

**TWIN BRIDGES STATION**  
**230kV - 138kV TRANSFORMER ADDITION**  
**CONSTRUCTION**  
CONTRACT AND SPECIFICATIONS

**CITY OF ALEXANDRIA**  
Alexandria, Louisiana

Prepared By:

**BHA, INC.**  
Consulting Engineers  
Baton Rouge, Louisiana  
Job No.: 2019E16A

March, 2019

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CITY OF ALEXANDRIA, LOUISIANA

ADVERTISEMENT FOR

BID # 2237 CONSTRUCTION OF THE TWIN BRIDGES STATION  
230kV - 138kV TRANSFORMER ADDITION

Sealed bids for the City of Alexandria,  
Twin Bridges Station 230kV – 138kV Transformer Addition  
will be received by the City of Alexandria at the  
City Council Meeting Chambers, City Hall  
915 Third Street, Alexandria, Louisiana 71301,  
Until 10:00 a.m. CDT, on Tuesday, April 30, 2019  
and then publicly opened and read.

The Project will consist of the construction of the  
Twin Bridges Station 230kV – 138kV Transformer Addition  
to include, but not be limited to, all foundation,  
bus installation, conduit and wiring, grounding, and  
control wire installation per the specifications.

All sealed bids shall be in compliance with comprehensive specifications  
issued for this project. The Plans, Specifications for Construction and  
Construction Drawings, together with all necessary forms and other  
documents for bidders, may be obtained from the Engineer, BHA, Inc.  
at their office located at 9342 Lindale Avenue, Baton Rouge,  
Louisiana 70815, upon payment of \$50.00, which will be refunded  
if documents are returned. The Plans, Specifications for Construction  
and Construction Drawings may be examined at the office  
of the Owner or at the office of the Engineer.

**Bids shall be in a sealed envelope marked**  
**Name of Bidder**  
**Louisiana Contractor's License Number**  
**City of Alexandria - "DO NOT OPEN"**  
**ATTN: Donna Jones, City Clerk**  
**Bid # 2237**

**Bid Opening: 10:00 a.m. CDT, Tuesday, April 30, 2019**

The City reserves the right to consider and/or reject any and all Bids for just cause.

This project is classified as Heavy Construction. The bidder shall certify  
that they are licensed in the above noted classification to construct  
electrical substations, under Louisiana Revised Statutes 37:2150-2173.

A Mandatory Pre-Bid Meeting is scheduled for  
Thursday, April 11, 2019 at 10:00 a.m.  
at the Electric Distribution Department located  
at 1015 N. Third Street, Alexandria, LA 71301

To be published: Friday, March 22, 2019, Friday, March 29, 2019, Friday, April 5, 2019.

## **SECTION 1**

## Section 1. Instructions to Bidders

### Definitions

#### A. Specifications

As referred to herein shall be made up of several parts, all of which shall be bound together into one complete document. The "Specifications" shall include:

	ADVERTISEMENT FOR BIDS
Section 1	INSTRUCTIONS TO BIDDERS
Section 2	GENERAL CONDITIONS
Section 3	SPECIAL PROVISIONS
Section 4	PROPOSAL
Section 5	FORM OF CONTRACT
Section 6	PERFORMANCE BOND
Section 7	TECHNICAL SPECIFICATIONS
Section 8	GENERAL SPECIFICATIONS ON MATERIAL AND ITEMS OF WORK
Section 9	OWNER-FURNISHED EQUIPMENT AND MATERIAL
Section 10	BID SHEETS
Section 11	VICINITY MAP

#### B. The Owner

The City of Alexandria, Louisiana, acting by and through its Mayor and City Council.

#### C. The Engineer

BHA, Inc.

#### D. Resident Engineer

An employee of the Engineers who may be placed in the field to represent the Engineers.

#### E. The Bidder

Any qualified individual, firm or corporation submitting a proposal for the contemplated work.

#### F. The Contractor

Any Construction Agency or Agencies selected by the Owner and to whom Contract is awarded by Owner.

G. The Subcontractor

Any Construction Agency selected by the Contractor and approved by the Engineers to handle any phase of the Contract work.

H. Surety

The corporate body licensed to do business in Louisiana which is bound with and for the Contractor and which is primarily liable and responsible for the payment of all obligations pertaining to and for the acceptable performance of the work required by the Contract.

I. Laboratory

Any testing laboratory designated or approved by the Engineers to perform tests on materials entering the work.

J. Proposal

The written offer of the bidder to perform the contemplated work and furnish the necessary materials, when made out on the prescribed form and properly signed and guaranteed.

K. Bid Security

The security designated in the "Proposal Form" to be furnished by the Bidder as a guarantee of good faith to enter into a Contract with the Owner, if the Contract is awarded to him.

L. Plans

The plans, working drawings and supplemental drawings approved by the Engineers, which show the location, character, dimensions, and details of the work to be done, and which are to be considered as a part of the Contract supplementary to these Specifications.

M. Contract

The written agreement between the Owner and the Contractor covering the performance of the work and the furnishing of labor, materials, tools, equipment, incidentals and service necessary for the completion of same. The Contract shall be mutually understood to include "Plans", "Specifications", "Addenda", "Alternates", "Proposal", and "Performance Bond", also any and all "Change Orders" which are required to complete the construction of the work in a satisfactory and acceptable manner.

N. Change Order

A written agreement between the Owner and the Contractor, with the approval of the Engineers, which when duly executed becomes part of the Contract. Change Orders may either increase or decrease the work to be performed under the Contract.



O. Performance Bond

The approved form of security furnished by the Contractor and his surety as a guarantee of the proper performance of the work and payment for all materials or other obligations Contracted by him in the prosecution thereof.

P. Work Order

A written notice from the Owner notifying the Contractor to begin the prosecution of the work.

Q. Standards and Abbreviations

These abbreviations shall be used implying the following definitions, associations or organizations and shall establish the standards of workmanship, materials and equipment, as applicable:

A.A.S.H.T.O.	-	American Association of State Highway and Transportation Officials
A.I.S.C.	-	American Institute of Steel Construction
A.C.I.	-	American Concrete Institute
A.S.T.M.	-	American Society of Testing Materials
A.G.A.	-	American Gas Association
A.W.W.A.	-	American Water Works Association
A.I.S.I.	-	American Iron and Steel Institute
N.E.M.A.	-	National Electrical Manufacturers Association
P.C.I.	-	Prestressed Concrete Institute
A.S.A.	-	American Standards Association
Louisiana One Call-		Regional Underground Utility Relocation Center
N.R.M.A.	-	National Ready-Mix Association
A.S.C.E.	-	American Society of Civil Engineers
A.R.E.A.	-	American Railway Engineering Association

## The Work

All work specified herein or indicated on the Plans as the contemplated improvement, covered by the Contract.

## Qualification of Bidders

Only the bids of experienced and qualified Contractors will be considered. After bids are received, at the Engineer's option, bidder may be called upon to furnish a statement of similar work performed, machinery and equipment available for the proposed work and a statement of financial responsibility.

## Proposals

All proposals shall be made on forms furnished by the Engineer and shall be delivered in person or by mail prior to opening of bids.

All bids must be filled out in writing and in figures and should include the name and address of the bidder. No condition may be attached to the bidder's proposal since any foreign conditions may cause rejection of the bid.

If there is any discrepancy between the written price and the price in figures, the written price shall be considered the bid. Any bid which is not in writing and figures may be rejected.

All alternates listed in the Proposal Form have to be bid on unless otherwise stated.

Quantities which are listed in the proposal are approximate quantities and may be used for bid comparison only. The Contractor shall be paid for only the actual work performed and the materials furnished in accordance with this Contract. If the actual quantities show an increase or decrease from the approximate estimate at the completion of work, the unit price quoted in the proposal shall still prevail except as otherwise provided.

## Examination of Site, Drawings, Etc.

Each bidder shall visit the site of the proposed work and shall familiarize himself with all the conditions, local or otherwise, which may have a bearing on the cost and time of completion of the project.

Bidders shall thoroughly examine the Plans and Specifications. The failure or omission of any bidder to examine the Plans, Specifications, and Contract Documents, or to visit the site and acquaint himself with the existing conditions, shall in no way relieve the bidder from any obligation with regard to his bid or to the Contract. The submission of a bid shall be taken as evidence of compliance with this section.

## Interpretation of Documents

If any person, company or corporation contemplates submitting a bid for the proposed Contract and is in doubt as to the meaning of any part of the Plans, Specifications or other proposed Contract Documents, he may submit to the Owner a written request for an interpretation not less than ten (10) days prior to bid opening. Any interpretation of the proposed documents will be made only by addendum duly issued. A copy of each addendum

will be mailed or delivered to each person receiving a set of Contract Documents. The Owner will not be responsible for any other explanation or interpretation of the proposed documents.

### Addenda

Any addenda, provisions or supplemental drawings that the Engineer may see fit to issue after distribution to Contractors of bid forms and during preparation of bids by Contractors shall be included in the proposal and shall become part of the Contract documents. Contractors are cautioned to inform subcontractors of these changes as well as the effect addenda will have on their work.

Any and all addenda to these specifications that may be issued by the Engineers prior to the opening of the bids, and after distribution of these documents shall be acknowledged by the Bidder in the order in which issued. The addenda shall also become part of this Document and shall have the same force and effect as original specifications. If the effect of any part of said addenda is to revise any specification previously provided by the Document, the revision so provided shall govern. Copies of any addenda so issued shall be properly attested by both contracting parties and made a part of this Contract.

### Taxes, Permits, Fees, Certificates, and Laws

Each bidder shall include and shall be deemed to have included the estimated cost of all taxes, bonds, royalties, license fees, permits and insurance which will be payable by the successful bidder for the use of materials supplies, or equipment for construction of the project, and all cost of the above nature shall be payable by the successful bidder after he becomes the Contractor.

The Contractor shall pay any and all federal, state, and parish taxes that may now be imposed on materials, machinery or equipment, or obligations included in the Specifications and Contract Documents. The Owner agrees to pay any additional federal, state, and parish taxes that may be imposed after receipt of proposal.

The Contractor shall furnish all necessary permits and certificates and comply with all laws or ordinances applicable to the locality of work.

### Subcontracting

The Engineers shall have the right of approval or rejection of subcontractors proposed for this work by the Contractor. If the Contractor sublets any part of this Contract, the Contractor shall be held fully responsible for all work performed or omitted by his subcontractor.

### "Or Equal" Clause

Whenever a material or article required is specified or shown on the Specifications by using the name of a proprietary product or of a particular manufacturer or vendor, any material or article which will perform adequately the duties imposed by the general design will be considered equal and satisfactory, providing the material or article so proposed is of equal substance and function and is approved by the Owner's Engineer.

### Extra and/or Additional Work and Changes

Without invalidating the Contract, the Owner may order extra work or make changes by altering, adding or deducting from the work, the Contract sum being adjusted accordingly, and the consent of the surety being first obtained where necessary and desirable.

All the work of the kind bid upon shall be bid for at the price stipulated in the proposal. No claims for extra work or materials shall be allowed unless the work is ordered in writing by the Owner through its Engineer. If the extra work shall be of a kind for which prices were stipulated in the proposal, the actual reasonable cost of labor and materials entering permanently into the work as determined by the Engineers, plus not over 15% to cover the cost of superintendence, overhead and general expense, shall be paid; but no claim for such extra work shall be allowed unless the same was done in pursuance of a written order, as aforesaid, and the claim, together with satisfactory vouchers for all labor and materials expended upon the work presented five days before the time of making up the first estimate after the work is done. The contractor shall, when requested by the Engineer, furnish accounts, bills and vouchers relating thereto.

### Consideration of Bids

Until final award of the Contract is made, the Owner reserves the right to reject any and all bids, waive any and all informalities, or accept any bid or bids which, in the opinion of the Engineers, will serve the best interest of the Owner. The Owner also reserves the right to accept or reject any alternates that may serve his best interest.

### Bid Price

The price bid shall cover furnishing of all materials, tools, labor, transportation, local, state and federal taxes, Old Age Benefit, Social Security services, Owner-furnished material and equipment necessary to construct the work in full conformity with Plans and Specifications, Addenda and Contract Documents.

### Award of Contract

The Contract will be awarded to the lowest responsible bidder complying with the conditions of the invitation for bids, provided his bid is reasonable, and it is evaluated to be in the interest of the Owner to accept it.

The Contract will be awarded within a thirty (30) day period after the opening of the bids.

The successful bidder shall execute the formal Contract for this work within seven (7) days after notification that Contract has been awarded to him. ***Upon receipt of executed contract, the Contractor shall have the contract recorded at the Rapides Parish Clerk of Court office.***

### Equal Opportunity Employment Clause

As required by U.S. Labor Department, Office of Federal Contract Compliance, Section 60-1.4.

During the performance of this Contract, the successful bidder (Contractor or Vendor) agrees as follows:

- (1) The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated equally during employment, without regard to race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion or transfer, recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the contracting officer setting forth the provisions of this non-discrimination clause.
- (2) The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.
- (3) The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other Contract or understanding, a notice to be provided by the agency contracting officer, advising the labor union or worker's representative of the Contractor's commitments under Section 202 of the Executive Order 11246 of September 24, 1965, and shall post copies of this notice in conspicuous places available to employees and applicants for employment.
- (4) The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.
- (5) The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations and orders.
- (6) In the event of the Contractor's noncompliance with the non-discrimination clauses of this Contract or with any of such rules, regulations, or orders, this Contract may be canceled, terminated or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.
- (7) The Contractor will include the provisions of paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the contracting agency may direct as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that in the event the Contractor becomes involved in, or is threatened with, litigation with the subcontractor or vendor as a result of such direction by the contracting agency, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

Assurance

The bidder (offeror or applicant) assures the Owner that he does not and will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not and will not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The bidder (offeror or applicant) understands that the phrase "segregated facilities" includes facilities which are, in fact, segregated on a basis of race, color, creed, or national origin, because of habit, local custom, or otherwise. The bidder (offeror or applicant) understands and agrees that maintaining or providing segregated facilities for his employees or permitting his employees to perform their services at any locations, under his control, where segregated facilities are maintained is a violation of the Equal Opportunity Clause required by Executive Order 11246 of September 24, 1965.

The bidder (offeror or applicant) further understands and agrees that a breach of the assurance herein contained subjects him to the provisions of Orders of the Secretary of Labor dated May 9, 1967 and the provisions of the Equal Opportunity Clause enumerated in the Contract between the Owner and the bidder (offeror or applicant).

Whoever knowingly and willfully makes any false, fictitious, or fraudulent representation may be liable to criminal prosecution under 18 U.S.C. Section 1001.

BIDDER: \_\_\_\_\_

BY: \_\_\_\_\_  
Name and Title

(Must be signed by an authorized Executive Officer)

DATE: \_\_\_\_\_

## **SECTION 2**

## Section 2. General Conditions

### Purchasing Policy & Procedure for Bidders

#### **PURCHASING POLICY & PROCEDURE FOR BIDDERS - PLEASE READ CAREFULLY**

1. Pursuant to LA R.S 38:2212.1C(2), any manufacturer's preference in this proposal is descriptive, but non-restrictive, and is used only to indicate minimum requirement for type, grade and quality unless otherwise specified.
2. Pursuant to LA R.S. 38:2212 A.(1)(b), the provisions and requirement of this bid shall not be considered as informalities and shall not be waived by the City of Alexandria. Therefore, conditions and specifications on this bid form shall be strictly enforced and any and all alterations, deviations, and non-compliance to said conditions and specifications, either on the bid form or by separate attachment, shall be grounds for immediate disqualification.
3. Preference shall be given to bidders quoting F.O.B. Destination (the City of Alexandria using department), FREIGHT PREPAID, unless otherwise requested.
4. Each bidder should submit his proposal on the proposal form furnished by the City of Alexandria Purchasing Department. The complete bid package must be returned as issued by the City with all pages intact and all specification response columns filled in. Incomplete columns or missing pages, to include addendum pages, shall result in the vendor's entire bid package being rejected.
5. Literature, brochures, and other related paperwork attached to the bid shall be identified with the name of the bidder and bid item number.
6. In case of a mathematical discrepancy between unit price and extensions, the unit price shall prevail.
7. Pursuant to LA R.S. 38:2212 A.(2), the bid specifications may contemplate a fixed escalation or de-escalation in accordance with the United States Bureau of Labor Statistic's Consumer Price Index and/or Wholesale Price Index. Bids based on specifications which are subject to a recognized escalation index shall be legal and valid.
8. Pursuant to LA R.S. 39:1701-1709, any public procurement unit may participate in a cooperative purchasing agreement with the City of Alexandria to acquire quantities of the above listed items under a contract with the City of Alexandria for items awarded by public bid.
9. The City of Alexandria reserves the right to award by item or by total bid, unless otherwise specified in the bid specifications. (Price(s) should be itemized.)
10. All erasures or corrections on the bid form must be initialed and the City of Alexandria may rely on the apparent authority represented by the initials.
11. The City of Alexandria reserves the right to reject for cause any and all bids or parts of bids, or accept bids most beneficial to the City.



**Purchasing Policy & Procedure for Bidders - Please Read Carefully (Continued)**

12. Any bid submitted which contains additions, conditional or alternate bids, or irregularities which may make the proposal incomplete, indefinite, or ambiguous as to its meaning, thus requiring clarification after the specified date and time of bid opening shall be rejected.
13. Bids shall be opened publicly in the City Council Chambers or Council Committee Room.
14. Cash discounts may be accepted, but SHALL NOT be considered in making award.
15. Regarding a bid for purchase of materials, supplies or services, not to include construction of any public works, a written notice of acceptance mailed or otherwise furnished to the successful bidder shall result in a binding contract without further action by either party.
16. When any bid is accepted for the construction or doing of any public works, a written contract shall be executed by and between the City of Alexandria and the Contractor. No contract shall be binding upon the City until it has been executed by the City and delivered to the successful bidder. Should the bidder to whom the contract is awarded fail to execute the contract, the award shall then be made to the next lowest responsible bidder, or re-advertised for public bid, said decision to be in the sole judgment of the City of Alexandria. This action may result in the loss of bidding privileges for a period of one (1) year.
17. The City of Alexandria shall schedule for payment the invoices for articles or services purchased under this bid within thirty (30) days after due and proper delivery accompanied by invoice.
18. The City of Alexandria is exempt from all taxes. A tax exempt form shall be furnished by the City of Alexandria Purchasing Department, if requested.
19. Bidder(s) awarded item(s) by the City of Alexandria shall be responsible for supplying all products at the awarded price(s). Failure may result in the City's cancellation of the remaining items awarded.
20. Regarding Service Contracts and Procurement Contracts, the terms of the contract shall be binding upon any and all parties involved until goods and supplies are delivered, services have been rendered, and/or work has been completed and accepted by the Mayor on behalf of the City of Alexandria and all payments required to be made to the Contractor have been made. However, a contract may be terminated under any and all of the following conditions:
  - (a) By mutual agreement and consent of either party upon thirty (30) days written notice to the other party;
  - (b) By the Mayor, on behalf of the City of Alexandria, as a consequence of the failure of the Contractor to comply with the terms and conditions of the contract or the progress or quality of work to be performed in a satisfactory manner, proper allowance being made for circumstances beyond the control of the Contractor; or
  - (c) By satisfactory completion of all services and obligations described in the contract.

**Purchasing Policy & Procedure for Bidders - Please Read Carefully (Continued)**

If the contract is terminated for any of the terms and conditions authorized in subparagraph (b) above, Contractor shall be formally notified in writing by the City of Alexandria Purchasing Department by means of certified mail informing him of cancellation of the contract, giving specific reasons for said cancellation. Contractor shall have the right to appeal to the City Council within ten (10) days from the date that said notification is placed in the U.S. Mail. Contractor's appeal shall be accomplished by means of a letter addressed to the City Council and delivered to the City Clerk, stating that an appeal to the decision of cancellation is desired. The City Council shall thereafter hold a hearing on the appeal, giving all parties the opportunity to present any and all evidence concerning the decision of cancellation. After hearing the appeal, the city Council may, by a majority vote, sustain, modify, or reverse the findings for said decision and shall provide, if requested by Contractor, a written determination of its findings.

21. Contractors submitting bids for Public Works construction projects in excess of \$1.00 must show his Contractor's License Number on the front of the bid envelope, except for certain projects for which a Contractor's License Number is not required by the State Contractor's Licensing Board. Failure to comply with this directive shall result in automatic bid rejection, furthermore, any Contractor who submits a bid for a type of construction for which he is not properly licensed shall be acting in violation of LA R.S. 37:2163, and shall be subject to all provisions for violation and penalties thereof. Contractors who are owned by, and are submitting a bid as a subsidiary of a parent company, whose name is listed in the State of Louisiana's Roster of Licensed Contractors, may do so by including a letter of proof of ownership from the parent company with the submitted bid package. The letter must be signed as per LA R.S. 38:2212 (A)(1)(c)(i) (see Item #22 below).
22. All bids shall be signed by hand and in ink by an authorized company representative per LA R.S. 38:2212(A)(1)(c)(i) which states:
  - (c)(i) Evidence of agency, corporate, or partnership authority shall be required for submission of a bid to the division of administration or the State of Louisiana. The authority of the signature of the person submitting the bid shall be deemed sufficient and acceptable if any of the following conditions are met:
    - (aa) The signature on the bid is that of any corporate officer listed on the most current annual report on file with the Secretary of State, or the signature on the bid is that of any member of a partnership or partnership in commendam listed in the most current partnership records on file with the Secretary of State.
    - (bb) The signature on the bid is that of an authorized representative of the corporation, partnership, or other legal entity and the bid is accompanied by a corporate resolution, certification as to the corporate principle, or other documents indicating authority which are acceptable to the public entity.
    - (cc) The corporation, partnership, or other legal entity has filed in the appropriate records of the Secretary of State in which the public entity is located, an affidavit, resolution, or other acknowledged or authentic document indicating the names of all parties authorized to submit bids for public contracts. Such document on file with the Secretary of State shall remain in effect and shall be binding upon the principal until specifically rescinded and canceled from the records of the office.

