contact information enables the City of Flint to contact those accounts as references.

Reference #1:

Company/Municipality: _____

Contact Person: _____ Title: _____

Address: _____

City: _____ State: _____ Zip: _____

Telephone: _____ Fax: _____

Email: _____

Type of Project: _____

_____

Project Timeline (Dates): _____ Budget: _____

Reference #2:

Company/Municipality: _____

Contact Person: _____ Title: _____

Address: _____

City: _____ State: _____ Zip: _____

Telephone: _____ Fax: _____

Email: _____

Type of Project: _____

_____

Project Timeline (Dates): _____ Budget: _____

❖ EXHIBIT D – LIST OF REFERENCES: (3) SIMILAR SCOPE OF WORK FROM THE LAST 5 YEARS (CONTINUES)

Reference #3:

Company/Municipality: _____

Contact Person: _____ Title: _____

Address: _____

City: _____ State: _____ Zip: _____

Telephone: _____ Fax: _____

Email: _____

Type of Project: _____

_____

Project Timeline (Dates): _____ Budget: _____

❖ EXHIBIT E – CERTIFICATE OF INSURANCE

INSURANCE REQUIREMENTS

The Contractor shall notify all insurance agents and companies retained by the Contractor that these insurance requirements shall be included in any Agreement between the Contractor and the City of Flint.

The Contractor shall purchase and maintain, at its sole expense and as long as it is providing services to the City, the following insurance coverage:

Commercial General Liability - Occurrence form, including coverage for bodily injury, personal injury, property damage (broad form), premises/operations, blanket contractual, and products/completed operations. Coverage shall be endorsed to include the City as an additional insured for work performed by the Contractor in accordance with the Agreement.

Minimum Limits:

- $1,000,000 per occurrence/$2,000,000 general aggregate
- $2,000,000 aggregate for products and completed operations
- $1,000,000 personal and advertising injury

Automobile - Michigan "no-fault" coverage, and residual automobile liability, comprehensive form, covering owned, hired, and non-owned automobiles. Coverage shall be endorsed to include the City as an additional insured for work performed by the Contractor in accordance with the Agreement.

Minimum Limits:

- No-fault coverages - statutory
- $500,000 per person/$1,000,000 per accident - bodily injury
- $500,000 per occurrence - property damage
- A combined single limit of $1,000,000 per occurrence

Workers' Compensation and Employer's Liability- Statutory coverage or proof acceptable to the City of approval as a self-insurer by the State of Michigan.

❖ EXHIBIT E – CERTIFICATE OF INSURANCE (CONTINUES)

Minimum Limits:

- Workers' Compensation - statutory
- Employer's Liability - $100,000 each accident/$100,000 disease - each employee
- $500,000 disease - policy limit

Professional Liability – Covering acts, errors or omissions of a professional nature committed or alleged to have been committed by the Contractor or any of its subcontractors. Coverage shall be effective upon the date of the Agreement and shall remain effective for a period of three (3) years after the date of final payment thereunder. Such coverage shall be endorsed to include any subcontractors hired by the City.

Minimum Limits:

- $1,000,000 per occurrence, $1,000,000 annual aggregate

Insurance coverage shall cover all claims against the City of Flint, its officials and employees, arising out of the work performed by the Contractor or any subcontractors under the Agreement. Should any work be subcontracted, it shall be the responsibility of the Contractor to maintain Independent Contractor's Protective Liability Insurance with limits equal to those specified above for Commercial General Liability Insurance. In addition, the Contractor shall provide proof of Workers' Compensation Insurance for all subcontractors in compliance with the required statutory limits of the State of Michigan.

Said policies of insurance shall be with companies licensed to do business in the State of Michigan and in a form satisfactory to the City. All insurance companies must maintain a rating of B+, VIII or better from AM. Best Company. Certificates of insurance with a thirty-(30) day cancellation clause shall be filed with and approved by the City at least five (5) days in advance of commencing work under the Agreement. Cancellation, material restriction, non-renewal or lapse of any of the required policies shall be grounds for immediate termination of the Agreement by the City.

The City reserves the right to request a complete certified copy of the policies for the above coverage's.

Any reduction or exhaustion in the limits of required insurance coverage shall not be deemed to limit the indemnification afforded in accordance with the Agreement or any amendments thereto.

Depending on the subject matter of the transaction, the City may require other insurance coverage in addition to the coverage's contained herein.

THE BID NUMBER IS TO APPEAR ON ALL INSURANCE CERTIFICATES

❖ EXHIBIT F – NON-BIDDER'S RESPONSE

VENDOR'S NAME: _____

NON-BIDDER'SRESPONSE

For the purpose of facilitating your firm's response to our invitation to bid, the City of Flint is interested in ascertaining reasons for prospective bidder's failure to respond to "Invitations to Bid". If your firm is not responding to this bid, please indicate the reason(s) by checking any appropriate item(s) below and return this form to the above address.

We are ***not*** responding to this "Invitation to Bid" for the following reason(s):

_____ Items or materials requested not manufactured by us or not available to our company.

_____ Our items and/or materials do not meet specifications.

_____ Specifications not clearly understood or applicable (too vague, too rigid, etc.).

_____ Quantities too Small.

_____ Insufficient time allowed for preparation of bid.

_____ Incorrect address used. Our correct mailing address is:

_____

_____ Our branch / division handles this type of bid. We have forwarded this bid on to them but for the future the correct name and mailing address is:_____

_____ **OTHER:** _____

_____

Thank you for your participation in this bid.

❖ EXHIBIT G – CITY OF FLINT AFFADAVIT

AFFIDAVIT FOR INDIVIDUAL

STATE OF _____

S.S.

COUNTY OF _____

_____being duly sworn, deposes and says that they are the person making the above bid; and that said bid is genuine and not sham or collusive, and is not made in the interest of or on behalf of any person not therein named, and that they have not directly or indirectly induced or solicited any bidder to put in a sham bid; that they have not directly or indirectly induced or solicited any other person or corporation to refrain from bidding, and that they have not in any manner sought by collusion to secure themselves any advantage over other bidders.

Subscribed and sworn to before me at _____, in said County and State,

this _____day of _____, A.D. 20_____,

_____

*Notary Public, _____County,_____

My Commission expires_____,20_____

❖ EXHIBIT G – CITY OF FLINT AFFADAVIT

FOR CORPORATION

STATE OF _____

S.S.

COUNTY OF _____

_____being duly sworn, deposes and says that she/he/they

is_____of_____

(Official Title) (Name of Corporation)

a corporation duly organized and doing business under the laws of the State of _____ the corporation making the within and foregoing bid; that they executed said bid in behalf of said corporation by authority of its Board of Directors; that said bid is genuine and not sham or collusive and is not made in the interests of or on behalf of any person not herein named, and that they have not and said bidder has not directly or indirectly induced or solicited any other person or corporation to refrain from bidding; that they have not and said bidder has not in any manner sought by collusion to secure to themselves or to said corporation an advantage over other bidders.

Subscribed and sworn to before me at _____, in said County and State,

this _____day of _____, A.D. 20_____,

_____

*Notary Public, _____County,_____

My Commission expires_____,20_____

RFP for Torrey Road Booster Station Survey

Scope of Work:

The City of Flint, Finance Department—Division of Purchases & Supplies, is soliciting sealed proposals for providing Engineering Services:

Water Plant
4500 N. Dort Highway
Flint, MI 48505

The existing Torrey Road booster pumping station has a total capacity of 4000 gallons per minute (gpm) and a firm capacity of 2000 gpm. This is an in-line pressure boosting facility that is designed for continuous duty. The City of Flint wishes to either upgrade the station to meet the requirements of the Michigan Safe Drinking Water Act (Act 399) and Ten States' Standards or construct a replacement station at a new location.

The Engineering Firm must complete an Investigative Study of the Torrey Road Booster Station (on Hammerberg Road just north of Twelve Street by I-69) to determine six important factors.

1. A complete inventory and study of the existing Torrey Road Booster Pump Station.

2. Property Deed Investigation to determine ownership and or deed restrictions.

3. Evaluate the City's hydraulic model including updating the existing model based on recent water main upgrades. The updated hydraulic model must be given to the City when completed.

4. Evaluate options for upgrading or replacing the station based on the updated hydraulic model.

5. The Engineering Firm must determine the cost to restore the current booster station. Develop a viable plan to replace the two old pumps and fully restore the complete building to meet Act 399 and the Ten States' Standards for water without taking the booster station out of service.

6. Develop a cost analysis of what would be required to build a completely new Booster station with all new equipment followed up by abandoning and eradicating the old building. This item would also include recommending a location for the new station.

Additional requirements are given below.

Requirements/Tabulations

FYI 2024 General Torrey Road Booster Station Restoration upgrades are listed below:

1. **Determine the proper pump size for this application with the proper pump curve to allow the booster pumps to run in all variations of normal distribution pressure ranges. To be determined by the Hydraulic Study.**
2. **Evaluate the electrical feed system to accommodate the new proposed pumps' electrical needs.**
3. **New Pumps must be fitted with SCADA incoming pressure readers and outgoing pressure readers.**
4. **The new pumps must be fitted with an electronically controlled discharge valve, not a swing check valve.**
5. **The new pump's discharge valves must have sensors to incorporate a series loop to verify proper pressure before the discharge valve opens or closes.**
6. **The Torrey Road Booster Pump Station building must have calculated upgrades to the heating and ventilation system to sustain the new VFD heat load that will be added to the old building if restored.**
7. **Both existing booster station Isolation valves and the 24" check valve in between the booster station isolation valves will need to be replaced as part of this project, so we need a cost and feasibility study to determine how to complete this work.**
8. **Determine the cost, size, and location of a permanent backup generator for the site.**
9. **Develop a plan and cost for upgrading the building security lighting with LED Exterior Lighting.**
10. **Determined the type of security fencing and cameras that will be needed around the building and the cost to install.**
11. **Determine the best type of entrance door needed and their cost to install.**
12. **All equipment and sensors must be telemetry relayed to the WTP through the SCADA system.**
13. **The Engineering Firm must determine the best re-location of the sump pump discharge drainpipe to a better location.**
14. **The Engineering Firm will need to provide a viable cost estimate for both renovating the existing building and equipment and or relocating and building a new pump station.**
15. **The Engineering Firm will also provide an estimate of both cost and time to design and complete the project.**

PROPOSAL FORMAT AND EVALUATION/SELECTION CRITERIA:

QBS will be the method used for selection. Proposals shall contain a clear, accurate, and detailed description of the scope of work, technical requirements, and consultants' qualifications necessary for the service to be rendered. It should detail the services to be performed, deliverables to be provided, estimated schedule for the performance of the work, and applicable standards, specifications, and policies. Proposals should be prepared economically using 11-point font and single-sided paper. Each proposal should have one original bound proposal, one unbound copy, and one electronic flash drive copy. All cost proposal sheets should be in a sealed envelope within the sealed proposal envelope. The inside envelope shall have the name of the project and the name of the firm with the address and indicate that the bid prices are within on the outside of the envelope. All not to exceed costs are to be included in the bid. All mileage, equipment, testing, surveying, and any sub-contractor's costs shall be part of the not to exceed bid price. Respondents should organize proposals into the following sections:

A. Title Page and Table of Contents All pages to be numbered and shown in the Table of Contents (pages 1 and 2)

B. Professional Qualifications –

1. State the full name and address of your organization and the office location where work will be performed. Include the history of the firm and the types of engineering services provided. Identify the technical details that make the firm uniquely qualified for this project. (Title this section B1. Firms History)

2. Include your organization chart with the names of the key personnel by skill and qualifications that will be employed in this project study. Show where the personnel will be physically located during the time, they are engaged in this project study. (Title this section B2. Organization Chart)

3. For each of the personnel Identify in Section B2 and any other individuals you consider key to the success of this project. Provide resumes (2-page maximum) including surveyors and any sub-consultant(s). (Title this section B3. Professional Qualifications)

C. Past Involvement with Similar Projects –

1. Provide a minimum of 2 projects that showcase similar experience to the project being proposed. The related projects must have been **completed** in the last 10 years. The projects should show your Firm's proven ability to develop cost and detailed study. (Title this section (C1. Similar Projects)

2. On each of the above-related projects:

    a) Give the size and the scope of the project.
    b) Show the date that the project's design started.
    c) Show the proposed design completion date.
    d) Show the date that the actual study was completed.
    e) Show the original estimated cost for the project.
    f) Show the finished bid cost for construction.
    g) Show the key personnel of the two projects and what their role was.
    h) Bold type or underline the key personnel of these projects that will be working on our project.
    i) Please explain the reasons if projects were over or under 10% of the engineer's estimate at the study stage. If all projects came in on cost indicate this.

3. Provide a list of two (2) references for similar project studies including their contact's name, agency, telephone number, and email address. (Title this section C2. References)

D. Project Challenges-

1. What do you see as the biggest challenges for completing the engineering study for this Project? How will your company overcome these challenges? (Title this section D1. Challenges)

2. How will the engineering firm make sure the City of Flint knows the best path to follow for re-building or replacing the booster pump station? (Title this section D2. Best Outcome)

E. Proposed Work Plan –

1. Provide a detailed flow chart, which lists chronologically all tasks determined to be necessary to accomplish the work of this project. The work plan shall be sufficiently detailed and clear to identify the progress milestones including when project tasks and deliverables a timeline and schedule for design depicting the sequence and duration of tasks showing how the work will be organized and executed. (Title this section E1. Timeline)

2. Include information that your firm believes is pertinent to the success of the project that may not have been requested or identified. (Title this section E2. Pertinent Information)
3. Provide details of what Quality Control and Quality Assurance will be utilized in the study and estimate the cost for this project (Title this section E3. QC/QA)

F. Capacity to follow instructions –

1. All the instructions for the proposal have been followed and completed.

The written proposal shall be evaluated on the clarity and content of their responses. The evaluators will include the Water Plant Personnel and the Director of Public Works.

This RFP will be graded both as the most highly qualified consultant and in terms of the cost. The lowest bid may or may not be picked. All bids will be based on the percentage of the lowest bid. In-state or local preference may be used as an RFP selection or consultant evaluation factor.

UTILITIES & MUNICIPALITIES

CITY OF FLINT, TRAFFIC ENGINEERING
1101 SOUTH SAGINAW STREET
FLINT, MICHIGAN 48502
CONTACT: ROD McGAHA
PHONE: (810) 766-7165

CABLE TELEVISION:
COMCAST CABLEVISION
6095 Wall Street
STERLING HEIGHTS, MI 48312
CONTACT: MR. TOM DICKINSON
PHONE: (586) 883-7412

TELEPHONE:
AT&T
502 BEACH STREET, ROOM 402
FLINT, MICHIGAN 48502
CONTACT: STEVE SHORT
PHONE: (810) 768-0118

ELECTRIC:
CONSUMERS ENERGY
3201 E. COURT STREET
FLINT, MICHIGAN 48501
CONTACT: MARCEY CONN
PHONE: (810) 760-3506

GAS:
CONSUMERS ENERGY
3201 E. COURT STREET
FLINT, MICHIGAN 48501
CONTACT: SAL DELISI
PHONE: (810) 760-3486

HVD
CONSUMERS ENERGY
1945 W. PARNELL ROAD
JACKSON, MICHIGAN 49201
CONTACT: EVANGELINE HARVEY
PHONE: (517) 927-4022

CITY OF FLINT, TRANSPORTATION DEPT.
1101 SOUTH SAGINAW STREET
FLINT, MICHIGAN 48502
CONTACT: KAY MUHAMMAD
PHONE: (810) 766-7165

CITY OF FLINT, WATER SERVICE CENTER
3310 E. COURT STREET
FLINT, MICHIGAN 48506
CONTACT: PHIL MATTHEWS
PHONE: (810) 766-7202

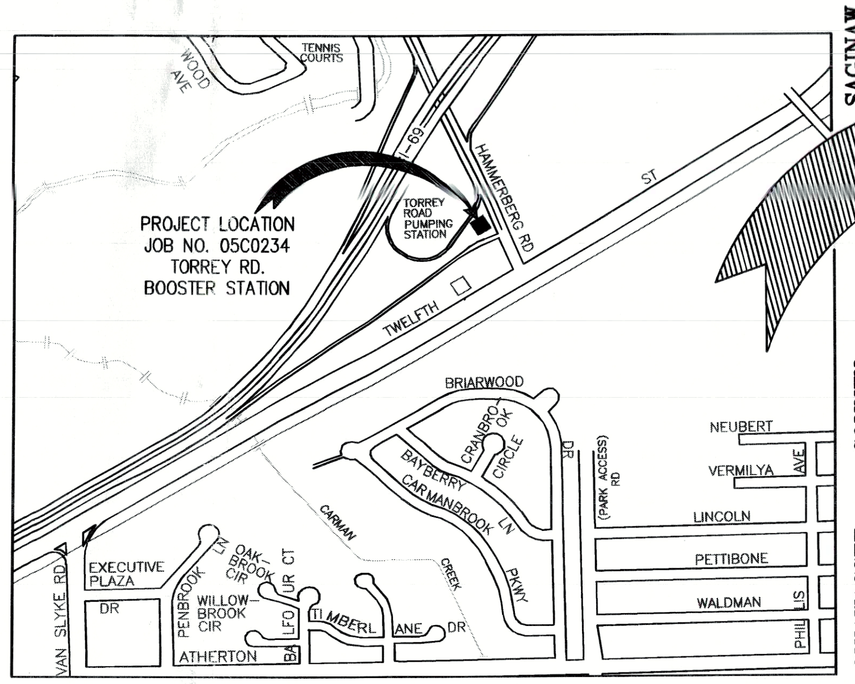
BUSES:
MASS TRANSIT AUTHORITY (MTA)
1401 S. DORT HWY
FLINT, MICHIGAN 48503
CONTACT: ED BENNING
PHONE: (810) 767-6950 EXT. 149

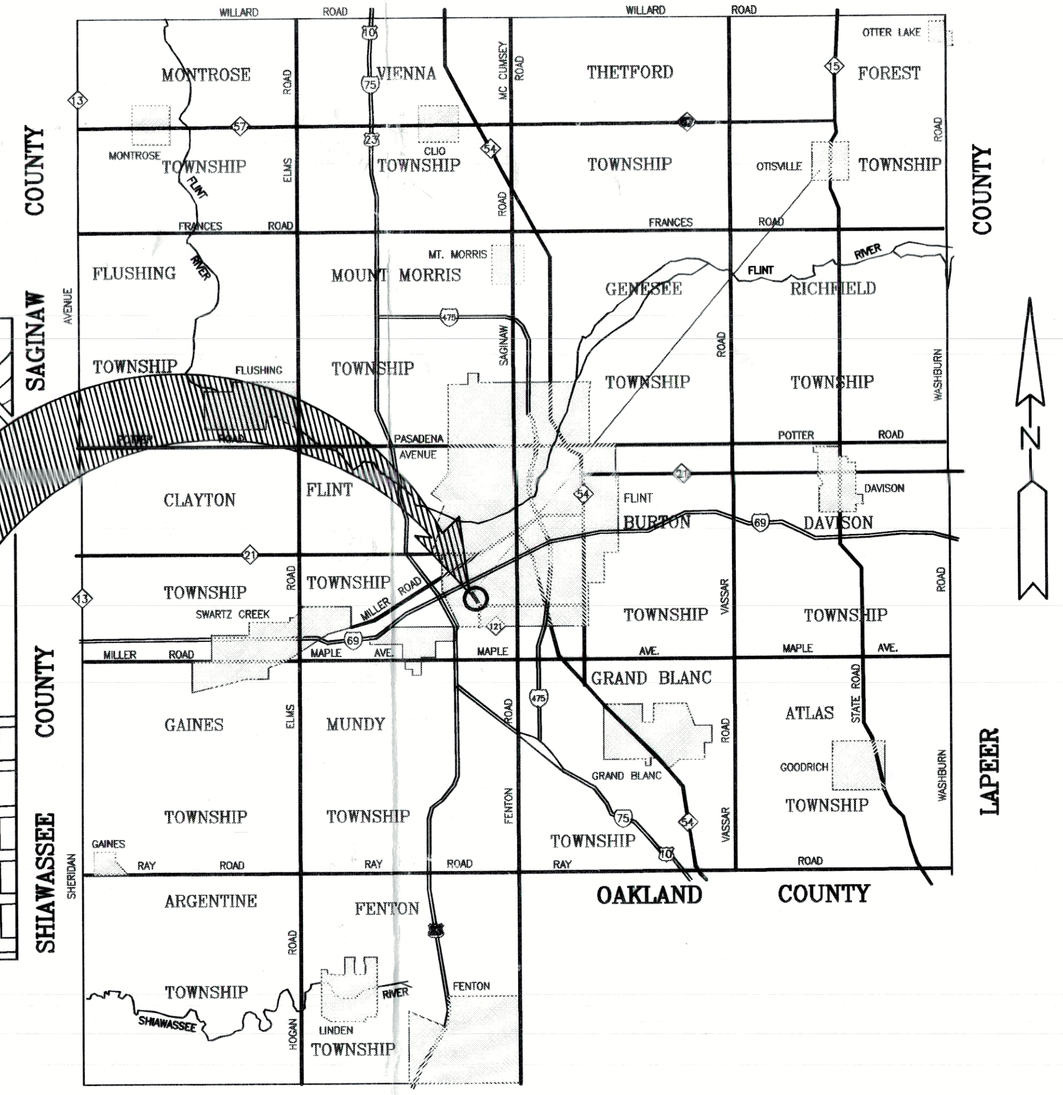
FIBER OPTICS:
FIBER LINK, INC.
3529 W. GENESEE ROAD
LAPEER, MICHIGAN 48446
CONTACT: BILL GEE
PHONE: (517) 927-4022

FIBER OPTICS:
PAETEC
4074 SOUTH LINDEN ROAD
FLINT, MICHIGAN 48507
CONTACT: GREG SERICH
PHONE: (810) 908-2399

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS
PLAN OF PROPOSED
TORREY ROAD BOOSTER STATION
CONTRACT No. 2
W. 12TH STREET, WEST OF HAMMERBURG ROAD
DWRF 7310-01

SHEET INDEX





DEQ
RESOURCE MANAGEMENT DIVISION
OCT 1 3 2012
LANSING DISTRICT

FINAL PLANS
MAY 25, 2012

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
PERMIT NO. W 1 2 1 0 7 3 NOV 0 2 2012
EXAMINED AND APPROVED FOR COMPLIANCE WITH ACT 399, P.A. 1976

3 WORKING DAYS
BEFORE YOU DIG
CALL MISS DIG
1-800-482-7171
FOR THE LOCATION OF UNDERGROUND FACILITIES

STATE OF MICHIGAN * REGISTERED * DOUGLAS A. SCOTT ENGINEER No. 47073 * LICENSED PROFESSIONAL

PLAN DATE: APRIL, 2012
PROJECT MGR.: J.B.M.
REVIEWER: D.A.S.
SCALE: NO SCALE

ROWE PROFESSIONAL SERVICES COMPANY
The ROWE Building
540 S. Saginaw St., Ste. 200; P.O. Box 3748
Flint, MI 48502
O: (810) 341-7500
F: (810) 341-7573
www.rowepsc.com