## Purchasing Policy & Procedure for Bidders - Please Read Carefully (Continued)

23. In-State preferences shall not apply to procurements involving federal funds.
24. Pursuant to LA R.S. 38:2212 C.(2)(b), any modifications of plans and specifications will be made through an addendum. No addendum shall be issued within seventy-two (72) hours of the bid opening, excluding weekends and legal holidays, without the extension of the bid opening date. An extension of at least seven (7) but no more than twenty-one (21) working days is required but, re-advertising is not required. The addendum shall be transmitted by any one of the following methods: (1) facsimile transmission; (2) e-mail; (3) by hand; or (4) posted on the City of Alexandria's website ([www.cityofalexandria.com](http://www.cityofalexandria.com)) and posted on BidSync ([www.BidSync.com](http://www.BidSync.com)) if applicable.
25. All Federal Transit Administration (FTA) funded procurements, including operating assistance funding contracts, are to follow the Best Practices Procurement Manual, to include all applicable federal clauses.
26. Under the City's *AFEAT (Alexandria Fairness, Equality, Accessibility, and Teamwork Program)*, participation by minority and/or disadvantaged business enterprise firms is encouraged. The *AFEAT* Program should be inquired about through the Division of Finance.

### Insurance

The Contractor shall not commence work under this Contract until he has obtained all insurance required under this paragraph and such insurance has been approved by the Owner, nor shall the Contractor allow any subcontractor to commence work on his subcontract until all similar insurance required of the subcontractor has been obtained and approved.

Bidder shall furnish, attached to the bid document, a current copy of his Certificate of Insurance indicating limits of General Liability, Automobile Liability and Worker's Compensation in force at the time of the bidding. Evidence of reliable insurance to fully indemnify against long-term liabilities shall be part of the evaluation criteria for award of this bid. Certificate of Insurance shall have a General Liability Aggregate of Four Million (\$4,000,000) Dollars and a per person/per occurrence of Two Million (\$2,000,000) Dollars. Automobile Liability will have a Combined Single Limit of Two Million (2,000,000). Also on the Certificate, the City shall be named as an "additional insured" and a waiver of subrogation in favor of the City of Alexandria. On the Certificate of Insurance under Worker's Compensation, it shall state that "This is a standard Worker's Compensation Policy", with statutory limits. Cancellation of any Certificate of Insurance should require sixty (60) days' notice to the City of Alexandria, but under no circumstances less than thirty (30) days' notice. Also, the following wording must be removed before acceptance of the Certificate: "Endeavor to" or "But failure to mail such notice shall impose no obligation of liability of any kind upon the company, its agents or representatives." Certificate holder shall be the City of Alexandria, P.O. Box 71, Alexandria, LA 71309-0071, Attention: Purchasing Manager.

### Accident Prevention

Precaution shall be exercised at all times for the protection of persons (including employees) and property. The safety provisions of applicable laws, building and construction codes shall be guarded or eliminated in accordance with safety provisions of the "Manual of Accident Prevention in Construction," published by the Associated General Contractors of applicable laws.

### Hold Harmless

To the maximum extent permitted by law, Bidder shall defend, indemnify, and hold harmless Owner and Owner's officers and employees from all claims, causes of action, losses, liabilities, and expenses (including reasonable attorney's fees) for personal loss, injury, or death to persons (including but not limited to Bidder's employees) and loss, damage to or destruction of Owner's property to the property of any other person or entity (including but not limited to Bidder's property) in any manner arising out of or connected with the Contract, or the materials or equipment supplied or services performed by the Bidder, its subcontractors and suppliers of any tier. But nothing herein shall be construed as making Bidder liable for any injury, death, loss, damage, or destruction caused by the sole negligence of Owner, otherwise this provision shall apply to any negligence or condition caused by the Owner.

### Owner's Right to Withhold Certain Amounts and Make Application Thereof

The Contractor agrees that he will indemnify and save the Owner harmless from all claims growing out of the lawful demand of all subcontractors, laborers, workmen mechanics, material men and furnishers of machinery and parts thereof, equipment, power tools and all supplies, including commissary, incurred in the furtherance of the performance of this Contract. The Contractor shall furnish satisfactory evidence that all obligations of the nature hereinafter designated have been paid, discharged or waived. If the Contractor fails to do so, then the Owner may either pay unpaid bills, of which the Owner has written notice, direct or withhold from the Contractor's unpaid compensation, a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been faithfully and fully discharged whereupon payments to Contractor shall be resumed in accordance with the terms of this Contract, but in no event shall the provisions of this sentence be construed to impose any obligation upon the Owner to either the Contractor or his surety. In paying any unpaid bills of the Contractor, and any payment so made by the Owner shall be considered as a payment made under the Contract by the Owner to the Contractor and the Owner shall not be liable to the Contractor for any such payment made in good faith.

### Termination for Breach

In the event that any of the provisions of this Contract are violated by the Contractor or by any of his subcontractors, the Owner may serve written notice upon the Contractor and the surety of its intention to terminate the Contract, and, unless within ten (10) days after the service of such notice upon the Contractor, such violation or delay shall not cease and satisfactory arrangements for correction be made, the Contract shall upon the expiration of said ten days, cease and terminate. In the event of any such termination, the Owners shall immediately serve notice thereof upon the surety and the Contractor and the surety shall have the right to take over and perform the Contract, provided, however, that if the surety does not commence performance thereof within thirty (30) days from the date of the mailing, to such surety of notice of termination, the Owners may take over the work and prosecute the same to completion by Contract for the account of and the expense of the Contractor, and the Contractor and his surety shall be liable to the Owner for any excess cost occasioned the Owner thereby.

### Notice and Service Thereof

Any notice to any Contractor from the Owner relative to any part of this Contract shall be written and considered delivered and the service thereof completed, when said notice is posted by registered mail, to the said Contractor at his last given address, or delivered in person to said Contractor or his authorized representative on the job site.

### Bid Bond

Each proposal must be accompanied by a certified check or bid bond acceptable to the Owner in the amount not less than ten percent (10%) of the proposal, payable without condition to the Owner as a guarantee that the bidder, if awarded the Contract, will promptly execute such Contract Documents and will furnish a good and sufficient bond for the faithful performance of same.

### Performance Bond

If the amount of the Contract is equal to or greater than \$5,000.00, it shall be the obligation of the Contractor to include within his bid the furnishing of a performance bond equal to the full amount of the Contract price. The Contract shall not be in force or binding upon the Owner until such satisfactory bond has been provided. Contract amounts less than \$5,000.00 do not require a performance bond.

The successful Bidder will be required to furnish a Performance Bond in quadruplicate per the form in Section 6 or a form approved by the Engineer. Only sureties listed with the United States Treasury Department will be accepted.

### Scope of the Bond and Obligation of the Bondsman

The Contractor's bondsman shall obligate himself to all the terms of these Specifications and of contracts covering the work executed hereunder. The Owner reserves the right to order extra work or make changes by altering, adding to, or deducting from the work under the conditions and in the manner herein described without, in any manner, affecting the liability of the bondsman or releasing him from any of his obligations hereunder.

The Owner reserves the right to order extra work, make such changes, alterations, additions and deductions in the manner specified without notice to the Contractor's surety, and waiver of such notice shall not affect the validity of the bond. The bond shall also secure for the Owner the faithful performance of the Contract in strict accordance with the Plans and Specifications. It shall protect the Owner against all liens which may be filed against the work according to the lien law of the State of Louisiana, and shall provide for payment of reasonable attorney's fees for enforcement of contract and institution of legal proceedings, or through delinquency or insolvency of the Contractor, and likewise it shall provide that if the Engineers are put to labor and expense for the same reasons, they shall be equitably paid for such extra expense and services involved.

### Authority of Engineers

The Engineers, or their authorized representatives, shall decide any and all questions which may arise as to the manner of performance and shall decide all questions that may arise as to the interpretation of the Plans and Specifications.

### Authority of Engineers (Continued)

The Engineers, or their authorized representatives, shall have the authority to suspend operations at any time when the work, in their opinion, is not being carried out in conformity with the Plans and Specifications.

### Authority and Duties of the Resident Engineer

The Resident Engineer shall be authorized to inspect all work done and materials furnished.

He will report the progress of work to the Engineer as well as the manner in which the work is being done, and call attention to any work not being done to the Plans and Specifications. The Resident Engineer will at no time act as foreman or interfere with the management of the work; nor will he be authorized to revoke, alter, enlarge or release any part of the Specifications. The Resident Engineer will not be authorized to accept any part of the work done or issue any instructions contrary to the Plans and Specifications.

### Inspection of the Work

The Engineer, or their authorized representatives, shall have full access to the work site in order to inspect the progress of the work being conducted and the materials being used.

If the Engineer or his authorized representative fails to reject or condemn work that is not in accordance with the Plans, Specifications or Contract Documents, it shall not be considered as acceptance thereof or a waiver of defects therein; Payment to the Contractor for occupancy by the Owner shall not be taken as acceptance of work or materials which are not in strict accordance with the Plans, Specifications and Contract Documents.

Inspection by the Engineers or their authorized representatives shall not be taken as supervision of actual construction nor make the Engineers or their authorized representatives responsible for providing safe working conditions for the performance of work by the Contractor or the Contractor's employees or employees of subcontractors or suppliers, or for access, visits, use, work, travel or occupancy by any person and the Contractor agrees to indemnify and hold the Owner harmless from all claims for damages or personal injury (including accidental death) and property damage which may arise from any operations under this Contract including claims by employees of the Contractor or the employees of the Contractor or the employees of any subcontractor or supplier.

### Supervisor or General Foreman

The Contractor will keep at the work site a capable Supervisor or General Foreman as his representative with sufficient authority to receive and carry out all instructions and notices given to him by the Engineers. In the event this Supervisor or General Foreman does not comply with the instructions and notices given to him by the Engineers, the Contractor will replace him by a suitable substitute upon the verbal or written notice of the Engineers.

The Contractor shall be responsible to see to it that all subcontracts and divisions of work are executed in a workmanlike fashion on schedule time, and with due and proper cooperation.

### Defective Work and Materials

All materials not conforming to the requirements of these Specifications shall be considered as defective, and all such materials, whether in place or not, shall be removed immediately from the site of the work.

Any work which is not in accordance with the Plans and Specifications shall be considered as defective and shall be corrected at the Contractor's expense.

Upon failure on the part of the Contractor to comply with any order of the Engineers, made under the provisions of this Article, the Owner shall have the authority to remove and replace defective material and to deduct the cost of removal and replacement from any monies due or to become due the Contractor under this Contract.

### Patents

The Contractor shall indemnify and save harmless the Owner from any and all suits, costs, penalties, or claims for infringement by reason of use of installation of any patented design, device, material or process, or any trademark or copyright in connection with the work agreed to be performed under this Contract, and shall indemnify and save harmless the Owner from any costs, expenses and damages which it may be obligated to pay by reason of any such infringement at any time during the prosecution or after completion of the work.

### Assignments

Neither party to the Contract shall assign or sublet his entire interest in this Contract without written consent of the other, nor shall the Contractor assign any monies due or to become due to him under this Contract, without previous written consent of the Owner.

### Cooperation With Public Utilities

The Contractor shall be responsible for notifying all public utilities or other interested parties to make necessary adjustment of utility structures or appurtenances affected by the work.

The Contractor will be responsible for any damages done by him to any utility structure either above ground or buried, owned or controlled by any agency, public or private. He shall perform and carry on the work so as not to interfere with or damage utility structures mentioned herein or shown on the Plans or discovered during construction, which are to be left within the limits of the work. Prior to commencement of any work, the Contractor shall notify Louisiana One Call and have all underground utilities located in accordance with Louisiana law.

The Owner will not be responsible for any delay or inconvenience to the Contractor in carrying out the work resulting from the existence, removal or adjustment of any public utility. Additional costs incurred as a result thereof shall be the expense of the Contractor.

### Additional Work or Changes

Without invalidating the Contract, the Owner may make reasonable changes by altering, adding to, or deducting from the work, the Contract Price being adjusted accordingly. No claim for extra work or materials shall be allowed and no alteration or deduction of the work shall be made unless same is ordered in writing by the Owner.

### Additional Work or Changes (Continued)

Where changes ordered by the Owner involve a monetary consideration, the Contract shall be adjusted by negotiation with the terms of said negotiation being expressed in a supplemental agreement of CHANGE ORDER signed by the Owner, the Contractor and the Engineers.

If the Owner and the Contractor are unable to reach an agreement as to the monetary consideration of a contract addition, the Engineers may order the Contractor to do such work on a force account or cost plus basis. For force account or cost plus work, the Contractor shall be paid the actual reasonable cost of labor and materials entering permanently into the work, plus not to exceed fifteen percent (15%) to cover overhead and profit. The Contractor shall furnish itemized weekly

statements to the Engineer of the cost of all such work, together with original receipted bills for all materials used and freight charges used and vouchers for labor and equipment engaged therein.

### Storage of Materials

Materials shall be stored so as to insure the preservation of their fitness for the work, and in a manner that leaves the material accessible to inspectors. Storage shall not interfere with the prosecution of the work or with public travel.

### Testing of Materials

The Engineers will appoint and the Owner will pay for the services of a competent Testing Laboratory of recognized standing for the testing and control of Owner-furnished materials entering into the construction of this project. The Contractor will be responsible for testing all Contractor-furnished material for proper operation.

The Contractor shall furnish, without additional charge, concrete samples for laboratory testing and pay for such services as required by the Engineers. The Contractor shall cooperate fully with the Engineers and the Testing Laboratory in the making of the required tests.

### Public Safety and Convenience

The Contractor shall, at all times, conduct his work to insure the least possible obstruction to traffic. The convenience of the general public and the protection of persons and property shall be provided for by the Contractor.

### Maintenance of Traffic

Maintenance of public travel shall be provided for by suitable means with effort made to keep inconvenience to public travel at a minimum. Protection for workmen and the public shall be provided during performance of work.

### Barricades, Danger Signs, Etc., for Public Safety

The Contractor shall provide, erect and maintain all necessary barricades, danger signs and signals, and take all necessary precautions for the protection of the work and workmen and for the safety of the public.



### Sanitary Conditions

The Contractor shall provide and maintain accommodations for the use of his employees as may be necessary to comply with the requirements and regulations of the State Department of Health, or of other authorities having jurisdiction. He shall commit no public nuisance.

### Right-of-Way

The Owner shall furnish the Contractor with all right-of-way necessary for the completion of his work. The right-of-way mentioned herein is only the permission to use and pass through the location of a street or highway or through public or private property in which the work is to be constructed by the Contractor and does not mean that the Owner is obligated to remove or be responsible for removal or change of any structure for which the Contractor is obligated to remove

or be responsible for removal or change of any structure for which the Contractor is obligated or for any overhead surface or underground construction which may impair operation or movement of Contractor's equipment.

Any structures which have to be constructed, changed, or moved for the use of any machine or facility by the Contractor shall be constructed, changed or moved at the Contractor's expense.

### Changes, Increases or Decreases

The Owner shall have the right to increase or decrease the amount of work to be done under the Contract at any time or times during the Contract provided that the increase or decrease does not exceed twenty per cent (20%) of the original Contract Price. The total increase or decrease may be applied to all items, to just one item, or by eliminating one or more items. No allowances shall be made for profits for increase or decrease in Contract Price.

### Maintenance of Work

The Contractor shall be responsible for maintenance of work during construction. He shall be responsible for cost for maintenance of work during construction and before final acceptance; such cost to be included in bid prices quoted for work. No additional amounts shall be paid to the Contractor for maintenance of work.

### Owner's Right to Occupancy

The Owner, or any other person under authority and permission granted by the Owner, shall have the right to use, at any time, any and all portions of the work that have reached a stage of completion as to permit such occupancy, provided such occupancy does not hamper the Contractor or prevent the efficient completion of the Contract. The Contractor obligates himself to permit such use, and to use every effort to facilitate the Owner in the occupancy of such available and useful portions of the work.

### Construction Shelter

This Contractor will be required to have on the site during construction a building of suitable dimensions to allow it to be used as a construction office. This office shall be equipped with a desk or layout table of suitable dimensions on which drawing sets can be opened and reviewed. This Contractor will also be required to have installed in this building an operational telephone at which he may be contacted, this telephone shall be operational within two (2) weeks of commencement of work.

Construction personnel will not be allowed to live on the site without permission of the Owner. Any approved housing/shelter must be complete with sanitary facilities.

### Final Clean-up

Upon completion of the work, all excess materials, temporary structures and debris shall be removed from the limits of the project, and the completed work left in a neat and presentable condition. All property, both public and private, which has been damaged during the prosecution of the work, shall be restored in an acceptable manner. Materials cleared from the project may not be deposited on the property adjacent thereto unless such disposal is approved by the Engineer.

### Guarantee

All work as herein specified and as indicated on the Plans shall be guaranteed against defects in materials and workmanship for a period of one (1) year from the date of final acceptance of work. The Contractor shall, within a reasonable time after receipt of written notice thereof, make good any defects in materials or workmanship which may develop during said one year period, and any damage to other work caused by such defects or the repairing of same, at his own expense and without cost to the Owner.

### Collateral Work

The Owner reserves the right to have such agent or agents as it may elect enter upon the property or location upon which the work herein contemplated is being constructed for the purpose of constructing or installing such collateral works as the Owner may desire. Such collateral work will be constructed or installed with as little hindrance or interference as possible with the Contractor. The Contractor shall work in harmony with other Contractors employed by the Owner and any difference of opinion between Contractors shall be arbitrated by the Engineer.

### Work Performed at Contractor's Risk

The Contractor shall take all precautions necessary and shall be responsible for the safety of the work and shall maintain all lights, guards, signs, temporary passages, or other protection necessary for that purpose. All work shall be done at the Contractor's risk and, if any loss or damage shall result from fire or from other cause, the Contractor shall promptly repair or replace such loss or damage free from all expense to the Owner. The Contractor shall be responsible for any loss or damage to material, tools, or other articles used or held for use in connection with the work. The work shall be carried on to completion without damage to any work or property of the Owner or of others and without interference with the operation of existing machinery or equipment.

## Alexandria Fairness, Equality, Accessibility and Teamwork Program (AFEAT)

Dear Vendor:

Under the City's *AFEAT (Alexandria Fairness, Equality, Accessibility, and Teamwork Program)*, participation by minority and/or disadvantaged business enterprise firms is encouraged. The AFEAT Program should be inquired about through the Division of Finance. The goals for qualifying disadvantaged, minority and female owned business in the use of professional service agreements with prime contractors will help effectuate the goals of increasing: the competitive viability of small business, minority, and women business enterprise by providing contract, technical, educational, and management assistance; business ownership by small business persons, minority persons, and women (including professional service opportunities); and the procurement by the City of professional services, articles, equipment, supplies, and materials from business concerns owned by small business concerns, minority persons, and women.

Prime contractors offering subcontracting should take specific action to ensure that a bona fide effort is made to achieve maximum results towards meeting the established goals. Primes shall document efforts and shall implement steps at least as extensive as the following in a good faith effort to reach or exceed the established goals:

- A. Establish and maintain a current list of minority and female owned businesses in Alexandria, in Rapides Parish, and in the State of Louisiana.
- B. Document and maintain a record of all solicitations of offers for subcontracts from minority or female construction contractor and suppliers in Alexandria, in Rapides Parish, and in the State of Louisiana.
- C. Secure listing of minority and women owned businesses from the City of Alexandria Purchasing Department, the Central Louisiana Business Incubator, and the State of Louisiana Department of Minority Affairs.
- D. Participate in associations which assist in promoting minority and women owned businesses such as the Central Louisiana Business League, the Central Louisiana Business Incubator, and the Entrepreneurial League System.
- E. Designate a responsible official to monitor all activity made in the effort to achieve or exceed the established goals; record contacts made, subcontracts entered into with dollar amounts, and other relevant information.

For more information on AFEAT and the City of Alexandria's Diversity in Action Initiative, and to explore a local and statewide directory of minority businesses, please visit [www.diversityinaction.org](http://www.diversityinaction.org).

Should you have any questions or comments, please do not hesitate to contact our Finance Department at 318-449-5091 or our Purchasing Department at 318-441-6180.

Sincerely,

City of Alexandria

## **SECTION 3**

### Section 3. Special Provisions

#### Time of Completion

The Contractor shall complete all work shown on Plans and called for in these Specifications within one hundred fifty (150) calendar days.

The Contractor shall be assessed Two Hundred Dollars (\$200.00) per day in liquidated damages for each calendar day he is delinquent. The above specified time shall be written into the Contract.

The 138kV bus between breaker CB1 and breaker CB5 can remain de-energized during construction unless an emergency occurs. The 230kV bus can be de-energized for short periods of time. This must be scheduled with the City a minimum of two weeks prior to de-energization.

#### Determination and Extension of Contract Time

Contract time will be extended to the Contractor only upon receipt of written request, provided such delays were caused by the Owner, by acts of God (provided such acts of God were not preceded by some fault of the Contractor without which the delay would not have occurred) or any causes completely beyond the control of the Contractor.

#### Work Order

Work will not begin on the Project until the Owner has issued a Work Order to the Contractor directing him to begin and stating that necessary funds are available for payments according to the Contract. The Contract time shall be based on the date of the Work Order.

Funds for financing this project will be deposited in the name of the Owner prior to issuance of a Work Order.

#### Payment to Contractor

Monthly, the Contractor shall submit to the Engineer an itemized invoice on a form approved by the Engineer, supported by such data substantiating the Contractor's right to payment as the Owner or the Engineer may require. Application for Payment shall be submitted on or about the first of each month for the value of labor and materials incorporated in the work and of material suitably stored at the site as of the twenty-fifth day of the preceding month, less normal retainage as follows:

1. Projects with Contract price up to \$500,000.00 - 10% of the contract price.
2. Projects with Contract price greater than \$500,000.00 - 5% of the contract price.

The normal retainage shall not be due the Contractor until expiration of the forty-five day lien period and submission to the Engineer of a Clear Lien Certificate and invoice for the retainage.

### Staking and Elevations

The Contractor will be responsible for all staking, flagging, dimensioning, and recording of elevations. Elevation records shall be maintained in sufficient detail to ensure that all of the finished foundations are as specified. The Contractor is to supply the Owner with a transit/level and the necessary components to periodically inspect the contracted work. The site elevations must be tied into a benchmark which will be designated by the Owner.

### Scheduling and Status Reports

The Contractor shall furnish to the Engineer and the Owner a milestone chart (construction schedule) within one (1) week after the Pre-Construction Conference. This chart shall list projected starting and completion dates for all major milestones including, but not limited to, the following construction events:

1. Foundations, including Transformer Oil Containment
2. Steel / Bus / Switches
3. Blast Wall
4. Conduit Installation
5. Grounding
6. Equipment Installation
7. Cable Installation
8. Wiring & Terminations
9. Final Site Clean-up

The Contractor shall also furnish to the Engineer and the Owner bi-weekly (every two weeks) status reports listing the work scheduled during the present reporting period and the work scheduled for the next period. The report shall list the percentage of work completed during the reporting period for each construction unit. For foundation work, the report shall list the quantity of each particular foundation unit installed. The report shall also include the number of days worked and the number of days not worked, along with an explanation as to why work was not done on that particular day.

The Owner and the Engineer shall use the status reports and field reports to compare actual construction to the milestone schedule submitted by the Contractor. The Owner and the Engineer require that all work be completed within the time allotted for construction.

### Removal and Adjustment of Utilities

It will not be the responsibility of the Owner for any expense to the Contractor because of the removal or adjustment of any utility. Any additional cost incurred as a result shall be at the expense of the Contractor and shall be included in the bid proposal.

### Removal and Relocation of Louisiana Geodetic Monuments

The Contractor shall be responsible for replacing and resetting any and all Louisiana Geodetic survey bench marks or other monuments which fall within the right-of-way in new locations hereinafter provided. The Contractor shall give the Resident Engineer sufficient notice of his intention of beginning work that may disturb existing monuments. Upon notice, the Resident Engineer shall designate the location to which the monuments shall be moved and reset and the manner in which the moving shall be done. A record of new locations, elevations, etc., shall be sent to the Louisiana Department of Highways by the Resident Engineer.

### Removal and Relocation of Louisiana Geodetic Monuments (Continued)

There will be no direct payment for this work and shall be included in the bid proposal.

### Maintenance of Traffic

Maintenance of public travel shall be provided for by suitable means with effort made to keep inconvenience to public travel at a minimum. Protection for workmen and the public shall be provided during performance of work.

### Existing Fences

The Contractor shall be very cautious not to damage existing fences. Any damage done to these fences shall be repaired at the expense of the Contractor.

### Subsurface Obstructions

Care shall be taken not to disturb or injure existing utilities, pipes or conduits during boring, excavation, backfilling and installing pipe without the approval of the Engineers. If necessary the Contractor shall shore up, sling and maintain any of these structures during work operation and shall repair all damage done to same within a reasonable length of time after damage. All repairs shall be made to the satisfaction of the Engineer. The Contractor shall notify Louisiana One Call and have all underground facilities near the proposed boring sites located prior the commencement of operations.

Before beginning work, the Contractor shall notify proper authority without delay and shall, at his option, repair the damage done to such structures or pay to the utility the amount required to make proper repairs for such damage. The Contractor shall be responsible for any damage done to persons or property due to damaged structures or his neglect in reporting and/or repairing these damaged structures.

The Owner or Engineers shall not be responsible for any claims the Contractor may have based on underground obstructions being different than shown on the Plans. The Contractor shall, when directed to do so by the Engineer, uncover subsurface obstructions before boring and associated operations begin in order to determine a method of avoiding these obstructions before the work reaches them.

### Description of Construction Units

Each Construction Unit represents a complete installation of the designated portion of a complete substation as indicated on the drawings and specified herein. Each Construction Unit represents all labor and material including necessary accessories completely installed and tested in satisfactory operation, except where specifically stated otherwise. Each Construction Unit shall be deemed to include any minor part associated with it which is necessary for the complete installation of the Construction Unit. Installation of the Construction Unit shall include all necessary handling, assembling, and testing and any and all other work necessary to complete the Project in accordance with Specifications. Full identification of each construction unit and all necessary specifications of the installation are shown on the drawings and specified herein.

### Construction Documents

Upon issuance of a Work Order, the Contractor shall be furnished with three (3) complete sets of Construction Documents. If required, additional sets may be purchased from the Engineer at a cost of \$50.00 per set.



## **SECTION 4**

Section 4. Proposal

DATE \_\_\_\_\_

BIDDER: \_\_\_\_\_  
\_\_\_\_\_

a corporation organized under the laws of the State of: \_\_\_\_\_

a partnership consisting of: \_\_\_\_\_

an individual trading as: \_\_\_\_\_

To the Honorable Jeffrey W. Hall, Mayor, and City Councilmen, Alexandria, Louisiana.

The undersigned hereby proposes to furnish all labor, equipment, tools and materials required for Substation Construction for the City of Alexandria as set forth in the Plans and Specifications.

I (or We) acknowledge the receipt of the following Addenda:

\_\_\_\_\_  
The undersigned declares that he has carefully examined the construction site and is familiar with existing conditions, has examined the Plans and Specifications covering the work and proposes to furnish all labor, equipment, tools and materials, supervision, etc., and to contract for and execute all items or work for the satisfactory completion of this project in accordance with the Plans and Specifications prepared by BHA, Inc., for the total price :

\$ \_\_\_\_\_

\_\_\_\_\_  
(Written in Word)

This price shall include the Owner-furnished material cost as indicated in Section 10. Bid sheets included in Section 10 of this document shall be completely filled out by the Contractor. Contractor shall add the cost of Owner-furnished materials to his material price for each unit and enter this total under the material unit price on the bid sheet. The amount included for Owner-furnished material will be deducted from the extended price on each unit before payment is made to the Contractor on completed construction units.

I (or We) agree to complete the work and have same ready for acceptance within One Hundred Fifty (150) consecutive calendar days from the date of issuance of Work Order.

The undersigned hereby declares that he has carefully checked the bid prices contained herein, and that they are submitted as correct and final. Upon receipt of notice of the acceptance of the bid, the undersigned will execute the formal contract attached within thirty (30) days and include a surety bond for the faithful performance of this Contract. The bid security, attached, in the sum of:

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(Written in Figures)

is to become the property of the City of Alexandria, Louisiana, in the event the Contract and Bond are not executed within the time above set forth. The undersigned further declares that he will provide all necessary tools, and apparatus, do all work and furnish all material covered by this Proposal, in strict accordance with the Contract Documents, Specifications and requirements pertaining thereto for the sum set forth.

Respectfully submitted

(Signed)

NAME OF  
BIDDER: \_\_\_\_\_

Contractor's Louisiana License  
No. \_\_\_\_\_

BY: \_\_\_\_\_

TITLE: \_\_\_\_\_

DATE: \_\_\_\_\_

## **SECTION 5**

Section 5. Form of Contract

STATE OF LOUISIANA

CITY OF ALEXANDRIA

This AGREEMENT made and executed in four (4) original copies on this \_\_\_\_\_ day of the month of \_\_\_\_\_, \_\_\_\_\_, by and between the City of Alexandria, acting by and through Jeffrey W. Hall, Mayor of Alexandria, the party of the First Part, and hereinafter designated as the Owner, and \_\_\_\_\_ Contractor, domiciled and doing business in the State of \_\_\_\_\_, party of the Second Part, and hereinafter designated as the Contractor.

WITNESSETH, that in consideration of the covenants and agreements herein contained to be performed by the parties hereto and of the payments agreed to be made, it is mutually agreed as follows:

For the sum of \_\_\_\_\_ Dollars and \_\_\_\_\_/100 (\$ \_\_\_\_\_), the Contractor shall and will provide and furnish all materials, equipment and labor for the construction of the **TWIN BRIDGES STATION 230kV - 138kV TRANSFORMER ADDITION CONSTRUCTION** in a thorough and workmanlike manner, in compliance with the Plans, Specifications, Proposal and Contract Documents.

It is agreed and understood that the Contractor shall receive full compensation for the equipment, services furnished and work performed in accordance with the Specifications, Proposal and Contract Documents.

The Contractor shall perform and execute only such items as are authorized under orders to be issued by the Owner. Work Orders shall not be issued by the Engineers for the Owners until funds sufficient to cover said work orders are on deposit.

The Contractor shall provide a Performance Bond in the full amount as set forth in the Specifications, Proposal and Contract Documents to insure the faithful performance of the work under this Contract. Said Performance Bond shall be attached hereto and shall be made part of this Agreement.

Completion of work shall be made as set forth in the Specifications, Proposals and Contract Documents.

This Contract shall become effective immediately upon, and as of the date all necessary parties hereto have approached and signed the same.

IN WITNESS WHEREOF, the parties of those present have executed this Agreement if four (4) copies in the year and day first above written.

CITY OF ALEXANDRIA

Attest:

\_\_\_\_\_

BY \_\_\_\_\_

TITLE \_\_\_\_\_

CONTRACTOR

Attest:

\_\_\_\_\_

BY \_\_\_\_\_

TITLE \_\_\_\_\_

## **SECTION 6**

**BID BOND**  
FOR

Date: \_\_\_\_\_

KNOW ALL MEN BY THESE PRESENTS:

That \_\_\_\_\_ of \_\_\_\_\_, as Principal, and as Surety, are held and firmly bound unto the \_\_\_\_\_ (Obligee), in the full and just sum of five (5%) percent of the total amount of this bid, including all alternates, lawful money of the United States, for payment of which sum, well and truly be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally firmly by these presents.

Surety represents that it is listed on the current U. S. Department of the Treasury Financial Management Service list of approved bonding companies as approved for an amount equal to or greater than the amount for which it obligates itself in this instrument or that it is a Louisiana domiciled insurance company with at least an A - rating in the latest printing of the A. M. Best's Key Rating Guide. If surety qualifies by virtue of its Best's listing, the Bond amount may not exceed ten percent of policyholders' surplus as shown in the latest A. M. Best's Key Rating Guide.

Surety further represents that it is licensed to do business in the State of Louisiana and that this Bond is signed by surety's agent or attorney-in-fact. This Bid Bond is accompanied by appropriate power of attorney.

THE CONDITION OF THIS OBLIGATION IS SUCH that, whereas said Principal is herewith submitting its proposal to the Obligee on a Contract for:

\_\_\_\_\_

NOW, THEREFORE, if the said Contract be awarded to the Principal and the Principal shall, within such time as may be specified, enter into the Contract in writing and give a good and sufficient bond to secure the performance of the terms and conditions of the Contract with surety acceptable to the Obligee, then this obligation shall be void; otherwise this obligation shall become due and payable.

\_\_\_\_\_  
PRINCIPAL (BIDDER)

\_\_\_\_\_  
SURETY

BY: \_\_\_\_\_  
AUTHORIZED OFFICER-OWNER-PARTNER

BY: \_\_\_\_\_  
AGENT OR ATTORNEY-IN-FACT (SEAL)





**AFFIDAVIT OF BIDDER**

STATE OF LOUISIANA

PARISH OF \_\_\_\_\_

BEFORE ME, the undersigned Notary Public, duly commissioned and qualified in and for the Parish and State aforesaid, personally came and appeared:

**BIDDER**

who, after being duly sworn, did declare and state:

1. Appearer's company is registered and participates in a status verification system to verify that all employees in the state of Louisiana are legal citizens of the United States or are legal aliens.
2. Appearer shall continue, during the term of the contract, to utilize a status verification system to verify the legal status of all new employees in the state of Louisiana.
3. Appearer shall require all subcontractors to submit to appearer a sworn affidavit verifying compliance with La. R.S. 38:2212.10 (C) (1) and (C) (2).
4. Appearer has the authority and personal knowledge requisite to testify to the matters stated herein.

\_\_\_\_\_  
**NAME OF BIDDER**

\_\_\_\_\_  
**AUTHORIZED SIGNATORY OF BIDDER**

\_\_\_\_\_  
**TITLE OF AUTHORIZED SIGNATORY OF BIDDER**

\_\_\_\_\_  
**SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER**

SWORN TO AND SUBSCRIBED before me, Notary Public, in \_\_\_\_\_, \_\_\_\_\_,  
*City State*  
on this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

\_\_\_\_\_  
NOTARY PUBLIC (Notary ID/Bar Roll No. \_\_\_\_\_)  
Printed Name: \_\_\_\_\_  
My commission expires \_\_\_\_\_.

Section 6. Performance Bond

KNOW ALL MEN BY THESE PRESENT:

That we, the undersigned: \_\_\_\_\_

\_\_\_\_\_

as Principal, and: \_\_\_\_\_, a corporation duly authorized to transact business in the State of Louisiana, as surety, are held and firmly bound unto the City of Alexandria, Louisiana, hereinafter referred to as the "OWNER", existing under the laws of the State of Louisiana, in the penal sum of:

\_\_\_\_\_ dollars and / 100 (\$ \_\_\_\_\_), lawful money of the United States, for the payment of which well and truly made, the said principal and the said surety do hereby bind ourselves, our heirs, executors, administrators and assigns, jointly and severally, by these present, as follows:

The condition of this obligation is such that; Whereas said principal by an instrument in writing attached hereto and bearing date of \_\_\_\_\_ has agreed with said Owner to provide and furnish all materials, equipment and labor and perform the work required to construct in a thorough and workmanlike manner, \_\_\_\_\_, to the Engineer's satisfaction ( \_\_\_\_\_ ) in compliance with the Plans, Specifications, Proposal, and Contract Documents.

NOW THEREFORE, if said principal shall well and truly and in good, sufficient and workmanlike manner, and to the satisfaction of said Owner, perform and complete the work required, and shall defend, expense and charge of every kind (including claims of infringement) arising out of injury or damage to persons or property by reason of said agreement and the work thereunder required of (It/Him) or arising from any act, omission or neglect of said principal, his agents, servants or employees with relation to said work; and shall pay all costs, charges, rentals and expenses for labor, materials, supplies and equipment, and deliver the said improvement to said Owner completed and ready for occupancy or operation, and free from all liens, encumbrances or claims for labor, material or otherwise; and shall pay for all other expenses lawfully chargeable to said Owner by reason of any default or neglect of said principal in the relation of said Agreement and said work, then this obligation shall be voided; otherwise, to remain in full force and effect.

PROVIDED FURTHER, that the said surety for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract, or the work to be performed thereunder, or the Specifications accompanying same, shall in any way affect its obligation on this bond and it does hereby waive notice of any change, extension of time, alteration or addition to the Contract, work or Specifications.

PROVIDED FURTHER, that if the Contractor, or his, their or its subcontractor(s) fail to duly pay for any labor, materials, team hire, sustenance, provisions, provender or any other supplies or materials used or consumed by such Contractor or subcontractors in performance of the work contracted, the surety will pay the same in any amount not exceeding the sum specified in the bond, together with interest as provided by law.

IN WITNESS WHEREOF:

Said principal and surety have hereunto set their hands and seals at \_\_\_\_\_,  
this \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_\_.

(SEAL)  
WITNESSES:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
Contractor

\_\_\_\_\_  
Name of Person Executing for Contractor

\_\_\_\_\_  
Address

(SEAL)

\_\_\_\_\_  
Surety

\_\_\_\_\_  
Name of Person Executing for Surety

\_\_\_\_\_  
Title

\_\_\_\_\_  
Address

**CONTRACTOR'S AFFIDAVIT**

STATE OF: \_\_\_\_\_

PARISH OF: \_\_\_\_\_

BEFORE ME, the undersigned Notary Public, personally came and appeared:

\_\_\_\_\_

\_\_\_\_\_  
*(Enter the legal name and address of the Contractor)*

Herein represented by \_\_\_\_\_, who after being duly sworn by me did dispose and say:

that he/she has been selected by the CITY OF ALEXANDRIA, LOUISIANA as Contractor for construction of:

\_\_\_\_\_

\_\_\_\_\_

and that he/she does hereby certify, in compliance with Louisiana Revised Statutes Section 38:2224:

1. That he employed no person, corporation, firm, association, or other organization either directly or indirectly, to secure the contract for the above mentioned public project, other than persons regularly employed by him whose services in connection with the construction, of said public project or in securing the contract for same were in the regular course of their duties for him; and
2. That no part of the Contract price received, or to be received, by him was paid or will be paid to any person, corporation, firm, association or other organization, for soliciting the Contract, other than the payment of their normal compensation to persons regularly employed by him, whose services in connection with the construction of said public project, were in the regular course of their duties for him.

\_\_\_\_\_  
(Witness)

BY: \_\_\_\_\_  
(Signature of Contractor)

\_\_\_\_\_  
(Witness)

THUS SWORN BEFORE ME, this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
Notary Public

## **SECTION 7**

## Section 7. Technical Specifications

### **Scope of Work**

Work intended under this section shall consist of furnishing all labor and materials necessary to complete the substation construction as specified herein. All material furnished by the Bidder shall be in conformance with the Specifications for Construction. Work under this contract shall include the following, but in no way limits the scope of work involved, and is issued only as a general scope of major items to be done.

City of Alexandria:

- : Install Transformer Blast Wall, 138kV Switch, H-Structure, Three 230kV Single Poles and the Static Mast Foundations
- : Install New 230kV – 138kV Transformer onto Foundation and Dress-Out
- : Install New Control Building onto Foundation
- : Install New Engineered Panels in Control Building
- : Furnish Steel/Bus/Switch/Jumpers/Connectors

Contractor:

- : Furnish & Install Remaining Foundations with Anchor Bolts
- : Furnish & Install Grounding, Below Grade & Above Grade
- : Furnish & Install Conduits, Concrete Duct Bank and Pull Boxes
- : Install Steel/Bus/Switch/Jumpers/Connectors
- : Furnish & Install All Miscellaneous Support Brackets for Conduit Routing And All Necessary Connectors for Grounding Equipment
- : Furnish & Install All Power/Controls/Metering/SCADA/Wiring to Transformers, Equipment, Relay/Control Panels, AC and DC Panels and PT Enclosure
- : Furnish & Install Oil Containment System for Transformer
- : Furnish & Install Blast Wall (Foundation By Others)
- : Furnish & Install 230kV Bushing CT's

**CAUTION:** The substation will remain energized during construction, except when critical tie-ins require an outage. Contractors shall use caution when working in the live portions of the station. All switching and outages are to be scheduled with and performed by the Owner.

## **Site Work**

The site is currently leveled and sloped to drain as indicated on the attached drawings. Drainage ditches shall be shaped by excavation to flow as indicated.

The Contractor is to supply all personnel and equipment necessary to survey the substation site as required to properly perform the contracted work. A record of this survey data is to be kept and will subsequently become the property of the Owner as part of the As-Built records.

The construction site has been prepared such that the final grade is smooth and even as indicated by the drawings, with final elevations in accordance with the drawings.

The Contractor shall maintain the driveway areas at all times during construction. Additionally, site areas subject to vehicular traffic such as those areas around breaker foundations, transformer foundations, and the control building shall remain clear, compacted, and graded so as to permit traffic for delivery of equipment to those areas in which the equipment is to be installed even should such installations not be part of this contract.

Site clean-up and final grading to eliminate any damage done to the site during the period of construction shall be done the Contractor. The Contractor shall furnish any additional fill material required to bring the site elevations to those shown on the topographic plans.

The Contractor shall remove the site surfacing in the existing Substation area requiring construction work. This material shall be stored in to a pre-determined location specified by the Owner.

The Contractor shall furnish and install crushed limestone aggregate as surfacing over the site area so designated on the drawings. The finished (rolled and compacted) depths of the crushed limestone aggregate surfacing shall be six (6) inches in those areas subject to vehicular traffic (Type 610), and six (6) inches in the remaining areas (Type 57), as shown on the drawings. Areas subject to vehicular traffic shall have a filter fabric installed prior to installing limestone. The Contractor shall furnish and install limestone (Type 57) along the inside and outside of the existing and relocated fence. In wash out areas, additional rip-rap type limestone shall be furnished and installed on the outside of the fence. The Owner will approve the rip-rap material.

The construction unit for crushed limestone shall be tons of stone installed and shall include placing, spreading, compacting and final grading.

The Contractor shall furnish copies of all suppliers delivery tickets stating the quantity delivered with all invoices for this construction unit item.

No limestone aggregate surfacing shall be installed until all below grade work (foundations, grounding, ducts, etc.) and steel erection is complete except as directed by the Engineer.

## **Site Sterilization**

The Contractor shall sterilize the construction area prior to installing the surfacing using an approved weed killer such as SPIKE-TREFLAN, or equivalent, at the rate prescribed by the manufacturer.

The complete specification on site work and site surfacing are included in Section 8, General Specifications, of this document and apply to all site work.

## **Foundations**

The specifications pertaining to the excavations, filling and backfilling, forms reinforcing steel, and concrete are included in the General Specifications and apply to all foundation work.

The Contractor shall furnish all labor and materials, including piles and their installation, if required, for all foundations as indicated and detailed on the drawings for this facility.

The Contractor shall notify the Owner forty-eight (48) hours prior to pouring foundations. The Owner shall inspect all foundation work prior to placement of concrete.

The Contractor shall furnish all miscellaneous anchors or anchor bolts, hardware, and steel fittings required in the foundation details unless specifically noted as supplied by others.

## **Owner-Furnished Materials**

It is the intent under this section of the specifications that the Owner shall furnish and the Contractor shall install complete structures consisting of the galvanizing steel and all associated equipment necessary for the installation of a complete project as shown on the drawings and as specified herein.

The Contractor shall take delivery of all items purchased by the Owner as itemized in Section 9 and install same as specified herein. The Contractor shall note the anticipated delivery date of Owner-furnished materials listed in Section 9. Actual delivery date may be earlier or later than the anticipated dates listed. Variations from the date listed shall not relieve the Contractor from the responsibility to take delivery of these materials. The Owner will also supply the tee connector (1272/1636). The single and double 1272 to 4-hole terminal connector.

The Contractor shall inventory all materials purchased by the Owner within twenty four (24) hours after delivery to insure that all of the materials are on the jobsite. If any materials are missing or found to be defective, the Contractor shall report this fact to the substation supplier and procure all required materials. The Contractor shall notify the Owner and the Engineer of the status of all materials. The Contractor shall furnish all miscellaneous materials not listed as being furnished by the Owner and not listed on the station supplier's List of Materials.