PREPARED FOR
CITY OF FLINT
TORREY RD. BOOSTER STATION
COVER SHEET

REV: C1
SHT# 1 OF 6
JOB No: 05C0234

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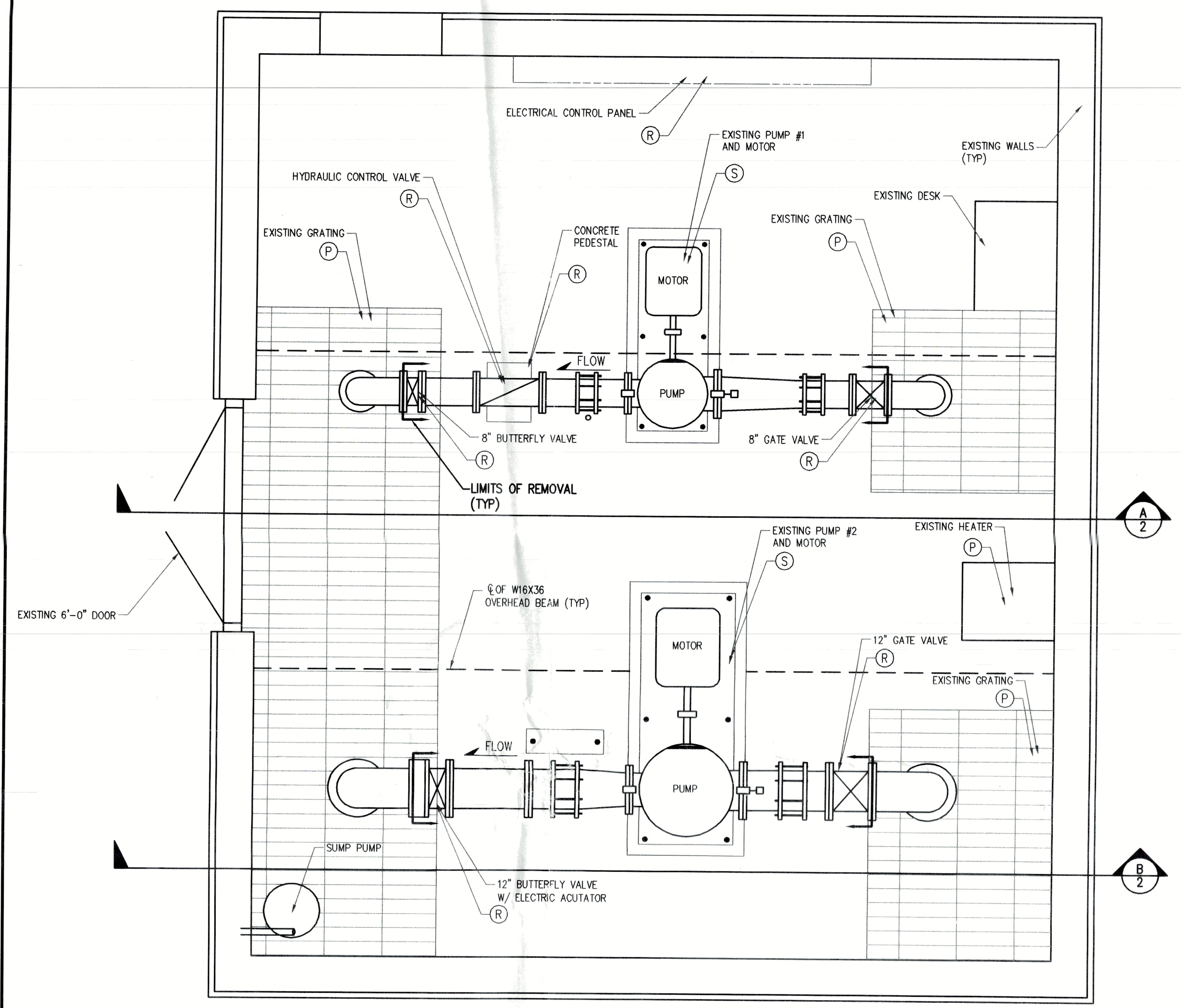
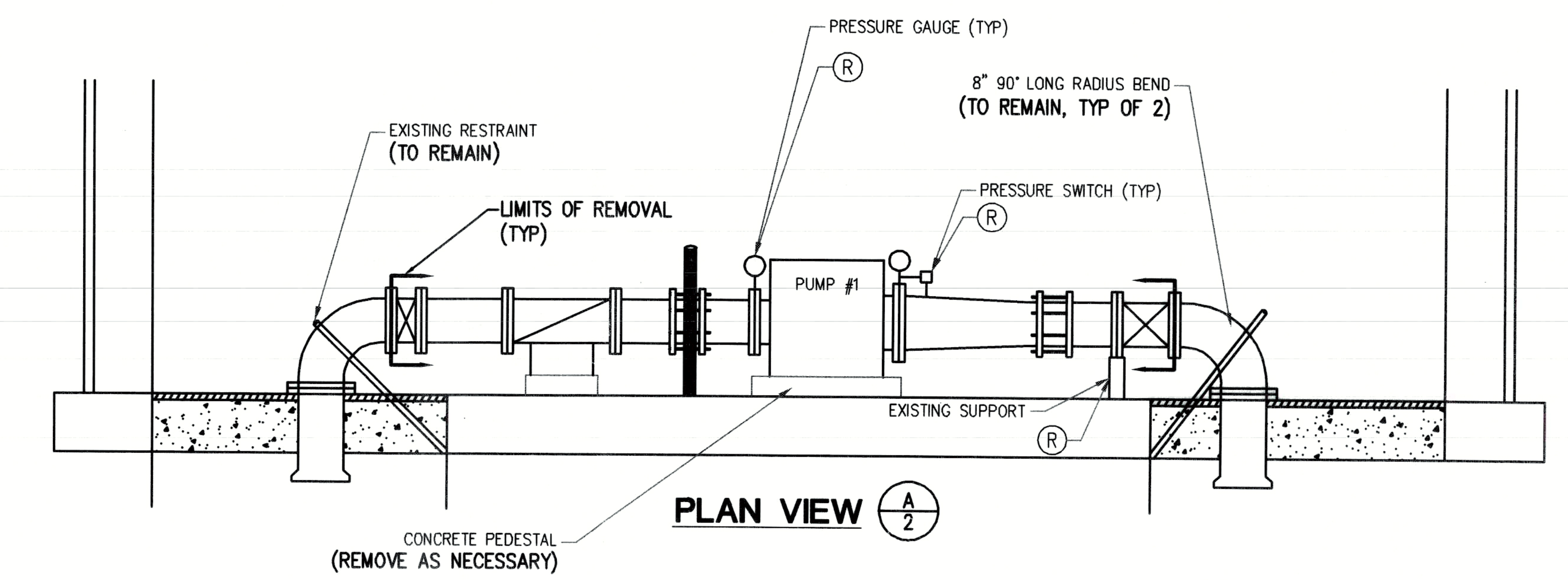
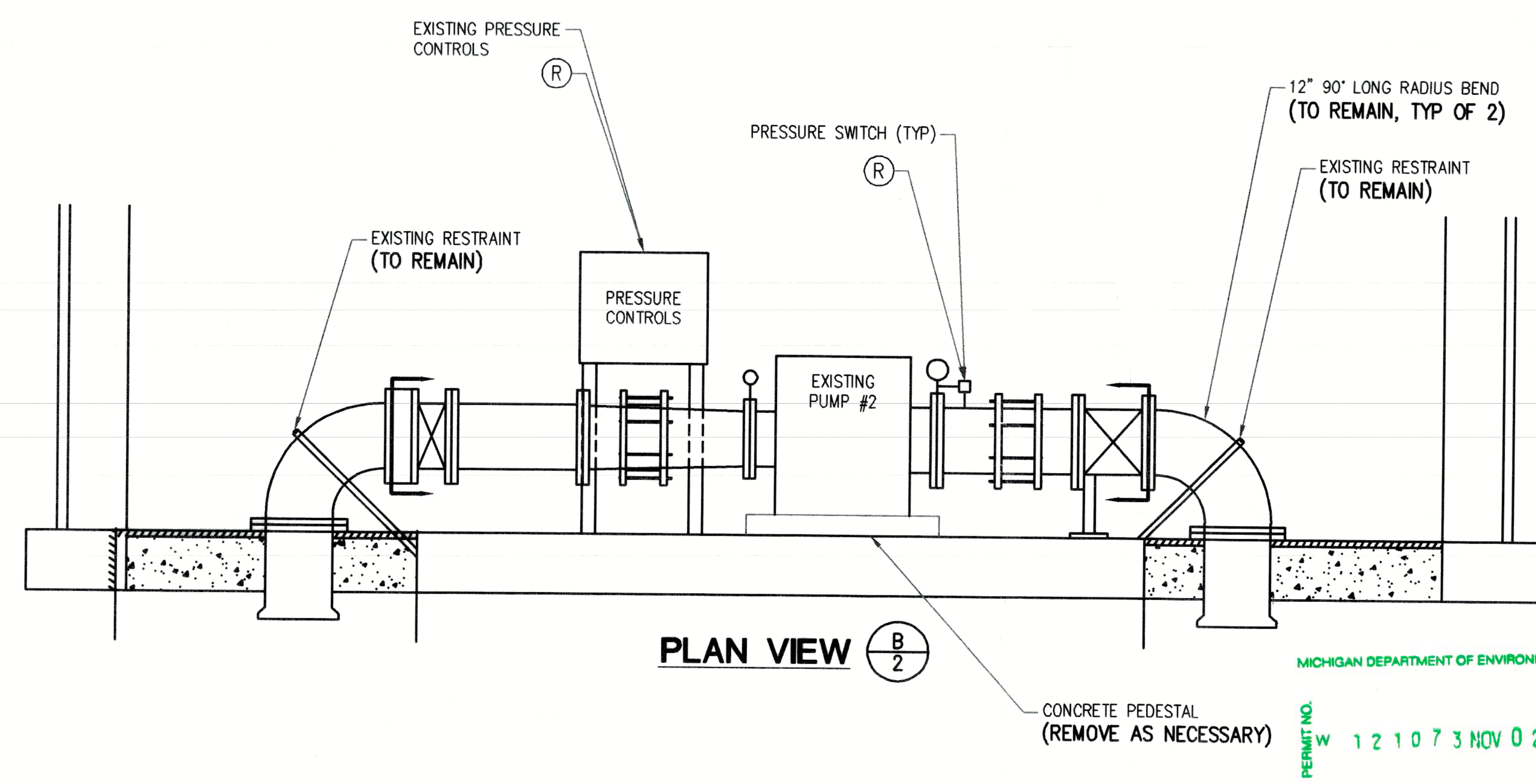


PLAN VIEW



PLAN VIEW A/2



PLAN VIEW B/2

DEMOLITION NOTES

1. THE SCOPE OF THIS PROJECT INCLUDES REMOVING THE EXISTING EQUIPMENT IN ACCORDANCE WITH THE REMOVAL LIMITS SHOWN ON THE PLANS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING ALL ITEMS EVEN WITHIN THE LIMITS EVEN IF NOT SHOWN ON THE PLANS.
2. THE DIMENSIONS SHOWN ON THE DRAWINGS HAVE BEEN COMPILED FROM THE RECORD DRAWINGS. THE CONTRACTOR SHALL VERIFY ALL MEASUREMENTS PRIOR TO ORDERING EQUIPMENT.
3. NO WORK SHALL COMMENCE UNTIL A WORK PLAN HAS BEEN SUBMITTED AND APPROVED BY THE OWNER.
4. THE WORK SHALL BE PHASED IN SUCH A MANNER THAN ONE PUMP IS ALWAYS IN SERVICE. STARTUP SHALL BE PERFORMED ON EACH PUMP SEPARATELY.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PREPARATION REQUIRED TO PERFORM THE DEMOLITION WORK IE – ISOLATING THE PUMP, DISCONNECTING PIPING, ETC.
6. THE CONTRACTOR SHALL SALVAGE ALL ITEMS DESIRED BY THE OWNER. SALVAGED ITEMS SHALL BE DELIVERED TO THE CITY OF FLINT PUBLIC WORKS FACILITY. ALL OTHER ITEMS SHALL BECOME THE CONTRACTORS PROPERTY AND SHALL BE DISPOSED / RECYCLED PROPERLY.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MODIFYING THE EXISTING CONCRETE PEDESTALS / BASES TO FACILITATE THE INSTALLATION OF THE NEW PUMPS. IF MODIFICATION OF THE EXISTING PEDESTAL / BASE IS NOT FEASIBLE, THE CONTRACTOR SHALL REMOVE IT AND INSTALL A NEW PEDESTAL. MODIFICATIONS SHALL INCLUDE EXTENDING OR PROPERLY ABANDONING ANY CONDUITS, SEAL WASH LINES, ETC. ANCHOR BOLTS SHALL BE INCLUDED IN THIS WORK.
8. THE WORK SHOWN ON THE PLANS IS CONSIDERED THE MINIMUM REQUIRED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ANY ADDITIONAL WORK REQUIRED FOR A COMPLETE SYSTEM.
9. REFER TO THE ELECTRICAL DRAWINGS FOR ELECTRICAL REMOVALS / MODIFICATIONS.

LEGEND

- (R) ABANDON
- (P) PROTECT
- (S) REMOVE AND SALVAGE FOR OWNER

PLAN DATE:	APRIL, 2012
PROJECT MGR:	J.B.M.
REVIEWER:	D.A.S.
SCALE:	1/2" = 1'

ROWE PROFESSIONAL SERVICES COMPANY
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PREPARED FOR
CITY OF FLINT
TORREY RD. BOOSTER STATION
DEMOLITION PLAN

REV: P1
SHT# 2 OF 6
JOB No: 05C0234

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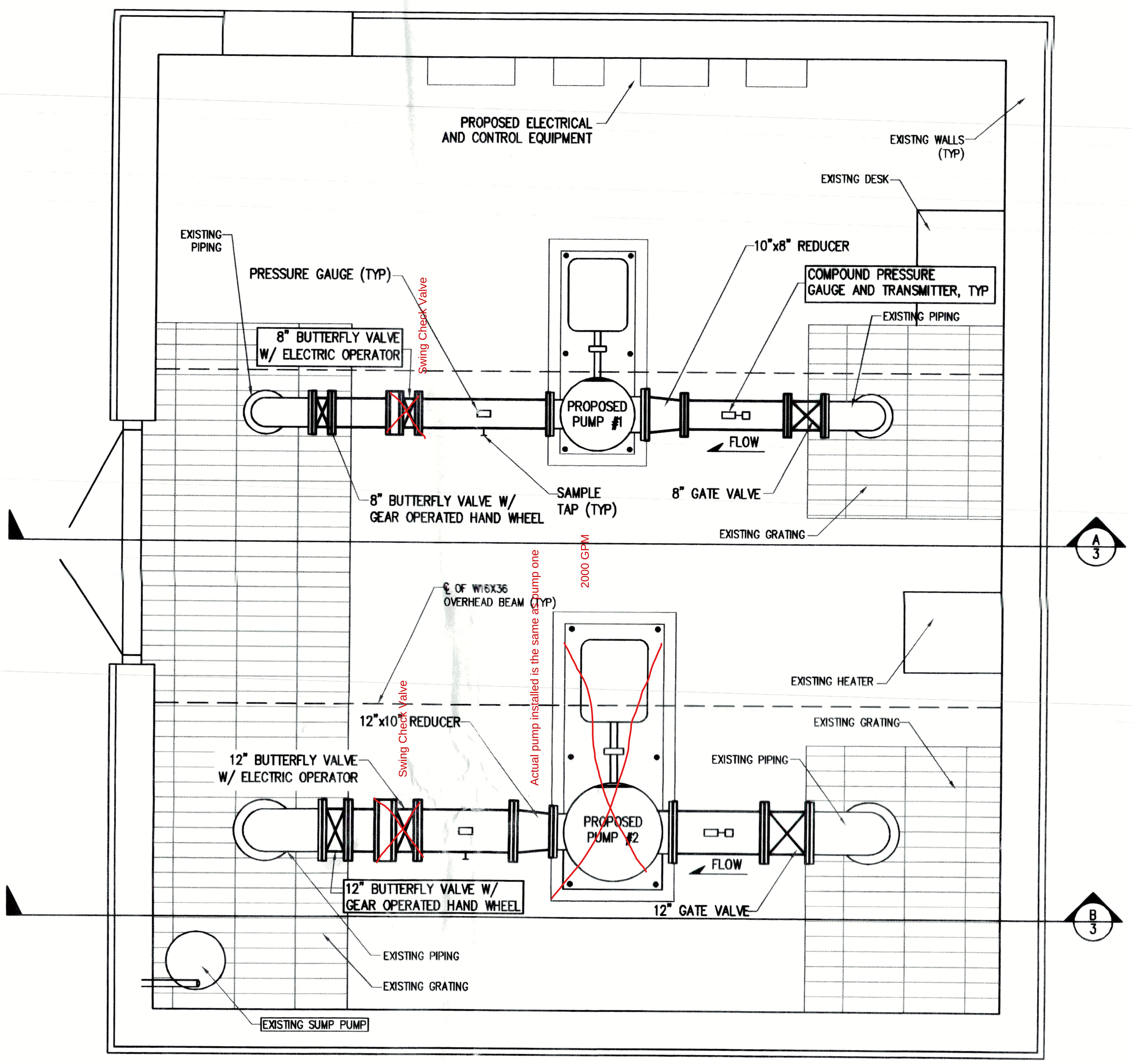
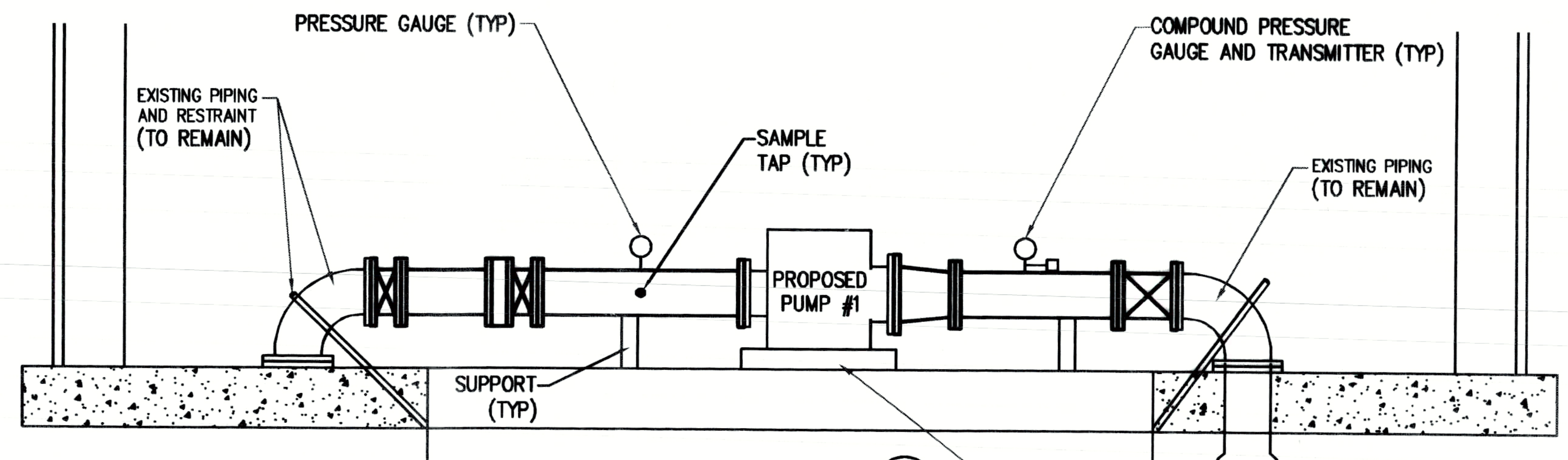
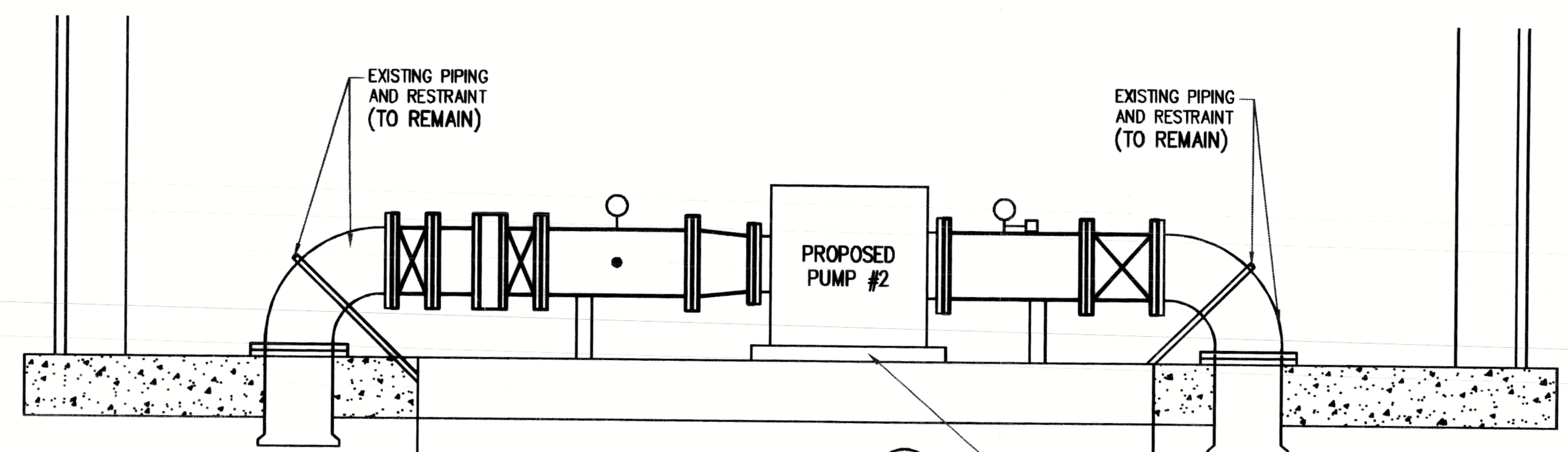


PLAN VIEW



PLAN VIEW (A/3)



PLAN VIEW (B/3)

PUMP SCHEDULE

	PUMP #1	PUMP #2
TYPE	SPLIT CASE	SPLIT CASE
DESIGN POINT	2000 GPM @ 66'	2500 GPM @ 76'
MAXIMUM HP	40	60
VOLTAGE	460V 3Φ 60Hz	460V 3Φ 60Hz
MAXIMUM SPEED	1800 RPM	1200 RPM
MODEL #	PATTERSON 10X8MN-A	PATTERSON 12X10MAA-E
IMPELLER	C-2750	C-5592
CONTROL	SOFT START/REMOTE	SOFT START/REMOTE

CONSTRUCTION NOTES

1. THE SCOPE OF THIS PROJECT INCLUDES INSTALLING TWO NEW PUMPS, MOTORS, ELECTRICAL EQUIPMENT AND ASSOCIATED VALVES, GAUGES, AND PRESSURE TRANSMITTERS. THE INSTALLATION SHALL INCLUDE ALL FITTINGS, BOLTS, CLAMPS, SUPPORTS, ETC. THAT ARE REQUIRED FOR A COMPLETE INSTALLATION.
2. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
3. THE CONTRACTOR SHALL PROVIDE A COMPLETE WORK PLAN FOR ACCOMPLISHING THE WORK FOR APPROVAL PRIOR TO COMMENCING WORK. THE PLAN SHALL DETAIL THE VALVE OPERATIONS, CONSTRUCTION SEQUENCE AND DURATIONS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL EQUIPMENT, MATERIALS, AND LABOR NECESSARY TO COMPLETE THE WORK.
5. REFER TO THE ELECTRICAL DRAWINGS FOR COMPLETE DETAILS REGARDING THE ELECTRICAL AND CONTROL REQUIREMENTS.
6. ALL MOTORS SHALL BE INVERTER DUTY RATED AND COMPATIBLE FOR USE WITH VARIABLE FREQUENCY DRIVES
7. ALL PENETRATIONS FOR ANCHOR BOLTS, WIRING, ETC. SHALL BE SEALED WITH A WATER TIGHT MATERIAL SUCH AS GROUT OR EPOXY.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MODIFYING THE EXISTING PUMP PEDESTAL FOR USE WITH THE NEW PUMPS. IF THE EXISTING PEDESTAL IS IN POOR CONDITION, THE CONTRACTOR SHALL PROVIDE A NEW PEDESTAL TO SUPPORT THE NEW PUMP.
9. EACH PUMP SHALL BE REMOVED FROM SERVICE SEPARATELY. AT NO TIME WILL BOTH PUMPS BE TAKEN OUT OF SERVICE TOGETHER WITHOUT THE APPROVAL OF THE OWNER.
10. AT THE COMPLETION OF THE INSTALLATION, EACH PUMP SHALL BE PLACED BACK IN SERVICE AFTER STARTUP HAS BEEN COMPLETED. ALL PUMP STARTUP WORK SHALL BE WITNESSED BY A FACTORY SERVICE REPRESENTATIVE. THE CONTRACTOR SHALL INCLUDE FACTORY STARTUP SERVICES IN THE COST OF THE WORK.
11. ALL HARDWARE / FASTENERS SHALL BE 316 STAINLESS STEEL
12. ALL NON FACTORY PAINTED PIPING AND FITTINGS SHALL BE PAINTED IN ACCORDANCE WITH THE SPECIFICATIONS.