## **Structures**

The Contractor shall erect the structures on new and existing foundations under this Contract and shall install all equipment on the structures for complete project. All lattice type columns and trusses will be pre-laced by the manufacturer. The Contractor shall be responsible for all modifications to the specified structure if required. The modifications shall include, but not be limited to, the punching of additional holes for mounting trusses, structural members, and equipment if required for a complete installation.

The structures shall be erected according to substation manufacturer's erection prints using galvanized bolts and appropriate locknuts and washers. Steel shall be secured to the foundation using two galvanized nuts on each anchor bolt. All steel shall be plumb. Where shims are required to plumb steel, shims shall be made of galvanized steel or cadmium plated steel. Any and all shims must be approved by the Owner. Shims shall not extrude from the structure.



### **Structures (Continued)**

Where additional punches or drilled holes are required, the holes shall be painted immediately with galvanized paint and allowed to dry before bolts are installed. Torch burning of holes will not be permitted. All additional holes required shall be made by this Contractor with the prior approval of the Engineer.

All steel structures will be received at the Twin Bridges Substation construction site.

Some bolts, nuts, and switches may be received at the Owner's Facility. This shall not exclude the Contractor from the responsibility of reporting any missing pieces within 24 hours of receiving equipment.

### **Equipment**

The Contractor shall install and assemble, if required, the following major equipment items which will be furnished by the Owner:

1. Transformer High & Low Side Bus & Connectors
2. 230kV & 130kV Switches
3. 230-138kV Transformer Connections
4. 230kV Breaker, Bus and Connectors
5. 230kV Potential Transformer
6. Area light poles with fixtures.

The Contractor shall terminate bus jumpers and control wiring under the respective assembly units.

### **Contractor Furnished Labor & Material**

The following is a list of the major items to be supplied and installed by the Contractor. Prior to their installation, the Contractor shall submit to the Engineer for approval Shop Drawings or Specifications of all Contractor supplied material. If there is a conflict what material should be supplied by the Contractor this should be brought to the Owner's attention at the Pre-Bid Meeting. If it is not brought to the attention of the Owner at the Pre Bid Meeting then the Contractor will be responsible for supplying this material, and the cost will be assumed to be included in the construction unit sheet.

### **Welded Bus Connections**

The Contractor shall make all welded bus connections in accordance with Bus Specifications in Section 8. It is the Contractor's responsibility to count all connections, any shortages not reported upon receiving them by the Contractor shall be the financial responsibility of the Contractor. No round or ball type connections shall be accepted. Any lost or unreported shortages shall be replaced and installed at the Contractor's cost. Any replaced parts shall comply with the Owner's original steel contract. (The manufacturer and type shall be approved by the Owner).

## **Grounding**

All work under this section shall be in accordance with the grounding specifications in Section 8, General Specifications.

The "List of Materials" of these specifications, gives quantities of grounding connectors furnished by Owner. All other grounding materials are to be furnished and installed by the Contractor. This includes, but is not limited to:

1. Below and above grade ground wire and connectors, including fence grounding of the relocation fence.
2. Jumpers from ground grid to structures, equipment, and control building, etc.

The Contractor is responsible for furnishing and installing the new grounding in the station. This includes all grounding specified herein and by the drawings. All materials supplied by the Contractor must be approved by the Engineer. The grounding conductors must be copper and the connectors must be bronze. The Contractor shall furnish all grounding materials not furnished by the Owner with the station materials.

All below-grade ground connections shall be inspected by the Owner and/or Engineer prior to backfilling. The Contractor shall notify the Owner when ground connections are ready to be inspected.

All below-grade ground connections shall be of the thermal variety such as Cadweld or Thermoweld.

## **Panelboards**

The Contractor shall furnish and install all A.C. and D.C. circuit breakers. All 120/240 A.C. volt and 125 D.C. volt wiring from inside of control buildings to and on the structures shall be furnished and installed by the Contractor. Ground fault interrupter breakers for outdoor receptacles shall also be furnished by this Contractor. Contractor shall fill out schedule label (to be typed) on door of all panels. All wires shall be tagged.

Minimum Required D.C. Breakers: 1-200A 2-Pole, 7-30A 2-Pole,  
Square D Type Type FA

Minimum Required A.C. Breakers: 6-20A 1-Pole, 2-35A 2-Pole, 2-30A 2-Pole,  
1-200A 2-Pole, 1-150A 2-Pole  
Square D Type FA

## **Enclosures**

### **230kV PT**

The standard conductor for a potential transformer circuit shall be a control cable consisting of nine (9) No. 10 gauge conductors. The nomenclature and color of the P.T. circuits as appearing on the drawing shall be as follows:

<u>Description</u>	<u>Color Code</u>
A Phase Potential	Black
B Phase Potential	White
C Phase Potential	Red
Neutral/Ground	Green7-5

### **230kV PT Junction Box**

The Contractor shall furnish and install a weatherproof, enclosure with internal parts, per PCS 2000's drawing #2045-5-J01, at the base of one structure for each set, and individual, PT's.

## **Wiring**

The specifications on wire are included in the General Specifications and apply to all wire installed at this station.

All wire required to make complete electrical connections to all equipment in this station shall be Contractor-furnished and installed per the wire and conduit schedule included in the drawings of this contract. The Contractor shall bundle, tie, and tag appropriate groups of wire where necessary and where directed to do so by the Engineer. The wire tags and ties shall be furnished by the Contractor and approved by the Engineer prior to commencement of work. All terminations of control and metering cable shall be made by the Contractor. All terminations of the A.C. and D.C. power, control and lighting shall be made by the Contractor with approved terminals - furnished by the Contractor. Ring-type insulated terminals shall be used for all terminations to screw terminals.

All A.C. power circuit wiring shall be 3-conductor control cable with black wire used for hot and with white insulated wire to be used as the neutral leg. In-house wiring may be single conductor with color code same as above.

All D.C. power circuit wiring shall be 2-single conductors with one red insulated wire for positive and one black insulated wire for negative.

Control cables shall be 600 volt shielded control cable; unless otherwise specified, Type TC, 90°C, in accordance with IPCEA Standards Publication No. S-61-402, Section 7.4. All control cables shall have an overall outer jacket of black PVC. The color coding of all control cable shall be in accordance with IPCEA Standard 61-402, Method #1. Control cables containing conductors with monotoned insulation shall not be acceptable for use in this station. The Contractor shall submit the color coding of the control cables he proposes to use to the Engineer for approval prior to installation.

All control cables to equipment cabinets, (transformer, breakers, circuit switcher, motor operator, etc.) shall be long enough to reach any termination point in their respective cabinet after termination, plus a minimum of 10' of spare wire.

### **Wiring (Continued)**

Shielded cable, where specified, shall be 600 volt 100% shielded overall shield with copper shield drain wire. All other specifications above shall apply.

#### **C.T. Circuits**

The standard conductor for a C.T. circuit shall be a control cable consisting of five (5) number No. 10 AWG conductors. The color coding of the C.T. circuits as appearing on the drawings shall be as follows:

<u>Phase</u>	<u>Color Code</u>
A	Black
B	White
C	Red
Ground Neutral	Green

#### **P.T. Circuits**

The standard conductor for a P.T. circuit shall be a No. 10 AWG conductor. The nomenclature and color coding of the P.T. circuits as appearing on the drawings shall be as follows:

<u>Description</u>	<u>Color Code</u>
A Phase Potential	Black
B Phase Potential	White
C Phase Potential	Red
Neutral/Ground	Green

### **Control Building Requirements**

The Contractor shall furnish all control cable to be pulled into the control building. The Contractor shall also supply all electrical wiring, equipment, associated with the control building. All connections, breakers, electrical components, and grounding hardware shall be furnished and installed by the Contractor.

Any adjustments necessary to be made to the control building to allow for a functional installation shall be the responsibility of the Contractor.

Any damages to equipment in the Control Building due to the negligence or fault of the Contractor will be replaced or repaired at the expense of the Contractor.

### **230kV Bushing CT's**

Contractor shall furnish and install three 230kV Bushing CT's equal to ITEC quote in Section 11. The Contractor shall furnished and install all rigid steel conduit, connectors, CT wire and CT terminal strip on the transformer and inside the transformer control cabinet for a complete installation.

### **Tagging and Labeling**

All circuits shall be labeled at all pull points such as termination points, pull boxes, hand holes, junction boxes, in control building trenches, and in cable trays. Where circuits are exposed, they shall be labeled at four (4) foot intervals. Where circuits consist of individual conductors in lieu of control cables, the individual conductors shall be bundled as a circuit and then labeled. In this case, each individual conductor shall be labeled to identify the circuit.

For control cables with multiple conductors, each individual conductor in the cables shall be identified by circuit number at the termination point in addition to labeling as outlined above.

Cables shall be properly identified by use of a 1/8" x 1-1/2" fiber tag at each end of the cable run. The run number shall be stenciled on the tag with characters not less than 3/8" high with lettering die. Cable tags shall be attached to the cable with mylar cord at least 1/16" in diameter. Attachment shall allow 2" freedom of tag from cable. Knots shall be secure.

### **Sump Pump**

The Contractor shall furnish and install one (1) 1/3 hp Submersible Sump Pump, Liberty Pump 230 Series, or equal, and associated plumbing to remove excess water from pull box. The Contractor shall furnish and install the discharge line from the sump pump to an area beyond the substation fence. (See Drawings.)

Contractor shall size, furnish and install in the transformer containment pit, one (1) 115 volt submersible pump, complete with an oil detection control system. The Contractor may purchase a packaged system or purchase the pump and control units separately. The Engineer must approve the system prior to purchase. The Contractor shall furnish and install the discharge line from the sump pump to an area beyond the substation fence. (See Drawings.)

### **Blast Wall**

Contractor shall furnish and install a Intelli-Firewall. See Section 12 for quote by Composite Support and Solutions, Inc. It is the intent of the City to use this blast wall system, as the foundations have already been installed. If a different system is quoted by the bidder, the size of the steel structure and anchor bolt pattern, as well as ground line reactions, shall be equal to the attached quote.

### **Duct Banks, Pull Boxes and Conduit**

The Contractor shall furnish and install materials required for the installation of all conduit runs as shown on drawings.

All conduit runs below grade shall be PVC, Carlon Schedule 40, except at stub-ups and 90° bends, which shall be rigid galvanized steel. All transitions between PVC and rigid conduit shall be encased in concrete. All PVC/rigid conduit fittings shall be furnished and installed by the Contractor. PVC sleeve shall be Schedule 80 at transition point. All PVC conduits entering pull boxes and the control building shall be equipped with end bells and shall fit flush with the interior pull box walls and the Control Building trench walls.

All conduits run underground must be encased with a minimum of three (3) inches of red concrete all around at a minimum depth of 1'-6" below final ground level. (See Details) All conduit stub-outs and stub-ups must have a plug and sleeve to fit the conduit.

All conduit runs within the Control Building shall be rigid or EMT galvanized conduit. The routing and method used to secure conduits shall be subject to approval by the Engineer.

All above-grade conduit runs shall be rigid galvanized steel conduit and shall be field routed. All rigid conduit work shall be in accordance with General Specifications. The method used to secure rigid conduits to structures shall be subject to approval by the Engineer.

The Contractor shall furnish and install all materials required to install all pull boxes as shown on the plans.

All unused conduits in the pull boxes / trench shall be plugged with universal plugs as manufactured by Underground Products, Inc., Livonia, Michigan, or Condux International, Inc., Mankato, Minnesota.

### **Area Lighting & Gate Alarm**

Contractor shall furnish and install all conduit, fittings, and wire to re-reconnect the two area pole lights, as well as the rear gate alarm contact. The Contractor shall install with new foundations, the two light poles which are on the job site.

### **Miscellaneous Connectors**

Contractor shall furnish and install all necessary material to securely mount/install all enclosures, metering units, conduit, miscellaneous ground wires, and relay panels. All materials used to mount the equipment or conduit that will be exposed to the elements shall be hot dipped galvanized steel, aluminum, or in the course of the ground wires, bronze.

### **Miscellaneous Construction Units**

The Contractor shall submit unit prices for the miscellaneous construction units listed in Section 10. The Owner shall have the option to exercise these unit prices for additional work, which shall be done by this Contractor when, in the judgment of the Owner and the Engineers, the said work is outside the intended scope of work required by these specifications.

### **Shop Drawings**

The following is a list of major items supplied by the Contractor for which shop drawings/manufacture specifications are required:

A.C. & D.C. Breakers	Wire/Cable
Cable ID Tags	Oil Containment System
Blast Wall	Pull Box Covers
Conduit	Sump Pump
230kV Bushing CT's	PT Enclosure with Interior Parts

The Contractor shall provide shop drawings, manufacturer specifications, settings, schedules, and such other drawings as may be necessary for the prosecution of the work in the field as required by the Drawings, Specifications, or Engineer's instruction. Deviations from the drawings and specifications shall be called to the attention of the Engineer at the time of the first submission of shop drawings and other drawings for approval. The Engineer's approval of any drawings shall not release the Contractor from responsibility for such deviations.

### **Scheduling**

The Contractor shall produce a work schedule for construction and operations. The Contractor shall coordinate with the City for the station outages. Outages will be very limited.

### **Inspections and Clean-up**

The Contractor shall have construction personnel available to make adjustments and minor construction changes and corrections during all inspections to include, but not be limited to, the following inspections:

1. Construction inspections and site visitations by the Owner or Engineer.
2. Final inspection by the Engineer.
3. Final inspection and station checkout by the Owner.

## **SECTION 8**



## Section 8. General Specifications on Materials and Item of Work

### General Requirements

The specifications included in this section apply to all work which is required or specified for this project. However, this portion of the contract and specifications is general in nature and in any conflicts between it and the remainder of the specifications and drawings, the remainder of the specifications and drawings will take precedence.

### Site Work

#### Excavation

This item shall consist of excavating, removing and satisfactorily disposing of all materials of every character within the limits of the work. It shall include excavation for foundations, inlet and outlet ditches, trenches, slabs, structures, roadways, earth dikes, etc., in accordance with these Specifications and in conformity with the grades, alignments and cross-sections shown on the Plans or established by the Engineer.

The Owner does not guarantee the existing grades to be exactly as shown on the drawings and any variation in level that may exist shall be accepted and corrected as part of the work to be performed in order to obtain the required finish elevations shown on the drawings.

Prior to beginning excavation operations in any area, all necessary clearing and grubbing in that area shall have been performed in accordance with the Section on Clearing and Grubbing.

All excavations shall be made to proper depth and correct line with sufficient allowance for correct forming, shoring, and inspection of foundation work. **POURING OF CONCRETE AGAINST EARTH SIDE WALLS WILL NOT BE PERMITTED EXCEPT AS APPROVED BY THE ENGINEER.**

Rough excavation must be stopped at least three (3) inches from finished grade; fine excavation and dressing must be done by hand to the required depth just prior to concreting operations.

If the bottom of the excavation is made mucky or unstable due to the Contractor's operations or carelessness, the excavation shall be deepened to undisturbed soil just before concreting operations, and the thickness of concrete shall be increased accordingly without additional compensation to the Contractor.

Bottoms shall be level and free of loose material. If excavations are carried below the level called for in the Plans, foundations must be poured at this level, on undisturbed soil, and the thickness of footings increased to make up the discrepancy without additional compensation to the Contractor.

The Contractor shall provide, operate and maintain all necessary pumps, discharge lines, well points, etc., in sufficient number and capacity to keep all excavation, bases, pits, tanks, etc., free from seepage, sanding or running water at all times throughout the period of construction.

The Contractor shall assume all responsibility for security of the excavation required, employing bracing, lining or other accepted means necessary to accomplish same. If temporary or permanent casing should be required for installation of drilled piers, this shall be provided by the Contractor at no additional cost to the Owner.

## Protection of Persons and Property

Barricade open excavations occurring as part of this work and post warning lights where required by authorities having jurisdiction.

All existing utilities shall be located and properly flagged. If utilities are to remain in place, provide adequate means of protection during earthwork operations. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult the utility owner immediately for directions. Cooperate with Owner and Utility Companies in keeping respective services and facilities in operation.

Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

Damaged utilities and other facilities shall be repaired by the Contractor to the satisfaction of the Owner at no cost to the Owner.

## Classification

Excavations shall be classified as follows:

- A. Borrow Excavation
- B. Muck Excavation
- C. Drainage Excavation
- D. Common Excavation

Borrow Excavation: This work shall consist of excavating from borrow pits, transporting material to the proper site, placing and compacting of material for the construction or fills in accordance with these Specifications and in reasonably close conformity with the lines, grades, thickness and typical cross-sections shown on the Plans or established by the Engineer.

Borrow Excavation shall include all excavation obtained from borrow pits furnished by the Owner, as shown on the Plans or designated by the Engineer, or borrow pits furnished by the Contractor.

Clearing, grubbing, and stripping of pits furnished by the Contractor and excavated materials from these pits not used for filling purposes will not be measured or paid for.

Muck Excavation: Muck Excavation shall consist of the removal of deposits of saturated or unsaturated mixtures of soils and organic matter not suitable for foundation material and satisfactorily disposing of materials encountered as indicated on the Plans or as directed by the Engineer.

Drainage Excavation: Drainage Excavation shall include all required excavation for inlet and outlet ditches, trenches, changes in or deepening of channels or streams, berm ditches, ditches parallel to or adjacent to roadway, ditches draining borrow pits furnished by the Owner, ditches draining excavations for foundations, etc. Material excavated from under existing bridges will also be classified as Drainage Excavation.

Common Excavation: Common Excavation shall include all excavation under this item, except Borrow Excavation, Muck Excavation, and Drainage Excavation.

### Excavation for Pavements and Roads

Cut the surface under pavements and roads to comply with cross-sections, elevations and grades as shown on the Plans or as directed by the Engineer.

### Excavation for Slopes

Excavation slopes shall be finished in conformance with the lines and grades shown on the Plans. Debris and loose material shall be removed. When completed, the average plane of the slopes shall conform to the slopes indicated on the Plans and no point on the completed slopes shall vary from the designated plane by more than six inches measured at right angles to the slope, except where excavation is in rock, no point shall vary more than two feet from the designated plane of the slope. In no case shall any portion of the slope encroach on the roadbed.

Tops of excavation slopes and ends of excavations shall be rounded as shown on the Plans and these quantities shall not be included in the quantities of excavation to be paid for. This work will be considered as part of finishing slopes and no additional compensation will be allowed therefore.

Embankment slopes shall be finished in conformance with lines and grades shown on the Plans. When completed, the average plane of embankment slopes shall conform to slopes indicated on the Plans and no point on completed slopes shall vary from the designated plane by more than six inches measured at right angles to the slope. The placing and compacting of embankments shall conform to the applicable portions of Section 8, Filling and Backfilling.

### Execution

Execution consists of the removal and disposal of materials encountered when establishing the required grade elevations.

Unauthorized Excavation: Consists of removal of materials beyond indicated elevations without the specific direction of the Engineer. Replace unauthorized excavation by backfilling and compacting as specified for authorized excavations of the same classification, unless otherwise directed by the Engineer.

Additional Excavation: When excavation has reached required subgrade elevations, notify Engineer who will make an inspection of conditions.

If unsuitable materials are encountered at the required subgrade elevations, carry excavations deeper and replace the excavated material as directed by the Engineer.

Removal of the unsuitable material and its replacement as directed will be paid on the basis of contract conditions relative to changes in the work.

Dewatering: Prevent surface water and subsurface or ground water from flowing into excavations, and flooding the project site and surrounding area.

Dewatering: (Continued)

Do not allow water to accumulate in excavations. Remove water from excavations to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to the stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey the water away from the site.

Convey water removed from excavations and rain water to collecting or run-off areas. Do not use trench excavations for site utilities as temporary drainage ditches.

Material Storage: Stockpile excavated materials classified as satisfactory soil material where directed, until required for fill. Place, grade and shape stockpiles for proper drainage.

Unless otherwise shown on the Plans, specified in the Special Provisions, or approved by the Engineer, no surplus excavated material or unsatisfactory soil, material, trash and debris, shall be disposed of within the property limits. The Contractor shall make all arrangement for disposal of the material at offsite locations as may be approved by the Engineer and shall, upon request, file with the Engineer the written consent of the Owner of the property upon which he intends to dispose of such material.

Stability of Excavation: Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated.

Maintain sides of slopes of excavations in a safe condition until completion of backfilling.

Shoring and Bracing: Provide materials for shoring and bracing, such as uprights, stringers and cross-braces, in good serviceable condition.

Establish requirements for trench shoring and bracing to comply with local codes and authorities having jurisdiction.

Maintain shoring and bracing in excavations regardless of time period excavations will be open. Carry down shoring and bracing as excavation progresses.

Cold Weather Protection: Protect excavation bottoms against freezing when atmospheric temperature is less than 35°F degrees.

Special Requirements

When required or directed, obliteration of old roadways shall include all grading operations necessary to incorporate the old roadway into the new roadway and surroundings in order to provide a pleasing appearance from the new roadway.

When the Contractor's excavation operations encounter remains of prehistoric people's dwelling sites or artifacts of historical or archeological significance, the operations shall be temporarily discontinued. The Engineer will contact archeological authorities to determine the disposition thereof. When directed, the Contractor shall excavate the site in such a manner as

### Special Requirements (Continued)

to preserve the artifacts encountered and shall remove them for delivery to the custody of the proper state authorities. Such excavation will be considered and paid for as extra work.

When the Contractor's excavation operations encounter human graves or tombs not indicated on the Plans or, if shown on the Plans, not previously moved, the operations shall be temporarily halted to allow the legal disposition of the grave. The movement of the grave will be provided for by the Owner. However, no claim for damages due to delay will be considered.

### Filling and Backfilling

Excavated earth free from debris or organic material may be used for backfilling foundation or for fill. Where concrete slabs are indicated to be poured upon earth fill, without forms, the earth upon which the slabs will rest shall first be thoroughly wetted and compacted with pneumatic rammer, equal to Chicago Pneumatic Tool Company's size 2-1/4 x 6 ft. The fill material shall be placed in layers not to exceed 6" in thickness and compacted to a density or hardness exceeding the natural earth to insure against settlement and subsequent cracking of the slab. **HAND TAMPING WILL NOT BE PERMITTED.** All areas to receive fill shall be stripped of all vegetation to a depth of 6" prior to placement of any fill material.

Footings and foundations shall not be placed on fill material but shall bear on undisturbed soil.

Contractor shall backfill all subgrade excavations immediately after Engineer's inspection and approval of work to be covered. Contractor shall securely tamp the backfilling with pneumatic rammer around the walls, footings, and piers. No backfilling or filling shall be done without approval of the Engineer, especially in the case of concrete walls sustaining earth pressure.

Surplus material resulting from the prosecution of the excavation and backfill shall be used in grading the site or removed from the site and disposed of as directed by the Owner. In no case shall any surplus material be deposited on adjacent lands. Fill used for grading shall be placed in layers not to exceed 12" in thickness and shall be compacted by suitable means to a density equal to that of the surrounding natural ground.

### Materials

Soil materials for filling and backfilling shall be free from muck, tree stumps, bushes, roots, rubbish, frozen materials, gravel larger than 2" in any dimension, vegetable and other deleterious matter.

Satisfactory soil materials are defined as those complying with the American Association of State Highway and Transportation Officials (AASHTO), M145, Soil Classification Groups A-1, A-2-4, A-2-5, A-2-6, A-2-7, and A4.

Unsatisfactory soil materials are those defined in AASHTO M145, Soil Classification Groups A-5, A-6, A-7-5, A-7-6, and A-7; also, peat and other highly organic soils.

## Placing

Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow strip or break up sloped surfaces steeper than one vertical to four horizontal so that fill material will bond with existing surface.

When existing ground surface has a density less than that specified under "Compaction" for the particular area classifications, break up the ground surface, pulverize, moisture-condition to the optimum moisture content, and compact to required depth and percentage of maximum density.

Placement and Compaction: Place backfill and fill materials in layers not more than eight inches in loose depth for material compacted by heavy compaction equipment, and not more than four inches in loose depth for material compacted by hand-operated tampers.

Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

Place acceptable soil material in layers to required subgrade elevations for each area classification listed below.

In excavations, use satisfactory excavated or borrow material.

Under grassed areas, use satisfactory excavated or borrow material for a minimum depth of three inches.

Under walks and pavements, use sub-base material, or satisfactory excavated or borrow material, or a combination of both.

Place backfill and fill materials evenly adjacent to structures, to required elevations. Take care to prevent wedging action to backfill against structures by carrying the material uniformly around structure to approximately the same elevation in each lift.

## Grading

Uniformly grade areas within the limits of site grading under this section, including adjacent transition areas. Smooth finished surfaces within specified tolerances, compact, with uniform levels or slopes between points where elevations are shown, or between such points and existing grades. Any change in elevation of the soil should be gradual so that erosion will be minimized.

The degree of finish required will be that ordinarily obtainable from either blade-grader or scraper operations.

Ditches: Finish ditches to ensure proper flow and drainage. Conduit final rolling operations to produce a hard, uniform and smooth cross-section.

Lawn or Unpaved Areas: Finish areas to receive topsoil within not more than 0.10 feet above or below the required subgrade elevations, compacted as specified, and free from irregular surface changes.

### Grading (Continued)

Walks: Shape the surface of areas under walks to line, grade and cross-section, with the finish surface not more than 0.00 feet above or 0.10 feet below the required subgrade elevation, compacted as specified, and graded to prevent ponding of water after rains.

Pavements: Shape the surface of areas under walks to line, grade and cross-section, with the finish surface not more than 1 inch above or below the required subgrade elevation, compacted as specified, and graded to prevent ponding of water after rains. Include such operations as plowing, discing, and any moisture or aerating required to provide the optimum moisture content for compaction. Fill low areas resulting from removal of unsatisfactory soil materials, obstructions, and other deleterious materials, using satisfactory soil material. Shape to line, grade, and cross-section as shown on the drawings.

### Subgrade

The bottom of the excavation or the top of the fill shall be known as the subgrade and shall conform to the lines, grade and cross-section shown on the Plans.

All soft and yielding material and other portions of the subgrade that will not compact readily when rolled or tamped shall be removed and replaced with suitable material placed and compacted as specified herein.

The finished subgrade shall be maintained in a smooth and compacted condition. No storage piles of fine or coarse aggregate shall be placed directly upon finished subgrade.

Fill shall be constructed in compacted layers of uniform thickness and each layer shall be compacted in accordance with the requirements herein specified.

Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum dry density for soils which exhibit a well-defined moisture density relationship determined in accordance with ASTM D 1557; and not less than the following percentages of relative density, determined in accordance with ASTM D 2049, for soils which will not exhibit a well defined moisture-density relationship.

Unpaved Areas: Compact top six inches of subgrade at 90% maximum dry density.

Walkways: Compact top six inches of subgrade at 95% maximum dry density or 90% relative dry density.

Structures and Slabs: Compact or backfill in layers not to exceed eight inches. Fill under structures and floor slabs shall be compacted to 95% relative dry density.

Pavements and Unpaved Areas Subject to Vehicular Traffic: Compact each required course of fill and the top twelve inches of subgrade where fill is not required at 95% maximum dry density or 90% relative dry density.

Moisture Control: Where the subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to the surface of subgrade, or layer of soil material, to prevent free water appearing on the surface during or subsequent to compaction operations.

Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.

Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing, or pulverizing, until the moisture content is reduced to a satisfactory value.

Base Course: The base course consists of placing base course materials, in layers of specified thickness as shown on the Plans, over subgrade surface to support the pavement surface course.

Grade Control: During construction, maintain the lines and grades including crown and cross-slope of the subbase course.

Placing: Place the base course material on the prepared subgrade in layers of uniform thickness, conforming to the indicated cross-section and thickness. Maintain the optimum moisture content for compacting the subbase material during placement operations.

When a compacted base course is shown to be six inches thick or less, place the material in a single layer. When shown to be more than six inches thick, place the subbase material in equal layers, except no single layer more than six inches or less than three inches in thickness when compacted.

### Field Quality Control

A testing service must inspect and approve subgrades and fill layers before further construction work is performed thereon. Location of all density tests shall be approved by the Engineer. Location must be shown on the plat.

Make at least one field density test of the subgrade for every 10,000 square feet of paved area, but in no case less than three tests.

In each compacted fill layer, make one field density test for every 10,000 square feet of overlaying paved area, but in no case less than three tests.

If in the opinion of the Engineer, based on reports of the testing service and inspection, the subgrade or fills which have been placed are below the specified density, additional compaction and testing will be required until satisfactory results are obtained.

The results of density tests of soil-in-place will be considered satisfactory if the average of any four consecutive density tests which may be selected are in each instance equal to or greater than the specified density, and if not more than one density test out of five has a value more than two percent below the required density.



## Maintenance

Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

Repair and re-establish grades in settled, eroded and ruffed areas to the specified tolerances.

Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify the surface, reshape, and compact to the required density prior to further construction.

Where required by the drawings, slopes shall be seeded with native grasses using an approved Geosynthetic erosion control blanket, ARMTEC ECO-CS-C or equal as directed by the Engineer for erosion control. When the time for completion of construction will not permit growth of perennial grasses, both perennial and winter grass shall be seeded as directed by the Engineer.

In no case will grading work be considered complete for final payment until the required seeding is complete and growth has been established.

Any required seeding, mulching, watering, etc., shall be considered incidental to the grading construction, where required, and in no case will any additional payment be approved or allowed.

## Concrete

### General:

Applicable provisions of "General Conditions" govern work under this Section.

### Work Included:

This section of work includes the furnishing of all labor, materials, equipment, etc., and the performing of all work incidental to forming, reinforcing, concrete mixing, placing and finishing as required for reinforced concrete footings, piers, beams, slabs, etc., including special finish; and all other structural concrete work specified and/or required to complete the contract.

### Materials

General: Where the ASTM Designation is given in the specifications, it shall apply to the current specifications and supplements at the time of receipt of bids.

All reinforced concrete work shall conform to the applicable sections of the "Building Code Requirements for Reinforced Concrete" of the American Concrete Institute unless otherwise noted.

Portland Cement: Portland Cement shall be Type 1 and shall conform to the requirements of ASTM Specification C-150. Only one brand of cement shall be used throughout the work, unless otherwise authorized, in writing, by the Engineer.

Fine Aggregate: Fine Aggregate shall conform to the requirements of ASTM Specification C-33, shall be natural sand, washed and screened, consisting of hard, strong, durable uncoated particles free from loam, alkali, dust or organic matter, and shall be so graded from coarse to fine as to produce the minimum percentage of voids.

Coarse Aggregate: Coarse Aggregate shall conform to the requirements of ASTM Specification C-33, size number 57, shall be gravel, suitably processed, washed, and screened consisting of hard, strong, tough, durable particles, free from any adherent coating.

Water: Water for mixing and curing concrete shall be fresh, clean and free from oil, acids, alkali, vegetable, sewage, organic or other deleterious matter.

Metal Reinforcement: Reinforcing bars shall conform to the requirements of the "Standard Specifications for Billet-Steel Bars for Concrete Reinforcement", ASTM Designation A-615-68, Grade 40.

Welded steel wire fabric reinforcement shall be in accordance with ASTM A-185.

Strength: The minimum ultimate compression strength for concrete at twenty-eight (28) days shall be 3,000 pounds per square inch for all concrete except curbs and sidewalks. Concrete for curbs and sidewalks shall be 2,500 pounds per square inch. The strength of the concrete shall be fixed in terms of a water cement ratio of not more than 6-1/2 gallons of water to each 94 pound sack of cement and this amount of water shall include the amount of moisture carried by the aggregates.

Cement Factor: It is required that not less than 5-1/2 ninety-four (94) pound sacks of cement be used in each cubic yard of 3,000 p.s.i. concrete and five (5) ninety-four (94) pound sacks of cement be used in each cubic yard of 2,500 psi concrete, the ratio between fine and coarse aggregate shall be determined by the testing laboratory.

Slump: The quantity of water mixed into concrete shall be maintained at a minimum and the proportions of aggregate to cement shall be mixed to produce concrete of suitable consistency and workability that will permit placing around the reinforcement in a dense and homogeneous mass. In no case, however, shall the slump exceed 5 inches. Where vibration is used, the slump shall be held to not more than 3 inches.

Slump tests of concrete shall be made at frequent intervals in accordance with ASTM C-143.

Admixtures: Pozzoloth 100-N or 100-R as manufactured by Master Builders, Cleveland, Ohio, or approved equal, in the amount of 3 fluid ounces per 94 pound sack of cement shall be used in all concrete except footings or as directed by the Engineer.

Trial Mixes: Three or more trial mixtures shall be made at the beginning of the work by the testing laboratory and cylinder compression tests of the concrete of each shall be made as directed by the Engineer. The results obtained shall be reported promptly to the Engineer before any concrete work is begun.

Beginning Work: No concrete shall be poured until the laboratory reports indicate that the proposed mix will develop the strength specified. The material used in these mixtures shall be in every respect identical with and from the same source as those that are to be employed in the actual work. The materials and their proportioning as adopted shall be maintained throughout the work, without change, except upon the written consent of the Engineer, and upon the undertaking of further tests, as above required, if so ordered.

Ready Mixed Concrete: Ready mixed concrete shall be mixed and delivered in accordance with the requirements set forth in the "Specifications for Ready Mixed Concrete" (ASTM Designation C-94), except discharge shall be completed within one (1) hour after introduction of mixing water to cement and aggregates.

Transporting: Concrete shall be transported from the mixer to the place of final deposit in carts, buggies, wheelbarrows, or other approved conveyances which shall be maintained in first class condition, and shall be cleaned at frequent intervals while in use. If chutes are used, the slopes shall be properly inclined to prevent the separation of water and materials.

Depositing: The depositing of concrete shall be suspended during inclement weather conditions if so ordered by the Engineer. Before the placing of any concrete, the Contractor shall properly condition all excavated areas, and the forms shall be free of water, slush, and other foreign matter. Concrete in footings shall be placed independently of other superimposed work, unless monolithic construction is indicated on the drawings. Concrete shall be placed in the forms in a manner that will prevent segregation. The free fall of concrete dumped or chuted into place shall not exceed four feet. The spreading of concrete by means of hoes or shovels in mass concrete of footings, etc., shall be permitted for a distance not greater than six feet from the location at which the concrete is deposited. Placing of concrete shall be continuous between construction joints.

Concrete shall be poured in layers of uniform level not exceeding two feet in depth, and the method of sequence of such pours shall be of such order so as to prevent lamination of the various layers. All concrete, irrespective of mass or location, shall be placed in a manner to secure a uniform, thoroughly compacted and homogeneous mass, and shall be hand or machine tamped and puddled, supplemented by spacing in all corners and angles of forms and along all form surfaces of the work and shall be executed in such a manner and time so as to assure intermixing of concrete on successive pours. When placing of concrete is suspended, all necessary grooves for joining to future work must be provided at sections of minimum stress, as directed by the Engineer.

Construction Joints: The Contractor's proposed location of construction and contraction joints shall be submitted sufficiently in advance of pouring operations to secure the Engineer's written approval of same. In all instances, the approved construction joint locations shall be made available to the reinforcing steel fabricator in order that shop drawings for that specific portion of the work may detail, provide placing details, and provide special construction joint reinforcement as hereinafter specified. Shop drawings will not be considered for approval unless the above requirements are conformed with.

The placing of concrete shall be carried on continuously between construction joints. If, for any reason, it becomes necessary to stop the placing of concrete at places other than those agreed upon or shown on the drawings, such places shall meet the approval of the Engineer and the manner of making the joint shall be approved by the Engineer.

Special Reinforcing at Construction Joints: Reinforcing steel through construction joints shall be as shown on the plans.

Special drawings shall carefully detail and provide placing details for all special construction joint reinforcing at the time of submittal of reinforcing shop drawings for portions of the work requiring special joint reinforcing. Special construction joint reinforcing shall be provided in the basic contract price and extra pay will not be allowed for it.

Curing: Reinforced concrete, wherever practical, shall be cured by covering with cotton mats, or such other method as approved by the Engineer and/or Owner that will provide for water curing. The use of curing compounds is expressly prohibited. Surfaces of exposed concrete to which reference is not specifically made shall be kept wetted for a period of not less than seven (7) days after pouring.

Protection for Cold or Heat: All concrete shall be placed and cured in accordance with "Recommended Practice for Cold Weather Concreting" (ACI 306-66), and "Recommended Practice for Hot Weather Concreting" (ACI 605-59).

Forms: All concrete formwork shall be in accordance with "Building Code Requirements for Reinforced Concrete" (ACI 318), and "Recommended Practice for Concrete Formwork" (ACI 347). All forms shall be of a suitable design and construction to permit removal and shall conform to the shape, lines, and dimensions of the various concrete elements of the work. Forms shall be substantially watertight to prevent the leakage of water, cement and finer particles of aggregate. Temporary openings shall be provided where required to facilitate cleaning. Side forms shall be required for all grade beams. The placing of concrete against earth forms is expressly prohibited.

Oiling: All surfaces of wood forms that will be in contact with concrete shall have applied a uniform coating of form oil. Form oil shall be non-staining paraffin-base oil, having specific gravity of between 0.8 and 0.9.

Lining: Forms for all surfaces of concrete permanently exposed to view shall be lined with plywood, masonite, or other suitable material, and true corners and angles will be required.

Substitutions: The Contractor may submit to the Engineer and/or Owner for approval the use of suitable forms constructed of material other than lumber.

Defects: The Contractor will be held responsible for and will be required to correct any or all defects in the work which may be due to improper construction of forms.

Ties: Forms for the construction of walls, grade beams, and other work of similar character shall be secured with metal ties.

Removal of Forms: No form work or shoring shall be removed without the approval of the Engineer and/or Owner. The removal of forms shall be carried out in such a manner as to insure the complete safety of the work and the prevention of defects. Unless limited by consideration of dead loading, forms or shores supporting the underside of the concrete for slabs, beams, etc., shall not be removed until the concrete so supported has acquired 70 percent of its design strength. Shores for support of slabs, beams, etc., subject to loading in addition to that of dead weight, shall not be removed within 24 hours after the concrete of same shall have acquired 90 percent of the design strength, notwithstanding the above limitations which are herein established as minimum for the removal of forms and shores, etc., and the Engineer's sanction or approval with respect to same. It is to be distinctly understood that any failure, damage, or defect arising from removal of forms or shores shall be the responsibility of the Contractor.

Concrete Reinforcement: All structural concrete work unless otherwise noted shall be reinforced and if through oversight the drawings do not indicate the reinforcement which would ordinarily be required in good practice, the matter shall be brought to the attention of the Engineer for decision and any required reinforcement shall be provided and installed without additional cost to the Owner.

Shop Drawings: The Contractor shall prepare and submit for approval, shop drawings, including placing plans and bar bending details covering all reinforcement bars to be furnished and placed in the work. Shop drawings shall designate the name of the project, Contractor, sheet number, and date.

Drawings shall be carefully checked by the Contractor before and after submitting for approval and shall include elevations and sections necessary to properly facilitate the placing of all reinforcement, dowels, etc., in the work. Shop drawings must be CHECKED before submission and the Contractor shall indicate by SIGNED CERTIFICATION on all shop drawings that the said drawings have been checked by him and that they meet the requirements of the plans and specifications. The Engineer's approval of shop drawings shall not relieve the Contractor of his responsibility for the correctness of said drawings or for any costs or delays that might arise as a result of errors in same. The use of reproducible copies of the contract drawings as erection plans or as a part of the shop drawings is strictly prohibited.

Detailing: Unless otherwise indicated, wire fabric used and reinforcement shall be lapped at least 12 inches at all edges.

Reinforcement bars shall be fabricated to shape in shop. Bends shall be made around pin of six bar diameters minimum, except that bars 5/8 inches round and smaller may be bent around pin of four bar diameters minimum. Bars shall be bent cold.

Splicing of reinforcement, where required, shall be made at points of minimum stress, subject to approval of the Engineer and in accordance with the requirements of this specification. Vertical wall reinforcement shall be spliced at location of horizontal construction joints if required to facilitate the Contractor's operations. The method of splicing shall be approved by the Engineers.

Reinforcement for the anchorage of connection work, if not continuous, and the reinforcement for temperature and for purpose not specifically indicated, shall lap 24 inches in diameter at all splices.

Accessories: Reinforcement shall be accurately placed in position and shall be tied with No. 16 gauge black annealed wire at all joints and crosses. Tack welding of the reinforcement is permitted at the Contractor's option, only if all rebar is increased one bar size above that shown in the foundation detail drawings. If this option is selected, the Contractor shall notify the Engineer in writing and submit markup prints for approval at least seven (7) days prior to installation of any concrete. Reinforcement shall be firmly secured against displacement and shall not exceed the recommendations of the ACI Building Code. Small precast concrete blocks or chairs with sand plates shall be used to the support of the bottom layer of reinforcing steel in footings and slabs. The Contractor shall furnish and install approved type metal bar spacers and supports for the securing of reinforcement.

Reinforcing steel for members in which the concrete is deposited against the ground shall have not less than three (3") inches of concrete between it and the ground contact surface. If concrete surfaces, after removal of the form, are to be exposed to the weather or be in contact with the ground, the reinforcing steel shall be protected with not less than two (2") inches of concrete for bars larger than #5 and 1-1/2 inches for #5 bars or smaller.

The concrete protective covering for any reinforcing steel at surfaces not exposed directly to the ground or weather shall be not less than three-quarter (3/4") inches for slabs and walls, and not less than 1-1/2 inches for beams and girders.

Cleaning: Metal reinforcement, at the time the concrete is placed, shall be free from rust, scale, or other coatings that will destroy or reduce the bond.

Concrete Piles: Where concrete piles are used, the following specifications shall apply:

1. Piles shall be 12" square pre-stressed concrete.
2. The concrete used in the pile manufacturing shall be Class "P" and have a compressive cylinder strength of 5,000 PSI at 28 days, and a minimum compression cylinder strength of 3,500 PSI prior to the release of pre-stress force.
3. Spiral shall be W4 (.225 Dia.) and conform to ASTM A-82.
4. The pre-stressing strand shall be ½", 270 k, low-relaxation and shall conform to ASTM-416.
5. Pile corners shall have a 3/4" chamfer.

Testing Services: An established independent testing laboratory approved by the Engineer shall be employed and paid by the Contractor. The testing laboratory shall provide the following services:

1. Design of the concrete mix.
2. Prepare concrete test cylinders at the direction of the Engineer.
3. Compression tests of concrete cylinders for design mixtures and compression tests of specimen cylinders taken from concrete used in construction as the work progresses.

During the progress of the work, tests shall be made in accordance with the procedure set forth in ASTM Serial Designation C-31 and C-39, as and when considered necessary by the Engineer. Four specimens shall be taken on each 50 cubic yards of concrete poured, or fraction thereof (i.e., a minimum of four cylinders from each day's pouring) and compression tests shall be made on each two at the age of seven and twenty-eight days.

Reports of all inspections and tests with complete statements of the results obtained shall be promptly furnished to the Engineer and the Contractor.

It is to be understood and agreed that the services of this laboratory inspections shall, in no event, relieve the Contractor of his responsibility and obligations under the terms of the specifications.

Should any concrete fail to meet the strength requirements of this specification, all construction in which defective concrete has been incorporated and/or is affected by said defective concrete shall be removed at the Contractor's expense.

The Engineer shall be the final authority determining whether or not the concrete meets the requirements of this specification.

Finishing: Concrete shall not be placed in excess amount which can be completely finished during the daylight hours; Engineer's approval must be obtained for any night finishing necessary. All exposed surfaces of concrete work, both interior and exterior, shall be properly patched and all fins, burrs, unusually heavy form marks, nail heads, etc., removed by rubbing with stones. Exterior exposed concrete shall be rubbed to smooth finish, uniform in color.

All concrete surfaces to six (6") inches below final grade shall be cleaned from drip marks and discolorations, washed down and broomed so that the entire structure is left with a neat, clean and uniform finish and color.