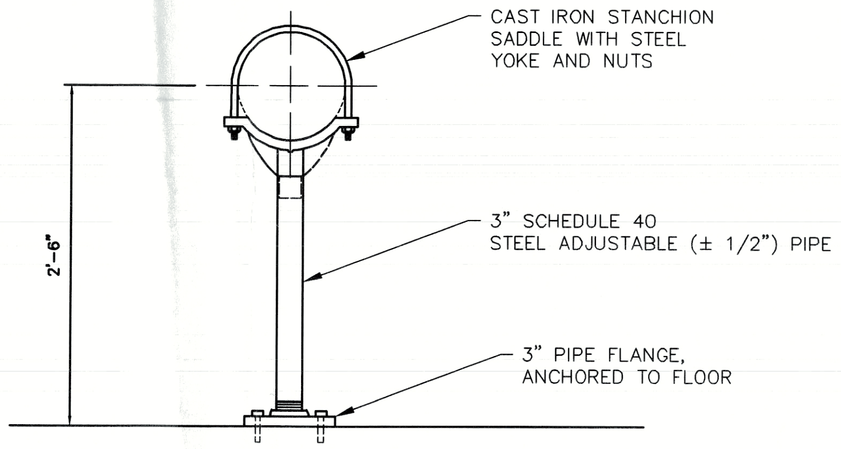
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
PERMIT NO. W 121073 NOV 02 2012
EXAMINED AND APPROVED FOR COMPLIANCE WITH ACT 399, P.A. 1976

PREPARED FOR
CITY OF FLINT
TORREY RD. BOOSTER STATION
PROPOSED MECHANICAL PLAN

ROWE PROFESSIONAL SERVICES COMPANY
The ROWE Building
540 S. Saginaw St., Ste. 200; P. O. Box 3748
Flint, MI 48502
O: (810) 341-7500
F: (810) 341-7573
www.rowepsc.com

PLAN DATE: APRIL, 2012
PROJECT MGR: J.B.M.
REVIEWER: D.A.S.
SCALE: 1/2" = 1'

REV: P2
SHT# 3 OF 6
JOB No: 05C0234

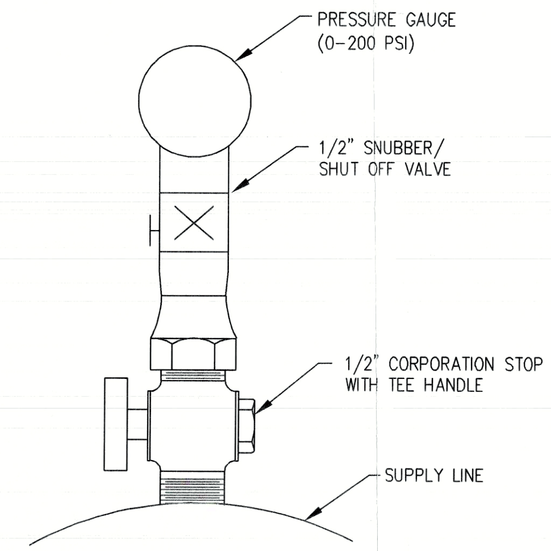


TYPICAL PIPE SUPPORT

NOT TO SCALE

NOTES

1. CONTRACTOR SHALL PROVIDE PIPE SUPPORTS AS NECESSARY. PIPE SUPPORT SPACING SHALL NOT EXCEED FIVE FEET.
2. CONTRACTOR SHALL SUPPLY AND INSTALL SUPPORTS AS RECOMMENDED BY THE MANUFACTURER.
3. PIPING SUPPORT SYSTEM SHALL BE STAUDON BY MATERIALS RESOURCES, INC. SUGGESTED MODELS INCLUDE: 589, 592, 596 AND TP. THE CONTRACTOR SHALL PROVIDE A PLAN FOR SUPPORTING THE PIPING.

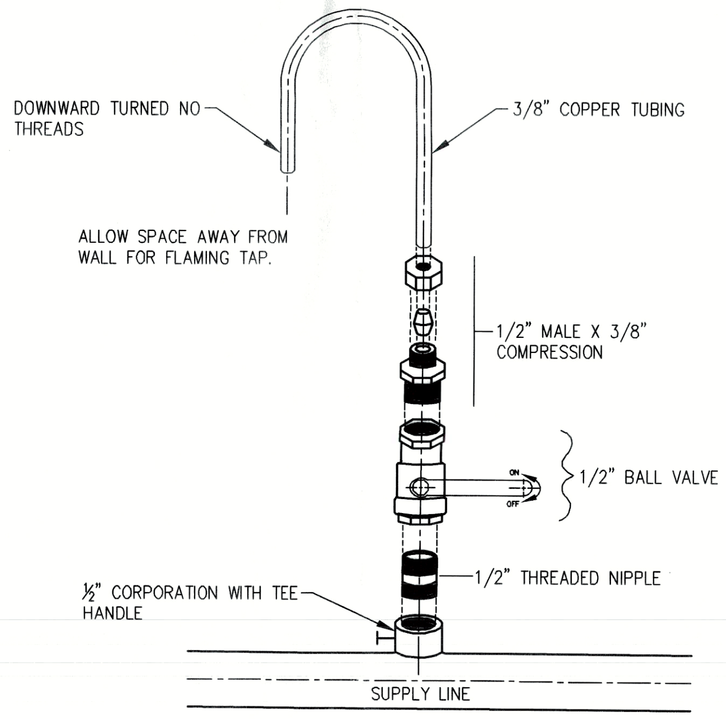


PRESSURE GAUGE DETAIL

NOT TO SCALE

NOTES

1. PRESSURE GAUGE SHALL BE LIQUID FILLED. GAUGE SHALL BE ASHCROFT SERIES 1279 OR APPROVED EQUAL.

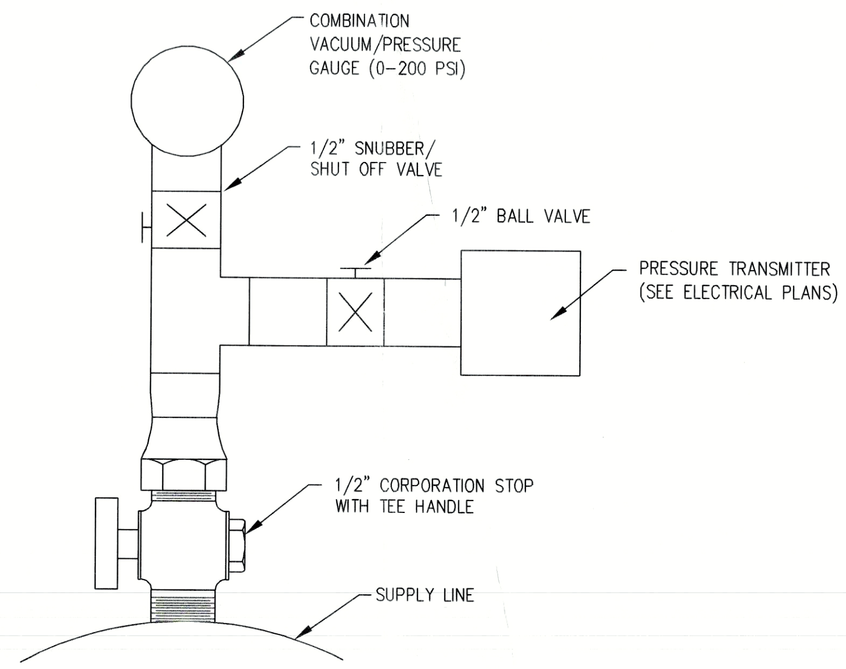


SAMPLE TAP DETAIL

NOT TO SCALE

NOTES

1. COMBINATION VACUUM PRESSURE GAUGE SHALL BE LIQUID FILLED. GAUGE SHALL BE ASHCROFT SERIES 1279 OR APPROVED EQUAL.
2. REFER TO ELECTRICAL PLANS FOR PRESSURE TRANSMITTER REQUIREMENTS.



COMPOUND PRESSURE GAUGE AND SWITCH DETAIL

NOT TO SCALE

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
PERMIT NO. W 1 2 1 0 7 3 NOV 0 2 2012
EXAMINED AND APPROVED FOR COMPLIANCE WITH ACT 399, P.A. 1976

PLAN DATE: APRIL, 2012
PROJECT MGR: J.B.M.
REVIEWER: D.A.S.
SCALE: NONE

ROWE PROFESSIONAL SERVICES COMPANY
The ROWE Building
540 S. Saginaw St., Ste. 200; P. O. Box 3748
Flint, MI 48502
O: (810) 341-7500
F: (810) 341-7573
www.rowepsc.com

PREPARED FOR
CITY OF FLINT
TORREY RD. BOOSTER STATION

MECHANICAL DETAILS

REV: P3

SHT# 4 OF 6

JOB No: 05C0234

SINGLE-LINE DIAGRAM LEGEND

Symbol	Description
30A FRS-R -30	FUSED DISCONNECT SWITCH. (SWITCH SIZE, FUSE TYPE AND FUSE SIZE AS SHOWN)
30A	UNFUSED DISCONNECT SWITCH (SWITCH SIZE AS SHOWN)
40A	THERMAL-MAGNETIC CIRCUIT BREAKER OR MOTOR CIRCUIT PROTECTOR-MCP (TRIP SIZE AS SHOWN)
CB	HIGH OR MEDIUM VOLTAGE CIRCUIT BREAKER
12470 1000KVA 480Y/277V	LIGHTING OR POWER TRANSFORMER, THREE PHASE UNLESS NOTED OTHERWISE (CONNECTION, SIZE & RATING AS SHOWN)
	FULL VOLTAGE NON-REVERSING MOTOR STARTER WITH OVERLOADS (FVNR)
R F	FULL VOLTAGE REVERSING MOTOR STARTER WITH OVERLOADS (FVR)
RVSS	REDUCED VOLTAGE SOLID STATE STARTER
	VACUUM CONTACTOR
5	THREE PHASE AC MOTOR (HORSEPOWER AS SHOWN)
600/5 AS AM	CURRENT TRANSFORMER WITH AMMETER SWITCH, AND AMMETER (RATIO AS SHOWN)
600/5	CURRENT TRANSFORMER WITH SHORTING BLOCK (RATIO AS SHOWN)
VS VM	POTENTIAL TRANSFORMER WITH VOLTMETER SWITCH, AND VOLTMETER
6KV	LIGHTNING ARRESTER (VOLTAGE RATING AS SHOWN)
	TRANSIENT VOLTAGE SURGE SUPPRESSOR (TVSS)
	GROUND CONNECTION
	LINE OR LOAD REACTOR
K	KIRK KEY (DASHED LINES TO INTERLOCKED DEVICES)
	DRAWOUT FOR SWITCHGEAR OR MOTOR CONTROL CENTER
	POWER FACTOR CORRECTION CAPACITOR - (PFCC) (SIZE PER MOTOR MANUFACTURER RECOMMENDATIONS.)
100E	HIGH OR MEDIUM VOLTAGE FUSED CUTOUT (SIZE AS SHOWN)
4/0	CABLE LIMITER (SIZE AS SHOWN)
G 450KW 800A	STAND-BY GENERATOR (SIZE AS SHOWN) WITH FIELD PROTECTION CIRCUIT BREAKER (TRIP SIZE AS SHOWN)
VFD BP	VARIABLE FREQUENCY DRIVE WITH A BY-PASS OPTION (SHOWN WITH INTEGRAL EXTERNAL DISCONNECT HANDLE)
	CP = CONTROL PANEL SSRVS = SOLID STATE REDUCED VOLTAGE STARTER (SHOWN WITH INTEGRAL EXTERNAL DISCONNECT HANDLE)
DPM	DIGITAL POWER METER
WHM	WATTHOUR METER
	AUTOMATIC TRANSFER SWITCH (ATS)
	MANUAL TRANSFER SWITCH (MTS)

ELECTRICAL PLAN LEGEND

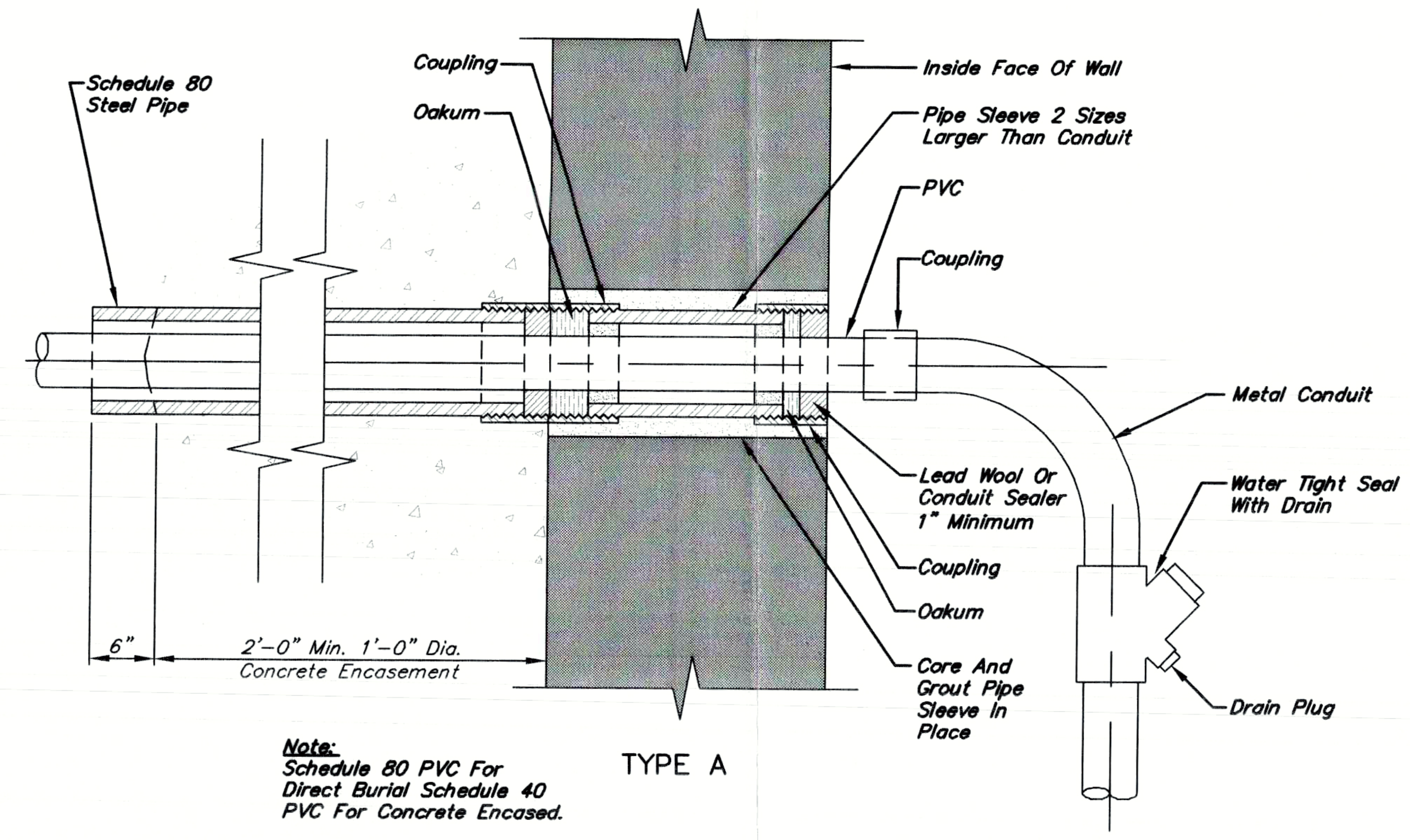
Symbol	Description
— G —	GROUND WIRE
	DIRECT BURIAL CABLE
	CONDUIT CONCEALED
	CONDUIT EXPOSED
	CONDUIT IN CONCRETE DUCT BANK
	HOMERUN
	CONDUIT TURNS UP
	CONDUIT TURNS DOWN
	CAPPED CONDUIT (FUTURE USE)
	CONDUIT TEE
	CADWELD CONNECTION
	GROUND ROD WITH CADWELD CONNECTION

GENERAL ELECTRICAL ABBREVIATIONS

PVC - POLYVINYL CHLORIDE
RGS - RIGID GALVANIZED STEEL
PVC/RGS - PVC COATED RGS

MOTOR STARTER ABBREVIATIONS

FVNR - FULL VOLTAGE, NON-REVERSING
FVR - FULL VOLTAGE REVERSING
TS1W - TWO SPEED, ONE WINDING
TS2W - TWO SPEED, TWO WINDING
TSR1W - TWO SPEED REVERSING, ONE WINDING
TSR2W - TWO SPEED REVERSING, TWO WINDING



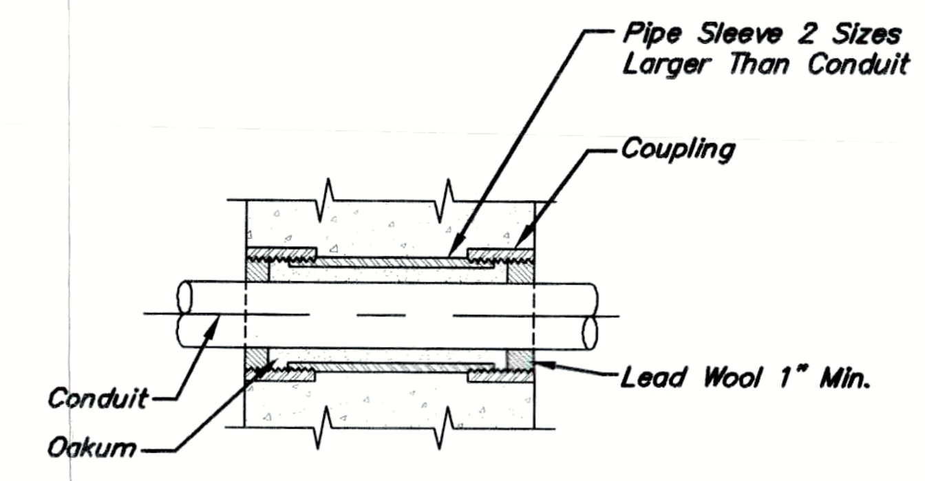
Note: Schedule 80 PVC For Direct Burial Schedule 40 PVC For Concrete Encased.

TYPE A

EXTERIOR WALL SLEEVE FOR PVC CONDUIT
NTS

ELECTRICAL NOTES

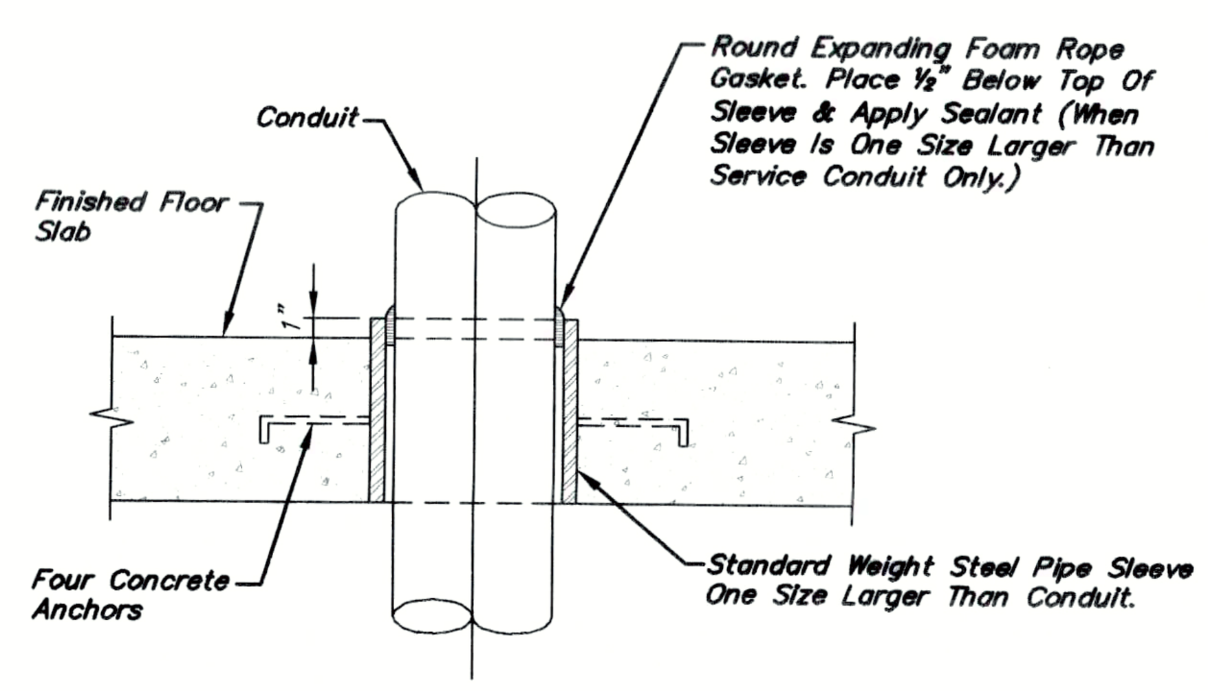
1. Where Lines Are Shown Connecting Electrical Equipment, They Are Not Intended As Conduit Routing. Contractor Shall Route All Conduit Runs (Shown Or Not) Per Division 16 Specifications.
2. For Below Grade Conduit Penetrations Through Existing Exterior Concrete Walls, Provide Type A Conduit Sleeve For PVC Conduit. For RGS Or PVC-Coated RGS Conduit, Provide Type B Conduit Sleeve Through Concrete Walls, And Type C Conduit Sleeve Through Existing Concrete Walls.
3. For Above Grade Conduit Penetrations Through Exterior Concrete Walls, Provide Type C Conduit Sleeve. For Masonry Walls Provide Type F Conduit Sleeve.
4. For Conduit Penetrations Through Existing Concrete Floors And Walls Between Adjacent Non-Classified (Non-Hazardous) Areas, Provide Type C Conduit Sleeves For All Conduit Types. For Similar Penetrations Through Concrete Floors And Walls, Provide Type D Conduit Sleeves For All Conduit Types.
5. Legends Are For Reference Only And Does Not Mean That All Items Are Used.



TYPE B

Note:
For Conduit Less Than 4" Dia., Use Galvanized Steel Pipe Sleeve.
For Conduits 4" Dia. Or Larger, Use CI Or DI Type "E" Sleeve.

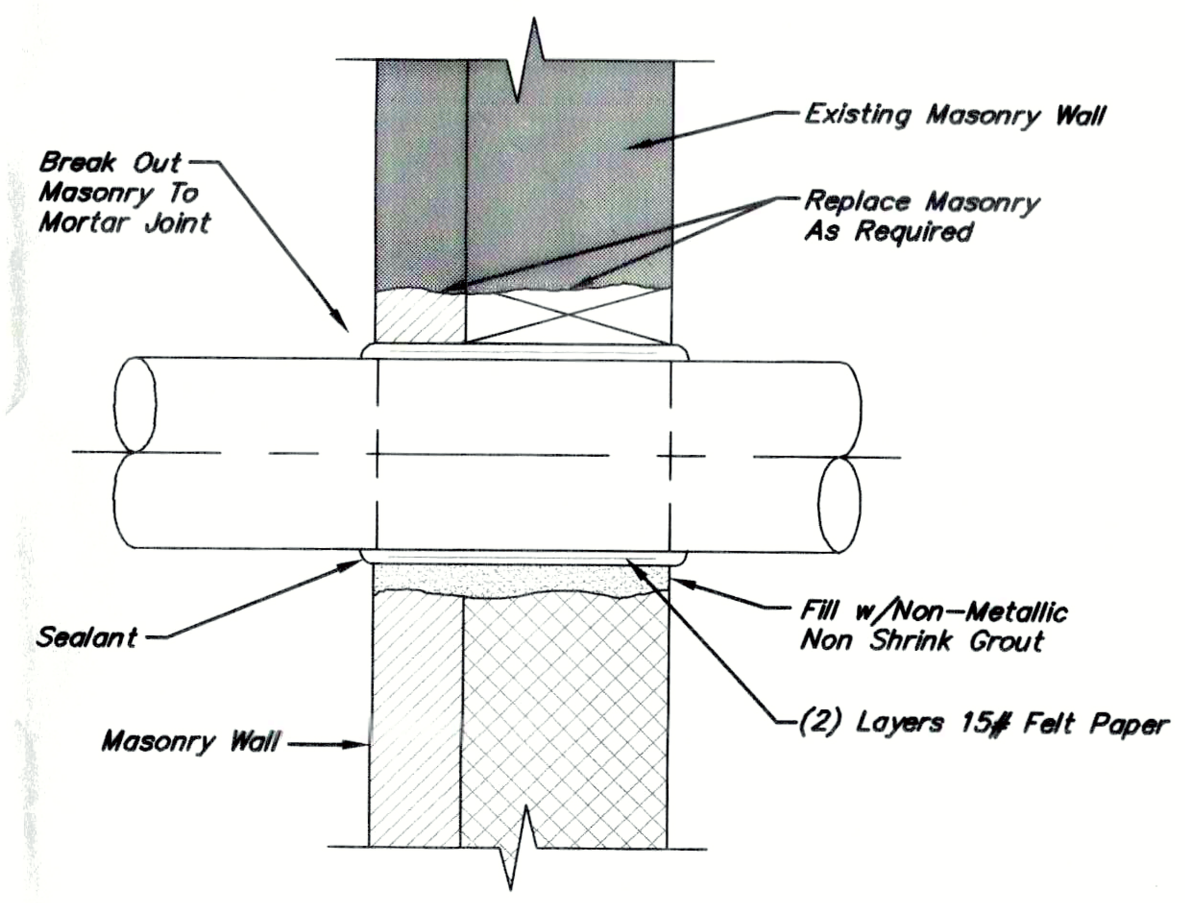
EXTERIOR CONCRETE WALL SLEEVE
R.G.S. OR PVC COATED R.G.S.
NTS



TYPE D

Note: Thru Existing Floors Where Type "D" Floor Sleeves Are Called Out, The Contractor Shall Core Floor And Caulk As Shown, Eliminating The Steel Sleeve.