Patching: Immediately after stripping forms, surfaces of all concrete shall be examined and any honeycombing, defective joints, voids, tieholes, etc., shall be patched before the concrete is thoroughly dry. However, no attempt shall be made to correct or fill any honeycomb spots or any other defects until they have been examined by the Engineer and his approval obtained as to the method of correction to be employed.

Floor Slabs on Earth: Concrete floor slabs on earth shall be placed over a well tamped subgrade and damp proofing as specified. Place concrete of required thickness and strike off at proper levels to receive finish specified. Use pipe skids on concrete pads and avoid penetrations of the underslab waterproofing membrane.

Built-in Metal Work, Castings, and Inserts: In addition to the steel reinforcement, the Contractor shall place or attach to the concrete however shown or directed, anchor bolts, thimbles, pipe sleeves, frames, electric conduits, metal strips, and other metal objects shown on the drawings, specified, or ordered. These objects shall be accurately set and properly secured to prevent them from being displaced, broken or deformed.

The final settings of all anchor bolts after concrete has set shall meet the following tolerances:

- Bolt projection plus 1/4", minus 0
- Bolt location (without sleeves): plus or minus 1/8"
- Bolt location (with sleeves): plus or minus 3/16"
- All bolts shall be plumb.

Moisture Barrier Under Floor Slabs on Grade: Place over well compacted porous subgrade of four (4") inches clean, washed gravel, unless otherwise shown. Under all interior slabs on grade, lay .006" (6 mil) thickness of polyethylene film. All joints shall be in direction in which concrete is to be placed and shall be lapped a minimum of twelve (12") inches.

Electrical Conduit Under Slabs: Wherever electrical conduit is shown under floor that occurs on grade or fill, any conduit larger than 1" shall be installed under the concrete floor slab, encased in red concrete. All conduit occurring below grade outside building lines shall be encased with a minimum of 3" red concrete cover on all sides.

Finishing Floors: All interior floor slabs scheduled as natural cement or to have resilient floor covering shall receive a monolithic natural cement or steel trowel finish. Slabs shall be floated and trowelled to a smooth, even finish.

THE FOLLOWING LIMITS SHALL APPLY:

Floor Levelness: Maximum deviation from the elevation established for the floor shall not exceed plus or minus one (1") inch (2.45 CM) over the entire floor area and the maximum difference in elevation between the high and low points in any building bay shall not exceed three-quarter (3/4") inch.

Floor Flatness: Maximum deviation from a true straight edge eight (8') feet (2.438 M) in length placed anywhere on the floor shall not exceed one-quarter (1/8') inch.

Under no circumstances shall dry cement, sand or other material be sprinkled on the surface of wet concrete for the purpose of absorbing water.

Slabs which are to receive membrane waterproofing shall be floated to provide smooth, even surface for reception of waterproofing materials.

Exterior walks shall be trowelled smooth, then lightly brushed. Edge tool all edges and joints.

Driveway and parking area slabs shall have belt finish.

Cleaning: At the completion of the work, all exposed concrete shall be cleaned, all mortar splatter and stains removed, and the whole left in a condition acceptable to the Engineer.

Sealing: After completion of all equipment installation, the interior floor slab of the control building shall be thoroughly cleaned by wet mop and sealed with two (2) coats of transparent concrete sealer (Devoe-Granitex or approved equal) by this Contractor. Sealer coat thickness and method of application shall be in accordance with manufacturer's instruction.

### Lugs and Connectors

All electrical connections and taps on all wiring, except for lighting branch wiring, shall be made with Delta Star, Burndy or Thomas and Betts solderless lugs or other solderless connectors, as required.

All connector terminations shall be marked with approved numbering tabs.

### Grounding

This Contractor shall furnish all labor and materials for complete installation of grounding mats, fence grounding, equipment grounding, and transmission pole grounding, as described herein. All grounding shall be installed according to the grounding plans.

All underground connections shall be welded connections using the Thermoweld or Cadweld process. All connections shall be made using the proper mold and cartridge for the size wire or other material being used. Material lists are included on the drawings for the Contractor's reference but these lists do not preclude the responsibility of the Contractor to verify size and quantity of materials to do a thorough job. All ground rods shall be Copperweld with required average and absolute minimum copper coating thickness of 15 mils (0.015 in.) and 13 mils (0.013 in.), respectively. Field testing for specified coating thickness may be conducted by the Engineer. Failure to meet specifications shall be grounds for rejection of entire lot.

All welds to galvanized surfaces above grade shall be coated with a minimum of four mils of Wyandotte Chemicals Subox Galvanox Type 1. All welds shall be thoroughly wire brushed before application of either coating.

Lightning arresters shall be interconnected with each other and with the station ground grid using proper grounding leads and connectors.

The grounding plate on gang operated switches shall be bonded to the station grounding grid and to the operating handle as indicated on the plans.

All transmission and distribution structures shall be grounded. The method of grounding the individual poles is by "butt-wrapping" unless stated otherwise.

### Conduit and Conduit Fittings

All conduit used on this project shall be rigid galvanized steel above ground and Schedule 40 PVC below ground of the size indicated on the drawings. Exceptions will be indicated in the Technical Section of this specification.



All conduit shall be sawed square with longitudinal axis and reamed out until free of any burrs or sharp edges.

All field-made threads shall be full and continuous. The length of field cut threads on each size conduit shall not be less than the length of factory-made threads on the same size conduit. All conduit joints, in couplings, shall be butted; and fittings shall be made up with a minimum of five threads. The use of running threads will not be permitted.

Rigid conduit shall be terminated at sheet metal enclosure or outlet boxes with two steel locknuts and one malleable iron bushing, except a shallow type insulating bushing shall be used when conduit is one inch or larger.

All bends in conduit 1-1/4 inch and smaller may be made with a handy bender "Hickey." Bends in large size conduit shall be made with a machine bender. All conduit, after bending fabrication, shall be true round with full inside area the entire length of the bend. Where sufficient conduit bends are not provided, Contractor shall fabricate field bends at no extra cost.

All conduit ends shall be plugged after installation until wire is pulled. All conduit shall be thoroughly swabbed out to remove moisture and debris before wires are pulled. All conduit runs shall be installed complete before wires are pulled.

All conduit runs shall be encased in red tinted concrete, with a minimum of three (3") inches cover on all sides.

All conduit, installed where support is required, shall be supported with one hold strap on not more than 8 foot centers unless otherwise specified. Additional supports shall be installed at all critical points in the run such as at bends and where conduit enters fittings or equipment, to make the conduit run rigid.

### Wire

All wire used for 250 volt and below service and branch power wiring shall be insulated for 600 volts. All wire shall consist of 90% conductivity copper with insulation as hereinbefore specified, and in strict accordance with requirements of the Board of Underwriters and the A.I.E.E.

All wire, No. 1 or smaller, for installation in rigid conduit, shall have a PVC outer jacket with type THHW insulation, except when installed in areas with ambient temperature above 120°F, it shall have AV insulation.

Wire No. 8 B & S gauge or larger shall be stranded. Wiring shall be color coded with a white wire for the neutral.

All AC power circuit wiring shall be 3-conductor cable with the black insulated wire to be used for hot and with the white insulated wire to be used as the neutral leg. For 240V circuits, the remaining red wire shall be used for the other hot leg. In-house wiring may be single conductor with color-coding same as above. The Contractor shall terminate power circuit wire as shown on the wire schedules.

Control cables shall be 600V control cable in accordance with IPCEA Standards Publication No. S-61-402, Section 7.4. All control cables shall have an overall outer jacket of black PVC. The color-coding of all control cables shall be in accordance with Method 1 of Section 5.6.3.1.1, Table 1-1 of Part 5 of IPCEA Standards Publication No. S-61-402, Appendix I. Control cables containing conductors with mono-toned insulation shall not be acceptable for use in this station.

The Contractor shall submit the color-coding of the control cable he proposes to use to the Engineer for approval prior to installation.

Shielded control cables shall be shielded using 2.35 mil aluminum/polyester laminate tape applied helically over the core. The shielding tape shall be applied with 25% overlap, ensuring 100% minimum coverage. The aluminum side of the tape shall be in continuous contact with a tinned, stranded, 16 AWG copper drain wire.

All wires and cables shall be pulled into the equipment in which it will be terminated in such a manner so sufficient length of conductor will be left in the equipment so any conductor can be connected to any terminal in the equipment.

No splices shall be allowed without the express permission of the Engineer. No splices shall be allowed in a cable feeder run.

## Steel Structures & Equipment

### General

The Contractor shall erect all steel structures required for the complete substation, as shown on the drawings or specified herein.

No structure shall be erected until after results of seven day concrete test reports are received by the Engineer and the Engineer approves start of steel erection. All seven day concrete test reports must show minimum of 2500 psi prior to commencement of steel erection.

The structural steel shall be erected as herein specified and in accordance with the shop, assembly, and outline drawings as supplied by the manufacturer and the Engineer.

Shop errors shall be reported to the Engineer and the Engineer shall direct and supervise the correction of such errors, if the material is not completely rejected. The Engineer's decision on whether to correct or reject the material shall be final.

The base plates are to be set level, in exact position, and shall be given full and even bearing.

All galvanized steel shall be handled with care to avoid binding or damage to the galvanizing. Pieces bent in handling may be used only if they are straightened to the satisfaction of the Engineer.

Minor field drilling of steel as may be required shall be done by Contractor as part of this construction. No alterations to steel will be made without approval of Engineer.

Material on which the galvanizing has been damaged, if determined to be minor by the Engineer, may be repaired by applying a coat of zinc-dust zinc-oxidized paint. Where such repair is authorized, the damaged area shall be cleaned by using clean rags saturated with mineral spirits or xylene, followed by a hand wire brushing. After wire brushing, the area shall be recleaned with solvent to remove residue and shall be given one heavy brush coat of zinc-dust by the Contractor as directed by the Engineer, at no cost to the Owner.

After erection, the completed structures shall be plumb and level to a tolerance of one part in 600. The Engineer will check for loose bolts, open holes, or other errors in erection. All errors in erection shall be corrected by the Contractor at no additional cost to the Owner. Failure of the Engineer to detect inconsistencies, errors, etc. will not relieve the Contractor of his responsibility of correctly erecting the steel.

- A. All equipment shall be installed in strict compliance with manufacturer's instructions. Manufacturer's instructions will be furnished to the Contractor as required.

Care shall be exercised in the installation of all items to prevent damage to any part. All items shall be handled with tools and equipment designed for the application.

- B. Disconnect Switches and Fused Disconnect Switches. All switches shall be carefully aligned prior to installing on the steel structure. Alignment shall be made to provide complete blade and contact makeup and locking without binding.

- C. Gang - Operated Switches - Manual and Motor Operated. Each gang-operated airbreak switch shall be installed with a manual or motor operated gang-operated mechanism arranged for mounting as shown on the drawings. Operating mechanisms shall be installed complete with all necessary linkage, cranks, bearings and levers. Structural members and guide plates necessary to support the switches and operating mechanism on the steel structures shall be installed as required. The final installation of switches and operating mechanisms shall provide smooth, completely controlled, simultaneous movement of the switch blades throughout the entire cycle of operation.

The final installation of control mechanism shall provide continual loading throughout the entire operating cycle to prevent the switch from alternately leading or lagging the control. Individual adjustments of the operating mechanism of each pole shall be made to take care of misalignment of the switch bases and operating shafts, and to make it mechanically impossible, after final adjustment has been made, for any blade to remain in an open position when the switch handle has been operated at any speed to the closed position, or to remain in the closed position when the switch handle has been operated at any speed to the open position. All three blades shall be adjusted to operate simultaneously and the alignment shall be such that the blades will close without undue stress on the mechanism.

Connecting shafts or pipe between phases shall be to provide the correct transmission of torque to pull without appreciable distortion or lost motion and to assure that the three phases shall operate simultaneously. Final setting of self-tapping screws shall not be made prior to making final adjustment.

## Bus Specifications

### General

Utmost care shall be exercised in installing clamps and connectors. The contact surface of the clamp or connector, and the bonding surface or wire shall be clean and bright. A steel brush is recommended as the principal cleaning instrument. Bolts shall be tightened firmly, but threads must not be over-stressed. No not exceed standard foot – pounds rating of each type and size of bolt.

Insulators, lightning arresters, and other equipment and all bushings shall be carefully inspected for damage prior to installation, and care shall be exercised in handling and installing all such units. The Contractor shall remove, replace, and reinstall any such unit found damaged in any way.

The Contractor shall use the proper tools for installation of all compression type fittings.

Stranded conductors shall be processed before installation to assure a smooth, neat appearance. Particular care shall be taken at all times to insure that the conductors are not kinked, twisted, or abraded. If the cables are damaged, the Contractor shall replace or repair the damaged section in a manner satisfactory to the Engineer and at no additional cost to the Owner.

Splices in overhead strain busses will not be made. Tension or internal strain busses shall not exceed tensions specified and may be less than this if consistent with maintenance of proper clearances and the appearance of the completed work.

All insulators shall be thoroughly cleaned at the conclusion of the job.

All busses shall be installed in a neat and symmetrical order.

Joint Compound - All bus connections shall be thoroughly coated with the specified joint compound prior to installing the fitting and conductor. Joint compound shall be used on all aluminum and aluminum-copper joints. The joint areas shall be cleaned, after which the areas shall be coated with compound. The areas shall then be thoroughly brushed with a brass wire brush. Additional compound shall then be reapplied if necessary prior to assembly of the connection.

All tubular busses shall be provided with an internal dampener consisting of specified conductor. This material must be clean and may be straight pieces of scrap material but must be of a continuous length for the bus run. The conductor length shall be the same as the bus run.

All tubular busses shall be provided with a 3/16" hole in the underside of each span to provide for water drainage. These holes shall be deburred after drilling.

#### Welding Method

The welding of aluminum fittings and buses shall be by the Metallic-Arc Inert-Gas Shielded Welding method.

#### Welder's Qualifications

The welder shall have had extensive experience with welding aluminum alloys by the method described above. The Contractor shall provide a sample of the welder's work on actual tubular aluminum buses upon the request of the Engineer to qualify the welder as acceptable for work on the project if, in the judgment of the Engineer or his representative, the work is found to be of inferior quality.

#### Procedure

The Contractor shall remove all oil, grease, water, oxide, and any other foreign matter from the surfaces of metals to be welded. Prior to welding, the Contractor shall wire brush all surfaces to be welded with a stainless steel brush. Should more than one weld-pass be required, the Contractor shall wire brush the original weld prior to making each additional pass. Preheating of surfaces shall not be required. Bus sizes larger than 3" IPS may be preheated to 400°F. The following tables shall be used as a guide for welding aluminum tube and flat bar. After welding, the Contractor shall grind, sandpaper, and polish all aluminum buses to remove any oil, grease, water, oxide, dirt, and any other foreign matter from the tubing after completion of bus installation.

METALLIC-ARC INERT-GAS CONSUMABLE ELECTRODE

ISP SIZE	WALL THICKNESS	4043 FILLER ROD SIZE	WIRE SPEED INCHES PER MIN.	NO. PASSES	AMPERES	APPROX. ARGON FLOW CFH
1/2	.108	1/16	170	1	125-150	20
3/4	.113	1/16	180	1	125-150	20
1	.133	1/16	180	1	125-150	30
1-1/4	.140	1/16	180	1	160-170	30
1-1/2	.144	1/16	180	1	160-170	30
2	.154	1/16	180	1	170-190	30
2-1/2	.203	1/16	180	1	170-190	40
3	.216	1/16	180	1	170-190	40
3-1/2	.226	1/16	200	1	170-190	40
4	.237	1/16	200	1	180-200	50
4-1/2	.247	1/16	200	1	180-200	50
5	.258	1/16	200	1 or 2	180-200	50
6	.280	1/16	200	1 or 2	180-200	50

FLAT BAR

FLAT BAR THICKNESS	4043 FILLER ROD SIZE	WIRE SPEED INCHES PER MIN.	NO. PASSES	AMPERES	APPROX. ARGON FLOW CFH
1/8	1/16	180	1	125-150	30
1/4	1/16	180	1	180-200	50
3/8	1/16	200	1 or 2	300	50
1/2	1/16	200	2	340	60
3/4	1/16	200	2	375	60

## Site Surfacing

Description and Scope: This section covers the construction of roads including all preparatory and finishing work. All work and material necessary for the completion of the job but not specifically described shall conform to the Standard Specifications for Roads of the Louisiana State Department of Transportation and Development (D.O.T.D.).

Ditches shall be pulled, foreslopes and shoulders shaped, and the various sections of the roadway, after shaping, shall be not less than the minimum requirements as shown on the Plans, unless otherwise directed by the Engineer. All surplus material pulled onto the roadbed shall be used where required in the grading of ramps and turnouts, for widening shoulders or otherwise be disposed of, all as directed by the Engineer. Materials placed in ramps and turnouts shall be compacted to the satisfaction of the Engineer.

Reasonable variations in slopes shall be permitted, but the completed section must present a neat and uniform appearance. All existing drainable structures which are to remain in place and all areas adjacent to the intake and discharge of such structures shall be cleaned and left in a condition to operate efficiently.

Existing side drains to private drives and alleys shall be removed to permit pulling the ditches and shaping the roadway and shall be immediately replaced following the completion of these operations. No payment will be allowed for this work, but the cost therefore shall be included in the prices bid on the various pay items. All work shall conform to the elevations shown on the plans. The final exterior grade shall be dressed to easy contours and crowned to drain.

Crushed Limestone Aggregate Road and Site Surfacing: This work consist of constructing a crushed limestone surface course for roadway, shoulders, area site surfacing or driveway entrances in accordance with these specifications, and in reasonably close conformity with the lines, grades, thickness and typical sections shown on the plans or established by the Engineer.

Equipment: Equipment necessary to produce a finished product which meets specification requirements shall be furnished and maintained by the Contractor.

Subgrade: The subgrade shall be prepared as provided in the specifications and shall be approved before any surfacing material is placed. On existing shoulders, all vegetation shall be removed and the shoulders shall be shaped and compacted to the satisfaction of the Engineer prior to placing aggregate surfacing. Material removed from shoulders shall be uniformly spread on adjacent slopes. Preparation of existing shoulders will be considered as incidental to the aggregate surfacing, and no separate payment will be made therefore.

Placing Material: The material shall be deposited directly on the fabric covered subgrade from vehicles used for hauling or from spreading equipment. No surface course shall be placed on a muddy or rutted subgrade.

Aggregate surfacing materials shall not be placed or spread on Portland cement, concrete, or asphaltic concrete pavements.

When the total loose depth of the limestone layer to be placed and compacted is 8 inches or more, it shall be spread and compacted in two (2) or more courses of equal depth, the maximum depth of each course being eight (8) inches.

Placing Material: (Continued)

Limestone deposited on the subgrade shall be spread and shaped the same day. In the event inclement weather or other unforeseen circumstances render impractical the spreading of the material during the first 24 hour period, the material shall be scarified and spread as directed by the Engineer.

Forms: When forms are required by the Plans or Special Provisions, they shall conform to the following requirements: Metal or wood forms may be used. Wood forms shall be at least two (2") inch lumber, square edged and sound, and of sufficient width to extend from top to bottom of loose spread base material. Forms shall be set true to line and grade and substantially staked in place to insure stability during spreading and rolling operations.

The earth shoulders shall be constructed to full width and height as the forms are removed.

Mixing: Aggregate surfacing consisting of a combination of materials shall be uniformly mixed prior to placing on the subgrade.

Shaping and Compacting: The material shall be shaped by suitable means while being compacted. Any ruts formed shall be filled by blading as often as necessary to prevent breaking through the surfacing material into the subgrade. Holes, waves and deficiencies in thickness which may develop and are not filled by blading shall be filled by adding more material. Shaping and compacting shall continue until the surface reasonably conforms to the cross-sections shown on the Plans and until it is free from ruts and waves.

The aggregate surfacing shall be compacted by a minimum of twelve (12) passes of a 5,000 pound sheepsfoot roller with a single three (3') to four (4') foot diameter drum, or other approved method of compaction. Upon completion of the required number of passes with compaction equipment, the surface will be wetted as necessary and rolled with a pneumatic-tire roller or steel wheel roller to insure a tight uniform surface.

On shoulders less than five (5') feet wide and ramps, the aggregate surfacing shall be wetted as necessary, shaped to the required section and uniformly compacted with suitable compaction equipment until a tight, uniform surface is obtained.

Shaping and compacting shall continue until the surface reasonably conforms to the cross-sections shown on the Plans and until it is free from ruts and waves.

Side forms, when used, shall be removed prior to final shaping and compacting of each course, and the trench shall be backfilled and compacted immediately.

Dimensional Tolerances: When net section measurement is specified, the thickness and width of completed aggregate surface course will be checked for determining acceptance in accordance with DOTD Designation: TR602. Areas with thickness and width deficiencies in excess of the following tolerances shall be corrected to plan dimensions by furnishing, placing, shaping and compacting additional materials as required at the Contractor's expense.

- (a) Thickness: Underthickness shall not exceed 3/4 inch. Overthickness will be waived at no additional cost to the Owner.
- (b) Width: Underwidth on roadways shall not exceed 6 inches. Underwidth on shoulders shall not exceed 3 inches. Overwidth will be waived at no additional cost to the Owner.

Materials: Unless otherwise approved in writing by the Engineer, the same fill material shall be used throughout the project.

The aggregate surface shall be 100% crushed limestone, a combination of 50% Grade 610 and 50% Grade 57 for all driveway areas and Grade 57 elsewhere as shown on Drawing No. CNR-1A. The crushed stone shall show not more than 45% loss when tested in accordance with AASHTO Designation: T96, and shall show not more than 15% loss when tested in accordance with AASHTO Designation: T104, and shall meet the following gradation requirements:

<u>U. S. Sieve</u>	<u>Grade No. 610 Percent Passing (By Weight)</u>	<u>Grade No. 57 Percent Passing (By Weight)</u>
1-1/2"	100	100
1"	95 to 100	95 to 100
1/2"	62 to 90	25 to 65
No. 4	40 to 65	0 to 10
No. 40	12 to 26	
No. 200	4 to 12	
No. 8		0 to 5

Geofabric:

Phillips Supac W woven fabric, No. 5WS, or approved equal, shall be placed under roadways or site area where specified in the drawings. Should lap joints be required, minimum overlap shall be 1'-6" on sides of runs and 3'-0" on end laps. Fabric shall completely cover the subgrade for roadways where specified. Fabric shall be installed in accordance with Manufacturer's instructions.