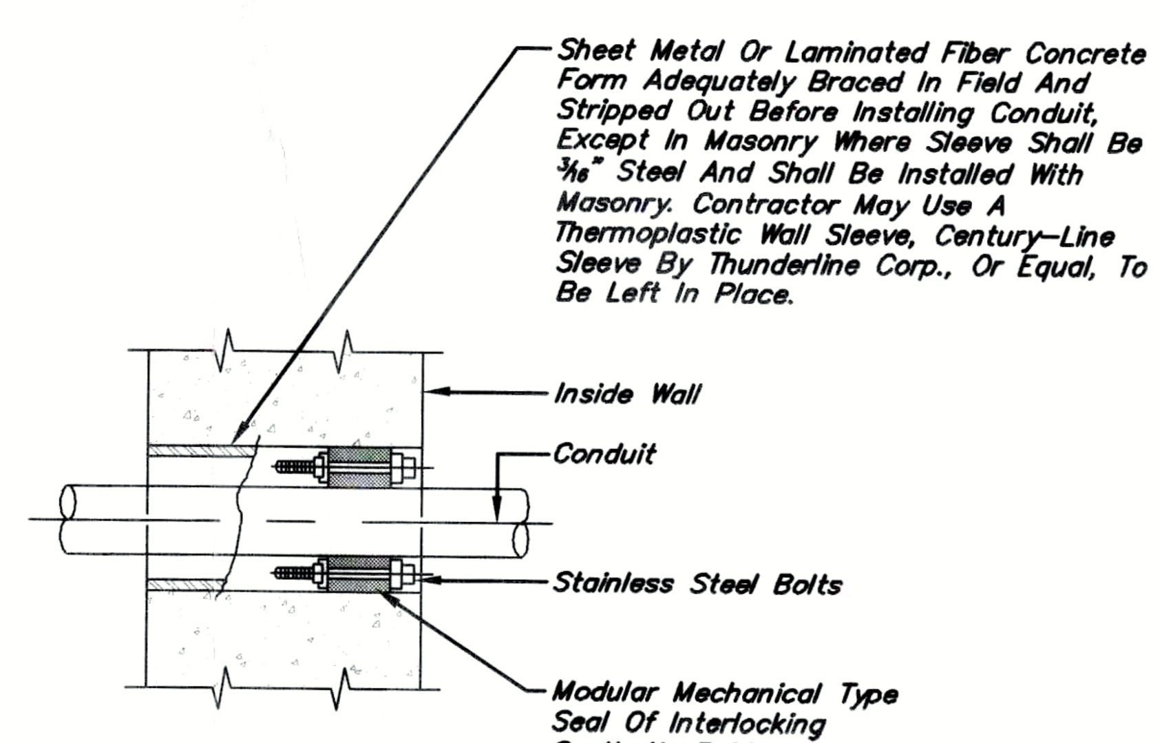
CONDUIT FLOOR SLEEVE
NTS



TYPE F

Note: For Exterior Walls, Face Courses To Be Masonry

CONDUIT SLEEVE THRU MASONRY WALL
R.G.S. OR PVC COATED R.G.S.
NTS



TYPE C

Note:
1. Existing Walls Shall Be Core Drilled.
2. Concrete Shall Be Worked In And Vibrated To Eliminate All Voids In Concrete - If Voids Do Remain, Fill With Grout Before Installing Conduit And Rubber Seals.
3. Unless Otherwise Shown On The Drawings All Interior Wall Penetrations Shall Use Type C Conduit Sleeve.

CONDUIT PIPE SLEEVE
NTS

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
PERMIT NO. W 1 2 1 0 7 3 NOV 0 2 2012
EXAMINED AND APPROVED FOR COMPLIANCE WITH ACT 399, P.A. 1976

THIS LINE SCALES 1" WHEN PLOTTED TO NOTED SCALE

PRELIMINARY 03/28/12

Jones & Henry Engineers, Ltd.
www.jheng.com
Fluid Thinking.℠

TDL-6648001E01-Model
03/28/12 05-V18

PLAN DATE:	APRIL 2012
PROJECT MGR:	TCM
REVIEWER:	PM
SCALE:	NONE

ROWE PROFESSIONAL SERVICES COMPANY
The ROWE Building
540 S. Saginaw St., Ste. 200; P. O. Box 3748
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PREPARED FOR
CITY OF FLINT
TORREY RD. PUMP STA. IMPROVEMENTS
ELECTRICAL LEGENDS AND CONDUIT SLEEVE DETAILS

REV:
SHT# 5 OF 6
JOB No: 758-6648

PLOTTED: 5/24/2012 10:30 AM
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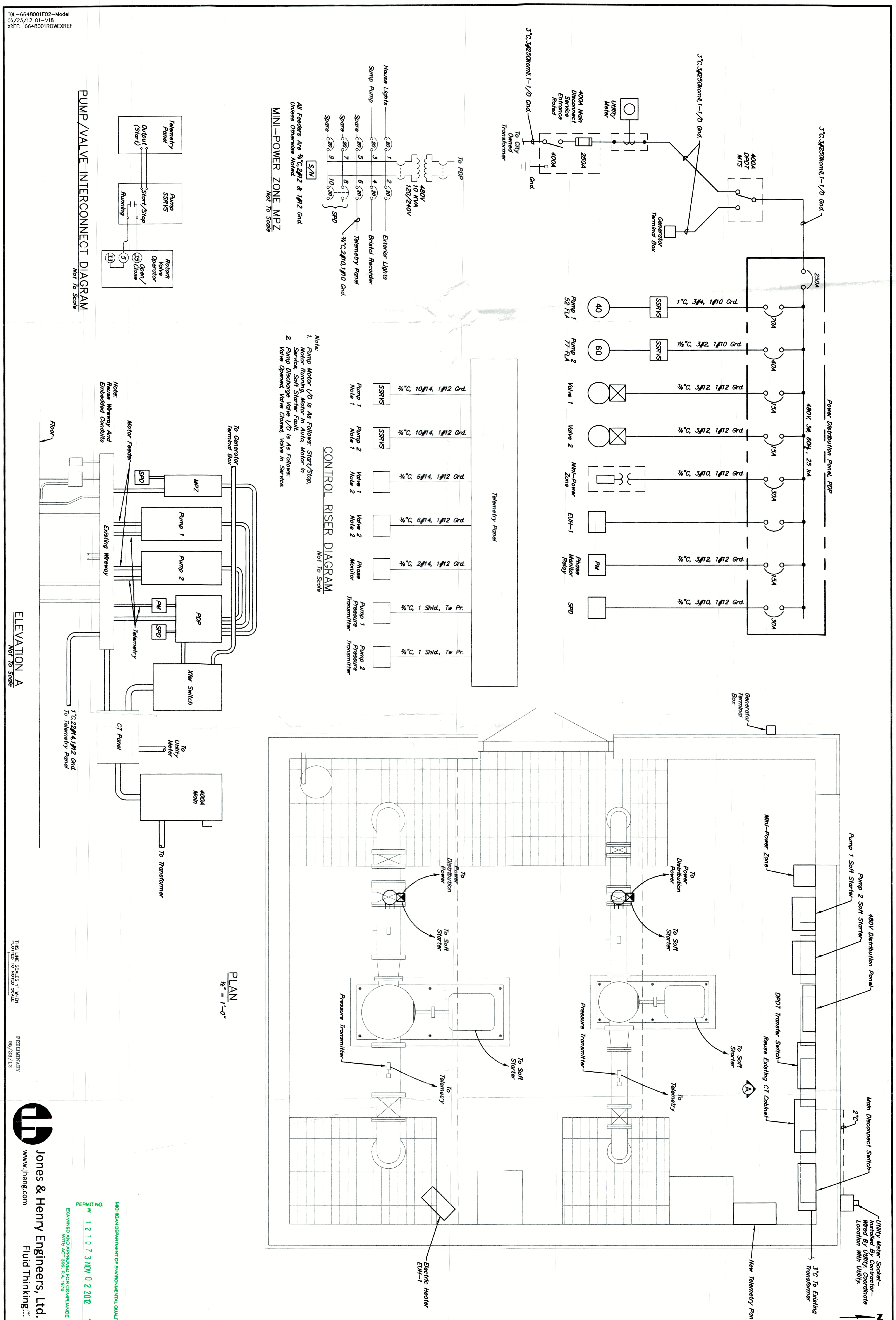

Jones & Henry Engineers, Ltd.
Fluid Thinking...
www.jheng.com

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
EXAMINED AND APPROVED FOR COMPLIANCE WITH ACT 399, P.A. 1976
PERMIT NO. W 121073 NOV 02 2012

REV:

SHT# 6 OF 6

JOB No. 758-6648

PREPARED FOR

CITY OF FLINT
TORREY RD. PUMP STA. IMPROVEMENTS

ELECTRICAL

PLAN AND SINGLE LINE DIAGRAM

ROWE PROFESSIONAL SERVICES COMPANY

The ROWE Building
540 S. Saginaw St., Ste. 200; P. O. Box 3748
Flint, MI 48502

O: (810) 341-7500
F: (810) 341-7573
www.rowepsc.com

PLAN DATE:	APRIL 2012
PROJECT MGR:	TCM
REVIEWER:	PM
SCALE:	As Noted

PLOTTED: 5/24/2012 10:31 AM

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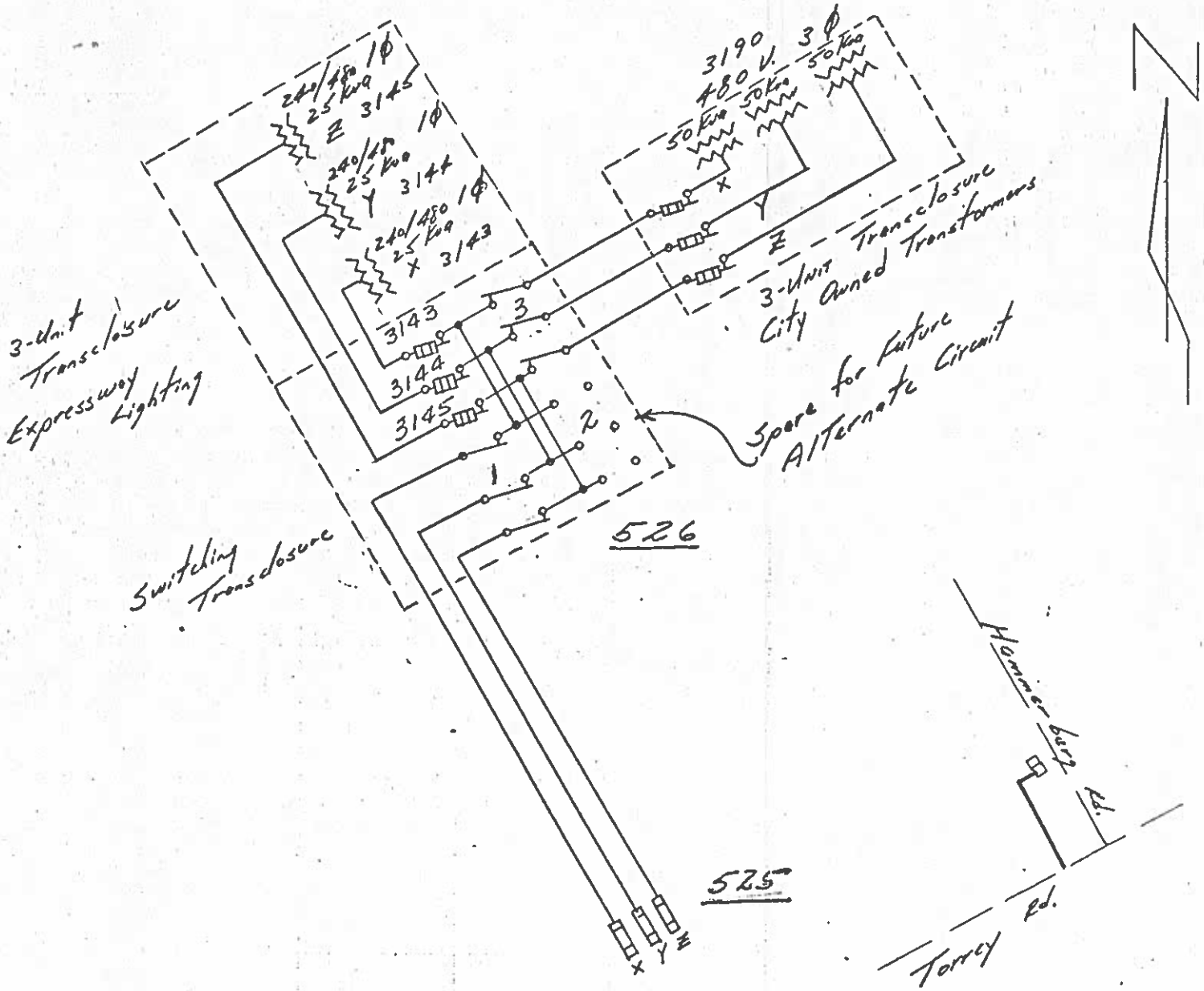
CARROLL, INC. 565
FORM 1042 REV. 1-6

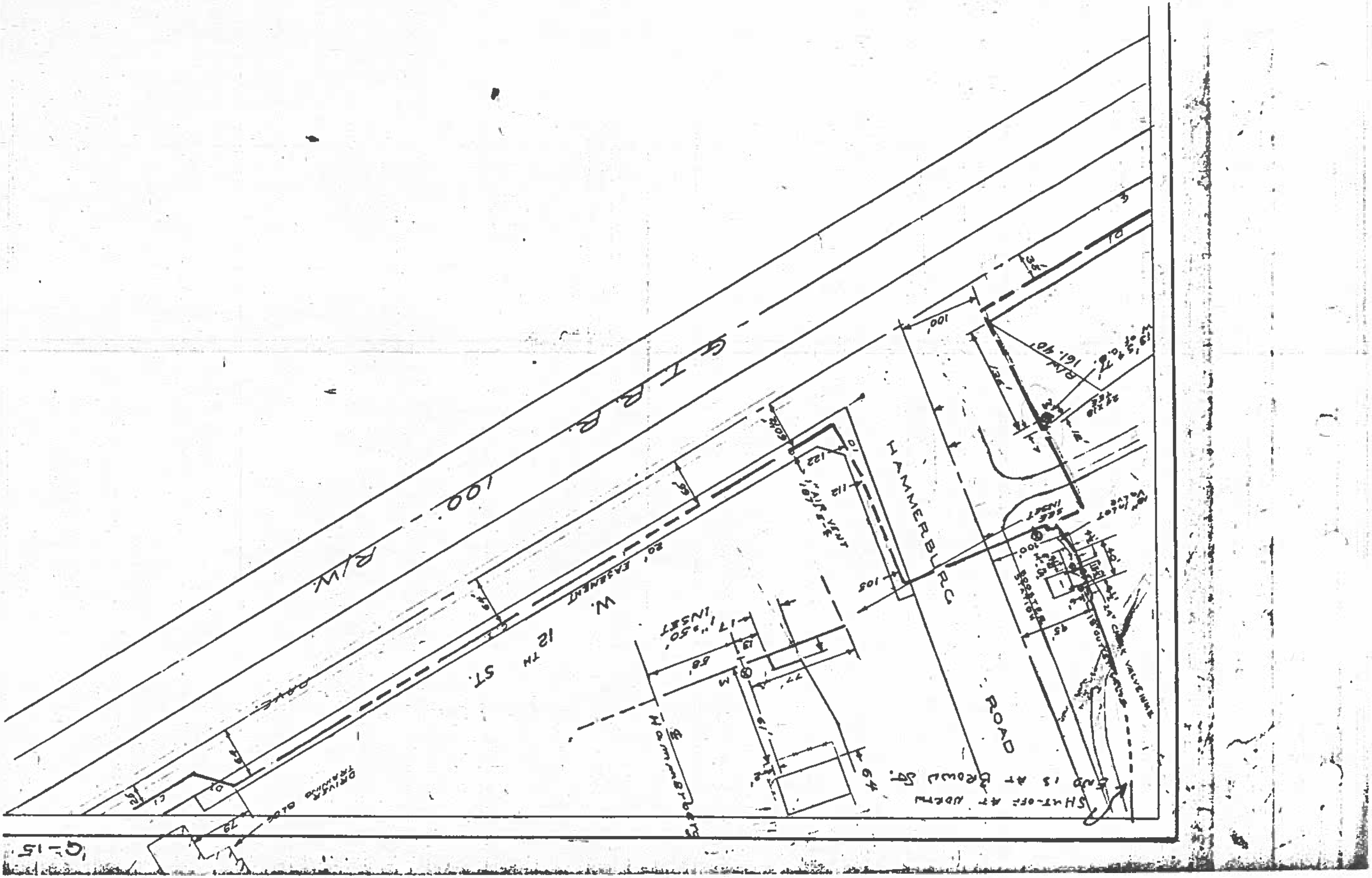
W. D. 1063	CKT. 02	L. C. PT. 101 J	T. L. M. 0156-24

CONSUMERS POWER CO.
DESIGN AG DATE 6-12-70
CHKD. T. J. C. DATE 6-12-70

HAMMERBERG RD. AT TORREY RD. CITY OF FLINT

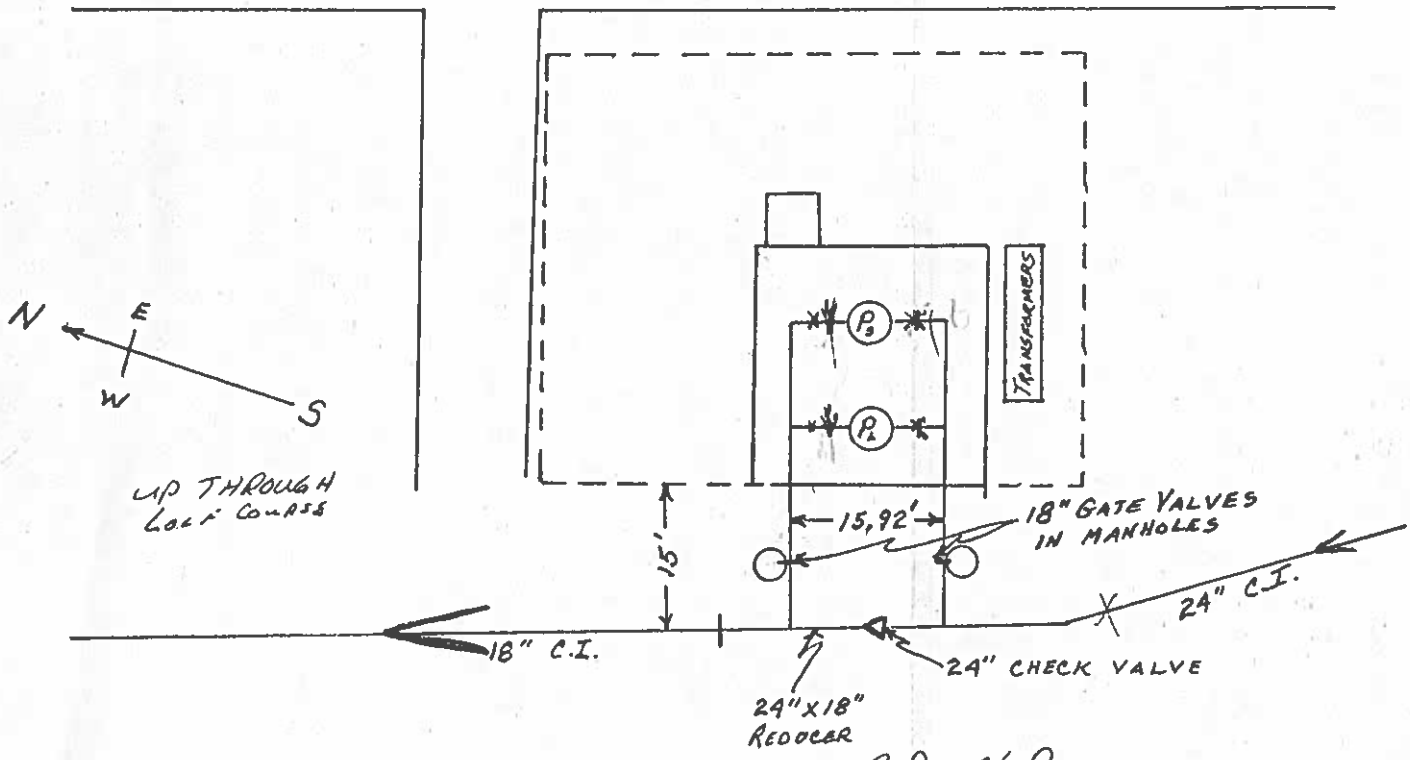
DIVISION FLINT
W. O. NO.
TAX CODE
SHEET 1 OF 1




G-15
G.T.R.R.
100' R/W
20' EASEMENT
W. 12 TH ST.
HAMMERBURG ROAD
Hammerberg
DRIVER TRAINING BLDG
DRIVE
SHUT-OFF AT NORTH END IS AT BROWN ST.
BOOSTER STATION
SEE INSET
17"x50' INSET
AIR VENT
R/W 161.40'
24" CHECK VALVE
100'
105
64
60

TORREY RD. STATION

HAMMERBERG RD.



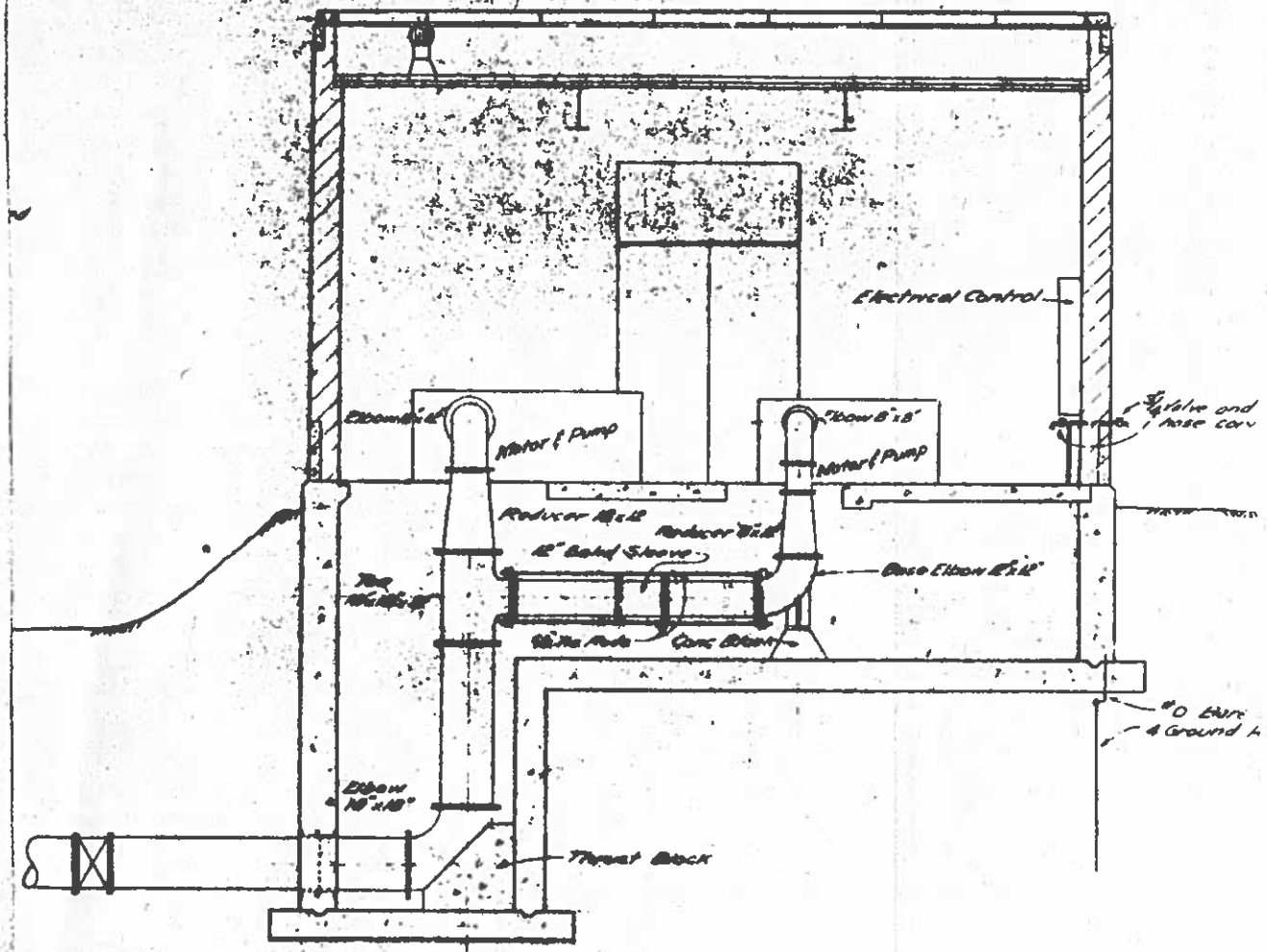
2.9 MGD

P_S = 2000 GPM PUMP ON 8" LINE 65'TL

P_L = 4000 GPM PUMP ON 12" LINE/100'TD

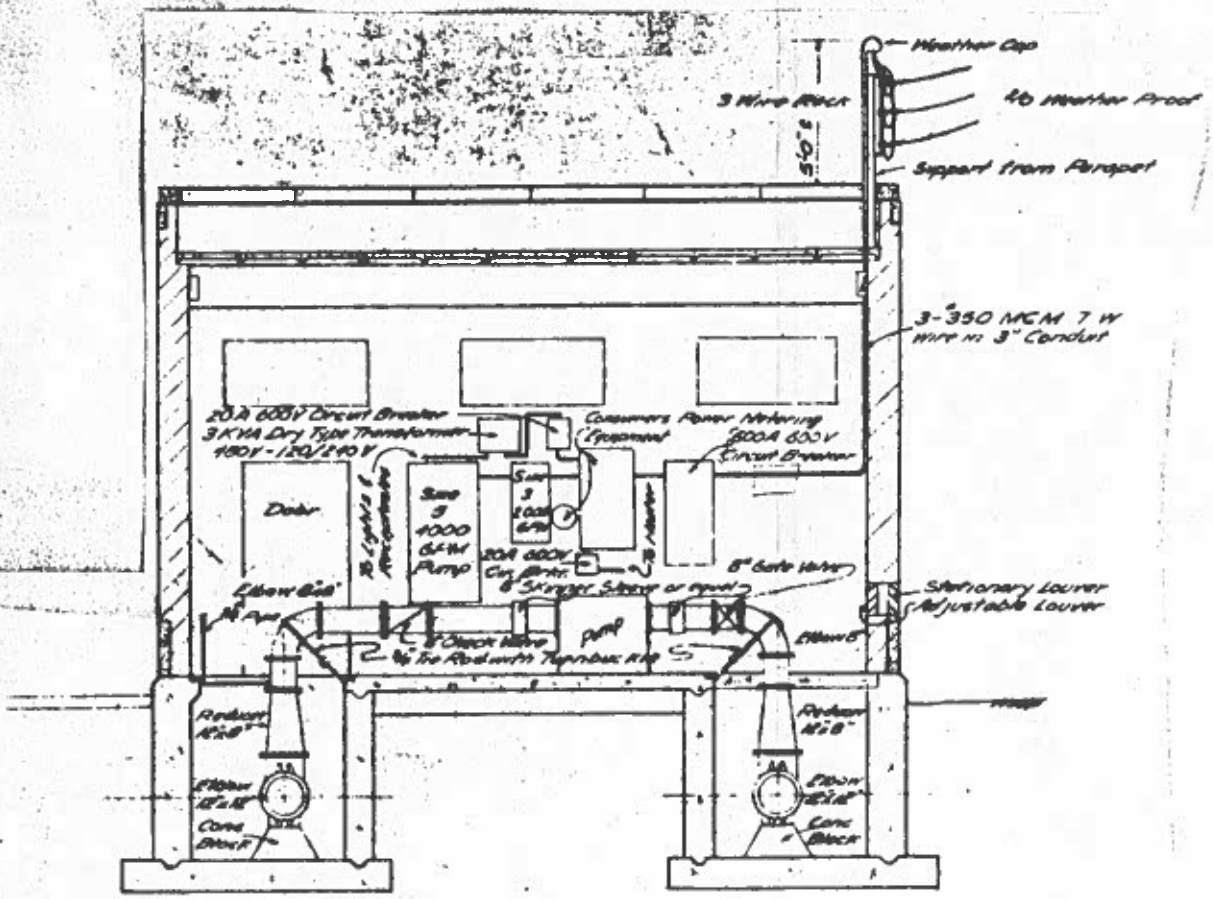
5.8

TORREY RD.
PUMP STA.



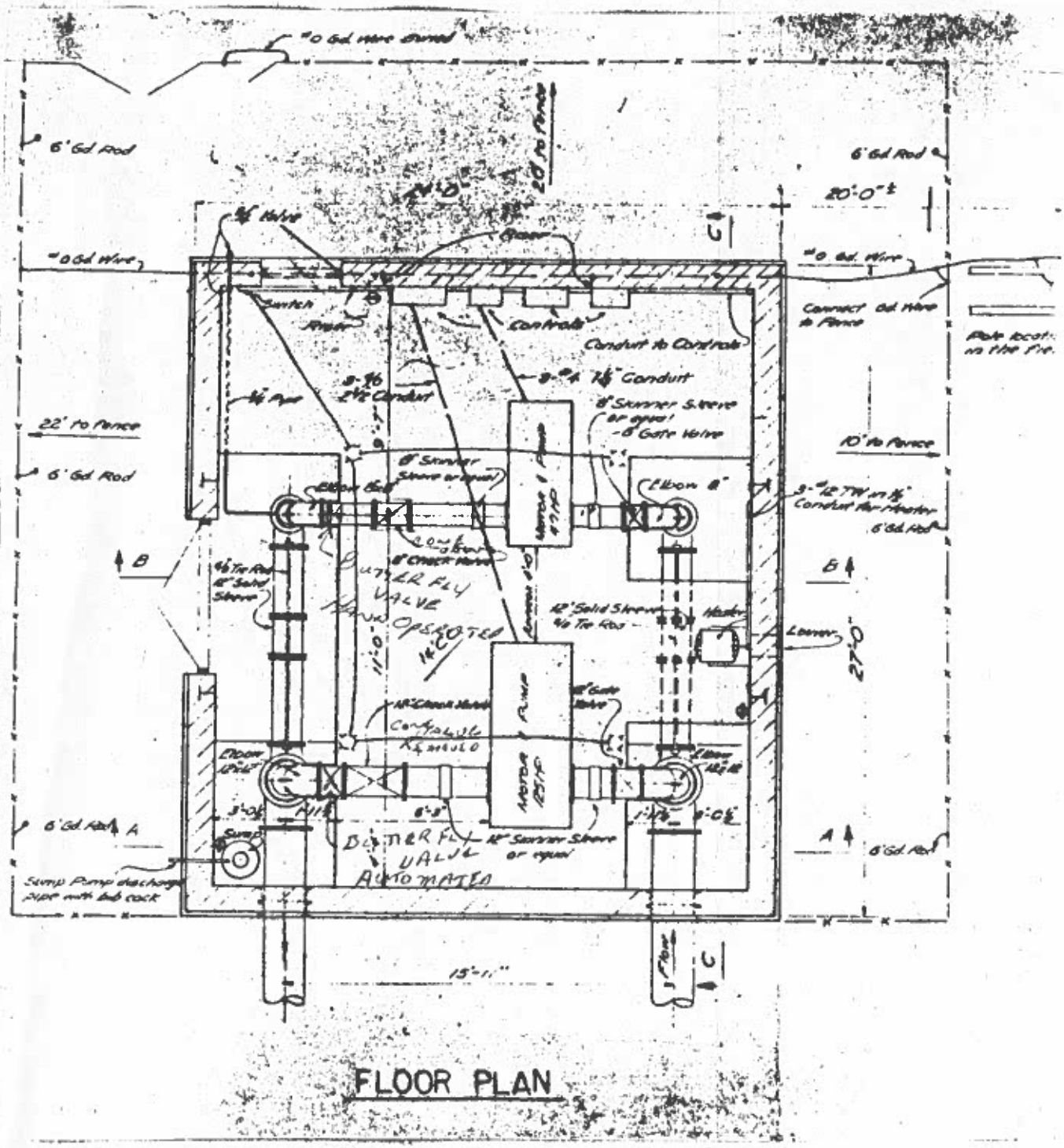
SECTION C-C

TORREY RD.
PUMP STA.



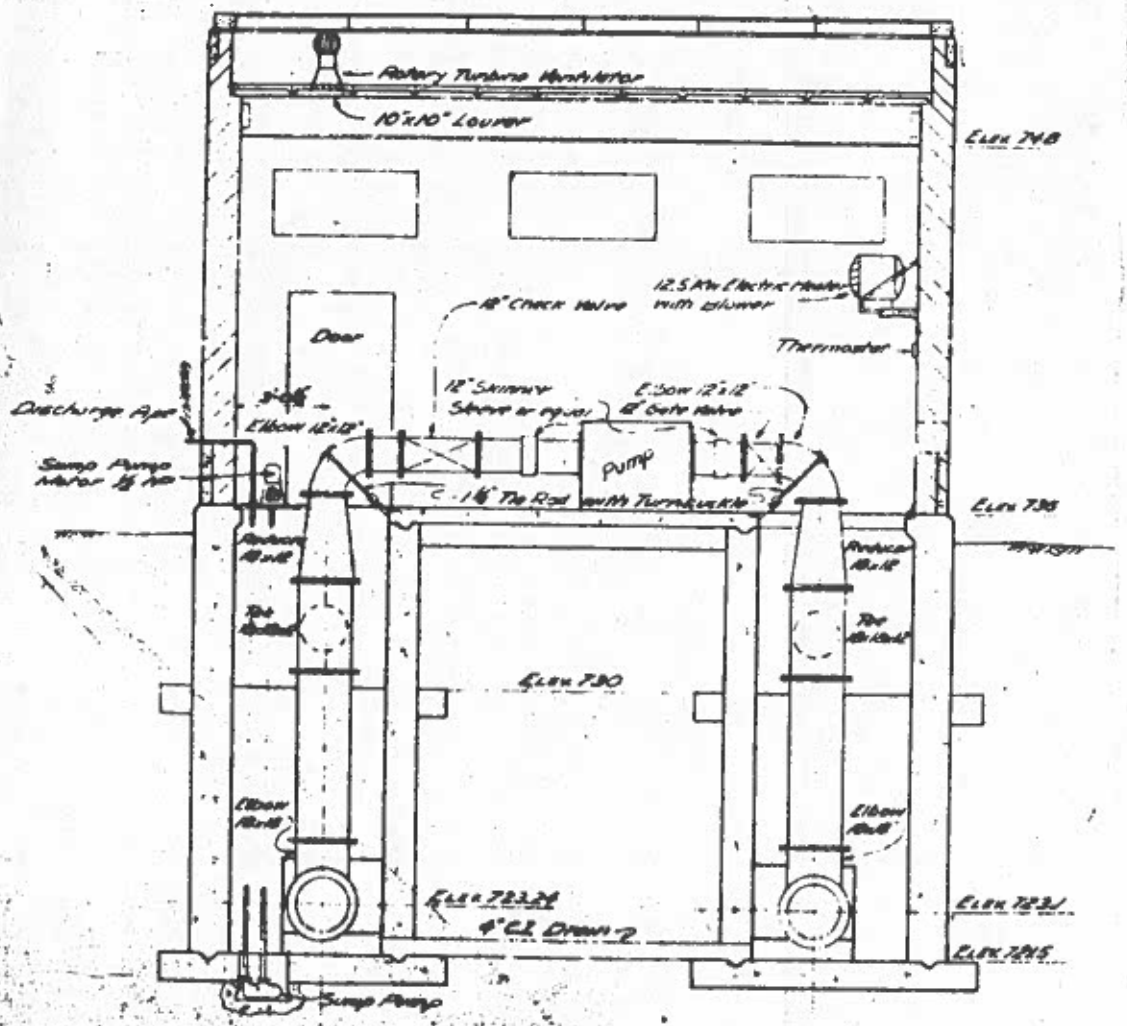
SECTION B-B

TORREY RD. PUMP STA.



FLOOR PLAN

TORREY RD.
PUMP STA.



SECTION A-A

2/24/71 Note: 30 psig is adequate pressure for up to two hours in this area. Refer pressure complaints to me and record their name & phone number so I can call them.

DATA SHEET

Date 2-18-70

By R.M. Harwood

TORREY BOOSTER TWO-PUMP CONTROLLER

Set-points	
	#1 pump
	starts-30
	stops-60
	#2 pump
	starts-40
	stops-55
	Timer
	10 minutes
	There is no-way both pumps can operate simultaneously.
	Control from P.S. #1
	(1) AUTOMATIC POSITION
	Both pumps will operate by pressure control set-points.
	#1-starts at 30 psi
	#1-stops at 60 psi
	#2-starts IF #1 has run for 10 minutes with pressure below 40 psi
	#1-stops when #2 starts
	#2-stops when pressure reaches 55 psi
	#1-starts when #2 stops
	#1-stops when pressure reaches 60 psi
	(OVER)

P.S. #1 COPY (Continued) PAGE 1 OF 2

DATA SHEET

Date _____

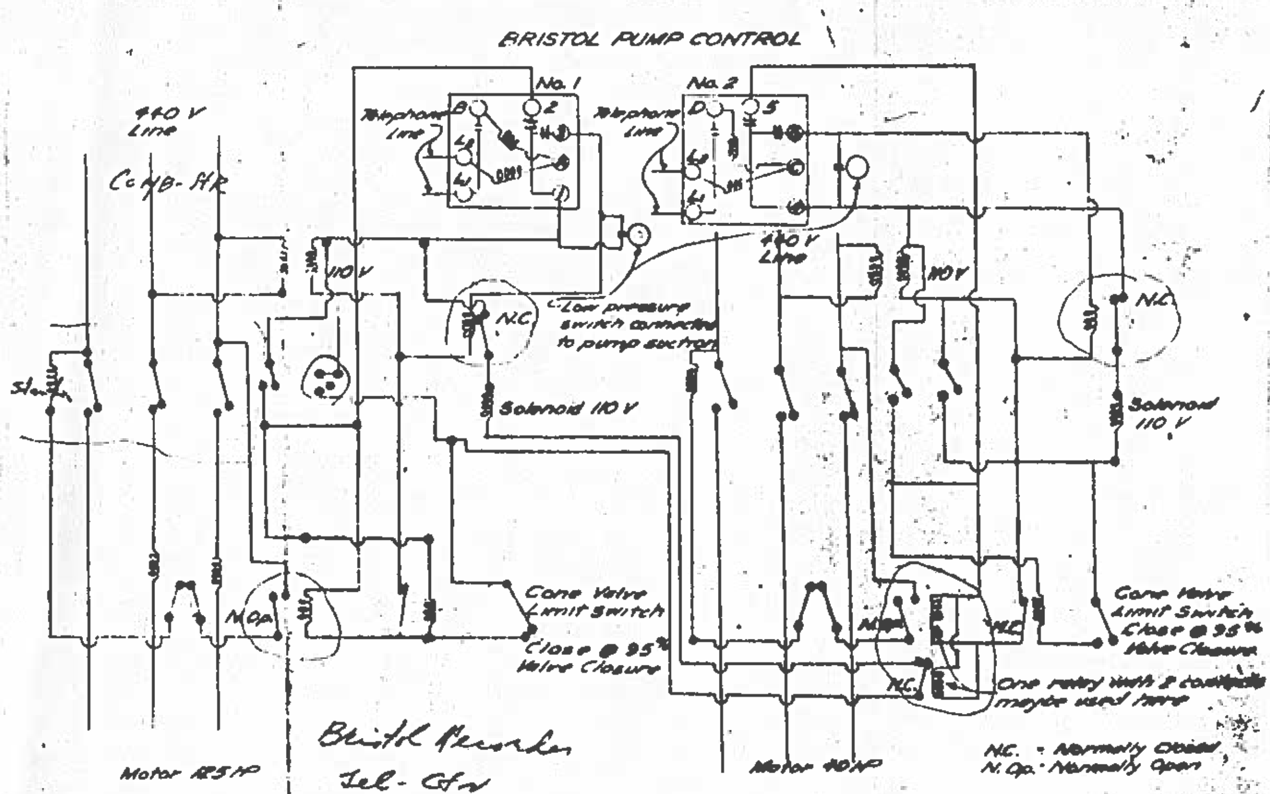
By _____

	(2) MANUAL POSITION
	This takes #2 pump out of automatic control so that it will
	only start if RUN switch is set at P.S. #1.
	#1 pump will continue to operate automatic to pressure set-points.
	#2 pump may be started or stopped from P.S. #1 by
	RUN-STOP switch.
	#1 pump will stop when #2 pump is started
	#1 pump will start——
	(a) if #2 pump is stopped manually before pressure reaches 60 ps
	(b) if #2 pump is stopped by switching to AUTO position and
	pressure rises to 55
	(c) if #2 pump is left on manual and pressure exceeds 60
	then expect #1 pump not to restart until pressure comes
	down to 30 psi.
SUMMARY:	P.S. #1
	(1) AUTO and STOP positions - normal setting
	#1 and #2 pumps on automatic
	(2) MANUAL and STOP positions-
	to keep #2 pump from running
	(3) MANUAL and ~~START~~ RUN positions-
	for instant start #2 pump

(OVER)

Checked
2-18-70 ZW ✔ ALC ✔ R.S. ✔

TORREY RD.
PUMP STA.



SCHEMATIC PUMP CONTROL DIAGRAM

NO SCALE

Note: The 2-20A 600 V circuit breakers maybe put in one cabinet

2000 GPM
Series 258347
Type-Frame I - 10/8
Speed 1750

SPECIFICATIONS
FOR
DE LAVAL CENTRIFUGAL PUMP

ACCOMPANYING PROPOSAL OF DE LAVAL STEAM TURBINE COMPANY

TO MAINTENANCE ENGINEERS, INC., FLINT, MICHIGAN

PROPOSAL NO. D-5336 DATE November 24, 1953

TYPE I 10/8

SPECIFICATIONS:

Size of pump suction 10" Location Side

Size of pump discharge 8" Location Side

Drive 40 HP, General Electric, Ideal, Electric Products or equal, 3 phase, 60 cycle, 440 volt, 1750 RPM, squirrel cage, drip proof induction motor.

Suitable bedplate will be furnished for mounting of pump and motor-bedplate to be raised lip. 5 type.

OPERATING CONDITIONS AND PERFORMANCE:

Capacity — U.S. gallons per minute 2000 GPM

Total dynamic head 65 feet PSIG 28 Ft. 65

Discharge pressure PSIG Ft.

Revolutions per minute 1750

Pump efficiency 82%

Brake horsepower required at pump coupling 40

Minimum net positive suction head required 23 feet

Liquid handled Water pH

Temperature 80° F

Specific gravity at pumping temperature 1.0

Suction conditions 45 feet - 90 feet suction pressure

MATERIAL OF PARTS: The pump will consist of the following principal parts, composed of materials as specified:

Pump Case and Cover Cast Iron Impeller Bronze

Bearings Anti-friction ball Impeller Protecting Rings Bronze

Shaft Steel Case Protecting Rings Bronze

Glands Bronze Shaft Protecting Sleeves 12-15% chrome steel

Coupling De Laval pin and rubber bushing

APPROXIMATE DIMENSIONS AND WEIGHTS: Pump, base and motor,

Length 58-3/8" Width 28" Height 31½" Weight 2100#

SPECIAL DATA: Performance Curve Section #1155, Page 4 and Bulletin #1002.
Additional features in accordance with Ayres, Lewis, Norris & May specifications:

1. Water seal piping.
2. Certified test curves.
3. One coat filler paint in addition to standard coat

Accompanying Proposal of DE LAVAL STEAM TURBINE COMPANY

To MAINTENANCE ENGINEERS, INC., FLINT, MICHIGAN

of machinery enamel.

4. Two Ashcroft Pressure gauges with brass case and shut-off cock.
5. End packed sleeves for suction pressures of 90#.
6. 12-15% chrome steel shaft sleeves.

SPECIFICATIONS
FOR
ELECTRIC MOTOR

ACCOMPANYING PROPOSAL OF DE LAVAL STEAM TURBINE COMPANY

TO MAINTENANCE ENGINEERS, INC., FLINT, MICHIGAN

PROPOSAL NO. D-5336 DATE November 24, 1953

THE DE LAVAL EQUIPMENT, described herein, is to be direct connected to an electric motor having the following characteristics:

Make of motor General Electric, Ideal, Electric Products

Normal rated capacity in H.P. 40 F.L. Speed 1750 RPM

Current 49 Phase 3 Cycles 60 Volts 440

Type Squirrel Cage Induction, Drip Proof Frame 404

TEMPERATURE RISE:

Full load continuously 40 degrees C.

The temperature rise is based on an ambient temperature of 40 degrees C., normal conditions of ventilation and an altitude not greater than 3300 feet.

Corrections for ambient temperature and altitude to be made in accordance with the N.E.M.A. standardization rules.

All temperatures are to be measured by thermometer in accordance with N.E.M.A. standardization rules.

LOAD	EFFICIENCY	POWER FACTOR
100 per cent load	90	89
75 per cent load	90	86
50 per cent load	88	83

WEIGHT: Bare Motor 600#

ACCESSORIES: The following accessories will be furnished with the motor:

SPECIAL DATA:

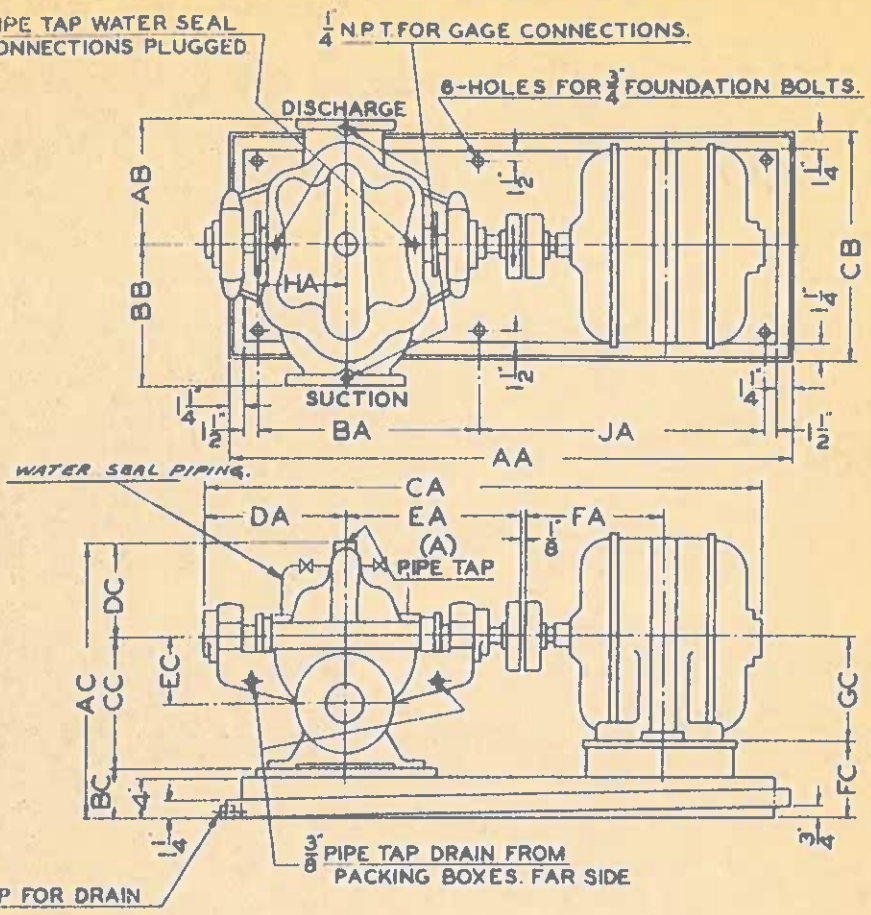
1. Insulation to withstand across-the-line starting.
2. Inrush limited to 550% of normal full load KVA.
3. Ball bearing.
4. Class A stator insulation.
5. Insulation capable of withstanding surges which are normal to switching surges.
6. Insulation capable of withstanding one start every 10 minutes for a period of one hours.

SINGLE STAGE DOUBLE SUCTION PUMPS

ROTATION:
COUNTER-CLOCKWISE

DIMENSIONS

AA	66 1/2	AB	13
BA	30 1/2	BB	15
CA	58 3/8	CB	24 1/2
DA	13 1/2	AC	32
EA	15 5/8	BC	4 1/2
FA	16 5/8	CC	17 1/4
HA	14 1/4	DC	10 1/4
JA	30 1/2	EC	9
		FC	11 3/4
(A)	1"	GC	10



NOTE: IF POSSIBLE DO NOT ATTACH ELBOWS, TEES, OR VALVES DIRECTLY TO THE SUCTION FLANGE. ECCENTRIC INCREASERS WITH THE STRAIGHT SIDE UP ARE RECOMMENDED TO AVOID AIR POCKETS.
WITH SEMI-STEEL PUMP CASES, RAISED FLANGES SHOULD NOT BE USED TO PREVENT POSSIBE BREAKAGE WHEN TIGHTENING BOLTS.