Site Sterilization:

The entire roadway right-of-way and site area shall be treated with an approved weed killer. A weed killer such as Spike-Treflan, or equivalent, should be used at a rate of 30 pounds per acre, unless noted otherwise.



## **SECTION 9**

## Section 9. Owner-Furnished Equipment

The following is a list of Owner-Furnished material to be delivered to the jobsite and/or obtained from the Owner's warehouse: Reference ONLY.

1 – 230-138kV, 300MVA Power Transformer

1 – 230kV Gas Circuit Breaker

3 – 230kV Potential Transformers

Lot – Dis-Tran Material

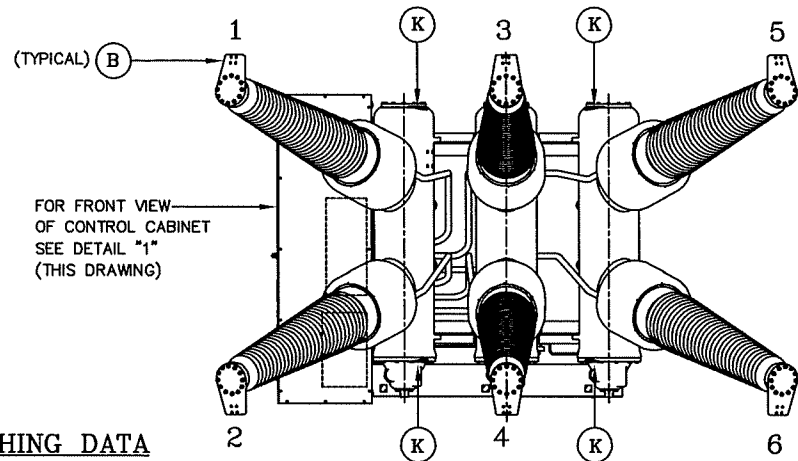


A

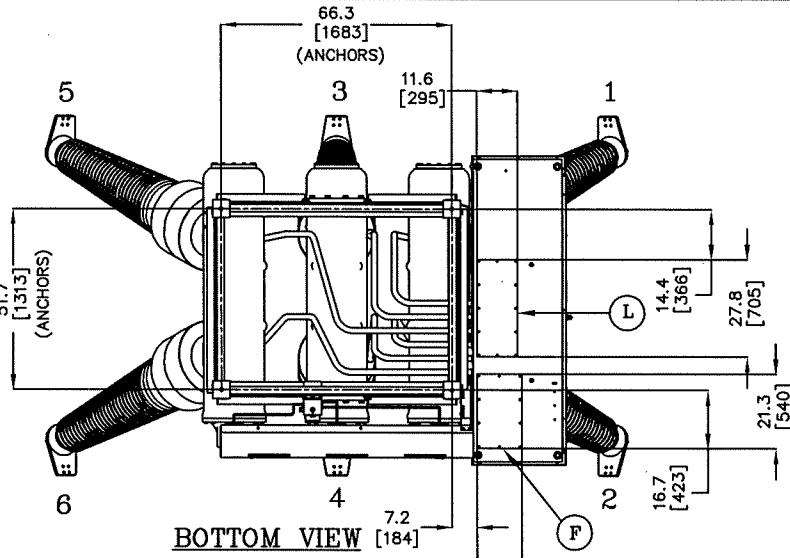
B

C

D



TOP VIEW



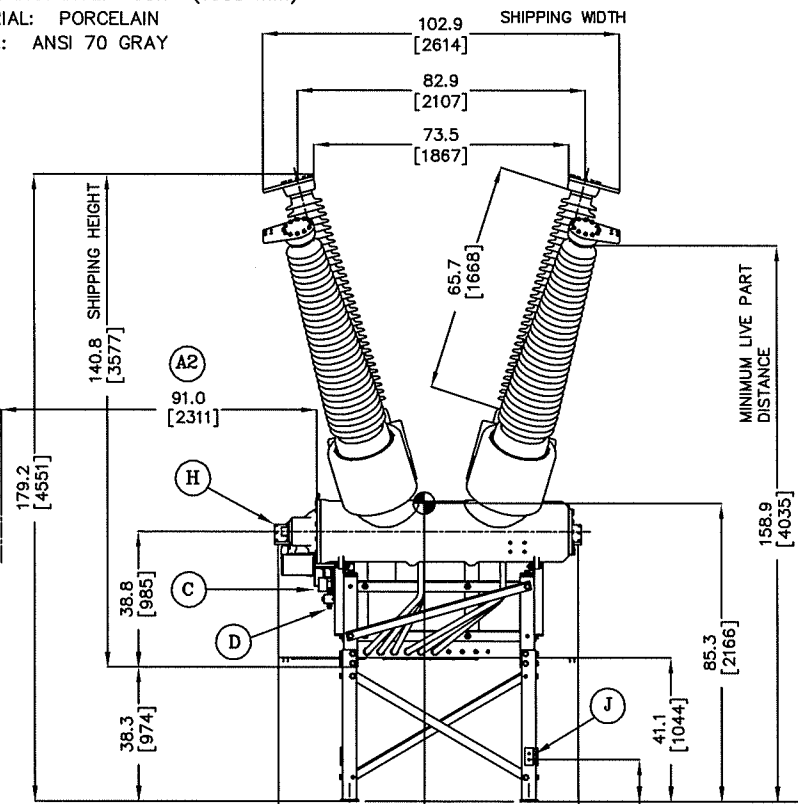
BOTTOM VIEW

LEGEND

- A1 - MINIMUM DISTANCE FOR BUSHING REMOVAL: 25.0" (635 mm)
- A2 - MINIMUM DISTANCE FOR INTERRUPTER REMOVAL: 91.0" (2311 mm)
- B - NEMA 4 HOLE TERMINAL PAD
- C - SF6 DENSITY MONITOR
- D - SF6 FILL VALVE
- E1 - CHARGED/DISCHARGE INDICATORS
- E2 - OPEN/CLOSE INDICATORS & COUNTER
- F - CABLE ENTRANCE
- G - RATINGS NAME PLATE
- H - PRESSURE RELIEF DEVICE
- J - NEMA 2 GROUND PAD (DIAMETRICALLY OPPOSED)
- K - LIFTING LOCATIONS
- L - MECHANISM ACCESS
- M - BCT NAMEPLATE (MOUNTED INTERNALLY)
- N - EXTERNAL GFI RECEPTACLE
- P - EMERGENCY TRIP PUSHBUTTON

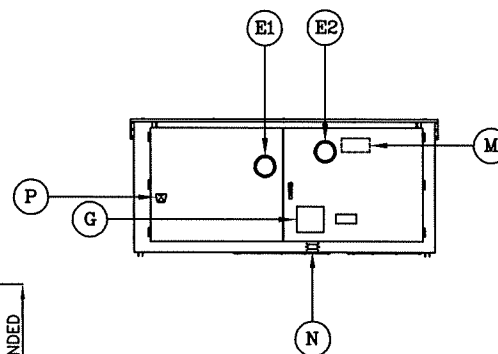
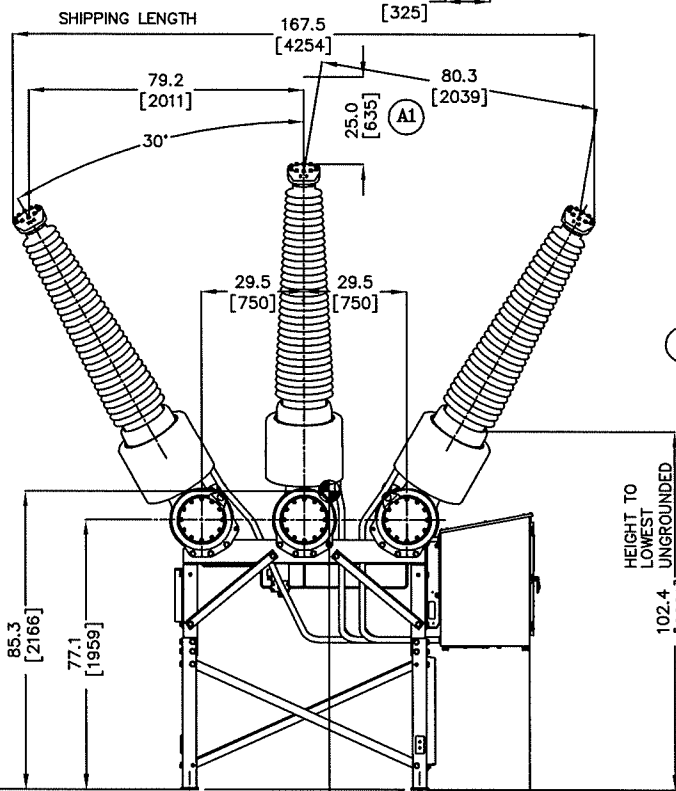
BUSHING DATA

CREEPAGE: 167.6" (4257 mm)  
 STRIKE DISTANCE: 65.7" (1668 mm)  
 MATERIAL: PORCELAIN  
 COLOR: ANSI 70 GRAY



CONTROL CABINET

RATING: NEMA 3R  
 MATERIAL: STEEL  
 COLOR: ANSI 70 GRAY (EXTERIOR)  
 WHITE (INTERIOR)



DETAIL "1"  
(CONTROL CABINET)

TYPE:	DT1-245P F1
IMPULSE WITHSTAND:	900 kV
MAXIMUM VOLTAGE:	245 kV
INTERRUPTER CURRENT RATING:	40 kA
CURRENT RATING:	2000 A

DIMENSIONS: INCHES / mm

6,680 lbs. (3,031 kg) -- WEIGHT OF BREAKER  
 121 lbs. ( 55 kg) -- WEIGHT OF SF6 GAS  
 820 lbs. ( 372 kg) -- WEIGHT OF CT's  
 7,621 lbs. (3,458 kg) -- TOTAL WEIGHT OF BREAKER

NOTES:

- 1) FOUR (4)  $\phi 3/4$ " [19 mm] ANCHOR BOLTS (ASTM A 36 OR GREATER)
- 2) 3.0" [76 mm] MINIMUM PROJECTION ABOVE FOUNDATION.
- 3) ANCHORING TO BE SUPPLIED BY CUSTOMER.
- 4) FOUNDATION TO BE LEVEL WITHIN 0.25" [6 mm] AT FOUR (4) BASEPLATES.
- 5) SHIM AND GROUT AS REQUIRED.
- 6) RATED SEISMIC LEVEL 0.2g OF RRS PER IEEE 693
- 7) OPERATIONAL FORCES IN ANY DIRECTION = 1112N (250 lbf)
- 8) HV TERMINAL STATIC HORIZONTAL FORCE (LONGITUDINAL) = 1250N (281 lbf)
- 9) HV TERMINAL STATIC HORIZONTAL FORCE (TRANSVERSE) = 1000N (225 lbf)
- 10) HV TERMINAL STATIC VERTICAL FORCE = 1250N (281 lbf)

CUSTOMER: CITY OF ALEXANDRIA  
 CUSTOMER ORDER No.: P1113601  
 SUBSTATION: TWIN BRIDGES STATION  
 SERIAL No.: 2577250010001

MATERIAL ID:  
CCDT1-245P-F1-001

REV.	DESCRIPTION	DRAWN	CHECKED	DATE

CUSTOMER EQ. NO.:

ORDER No.  
257725

OUTLINE DRAWING

W. HOLT    S. DOBROTKA    09/13/2018  
 DRAWN    CHECKED    DATE



Grid Solutions  
 One Power Lane  
 Charleroi, PA 15022

DRAWING No.: M257725010

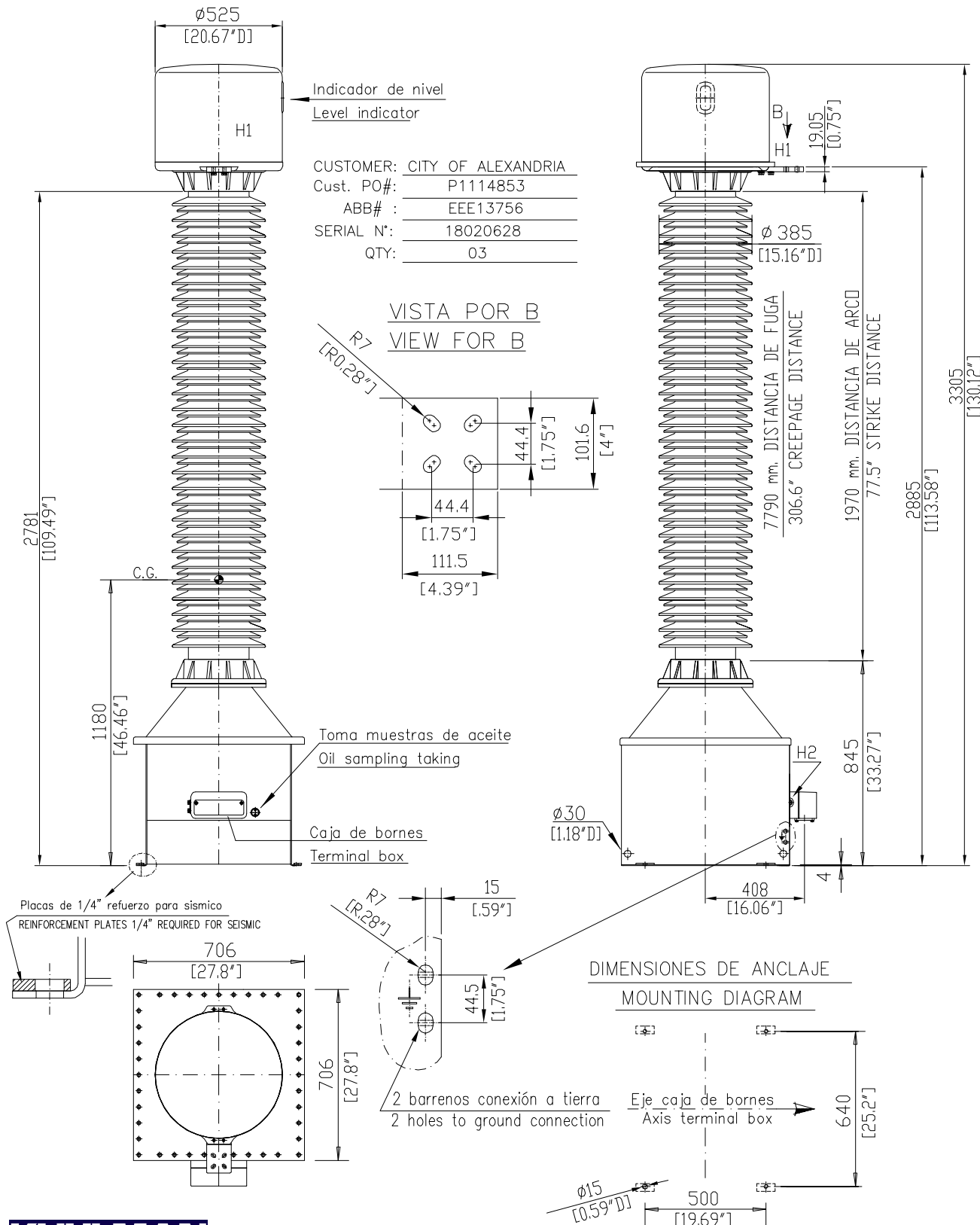
SHT 1 OF 1

A

B

C

D



**KUHLMAN  
ELECTRIC**



**arteche**

Dimensiones aproximadas en m.m.  
Approximate dimensions in m.m.

PESO	ACEITE-OIL	192 Kgs.	423 Lbs.
WEIGHT	TOTAL	800 Kgs.	1762 Lbs.

TRANSFO DE TENSION  
POTENTIAL TRANSFORMER

**UTG-245**  
**SEISMIC PLATE WASHERS**

Fecha 11.04.18 Comprobado  
Date Approved by

Dibujo N°  
Drawing

**4286732 A**

The logo consists of a light blue circle with a white vertical line through its center. Inside the circle is a square with a light red background and a white border. The letters 'D' and 'T' are written in white inside the square.

# Bill of Material



**230/138kV Twin Bridges Substation**  
**Alexandria Municipal Power & Light Dept**  
  
 Alexandria, LA

**Origination Date:**  
**Material List No:** ML-5449  
**Revision Number:** 1  
**Revision Date:** 8/13/2018  
**Sheet Number:** 1 of 3

ITEM	QTY.	DESCRIPTION	MFG.	TYPE OR CAT. NO.
		<b>230-138kV Twin Bridges Substation</b>		
		<b>STRUCTURES</b>		
A-1a.1	1	230KV "H" FRAME DEADEND STRUCTURE, SINGLE BAY, 42'-0" CONDUCTOR PULL-OFF HEIGHT - INBOARD COLUMNS - INCLUDES 12'-0" STATIC PEAK - PROVISIONS FOR STATION POST INSULATORS - TAPERED TUBULAR STEEL	KLUTE, INC.	APPX WT = 8,920 LBS EA
A-1a.2	3	230KV MONOPOLE STRUCTURE, 42'-0" CONDUCTOR PULL-OFF HEIGHT - INCLUDES 12'-0" STATIC PEAK - PROVISIONS FOR STATION POST INSULATORS - TAPERED TUBULAR STEEL	KLUTE, INC.	APPX WT = 3,141 LBS EA
A-1a.3	1	230KV SWITCH STAND, 3-PHASE, 18'-0" BUS HEIGHT - STANDARD SHAPE STEEL	KLUTE, INC.	APPX WT = 3,039 LBS EA
A-1a.4	1	230KV BUS SUPPORT STAND, 3 PHASE, 26'-0" BUS HEIGHT - STANDARD SHAPE STEEL	KLUTE, INC.	APPX WT = 1,255 LBS EA
A-1a.5	4	230KV BUS SUPPORT STAND, SINGLE PHASE, 18'-0" BUS HEIGHT - STANDARD SHAPE STEEL	KLUTE, INC.	APPX WT = 381 LBS EA
A-1a.6	3	230KV POTENTIAL TRANSFORMER STAND, SINGLE PHASE - STANDARD SHAPE STEEL	KLUTE, INC.	APPX WT = 527 LBS EA
A-1a.7	1	138KV SWITCH STAND, 3 PHASE, 22'-0" BUS HEIGHT - STANDARD SHAPE STEEL	KLUTE, INC.	APPX WT = 2,496 LBS EA
A1a.11	2	SWITCH OPERATOR PLATFORM, BAR GRATING, 1" X 3' X 4'	PSS	STOCK
A-1a.9	LOT	ANCHOR BOLTS, COMPLETE WITH (2) NUTS AND (2) FLATWASHERS (52) 1" X2'-6" A.B W(2) FW & (2) H. HEX NUTS EACH	T.F.	
A-1a.10	LOT	ANCHOR BOLTS, COMPLETE WITH (2) NUTS AND (2) FLATWASHERS CAGED FOR TAPERED TUBULAR STRUCTURES (20) 1 3/4"x9'-0" CAGED REBAR A.B W(2) FW & (2) H.HN EA. (4) 1 3/4"x8'_0" CAGED REBAR A.B W(2) FW & (2) H.HN EA.	T.F.	
A-1b	1	HOT DIPPED GALVANIZED 100' STATIC MAST - NO WIRES - TAPERED TUBULAR STEEL	KLUTE, INC.	APPX WT = 5,154 LBS EA
		<b>SWITCHES</b>		
B-1	1	230KV GROUP OPERATED VERTICAL BREAK SWITCH, 2000 AMP, HORIZONTAL MOUNTING, USCO TYPE AVR-23020-9, COMPLETE WITH: : STANDARD ARCING HORN : MANUAL OPERATING MECHANISM, SWING HANDLE : PROVISIONS FOR GROUNDING : PROVISIONS FOR TR-308 INSULATORS (ITEM B-1a) *CLARIFICATION 6/20/18* - OPERATOR CHANGED TO BE SWING HANDLE	USCO	AVR-24520-NA5W0IAHSH
B-1a	9	STATION POST INSULATOR, HIGH STRENGTH, 230KV, 900KV BIL, TR-308, 1450# CANTILEVER, UNIFORM STACK - (FOR SWITCHES: ITEM B-1)	LAPP	315308-70



230/138kV Twin Bridges Substation  
 Alexandria Municipal Power & Light Dept  
 Alexandria, LA

Origination Date:  
 Material List No: ML-5449  
 Revision Number: 1  
 Revision Date: 8/13/2018  
 Sheet Number: 2 of 3