WHEN CERTIFIED, DIMENSIONS ARE CORRECT FOR CONSTRUCTION WITH MOTOR FRAME INDICATED, SUBJECT TO MANUFACTURING TOLERANCES.

FLANGE DIMENSIONS

	SUCTION	DISCHARGE
INSIDE DIA.	10	8
OUTSIDE DIA.	16	13 1/2
BOLT CIRCLE DIA.	14 1/4	11 3/4
* NO. & SIZE, HOLES	12-1	8-7/8
THICKNESS	1 3/16	1 1/8

* BOLT HOLES STRADDLE CENTERLINES

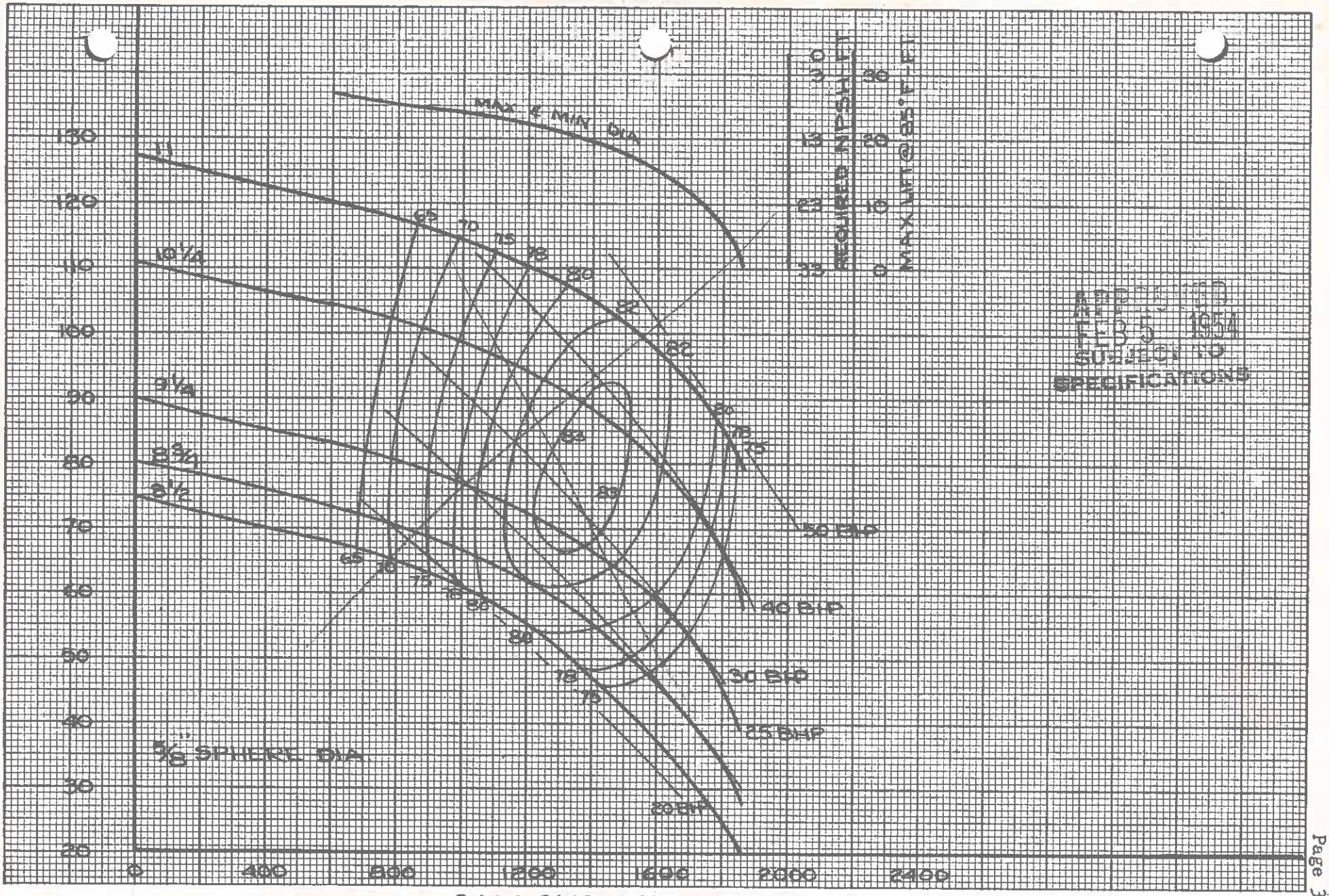
PUMP I-10/8 LIQUID Filtered water MOTOR Ideal Elec. FRAME 404-S
G.P.M. 2000 SUCTION 45' to 90' pos RATING 40 HP TYPE 3 phase
DISCH. 65' TDH EFF. 82% R.P.M. 1750 VOLTS 440

FOR City of Flint, Michigan thru Maintenance Engineers, Inc.
SENT TO DeLaval Co., Detroit, Mich.
CUSTOMER'S ORDER NO. DR-53258 259

DE LAVAL NO. 258347
CERTIFIED BY B.D. [illegible]
DATE 1-5-54

DE LAVAL STEAM TURBINE COMPANY
TRENTON, N. J.

NO.	REVISION	DATE	BY F. H. Kriser	DWG. NO.
			CHECKED BY [illegible]	DD-9607-46
			DATE 1-5-54	



PUMP TYPE AND SIZE	SPEED	SUPERCEDES		EYE AREA	IMPELLER SYMBOL(S)
I 10/8	1760	ENG. C.M.K.	DATE OCT. '52	50.26 SQ.IN.	PW-811

DE LAVAL STEAM TURBINE COMPANY

SPECIFICATIONS
FOR
DE LAVAL CENTRIFUGAL PUMP

ACCOMPANYING PROPOSAL OF DE LAVAL STEAM TURBINE COMPANY

To MAINTENANCE ENGINEERS, INC., FLINT, MICHIGAN

PROPOSAL NO. D-5336 DATE November 24, 1953

TYPE K 12/10, Single stage, double suction Centrifugal Pump

SPECIFICATIONS:

Size of pump suction 12" Location Side

Size of pump discharge 10" Location Side

Drive 125 HP, General Electric, Ideal, Electric Products or equal, 3 phase, 60 cycle, 440 volt, 1750 RPM, squirrel cage, drip proof induction motor.

Suitable bedplate will be furnished for mounting of pump and motor-bedplate is raised lip type

OPERATING CONDITIONS AND PERFORMANCE:

Capacity — U.S. gallons per minute 4000 GPM

Total dynamic head 100 feet PSIG Ft.

Discharge pressure PSIG Ft.

Revolutions per minute 1750

Pump efficiency 84%

Brake horsepower required at pump coupling 120

Minimum net positive suction head required 18 feet

Liquid handled Water pH

Temperature 80° F

Specific gravity at pumping temperature 1.0

Suction conditions 45 feet - 90 feet suction pressure

MATERIAL OF PARTS: The pump will consist of the following principal parts, composed of materials as specified:

Pump Case and Cover	Cast Iron	Impeller	Bronze
Bearings	Anti-friction ball	Impeller Protecting Rings	Bronze
Shaft	Steel	Case Protecting Rings	Bronze
Glands	Bronze	Shaft Protecting Sleeves	12-15% chrome steel
Coupling	De Laval pin and rubber bushing		

APPROXIMATE DIMENSIONS AND WEIGHTS: Pump, base and motor

Length 73-3/4" Width 33" Height 34-7/8" Weight 3700#

Performance Curve Section #1168, page 3 and Bulletin #1002.

SPECIAL DATA: Special features in accordance with Ayres, Lewis, Norris & May specifications:

1. Water seal piping.
2. Certified test curves.
3. One coat filler paint in addition to standard coat

Accompanying Proposal of DE LAVAL STEAM TURBINE COMPANY

To MAINTENANCE ENGINEERS, INC., FLINT, MICHIGAN

of machinery enamel.

4. Two Ashcroft Pressure gauges with brass case and shut-off cock.
5. End packed sleeves for suction pressures of 90'.
6. 12-15% chrome steel shaft sleeves.

SPECIFICATIONS
FOR
ELECTRIC MOTOR

ACCOMPANYING PROPOSAL OF DE LAVAL STEAM TURBINE COMPANY

TO MAINTENANCE ENGINEERS, INC., FLINT, MICHIGAN

PROPOSAL NO. D-5336 DATE November 24, 1953

THE DE LAVAL EQUIPMENT, described herein, is to be direct connected to an electric motor having the following characteristics:

Make of motor General Electric, Ideal, Electric Products

Normal rated capacity in H.P. 125 F.L. Speed 1750 RPM

Current 148 Phase 3 Cycles 60 Volts 440

Type Squirrel Cage Induction, Drip Proof Frame 505

TEMPERATURE RISE:

Full load continuously 40 degrees C.

The temperature rise is based on an ambient temperature of 40 degrees C., normal conditions of ventilation and an altitude not greater than 3300 feet.

Corrections for ambient temperature and altitude to be made in accordance with the N.E.M.A. standardization rules.

All temperatures are to be measured by thermometer in accordance with N.E.M.A. standardization rules.

LOAD	EFFICIENCY	POWER FACTOR
100 per cent load	92	90
75 per cent load	92	88
50 per cent load	91	82

WEIGHT: Bare Motor 1300#

ACCESSORIES: The following accessories will be furnished with the motor:

SPECIAL DATA:

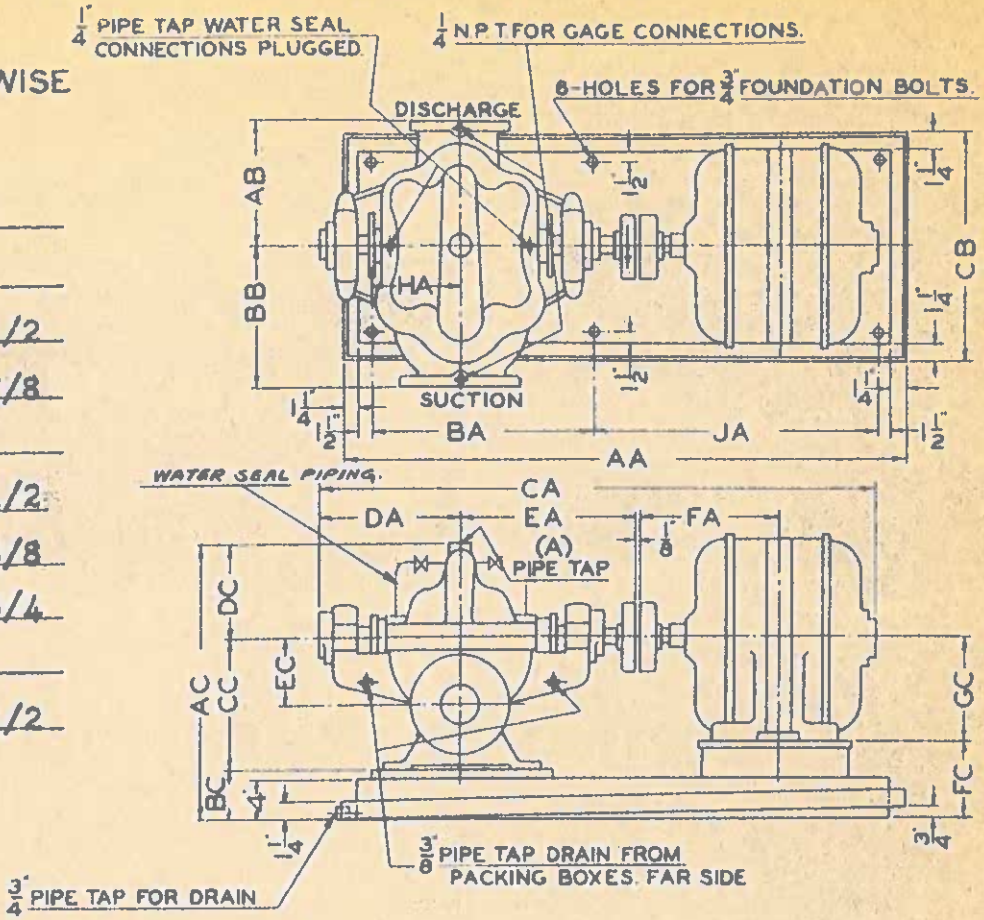
1. Insulation to withstand across-the-line starting.
2. Inrush limited to 550% of normal full load KVA.
3. Ball bearing.
4. Class A stator insulation.
5. Insulation capable of withstanding surges which are normal to switching surges.
6. Insulation capable of withstanding one start every 10 minutes for a period of one hour.

SINGLE STAGE DOUBLE SUCTION PUMPS

ROTATION:
COUNTER-CLOCKWISE

DIMENSIONS

AA	75 1/2	AB	15
BA	28 1/2	BB	18
CA	75 1/2	CB	27 1/2
DA	15 3/8	AC	35 7/8
EA	20 7/8	BC	5
FA	21 7/8	CC	19 1/2
HA	12 1/2	DC	11 3/8
JA	41 1/2	EC	9 3/4
		FC	12
(A)	1"	GC	12 1/2



NOTE: IF POSSIBLE DO NOT ATTACH ELBOWS, TEES, OR VALVES DIRECTLY TO THE SUCTION FLANGE. ECCENTRIC INCREASERS WITH THE STRAIGHT SIDE UP ARE RECOMMENDED TO AVOID AIR POCKETS.

WITH SEMI-STEEL PUMP CASES, RAISED FLANGES SHOULD NOT BE USED TO PREVENT POSSIBE BREAKAGE WHEN TIGHTENING BOLTS.

WHEN CERTIFIED, DIMENSIONS ARE CORRECT FOR CONSTRUCTION WITH MOTOR FRAME INDICATED, SUBJECT TO MANUFACTURING TOLERANCES.

FLANGE DIMENSIONS

	SUCTION	DISCHARGE
INSIDE DIA.	12	10
OUTSIDE DIA.	19	16
BOLT CIRCLE DIA.	17	14 1/4
* NO. & SIZE, HOLES	12-1	12-1
THICKNESS	1 1/4	1 3/16

* BOLT HOLES STRADDLE CENTERLINES

PUMP	K-12/10	LIQUID	Filtered Water	MOTOR	Ideal Elec.	FRAME	505-8
G.P.M.	4000	SUCTION	45' to 90' pos	RATING	125 HP	TYPE	3 phase
DISCH.	100' TDH	EFF.	84%	R.P.M.	1750	VOLTS	440

FOR City of Flint, Michigan thru Maintenance Engineers, Inc.
SENT TO DeLaval Co., Detroit, Mich. DR-53258
CUSTOMER'S ORDER NO. 259

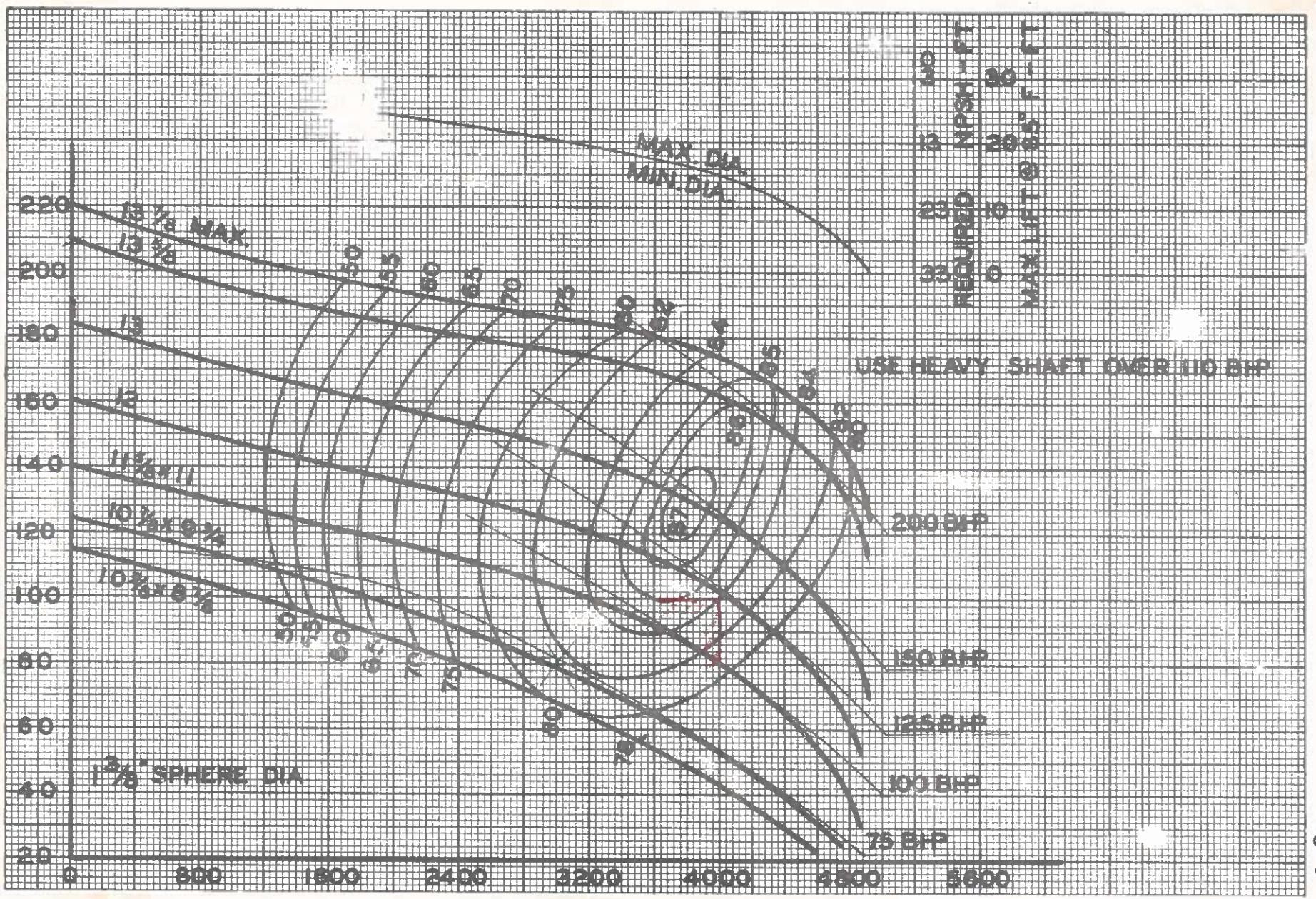
DE LAVAL NO. 258348
CERTIFIED BY B. DeLaval Cousins
DATE 1-5-54

DE LAVAL STEAM TURBINE COMPANY
TRENTON, N.J.

NO.	REVISION	DATE

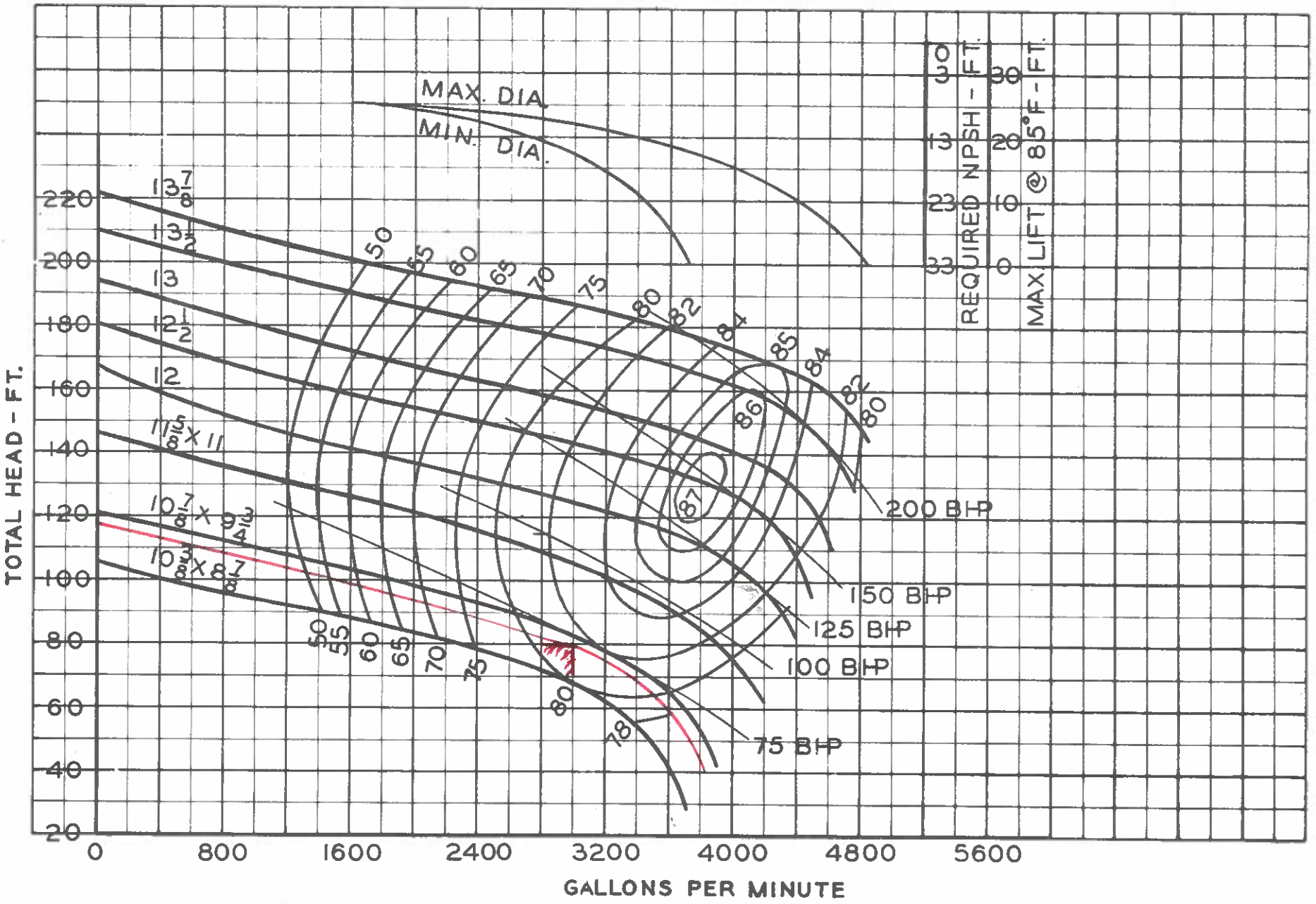
BY F. H. Kriser
CHECKED BY F.H.K.
DATE 1-5-54

DWG. NO.
DD-9607-47



PUMP TYPE AND SIZE	SPEED	ENG.	DATE	EYE AREA	IMPELLER SYMBOL (S)
K 12/10	1760	C.M.K.	MAR.'53	78.4 SQ. IN.	PW 1053

DE LAVAL STEAM TURBINE COMPANY



PUMP TYPE AND SIZE	SPEED	1 3/8 SPHERE DIA.		EYE AREA	IMPELLER
K 12/10	1775	ENG.	DATE	78.4 SQ. IN.	PW-1053

DE LAVAL STEAM TURBINE COMPANY

TEST REQUIREMENTS

PATTERSON PUMP COMPANY PO BOX 790 2129 AYERSVILLE ROAD TOCCOA, GEORGIA 30577	ORDER FIRST USED ON:			TR-2452
	ISSUED BY: AP	DATE: 11-11-13	PAGE: 1 of 1	

JOB: CUSTOMER ORDER NUMBER:

S/N: **SC-C0125249** PUMP MODEL: **10X8MN**

SUCTION DIAMETER: **10** DISCHARGE DIAMETER: **8** IMPELLER PATTERN: **C-2750**

DUTY POINT

GPM:	**2000**
HEAD:	**65**
RPM:	**1780**
EFFICIENCY REQUIRED:	**84%**
MAXIMUM BHP PERMISSIBLE:	**40**
ROTATION:	**CW**
SUBMITTAL REQUIRED:	**YES**
TEST ARRANGEMENT:	ASSEMBLY SECTION:
NUMBER OF PUMPS TO BE TESTED: **2**	GENERAL ARRANGEMENT:

WITNESS TEST: CERTIFIED TEST: **X** SHOP TEST: **X** FIELD TEST:

P.E. STAMP REQUIRED (give requirements to witness P.E.)

TEST RANGE

CAPACITY:	**0**	GPM	to	**2500**	GPM
HEAD:	**104**	FT	to	**40**	FT
SPEED:		RPM	to	**1780**	RPM

POSITIVE SUCTION HEAD: SUCTION LIFT: **X**

NUMBER OF TEST POINTS REQUIRED: **10** TEST POINT SPACING:

CURVE DATA REQUIRED

H/Q: **X** SHUTOFF: **X** BHP/KW: **X** NPSHR: PUMP EFFICIENCY: **X**

OVERALL EFFICIENCY:

HYDROSTATIC PRESSURE: **175** PSI TIME: **5**

MOTOR(s) TO BE USED: **NIDEC** VOLTAGE: **460** HP: **40**

INDUCTION: SYNCHRONOUS:

MOTOR EFFICIENCY: MOTOR COUPLING:

SPECIAL REQUIREMENTS

TEST USING JOB DRIVER AND NAMEPLATE EFFICIENCY.

TEST REQUIREMENTS

PATTERSON PUMP COMPANY PO BOX 790 9201 AYERSVILLE ROAD TOCCOA, GEORGIA 30577	ORDER FIRST USED ON:			TR-797-1
	ISSUED BY: AP	DATE: 07/13/00	PAGE: 1 of 3	

FACTORY HYDRO TEST PROCEDURE

1.0 SUBJECT:

1.1 Test procedure for conducting hydrostatic tests on Patterson Pumps.

2.0 REFERENCES:

2.1 Customer Purchase Order
2.2 Calibration Procedure

3.0 PURPOSE:

The purpose of this procedure is to outline scope of testing and to describe the methods to be used in order to comply with the specifications referenced in Paragraph 2.0 above.

4.0 PERFORMANCE REQUIREMENTS:

4.1 Design Requirements:

a. Each pump is to be tested hydrostatically for not less than five minutes. The pressure will be as stated on the Test Requirements sheet, but not less than 1.5 times expected shutoff pressure of the pump.

b. There shall be no rupture or leakage through the casting at the test pressure.

5.0 TEST PROCEDURE:

1. The pump casing will be cleaned of rust and scale by shot blasting. All pits and dents will be filled, then solvent cleaned. Exterior of the pump is then prime coated.

2. The pump casings are then machined and all oil, grease, dirt, etc., removed.

3. Completely assemble the pump.

4. Install blind flanges and gaskets on the casing suction and discharge flanges.

TEST REQUIREMENTS

5. Plug all vents, drain, and gauge ports.

6. Install air vent valve in the top of the casing.

7. Make necessary water line to the pump connections. Water line comes from factory tap water system.

8. Tighten packing glands to prevent leakage.

9. Open air vent valve and fill casing with water until the water is escaping through vent valve.

10. Close air vent valve and start pressurizing the pump using regulator and calibrated gauge to monitor pressure. Gauge has a range of 0 to 1500 psi. The gauge is permanently located next to the regulator, approximately 10-15 feet from the pump.

11. Pressurize to 175 psiG.

12. Maintain pressure for 5 minutes.

13. Some leakage through the stuffing box is acceptable as long as pressure can be maintained for time limit.

14. Loosen packing gland nuts until there is leakage between the shaft and the packing.

15. De-energize pressure pump.

16. Open air vent valve.

17. Drain water from the casing.

18. Disconnect water line and pressure pump.

19. Remove bland flanges and gaskets from the casing suction and discharge flanges.

20. Fill out Hydrostatic Pressure Test Report

A Subsidiary of The Gorman-Rupp Company

HYDROSTATIC PRESSURE TEST REPORT

Serial Number _____

Pump Model _____

Test Pressure (PSI) _____

Test Duration (MIN.) _____

Test Liquid Water , Temperature ranging from 50 t0 70 degrees F

Test Facility ☐ Small Pump Assy Gauge S/N 216619-63

☐ Large Pump Assy Gauge S/N _____

☐ Other Gauge S/N _____

Test Results ☐ PASS ☐ FAIL

COMMENTS:

_____

_____

_____

Tested By: _____ Date: _____

Witnessed By: _____ ☐ N/A Date: _____

TEST REQUIREMENTS

PATTERSON PUMP COMPANY PO BOX 790 9201 AYERSVILLE ROAD TOCCOA, GEORGIA 30577	ORDER FIRST USED ON:			TR-813
	ISSUED BY: AP	DATE: 08/28/00	PAGE: 1 of 2	

SUCTION LIFT TEST PROCEDURE

1.0 SUBJECT:

1.1 This procedure covers the testing of horizontal split case pumps under suction lift conditions.

2.0 REFERENCES:

2.1 Standards of the Hydraulic Institute, latest revisions.
2.2 Customer Purchase Order and / or Contract.

3.0 PURPOSE:

The purpose of this procedure is to outline the scope of testing and to describe the methods to be used in order to comply with the specifications referenced in paragraph 2.0 and attached Test Requirement sheet.

4.0 TEST PROCEDURE:

The pump assembly will be installed in the test system per attached drawing. Prior to starting the unit, the pump will be primed by pulling air out of the top of the casing by either a siphoning action or vacuum pump. Once the pump is primed, the motor will be temporarily energized to check rotation. When the unit has come up to full speed, all instruments will be vented to clear all air from the lines. After satisfactory running conditions have been established, the control valve will be completely closed and the following will be read and recorded.

a. suction pressure
b. discharge pressure
c. flow rate
d. kilowatts
e. pump speed
f. gage elevations

The flow control valve shall then be opened to the next predetermined increment of capacity and the above readings taken and recorded. This procedure will be continued until all the test points shown on the Test Requirements sheet have been taken.

5.0 TEST REPORT:

Copies of the test report containing test log sheets, test calculation printout, test setup drawing, and certified test curves shall be submitted to the customer. Test curves shall include as a minimum capacity, head, power and pump efficiency. The overall efficiency, test NPSHA and NPSHR will be included only if required by the Test Requirement sheet.

TEST REQUIREMENTS

PATTERSON PUMP COMPANY PO BOX 790 9201 AYERSVILLE ROAD TOCCOA, GEORGIA 30577	ORDER FIRST USED ON:			TR-813
	ISSUED BY: AP	DATE: 08/28/00	PAGE: 2 of 2	

6.0 INSTRUMENTATION:

1. Discharge Head	Measured by Bourdon Tube Gage
2. Suction Head	Measured by Mercury manometer
3. Capacity	Measured by means of a BIF Venturi Differential pressure across the Venturi Measured by a Mercury over water Manometer
4. Power	Measured by calibrated Himelstein System 6 wattmeter
5. Speed	Measured by Pioneer Electric DF-36 photo tach, ± 1 RPM accuracy

FORM 100A

Patterson
A Gorman-Rupp Company

Customer _____ Date _____

Serial No. _____ **PUMP PERFORMANCE TEST RECORD** Tested By _____

Pump _____ **(SUCTION LIFT TEST)** Test No. _____

RATING	PUMP DATA	TEST DRIVER				MISC DATA		
GPM	IMPELLER PATT.	HP		RPM		VENTURI METER/CONSTANT		WATER TEMP (°F)
FT. HD.	IMPELLER DIA.	MAKE		SERIAL NO.		PANEL NO.	DISCHARGE DIA. (in.)	Z_d (in.)
RPM N_2 =	VANE TIPS	VOLTS	AMPS	S.F.	EFF. (.00)	PRESSURE GA.	SUCTION DIA. (in.)	Z_1 (in.)

TEST READINGS

No.	P_d (Psi)	P_s (in. Hg)	kw	N_1	h (in. H_2O)	
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

(FOR CALCULATED DATA, SEE ATTACHED COMPUTER PRINTOUT)

COMMENTS: _____

_____

_____

SIGNED: _____ _____ _____

Test Dept. Engineer Witness

FORM 100C

PATTERSON PUMP COMPANY

A SUBSIDIARY OF THE GORMAN-RUPP CO.
Toccoa, Georgia 30577

PUMP PERFORMANCE TEST EQUATIONS
(SUCTION LIFT TEST)
Refer to Form 100A & 100B

$$Q_1 = k\sqrt{h}$$

$$H_1 = (P_d \times 2.31) + (P_s \times 1.133) + \left(\frac{Z_d + Z_s}{12}\right) + \left(.00259\, Q^2 \left[\frac{1}{D_d^4} - \frac{1}{D_s^4}\right]\right)$$

$$whp = \frac{Q \times H_1}{3960}$$

$$ehp = kw \times 1.341$$

$$bhp_1 = ehp \times \eta_{driver}$$

$$\eta_{pump} = \left(\frac{whp}{bhp_1}\right)$$

Conversion To rated Speed:

$$Q_2 = Q_1 \left(\frac{N_2}{N_1}\right)$$

$$H_2 = H_1 \left(\frac{N_2}{N_1}\right)^2$$

$$bhp_2 = bhp_1 \left(\frac{N_2}{N_1}\right)^3$$

DEFINITIONS

Q_1 = rate of flow at test speed, gpm
k = venturi meter constant
h = differential head between venturimeter inlet and throat, in. H_2O
H_1 = total head at test speed, ft. H_2O
P_d = discharge gauge reading, Psi
P_s = suction gauge reading, in Hg.
Z_d = distance that the discharge gauge ℄ is above the pump ℄ , in.
Z_s = distance that the suction gauge tap is below the pump ℄, in.
D_d = diameter at discharge gauge, in.
D_s = diameter at suction gauge, in.
whp = water horsepower
ehp = electrical horsepower input to driver
bhp_1 = pump brake horsepower at test speed
kw = kilowatt input to the motor
η driver = driver efficiency (.00)
η pump = pump efficiency (.00)
Q_2 = rate of flow at rated speed, GPM
H_2 = total head at rated speed, ft. H_2O
bhp_2 = pump brake horsepower at rated speed

NIDEC MOTOR CORPORATION
8050 WEST FLORISSANT AVE.
ST. LOUIS, MO 63136

DATE: 11/4/2013

P.O. NO.:
Order/Line NO.: NA

TO:

Model Number: G38031
Catalog Number: D40V2B
D40V2B,ODP,INV,AC MTR
60,230/460V
DI,40HP,4P,324T,10:1VT/5:1CT

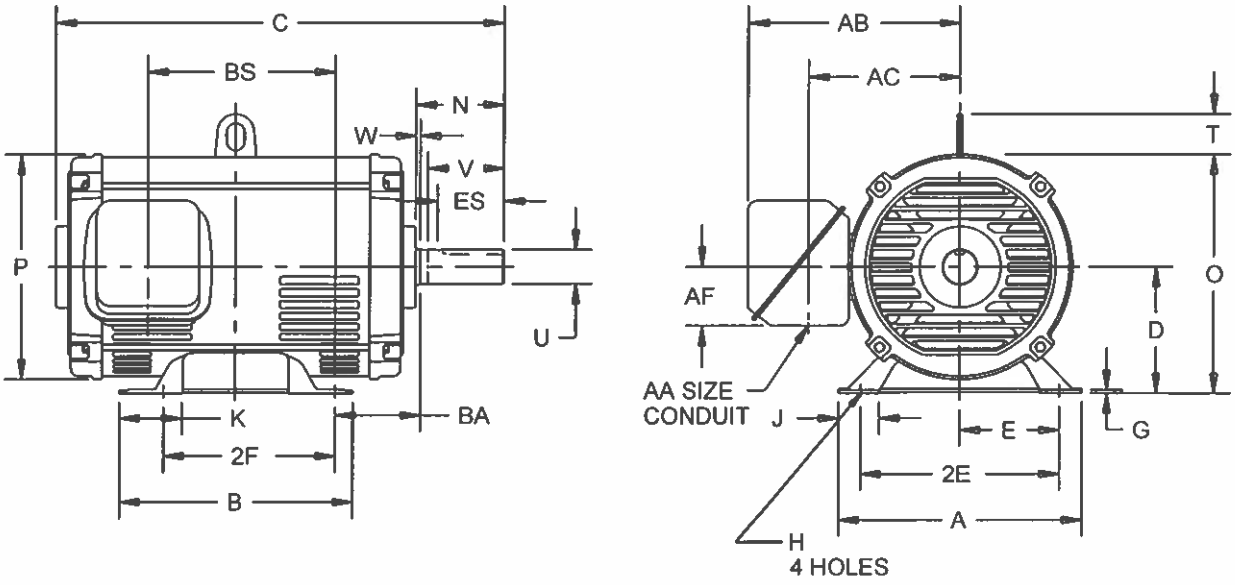
REVISIONS:

ALL DOCUMENTS HEREIN ARE CONSIDERED CERTIFIED BY NIDEC MOTOR CORPORATION.
THANK YOU FOR YOUR ORDER AND THE OPPORTUNITY TO SERVE YOU.

Features:

HorsePower	40
Enclosure	DP
Poles	04/00
RPM (Full Load)	1780
Motor Frame Size	324T
Phase	3
Frequency	60
Voltage	230-460
Motor Type Code	DI
Rotor Inertia (LB-FT²)	6.95 LB-FT²
Bearing Number PE (Shaft)	6311-2Z-J/C3
Bearing Number SE (OPP)	6211-2Z-J/C3

EFFECTIVE: 14-FEB-12	HORIZONTAL MOTORS ODP FRAME: 320T BASIC TYPE: D,DE,DI,FD,IMD	PRINT: 07-2199
SUPERSEDES: 29-APR-11		SHEET: 1 OF 1



ALL DIMENSIONS ARE IN INCHES AND MILLIMETERS

	UNITS	A	B	C	E	G	J	K	N	O	P [2]
	IN	15.00	14.00	27.25	6.25	.25	2.31	3.50	5.63	15.13	14.19
	MM	381	356	692	159	6	59	89	143	384	360

	UNITS	T	V MIN	W	AA	AB	AC	AF	BA	BS	ES MIN	SQ KEY
	IN	2.19	5.00	.38	2.00	12.69	9.31	3.25	5.25	11.50	3.91	.500
	MM	56	127	10		322	237	83	133	292	99	12.70

	UNITS	D -.06	2E ±.03	H +.05	U -.001
	IN	8.00	12.50	.69	2.125
	MM	203	318	18	53.98

	FRAME	UNITS	2F ±.03
	324T	IN	10.50
		MM	267
	326T	IN	12.00
		MM	305

1: ALL ROUGH DIMENSIONS MAY VARY BY .25" DUE TO CASTING AND/OR FABRICATION VARIATIONS.
2: LARGEST MOTOR WIDTH.
3: TOLERANCE UNITS ARE IN INCHES ONLY.
4: STANDARD ASSEMBLY POSITION F-1 IS SHOWN. F-2 IS PROVIDED WHEN SPECIFIED. CONDUIT OPENINGS MAY BE LOCATED IN STEPS OF 90° REGARDLESS OF LOCATION. STANDARD AS SHOWN WITH CONDUIT OPENING DOWN.

Nidec Motor Corporation
St. Louis, Missouri

ISSUED BY	R. KING
APPROVED BY	J. O'BRIEN

IHP_DP_NMCA (MAR-2011) SOLIDEDGE

NAMEPLATE DATA

CATALOG NUMBER: D40V2B

MODEL: G38031 FR: 324T

SHAFT END BRG: 6311-2Z-J/C3

PH: 3 MAX AMB: 40 C

INSUL CLASS: F Asm. Pos.

NAMEPLATE PART #: 422699-005

TYPE: DI ENCL: DP

OPP END BRG: 6211-2Z-J/C3

ID#

DUTY: CONT

HP	40		RPM	1780					
VOLTS	230	460							
FL AMPS	92	46							
SF AMPS									
SF	1.15	DESIGN	B	CODE	G				
NEMA NOM EFFICIENCY	94.1	NOM PF	87.1	KiloWatt					
GUARANTEED EFFICIENCY		MAX KVAR		HZ	60				

HP			RPM						
VOLTS									
FL AMPS									
SF AMPS									
SF		DESIGN		CODE					
NEMA NOM EFFICIENCY		NOM PF							
GUARANTEED EFFICIENCY		MAX KVAR		HZ					

UL DATA (IF APPLICABLE):

DIVISION

TEMP CODE

CLASS I

CLASS II

GROUP I

GROUP II

VFD DATA (IF APPLICABLE):

VOLTS

AMPS: 96 | 48

TORQUE 1: 118 LB-FT

VFD LOAD TYPE 1: VTQ/PWM

VFD HERTZ RANGE 1: 6-60 HZ

VFD SPEED RANGE 1: 180-1800

TORQUE 2

VFD LOAD TYPE 2

VFD HERTZ RANGE 2

VFD SPEED RANGE 2

SERVICE FACTOR: 1.00

NO. POLES

VECTOR MAX RPM

Radians / Seconds

FL SLIP

MAGNETIZING AMPS

Encoder PPR

Encoder Volts

TEAO DATA (IF APPLICABLE):

HP (AIR OVER)		HP (AIR OVER M/S)		RPM (AIR OVER)		RPM (AIR OVER M/S)	
FPM AIR VELOCITY		FPM AIR VELOCITY M/S		FPM AIR VELOCITY SEC			

MOTOR PERFORMANCE

MODEL NO.	CATALOG NO.	PHASE	TYPE	FRAME
G38031	D40V2B	3	DI	324T

ORDER NO.	NA	LINE NO.	

MPI:	18919	18920
HP:	40	40
POLES:	4	4
VOLTS:	460	230
HZ:	60	60
SERVICE FACTOR:	1.15	1.15
EFFICIENCY (%):		
S.F.	93.9	93.9
FULL	94.1	94.1
3/4	94.9	94.9
1/2	94.6	94.6
1/4	92	92
POWER FACTOR (%):		
S.F.	87.4	87.4
FULL	87.1	87.1
3/4	84.9	84.9
1/2	78.4	78.4
1/4	58.8	58.8
NO LOAD	5	5
LOCKED ROTOR	38.8	38.8
AMPS:		
S.F.	52	105
FULL	46	91
3/4	35	70
1/2	25.3	51
1/4	17.3	35
NO LOAD	13.6	27.2
LOCKED ROTOR	289	578
NEMA CODE LETTER	G	G
NEMA DESIGN LETTER	B	B
FULL LOAD RPM	1780	1780
NEMA NOMINAL EFFICIENCY (%)	94.1	94.1
GUARANTEED EFFICIENCY (%)	93	93
MAX KVAR	9.2	9.2
AMBIENT (°C)	40	40
ALTITUDE (FASL)	3300	3300
SAFE STALL TIME-HOT (SEC)	24	24
SOUND PRESSURE (DBA @ 1M)	64	64
TORQUES:		
BREAKDOWN(% F.L.)	255	255
LOCKED ROTOR(% F.L.)	192	192
FULL LOAD(LB-FT)	118	118

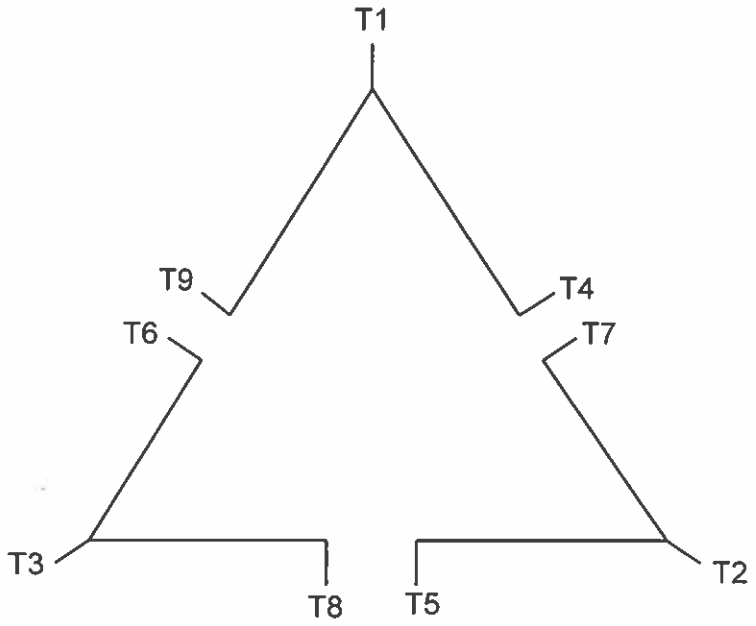
The Above Data Is Typical, Sinewave Power Unless Noted Otherwise

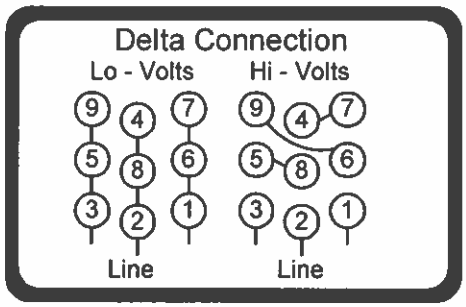
NIDEC MOTOR CORPORATION
ST. LOUIS, MO

A109145

Motor Wiring Diagram

9 Lead, Dual Voltage (DELTA Conn.)





To reverse direction of rotation interchange connections L1 and L2.

Each lead may have one or more cables comprising that lead.
In such case each cable will be marked with the appropriate lead number.

Connection Plate: A109145
Connection Decal: 344122

Suitability of Integral Horsepower (IHP)* Motors on Variable Frequency Drives

Variable Frequency Drives (VFD)

All Nidec Motor Corporation inverter duty motors have 40°C ambient, 1.0 SF on Inverter Power, 3300 ft. max altitude, 460 voltage or less line power, up to 10:1 speed range on Variable Torque and Class F Insulation.

Nidec Motor Corporation's INVERTER GRADE® insulated motors exceeded NEMA®† MG-1 Part 30 & 31 before the standards were established.

We are a leader in the development of electric motors to withstand pulse width modulated (PWM) drives evolution from power transistors to higher switching frequency insulated gate bipolar transistors (IGBTs).

Today, as the need for medium duty motor inverter applications grows, Nidec Motor Corporation provides products to meet these demands.

Through continued research and development, Nidec Motor Corporation has included the insulation wire from its INVERTER GRADE® motors in all Premium Efficient motors, enhancing their potential inverter compatibility.

Inverter compatibility with motors is complex. As a result, many variables must be considered when determining the suitability of certain types of motors. These variables include:

- Torque requirements (Constant or Variable)
- Speed Range
- Line/System Voltage
- Cable Length between VFD & Motor
- Drive Switching (Carrier) Frequency Motor Construction
- VFD dv/dt
- High Temperatures High Humidity

Wider speed ranges, higher voltages, higher switching frequencies and increased cable lengths all add to the severity of the application and therefore the potential for premature motor failure. Nidec Motor Corporation has differentiated its products into families for your ease of selection for various inverter applications.

Warranty Guidelines

The information within this section refers to the motor and drive application guidelines and limitations for warranty.

Hazardous Location Motors

Use of a variable frequency drive with the motors in this catalog, intended for use in hazardous locations, is only approved for Division 1, Class I, Group D hazardous location motors with a T2B temperature code, with a limitation of 2:1 constant torque or 10:1 variable torque output. No other stock hazardous location motors are inherently suitable for operation with a variable frequency drive. If other requirements are needed, including non-listed Division 2, please contact your Nidec Motor Corporation territory manager to conduct an engineering inquiry.

575 Volt Motors

575 volt motors can be applied on inverters when output filters are used.

Applying INVERTER GRADE® Insulated Motors on Variable Frequency Drives (2, 4, 6 pole)

The products within this catalog labeled "Inverter Duty" or "Vector Duty" are considered INVERTER GRADE® insulated motors. INVERTER GRADE® motors exceed the NEMA®† MG-1 Part 31 standard.

Nidec Motor Corporation provides a three-year limited warranty on all NEMA®† frame INVERTER GRADE® insulated motors and allows long cable runs between the motor and the VFD (limited to 400 feet typical without output filters). Cable distance can be further limited by hot and humid environments and VFD manufacturers cable limits. These motors may be appropriate for certain severe inverter application or when the factors relating to the end use application are undefined (such as spares).

Nidec Motor Corporation's U.S. Motors® brand is available in the following INVERTER GRADE® insulated motors:

- Inverter Duty NEMA®† frame motors good for 10:1 Variable Torque & 5:1 Constant Torque, including Vertical Type RUSI
- Inverter Duty motors rated for 10:1 Constant Torque
- ACCU-Torq® and Vector Duty Motors with full torque to 0 Speed
- 841 Plus® NEMA®† Frame Motors

Applying motors that do not have INVERTER GRADE® insulation on Variable Frequency Drives (2, 4, 6 pole)

Meet NEMA®† MG-1, Section IV, Part 31.4.4.2. They can be used with adjustable frequency drives under the following parameters: On NEMA®† frame motors, 10:1 speed rating on variable torque loads & 4:1 speed range on constant torque loads. On TITAN® frame motors, 10:1 speed rating on variable torque loads. On TITAN® frame motors, inquiry required for suitability on constant torque loads. Cable distances are for reference only and can be further limited by hot and humid environments. Refer to specific VFD manufacturers cable limits.

Cable Distances			
Maximum Cable Distance VFD to Motor			
Switching Frequency	460 Volt	230 Volt	380 Volt
3 Khz	127 ft	400 ft	218 ft
6 Khz	90 ft	307 ft	154 ft
9 Khz	73 ft	251 ft	126 ft
12 Khz	64 ft	217 ft	109 ft
15 Khz	57 ft	194 ft	98 ft
20 Khz	49 ft	168 ft	85 ft

Applying Standard & Energy Efficient Motors on Variable Frequency Drives is not recommended. VFD related failures on standard and energy efficient motors 444 frame and above will not be covered under warranty.

*This information applies only to Integral Horsepower (IHP) motors as defined on the Agency Approval page, under UL®† & CSA®† listings where indicated.

Motor / Inverter Compatibility

Thermal Overloads and Single Phase Motors

Motors with thermal overloads installed may not operate properly on a VFD. The current carrying thermal overload is designed for sine wave power. Operation on a VFD may cause nuisance tripping or potentially not protect the motor as would be expected on line power. Thermo-stats or thermistors installed in the motor and connected properly to the VFD may provide suitable thermal overload protection when operating on a VFD. (Consult Codes)

Single phase motors and other fractional horsepower ratings are not designed to be operated on a VFD. Within Nidec Motor Corporation standard products, all motors NEMA®† 48 frame (5.5" diameter) and smaller are not suitable for VFD applications. Three phase 56 and 143/145 frame applications should be noted on the catalog price page; or if in doubt ask an Nidec Motor Corporation technical representative for recommendations on compatibility with a VFD.

Slow Speed Motors

Motors with a base design of slower than six poles require special consideration regarding VFD sizing and minimizing harmonic distortion created at the motor terminals due to cable installation characteristics. Additional external PWM waveform filters and shielded motor cables designed for PWM power may be required to provide acceptable motor life. Harmonic distortion on the output waveform should be kept to a minimum level (less than 10%).

690V Applications

Motors that will be applied to 690VAC PWM VFDs require the use of an external filter to limit peak voltage spikes and the use of an INVERTER GRADE® motor. Where available, an alternative to using an output filter is to upgrade to a 2300V insulation system.

Low Voltage TITAN® Motors

When using 449 frame and larger motors on PWM type VFDs consider the use of an external filter and shielded motor cables designed for PWM power to minimize harmonic distortion and peak voltages at the motor terminals. Harmonic distortion on the output waveform should be kept to a minimum level (less than 10%).

Bearing Currents related to PWM waveform

Due to the uniqueness of this condition occurring in the field, protection of the motor bearings from shaft currents caused by common mode voltages is not a standard feature on sine wave or Inverter Duty motor products, unless explicitly noted. Some installations may be prone to a voltage discharge condition through the motor bearings called fluting.

Fluting damage is related to characteristics of the PWM waveform, VFD programming and characteristics and installation.

Bearing fluting as a result of VFD waveform characteristics may be prevented by the installation of a shaft grounding device such as a brush or ring and/or correction of the installation characteristics causing the shaft voltage condition. Insulated bearing(s) may be required. VFD filters may be needed if bearing fluting is to be avoided.

Multiple Motors on a Single VFD

Special considerations are required when multiple motors are powered from a single VFD unit. Most VFD manufacturers can provide guidelines for proper motor thermal considerations and starting/stopping of motors. Cable runs from the VFD and each motor can create conditions that will cause extra stress on the motor winding. Filters may be required at the motor to provide maximum motor life.

Grounding and Cable Installation Guidelines

Proper output winding and grounding practices can be instrumental in minimizing motor related failures caused by PWM waveform characteristics and installation factors. VFD manufacturers typically provide detailed guidelines on the proper grounding of the motor to the VFD and output cable routing. Cabling manufacturers provide recommended cable types for PWM installations and critical information concerning output wiring impedance and capacitance to ground.

Vertical Motors on VFDs

Vertical motors operated on VFD power present unique conditions that may require consideration by the user or installation engineer:

- Non-reversing-ratchet operation can interfere at low speeds (up to 300 RPM) causing locked rotor and drive tripping.
- Unexpected / unacceptable system vibration and or noise levels caused by the torque pulsation characteristics of the PWM waveform, a system critical frequency falling inside the variable speed range of the process or the added harmonic content of the PWM waveform exciting a system component
- Application related problems related to the controlled acceleration/ deceleration and torque of the motor on VFD power and the building of system pressure/ load.
- The impact the reduction of pump speed has on the down thrust reflected to the pump motor and any minimum thrust requirements of the motor bearings
- Water hammer during shutdown damaging the non-reversing ratchet

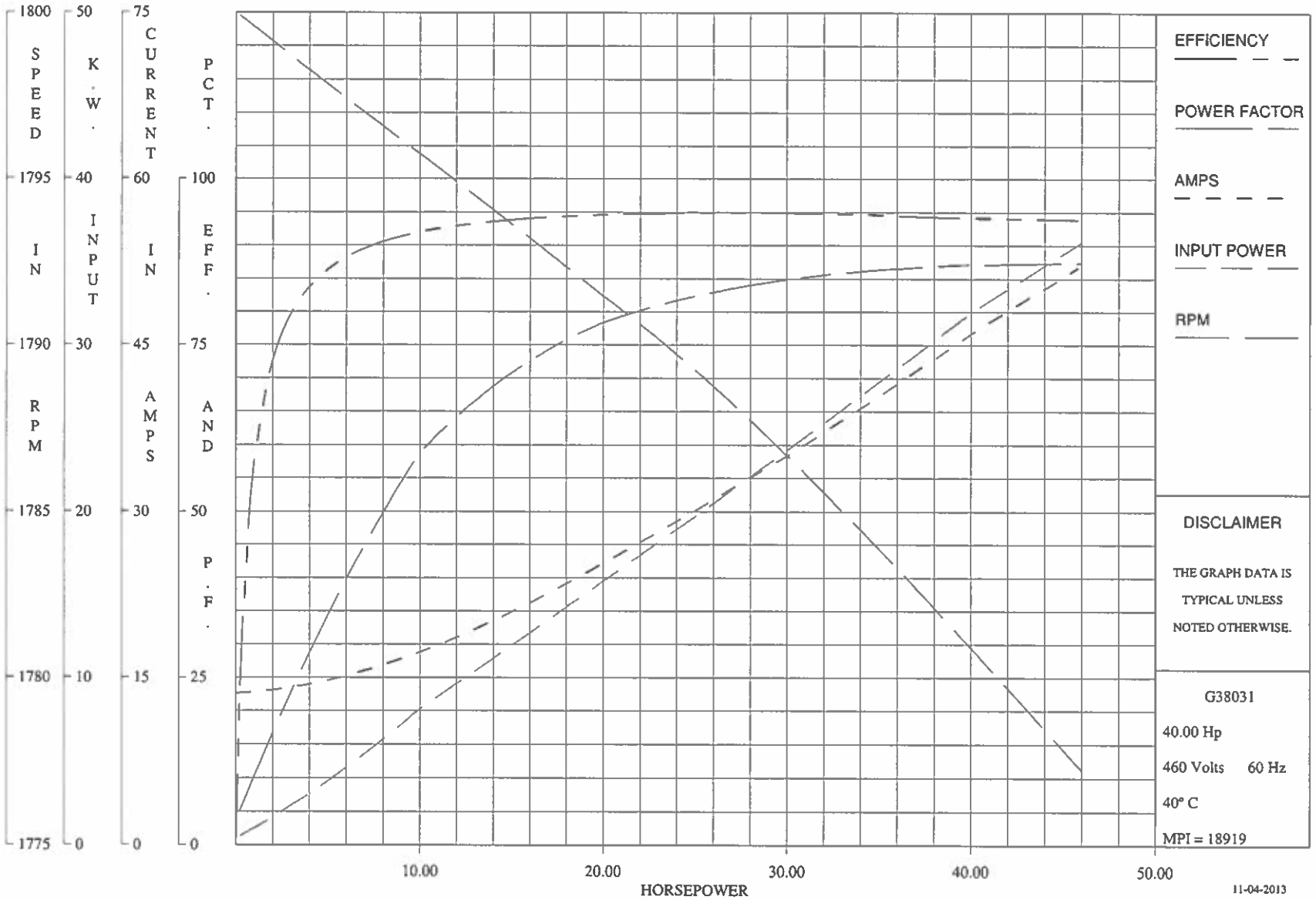
Humidity and Non-operational Conditions

The possible build-up of condensation inside the motor due to storage in an uncontrolled environment or non-operational periods in an installation, can lead to an increased rate of premature winding or bearing failures when combined with the stresses associated with PWM waveform characteristics. Moisture and condensation in and on the motor winding over time can provide tracking paths to ground, lower the Megohm resistance of the motor winding to ground, and lower the Corona Inception Voltage level of the winding.

Proper storage and maintenance guidelines are important to minimize the potential of premature failures. Space heaters or trickle voltage heating methods are the preferred methods for drying out a winding that has low megaohm readings. Damage caused by these factors are not covered by the limited warranty provided unless appropriate heating methods are properly utilized during non-operational periods and prior to motor start-up.

NEMA® Application Guide for AC Adjustable Speed Drive Systems: http://www.nema.org/stds/acadjustable.cfm#download

*This information applies only to Integral Horsepower (IHP) motors as defined on the Agency Approval page, under UL® & CSA® listings where indicated.



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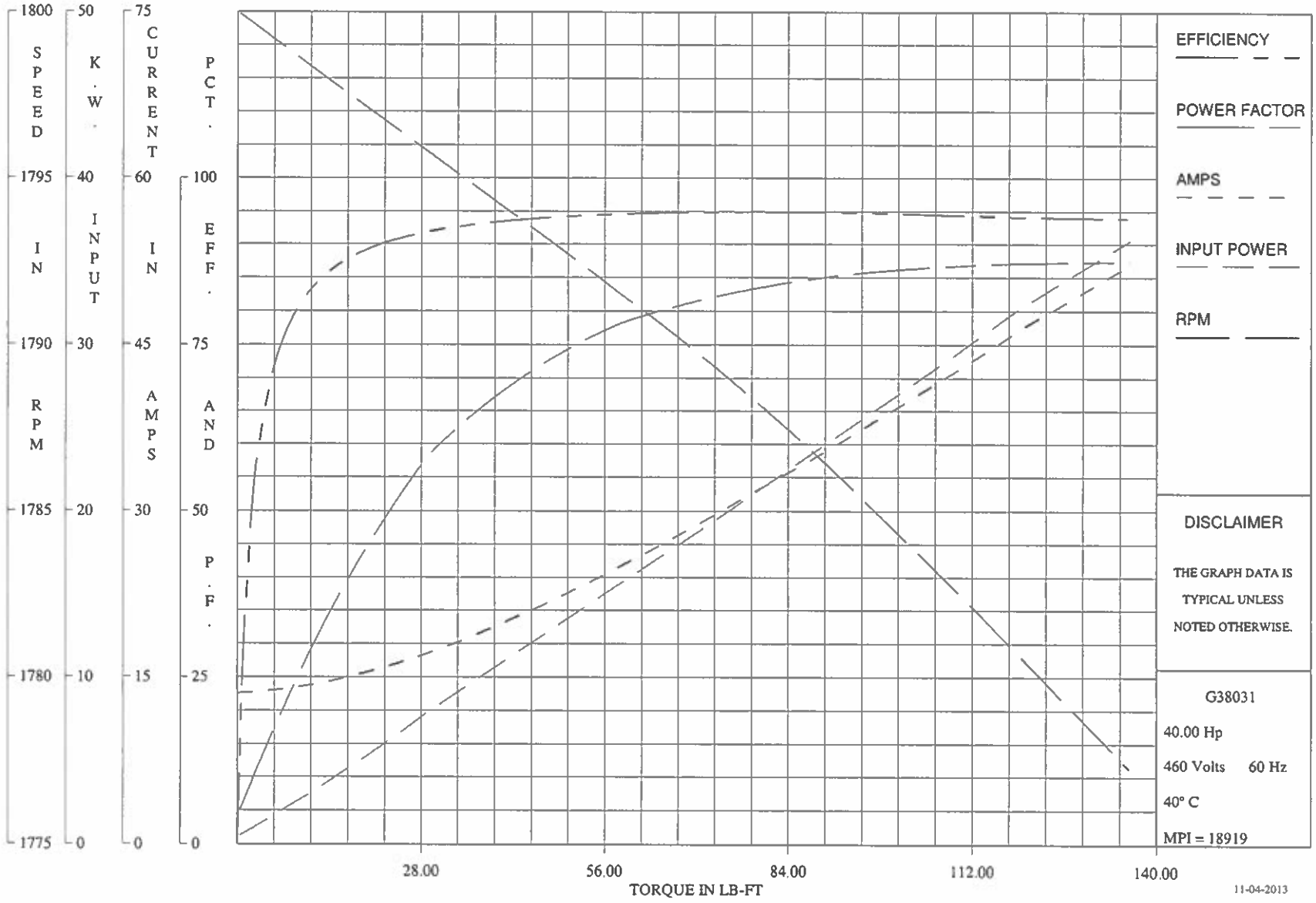

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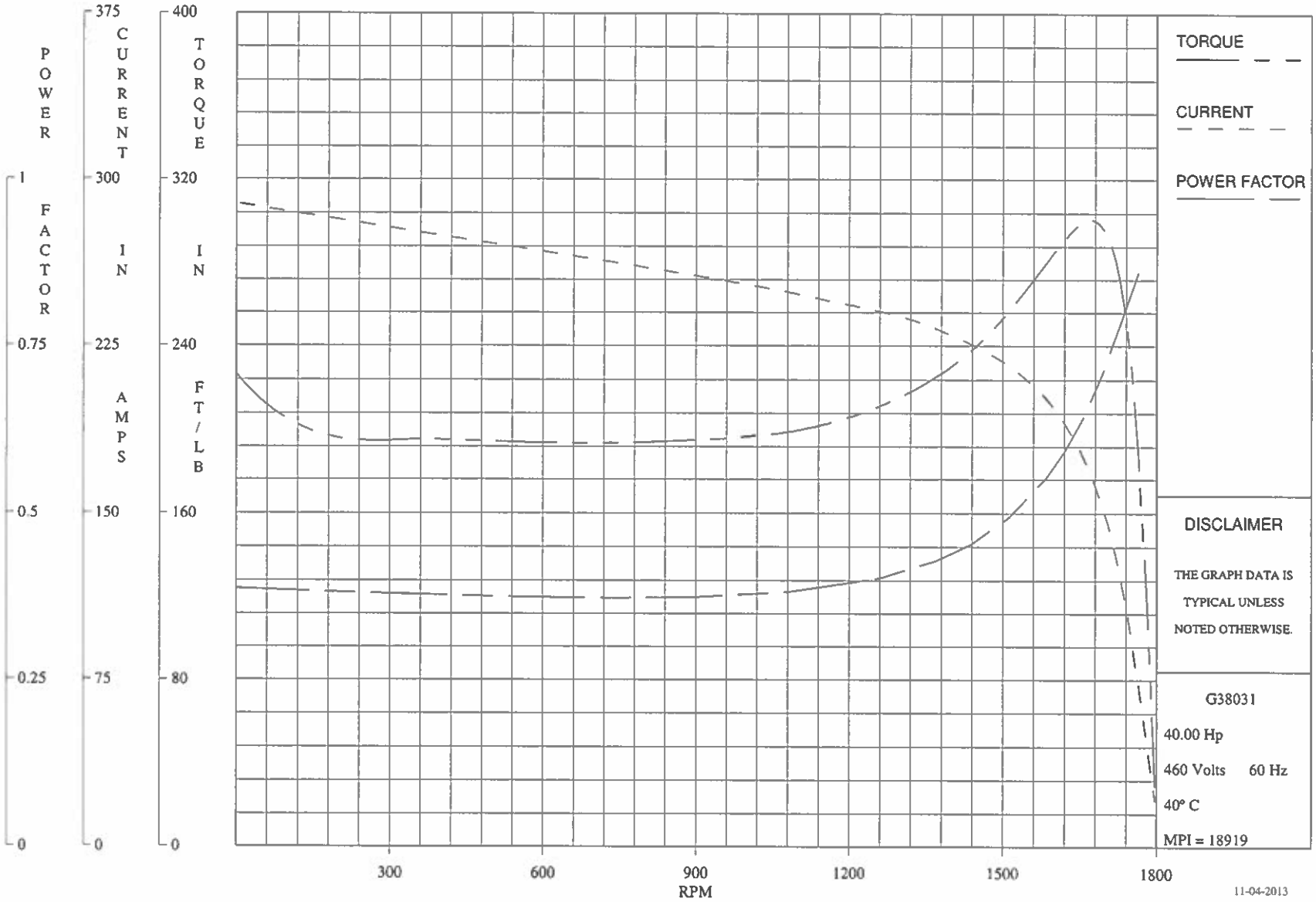

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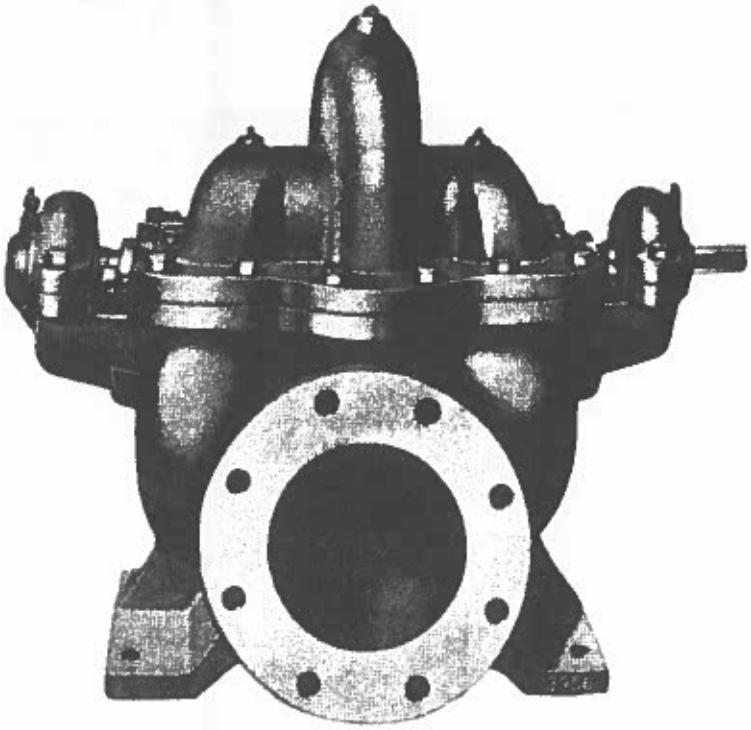
DELAVAL

G, I, and K

SINGLE STAGE
SINGLE AND DOUBLE SUCTION
CENTRIFUGAL PUMPS



INSTALLATION · OPERATION · MAINTENANCE

INSTRUCTIONS

INTRODUCTION

Follow these instructions to get the best performance and service from your Delaval pump. These instructions apply generally to the Delaval G, I and K type pumps.

For more detailed information refer to nearest Delaval Turbine Inc. district office (see back cover).

RATING

See name plate for pump type, size and ratings.

Changing a pump's rating requires an impeller alteration or a new impeller. The OPERATING RANGES chart shows normal operating ranges for G, I and K type pumps. These ranges may be exceeded under certain conditions.

For specific information refer to nearest Delaval Turbine Inc. district office.

CONSTRUCTION

G, I and K pumps are horizontally split, single stage centrifugal pumps with side suction, side discharge nozzles. A typical assembly drawing and mechanical modifications are shown on the center gate fold. Differences between pump types and sizes are shown on the CONSTRUCTION SPECIFICATIONS chart.

HANDLING

Attach ropes or slings so that weight is uniformly distributed. Do not use eyebolts on pump case cover to lift unit. Leave unit on skids until time of installation.

Do not remove protective caps from pipe openings until ready for piping. Do not remove slushing compound until ready to operate.

FOUNDATION

See certified outline drawing for general shape of base plate, location and size of foundation bolts.

Extend concrete or structural steel foundation three or four inches beyond base plate to support wedges or chocks. Make sure foundation can accommodate pipes projecting below base plate.

SETTING UP

With coupling disconnected, set unit on foundation with weight distributed evenly over a number of wedges or small steel chocks. (Do not connect piping.) Leave one inch or more clearance between base plate and foundation for grouting.

Level unit by adjusting wedges or inserting shims between chocks and base plate.

Establish proper alignment. See COUPLING INSTRUCTIONS.

Factory alignment of pump and driver may be changed by one or more of the following causes: improper handling; uneven support on foundation; uneven shrinkage of grouting; uneven tightening of foundation bolts; improper support of piping.

OPERATING RANGES

TYPE	SIZE		3500 RPM		1750 RPM		1150 RPM	
	SUCT.	DISCH.	TOT. HD. FEET	GPM	TOT. HD. FEET	GPM	TOT. HD FEET	GPM
G 150	2	1-1/2	75-250	40-200	25-70	25-130	-	-
G 200	2-1/2	2	80-250	60-200	15-60	60-160	-	-
G 200A	2-1/2	2	-	-	50-100	60-240	-	-
G 300	4	3	90-275	150-550	25-60	200-500	-	-
G 300A	4	3	-	-	40-110	150-600	-	-
G 400	5	4	125-250	450-900	15-80	200-750	-	-
G 500	6	5	50-200	400-1000	30-60	250-900	-	-
I 300	4	3	-	-	75-175	250-500	-	-
I 400	5	4	75-300	300-1100	60-150	400-1000	20-70	200-600
I 500	6	5	-	-	40-125	600-1250	10-50	400-900
I 800	10	8	-	-	30-125	800-2800	10-50	50-1800

TYPE	SIZE		1760 RPM		1160 RPM		880 RPM	
	SUCT.	DISCH.	TOT. HD. FEET	GPM	TOT. HD. FEET	GPM	TOT. HD. FEET	GPM
K 400	5	4	100-250	400-1250	40-120	200-600	-	-
K 500	6	5	100-250	500-2000	40-120	500-1400	-	-
K 600	8	6	100-200	1000-2000	30-90	500-1800	-	-
K 600A	8	6	150-300	1000-2800	60-130	800-1600	-	-
K 800	10	8	80-220	800-2800	30-80	60-130	-	-
K 800A	10	8	150-300	1500-3200	60-130	1000-2400	-	-
K 1000	12	10	60-180	1600-4000	30-90	1000-4000	-	-
K 1200	14	12	90-150	3500-6000	40-100	1500-5000	-	-

CONSTRUCTION SPECIFICATIONS

TYPE	Size		Single or Double Suction Impeller	Shaft Sleeve O. D.	Standard Packing		Wearing Ring Clearance*		Ball Bearing	
	Suct.	Disch.			Size	Rings Per Box	Min.	Max.	Radial	Thrust
G 150	2	1-1/2	Single	1-1/4"	5/16"	4	.010"	.014"	305	305
G 200	3	2	Single	1-1/4"	5/16"	4	.010"	.014"	305	305
G 200A	3	2	Single	1-1/4"	5/16"	4	.010"	.014"	305	305
G 300	4	3	Single	1-1/4"	5/16"	4	.010"	.014"	305	305
G 300A(1)	4	3	Single	1-1/4"	5/16"	4	.013"	.017"	305	305
G 400	5	4	Double	1-1/4"	5/16"	4	.010"	.014"	305	305
G 500	6	5	Double	1-1/4"	5/16"	4	.013"	.017"	305	305
I 300	4	3	Single	1-13/16"	3/8"	4	.013"	.017"	307	307
I 400	5	4	Double	1-13/16"	3/8"	4	.013"	.017"	307	307
I 500	6	5	Double	1-13/16"	3/8"	4	.013"	.017"	307	307
I 800	10	8	Double	1-13/16"	3/8"	4	.013"	.017"	307	307
K 400	5	4	Double	2-3/8"	3/8"	6	.013"	.017"	210	5210
K 500	6	5	Double	2-3/8"	3/8"	6	.013"	.017"	210	5210
K 600	8	6	Double	2-3/8"	3/8"	6	.013"	.017"	210	5210
K 600A	8	6	Double	2-7/8"	3/8"	7	.013"	.017"	212	5212
K 800	10	8	Double	2-7/8"	3/8"	6	.018"	.022"	210	5210
K 800A	10	8	Double	2-7/8"	3/8"	7	.018"	.022"	212	5212
K 1000	12	10	Double	2-3/8"	3/8"	6	.018"	.022"	210	5210
K 1200	14	12	Double	2-7/8"	3/8"	6	.018"	.022"	210	5210

* DIAMETRAL - Average of four readings 90° apart.

(1) Case Ring 583GA, Wheel Ring 567BS } Min. .010" Max. .014"

GROUTING

Tighten foundation bolts evenly, but not tightly. Establish proper alignment. Build a form around base plate. A non-shrink grout is recommended. Mix grout according to supplier's instructions. Pour mix through grout holes in base plate. Do not remove chocks or shims. Be sure grout completely fills all spaces under base plate.