ITEM	QTY.	DESCRIPTION	MFG.	TYPE OR CAT. NO.
B-2	1	138KV GROUP OPERATED VERTICAL BREAK SWITCH, 2000 AMP, HORIZONTAL HORIZONTAL MOUNTING, USCO TYPE AVR-13820, COMPLETE WITH: : STANDARD ARCING HORN : MANUAL OPERATING MECHANISM, SWING HANDLE : PROVISIONS FOR GROUNDING : PROVISIONS FOR TR-289 INSULATORS (ITEM B-2a) *CLARIFICATION 6/20/18* - OPERATOR CHANGED TO BE SWING HANDLE - CHANGED FROM 1200A TO 2000A SWITCH	USCO	AVR-14520-NA5WOIAHSH
B-2a	9	STATION POST INSULATOR, HIGH STRENGTH, 138KV, 650KV BIL, TR-289, GRAY, 2200# CANTILEVER - (FOR SWITCHES: ITEM B-2)	LAPP	315289-70
		<b>CONDUCTOR</b>		
A-2a	280	5" IPS SCHEDULE 40, ALUMINUM TUBING, ALLOY 6063-T6 SHIPPING: 1	WILLIAMS M	
A-2b	40	3 1/2" IPS SCHEDULE 40, ALUMINUM TUBING, ALLOY 6063-T6 SHIPPING: 1	WILLIAMS M	
A-2c	120	2" IPS SCHEDULE 40, ALUMINUM TUBING, ALLOY 6063-T6 SHIPPING: 1	WILLIAMS M	
A-2d	1200	1272 MCM AAC CABLE	AWG	
		<b>BUS &amp; GROUNDS</b>		
A-2f	12	STRAIN CLAMP FOR 1272 MCM AAC	ANDERSON	SD-130-N
A-2g	6	YOKE PLATE	ANDERSON	YPD3018437-3
A-2h	12	SOCKET EYE	ANDERSON	SA1313
A-2i	3	Y CLEVIS-CLEVIS ***CLARIFICATION*** - PER VENDOR, PART #YCC3090, NOT YCC-90	ANDERSON	YCC30
A-2j	12	POLYMER SUSPENSION INSULATOR, WITH CORONA RING 13.8" DIA	LAPP	CS2-097-YB-295-A
A-2j.1	12	13.8" corona rings For item A-2j (CS2-097-YB-295-A)	LAPP	CCA3-350-1
A-2k	16	TR 308 STATION POST INSULATORS, 5" BC, GRAY PORCELAIN	LAPP	315308-70
A-2l	6	BUS SUPPORT CLAMP FOR 5" ALUMINUM TUBING, SLIDE TYPE	ANDERSON	WTH-50-5
A-2m	10	BUS SUPPORT CLAMP FOR (2) 1272 MCM AAC CABLE	ANDERSON	ADCS-150-5
A-2n	12	ANGLE TEE, WELDMENT CONNECTOR FOR 5" ALUMINUM TUBE RUN TO 2" ALUMINUM TUBE TAP	ANDERSON	WTT-15-5020
A-2ad	12	ANGLE TEE, WELDMENT CONNECTOR FOR 2" ALUMINUM TUBE RUN TO 2" ALUMINUM TUBE TAP	ANDERSON	WTT-15-2020
A-2o	6	ANGLE VEE, WELDMENT CONNECTOR FOR 5" ALUMINUM TUBE RUN TO 2" ALUMINUM TUBE TAP	ANDERSON	WTT2-15-5020
A-2p	3	Y-CLEVIS-CLEVIS, 90 DEGREE	AEC	YCC3090

Monday, November 19, 2018





230/138kV Twin Bridges Substation  
 Alexandria Municipal Power & Light Dept  
 Alexandria, LA

Origination Date:  
 Material List No: ML-5449  
 Revision Number: 1  
 Revision Date: 8/13/2018  
 Sheet Number: 3 of 3

ITEM	QTY.	DESCRIPTION	MFG.	TYPE OR CAT. NO.
A-2s	6	TERMINAL CONNECTOR FOR 5" ALUMINUM TUBE TO FLAT 4-HOLE PAD	ANDERSON	WSTF-50-D-CF
A-2t	3	TERMINAL CONNECTOR FOR 3 1/2" ALUMINUM TUBE TO FLAT 4-HOLE PAD	ANDERSON	WSTF-34-D-CF
A-2u	6	TRANSITION PAD	ANDERSON	TP-D
A-2v	6	CORONA BELL FOR 5" ALUMINUM TUBE, SCHEDULE 40, INTERNAL	ANDERSON	ACBI-50
A-2w	4	COUPLER CONNECTOR, WELDMENT FOR 5" ALUMINUM, SCHEDULE 40, ALUMINUM	ANDERSON	WCI-5050
A-2x	3	COUPLER CONNECTOR, WELDMENT FOR 3 1/2" ALUMINUM, SCHEDULE 40 TUBE	ANDERSON	WCI-3434
A-2y	10	TOWER CLAMP, FOR TWO (2) 2/0 COPPER CABLES, TWO-PIECE	ANDERSON	GC-143-01
A-2z	20	TOWER CLAMP, FOR ONE 2/0 COPPER CABLES, TWO-PIECE	ANDERSON	GC-141-01
A-2aa	10	TOWER CLAMP, FOR ONE 2/0 COPPER CABLES, ONE-PIECE	ANDERSON	GC-140-01
A-2ab	21	CABLE SPACER FOR 1272 MCM AAC, 4"	ANDERSON	APCS-15-4
A-2ac	6	CABLE SPACER FOR 1272 MCM AAC, 12" ***CLARIFICATION*** - ANDERSON IS OFFERING A 12" CABLE SPACER FOR THIS CABLE SIZE. AN 18" SPACER WAS NOT OFFERED BY ANDERSON.	ANDERSON	APCS-15-12
A-2ad	220	556.5 ACSR, 26/7 "PARAKEET"	AWG	ACSR
A-2ae	90	336.4 ACSR, 26/7 "LINNET"	AWG	ACSR
<b>TERMINAL AND EQUIPMENT BOLTS</b>				
TM-1	LOT	SET OF (4) STAINLESS STEEL TERMINAL BOLTS,NUTS & WASHERS WITH BELLEVILLE WASHERS (4) (E4) 1/2" X 2 1/4" (2F-1BW-1HN) (7) (F4) 1/2" X 2 1/2" (2F-1BW-1HN) (23) (G4) 1/2" X 2 3/4" (2F-1BW-1HN)	T.F.	
EQ-1	LOT	GALVANIZED EQUIPMENT MOUNTING BOLTS (75) 5/8" X 1 1/2" HB (35) 5/8" X 2 1/4" HB (20) 5/8" X 2 1/2" HB (120) 5/8" LW (160) 5/8" FW (35) 5/8" BW (55) 5/8" HN	T.F.	

## **SECTION 10**

**LOUISIANA UNIFORM PUBLIC WORKS BID FORM**

**TO:** \_\_\_\_\_  
City of Alexandria  
1015 North 3<sup>rd</sup> Street  
P. O. Box 71 (70309)  
Alexandria, LA 71301

*(Owner supplied owner information)*

**BID FOR:** \_\_\_\_\_  
Twin Bridges Station  
230kV–138kV Transformer Addition  
Construction

*(Owner supplied project information)*

The undersigned bidder hereby declares and represents that she/he; a) has carefully examined and understands the Bidding Documents, b) has not received, relied on, or based his bid on any verbal instructions contrary to the Bidding Documents or any addenda, c) has personally inspected and is familiar with the project site, and hereby proposes to provide all labor, materials, tools, appliances and facilities as required to perform, in a workmanlike manner, all work and services for the construction and completion of the referenced project, all in strict accordance with the Bidding Documents.

The Bidder acknowledges receipt of the following **ADDENDA:**

No. ___ Dated: _____	No. ___ Dated: _____	No. ___ Dated: _____
No. ___ Dated: _____	No. ___ Dated: _____	No. ___ Dated: _____

**TOTAL BID: (\$ \_\_\_\_\_)**

\_\_\_\_\_ **Dollars**

**NAME OF FIRM OR JOINT VENTURE:** \_\_\_\_\_

**LOUISIANA CONTRACTOR'S LICENSE NUMBER:** \_\_\_\_\_

**SIGNATURE OF BIDDER \*\*:** \_\_\_\_\_

**NAME OF BIDDER:** \_\_\_\_\_

**TITLE OF BIDDER:** \_\_\_\_\_

**ADDRESS OF BIDDER:** \_\_\_\_\_

**DATED:** \_\_\_\_\_

\*\* If someone other than a corporate officer signs for the Bidder/Contractor, a copy of a corporate resolution or other signature authorization shall be required for submission of bid. Failure to include a copy of the appropriate signature authorization, if required, may result in the rejection of the bid unless bidder has complied with La. R.S. 38:2212(A)(1)(c) or RS 38:2212(O) .

**BID SECURITY** in the form of a bid bond, certified check or cashier's check as prescribed by LA RS 38:2218.A is attached to and made a part of this bid. If a bid bond is provided it shall be on the attached form and only on the attached form.

**LOUISIANA UNIFORM PUBLIC WORKS BID FORM**  
**UNIT PRICE FORM**

**TO:** City of Alexandria  
1015 North 3<sup>rd</sup> Street  
P. O. Box 71 (70309)  
Alexandria, LA 71301

*(Owner supplied owner information)*

**BID FOR:** Twin Bridges Station  
230kV–138kV Transformer Addition  
Construction

*(Owner supplied project information)*

**UNIT PRICES:** For any and all work required by the Bidding Documents, described as unit prices.

REF. NO.	UNIT OF MEASURE:	PRICE PER UNIT	
*A-1	QUANTITY: LOT	Words:	
	DESCRIPTION:	Figures:	
	GALVANIZED STEEL STRUCTURES	UNIT PRICE (QUANTITY X PRICE PER UNIT)	
		Words:	
		Figures:	
*A-2	QUANTITY: LOT	Words:	
	DESCRIPTION:	Figures:	
	BUS, BUS CONNECTORS, INSULATORS, JUMPERS, DAMPENING WIRE	UNIT PRICE (QUANTITY X PRICE PER UNIT)	
		Words:	
		Figures:	
*B-1	QUANTITY: 1	Words:	
	DESCRIPTION:	Figures:	
	230kV, GOAB, 2000 AMP SWITCH AND OPERATOR	UNIT PRICE (QUANTITY X PRICE PER UNIT)	
		Words:	
		Figures:	
*B-2	QUANTITY: 1	Words:	
	DESCRIPTION:	Figures:	
	138kV, GOAB, 2000 AMP SWITCH AND OPERATOR	UNIT PRICE (QUANTITY X PRICE PER UNIT)	
		Words:	
		Figures:	
*E-1	QUANTITY: 1	Words:	
	DESCRIPTION:	Figures:	
	230kV GAS CIRCUIT BREAKER	UNIT PRICE (QUANTITY X PRICE PER UNIT)	
		Words:	
		Figures:	
*G-1	QUANTITY: 3	Words:	
	DESCRIPTION:	Figures:	
	230kV POTENTIAL TRANSFORMERS	UNIT PRICE (QUANTITY X PRICE PER UNIT)	
		Words:	
		Figures:	

**\*OWNER FURNISHED MATERIAL**

**Additional sheets may be included if necessary. All quantities are estimated. The contractor will be paid based upon actual quantities as verified by the City Engineer. Unit price written in words shall govern. Should the written unit price be illegible, then the unit price in figures shall govern. All spaces must be filled out, even if "No" dollars and "No" cents.**

**LOUISIANA UNIFORM PUBLIC WORKS BID FORM**  
**UNIT PRICE FORM**

**TO:** City of Alexandria  
1015 North 3<sup>rd</sup> Street  
P. O. Box 71 (70309)  
Alexandria, LA 71301

*(Owner supplied owner information)*

**BID FOR:** Twin Bridges Station  
230kV–138kV Transformer Addition  
Construction

*(Owner supplied project information)*

**UNIT PRICES:** For any and all work required by the Bidding Documents, described as unit prices.

REF. NO.	UNIT OF MEASURE:	PRICE PER UNIT	
G-2	QUANTITY 3	Words:	
	DESCRIPTION:	Figures:	
	FURNISH & INSTALL BUSHING CURRENT TRANSFORMERS ON 230kV TRANSFORMER	UNIT PRICE (QUANTITY X PRICE PER UNIT)	
		Words:	
		Figures:	
REF. NO.	UNIT OF MEASURE:	PRICE PER UNIT	
K-1	QUANTITY LOT	Words:	
	DESCRIPTION:	Figures:	
	FURNISH & INSTALL A.C. & D.C. BREAKERS IN EXISTING AND NEW CONTROL HOUSE PANELS	UNIT PRICE (QUANTITY X PRICE PER UNIT)	
		Words:	
		Figures:	
REF. NO.	UNIT OF MEASURE:	PRICE PER UNIT	
K-2	QUANTITY: LOT	Words:	
	DESCRIPTION:	Figures:	
	FURNISH & INSTALL ALL BELOW & ABOVE GRADE CONDUITS, FITTINGS, CONCRETE DUCTS & CONCRETE JUNCTION BOXES	UNIT PRICE (QUANTITY X PRICE PER UNIT)	
		Words:	
		Figures:	
REF. NO.	UNIT OF MEASURE:	PRICE PER UNIT	
K-3	QUANTITY: LOT	Words:	
	DESCRIPTION:	Figures:	
	FURNISH & INSTALL ALL POWER & CONTROL WIRING AND TERMINATIONS AS DEPICTED ON THE WIRE SCHEDULE	UNIT PRICE (QUANTITY X PRICE PER UNIT)	
		Words:	
		Figures:	
REF. NO.	UNIT OF MEASURE:	PRICE PER UNIT	
K-4	QUANTITY: 1	Words:	
	DESCRIPTION:	Figures:	
	FURNISH & INSTALL SUBMERSIBLE SUMP PUMP FOR CONTROL HOUSE PULL BOX, INCLUDING DRAIN LINE	UNIT PRICE (QUANTITY X PRICE PER UNIT)	
		Words:	
		Figures:	

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**UNIT PRICE FORM**

**TO:** City of Alexandria  
1015 North 3<sup>rd</sup> Street  
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Alexandria, LA 71301  
*(Owner supplied owner information)*

**BID FOR:** Twin Bridges Station  
230kV–138kV Transformer Addition  
Construction  
*(Owner supplied project information)*

**UNIT PRICES:** For any and all work required by the Bidding Documents, described as unit prices.

REF. NO.	UNIT OF MEASURE:	PRICE PER UNIT	
K-5	QUANTITY: 1	Words:	
	DESCRIPTION:	Figures:	
	FURNISH & INSTALL P.T. JUNCTION BOX WITH INTERNAL PARTS	UNIT PRICE (QUANTITY X PRICE PER UNIT)	
		Words:	
		Figures:	
REF. NO.	UNIT OF MEASURE:	PRICE PER UNIT	
L-1A.3	QUANTITY: 2	Words:	
	DESCRIPTION:	Figures:	
	FURNISH & INSTALL 230kV SWITCH FOUNDATION	UNIT PRICE (QUANTITY X PRICE PER UNIT)	
		Words:	
		Figures:	
REF. NO.	UNIT OF MEASURE:	PRICE PER UNIT	
L-1A.4	QUANTITY: 2	Words:	
	DESCRIPTION:	Figures:	
	FURNISH & INSTALL 230kV 3Ø BUS SUPPORT FOUNDATION	UNIT PRICE (QUANTITY X PRICE PER UNIT)	
		Words:	
		Figures:	
REF. NO.	UNIT OF MEASURE:	PRICE PER UNIT	
L-1A.5	QUANTITY: 4	Words:	
	DESCRIPTION:	Figures:	
	FURNISH & INSTALL 230kV SINGLE PHASE BUS SUPPORT FOUNDATION	UNIT PRICE (QUANTITY X PRICE PER UNIT)	
		Words:	
		Figures:	
REF. NO.	UNIT OF MEASURE:	PRICE PER UNIT	
L-1A.6	QUANTITY: 3	Words:	
	DESCRIPTION:	Figures:	
	FURNISH & INSTALL 230kV POTENTIAL TRANSFORMER FOUNDATION	UNIT PRICE (QUANTITY X PRICE PER UNIT)	
		Words:	
		Figures:	
REF. NO.	UNIT OF MEASURE:	PRICE PER UNIT	
L-3	QUANTITY: 1	Words:	
	DESCRIPTION:	Figures:	
	FURNISH & INSTALL 230kV GAS CIRCUIT BREAKER FOUNDATION WITH ANCHOR BOLTS	UNIT PRICE (QUANTITY X PRICE PER UNIT)	
		Words:	
		Figures:	

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**LOUISIANA UNIFORM PUBLIC WORKS BID FORM**  
**UNIT PRICE FORM**

**TO:** City of Alexandria  
1015 North 3<sup>rd</sup> Street  
P. O. Box 71 (70309)  
Alexandria, LA 71301  
*(Owner supplied owner information)*

**BID FOR:** Twin Bridges Station  
230kV–138kV Transformer Addition  
Construction  
*(Owner supplied project information)*

**UNIT PRICES:** For any and all work required by the Bidding Documents, described as unit prices.

REF. NO.	UNIT OF MEASURE:	PRICE PER UNIT	
L-4	QUANTITY: 1	Words:	
	DESCRIPTION:	Figures:	
	FURNISH & INSTALL 12' X 16' CONTROL HOUSE FOUNDATION	UNIT PRICE (QUANTITY X PRICE PER UNIT)	
		Words:	
		Figures:	
L-5	QUANTITY: 1	Words:	
	DESCRIPTION:	Figures:	
	FURNISH & INSTALL TRANSFORMER OIL CONTAINMENT FOUNDATION	UNIT PRICE (QUANTITY X PRICE PER UNIT)	
		Words:	
		Figures:	
L-6	QUANTITY: 2	Words:	
	DESCRIPTION:	Figures:	
	FURNISH & INSTALL LIGHT POLE FOUNDATION	UNIT PRICE (QUANTITY X PRICE PER UNIT)	
		Words:	
		Figures:	
L-7	QUANTITY: LOT	Words:	
	DESCRIPTION:	Figures:	
	FURNISH & INSTALL / REPAIR EXISTING TRANSFORMER CONTAINMENT WALL SECTION 23' X 65'	UNIT PRICE (QUANTITY X PRICE PER UNIT)	
		Words:	
		Figures:	
M-1	QUANTITY: LOT	Words:	
	DESCRIPTION:	Figures:	
	FURNISH & INSTALL SITE WORK, INCLUDING REMOVING AND REPLACING SITE SURVACING THROUGHOUT WORK AREA, AND SITE CLEAN-UP	UNIT PRICE (QUANTITY X PRICE PER UNIT)	
		Words:	
		Figures:	

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**LOUISIANA UNIFORM PUBLIC WORKS BID FORM**  
**UNIT PRICE FORM**

**TO:** City of Alexandria  
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**BID FOR:** Twin Bridges Station  
230kV–138kV Transformer Addition  
Construction  
*(Owner supplied project information)*

**UNIT PRICES:** For any and all work required by the Bidding Documents, described as unit prices.

REF. NO.	UNIT OF MEASURE:	PRICE PER UNIT	
O-1	QUANTITY: LOT	Words:	
	DESCRIPTION:	Figures:	
	FURNISH & INSTALL BELOW AND ABOVE GRADE GROUNDING, INCLUDING EQUIPMENT AND FENCE GROUNDS	UNIT PRICE (QUANTITY X PRICE PER UNIT)	
		Words:	
		Figures:	
R-1	QUANTITY: 2	Words:	
	DESCRIPTION:	Figures:	
	RE-INSTALL EXISTING LIGHT POLES AND FIXTURES, INCLUDING CONDUIT AND WIRE	UNIT PRICE (QUANTITY X PRICE PER UNIT)	
		Words:	
		Figures:	
R-2	QUANTITY: 1	Words:	
	DESCRIPTION:	Figures:	
	RE-INSTALL EXISTING GATE ALARM, INCLUDING CONDUIT AND WIRE	UNIT PRICE (QUANTITY X PRICE PER UNIT)	
		Words:	
		Figures:	
	QUANTITY:	Words:	
	DESCRIPTION:	Figures:	
	UNIT PRICE (QUANTITY X PRICE PER UNIT)		
	Words:		
	Figures:		
	QUANTITY:	Words:	
	DESCRIPTION:	Figures:	
	UNIT PRICE (QUANTITY X PRICE PER UNIT)		
	Words:		
	Figures:		
	QUANTITY:	Words:	
	DESCRIPTION:	Figures:	
	UNIT PRICE (QUANTITY X PRICE PER UNIT)		
	Words:		
	Figures:		

**Additional sheets may be included if necessary. All quantities are estimated. The contractor will be paid based upon actual quantities as verified by the City Engineer. Unit price written in words shall govern. Should the written unit price be illegible, then the unit price in figures shall govern. All spaces must be filled out, even if "No" dollars and "No" cents.**



### Miscellaneous Construction Units

The Contractor shall submit unit prices for the miscellaneous construction units listed. The Owner shall have the option to exercise the unit prices for additional work, which shall be done by this Contractor when, in the judgment of the Owner and the Engineer, said work is outside the intended scope of work required by these specifications.

Unit No.	Name & Description of Construction Unit	No. of Units	Unit Price		
			Labor	Materials	Labor and Materials
X-1	INSTALL 2" RIGID CONDUIT (1 UNIT = 10 LINEAR FEET)	1			
X-2	INSTALL 4" RIGID CONDUIT (1 UNIT = 10 LINEAR FEET)	1			
X-3	INSTALL 2" SCHEDULE 40 PVC CONDUIT ENCASED IN CONCRETE (1 UNIT = 10 LINEAR FEET)	1			
X-4	INSTALL 4" SCHEDULE 40 PVC CONDUIT ENCASED IN CONCRETE (1 UNIT = 10 LINEAR FEET)	1			
Y-1	ONE CUBIC YARD OF 3,000 PSI CONCRETE COMPLETE WITH REINFORCING STEEL AND REQUIRED FORMS TO ADD OR MODIFY AND FOUNDATION (1 UNIT = 1 CUBIC YARD)	1			
Z-1	ONE CUBIC YARD OF CRUSHED LIMESTONE GRADE 57	1			
Z-2	ONE CUBIC YARD OF CRUSHED LIMESTONE GRADE 610	1			
Z-3	ROADWAY FABRIC PER SPECIFICATION (15' X 10')	1			
Z-4	INSTALL 4/0 COPPER WIRE FOR BELOW GRADE GROUNDING (1 UNIT = 10')	1			
Z-5	INSTALL 2/0 COPPER WIRE FOR BELOW GRADE GROUNDING (1 UNIT = 10'-0")	1			
Z-6	INSTALL (1) 3/4" X 10' COPPER GROUND ROD	1			

**SECTION 11**

**230kV Bushing CT's**



# Instrument Transformer Equipment Corporation

P.O. Box 129 Monroe, NC 28110

Phone (704) 282-4331

Fax (704) 283-3017

Date: 1/21/2019  
From: Lee Bigham

Quotation No. 2-01910215453  
Email: [lbigham@itec-ctvt.com](mailto:lbigham@itec-ctvt.com)

To: BHA, Inc.  
Attn: Gerry Waguespack

Tel: 225-214-4078  
Email: [gwaguespack@bhabr.com](mailto:gwaguespack@bhabr.com)

Fax:

CC: GHMR  
Attn: Bob Gonzalez  
Jared Reeves

Tel: 504-256-5549  
Email: [bob.gonzalez@ghmr.com](mailto:bob.gonzalez@ghmr.com)  
[jared.reeves@ghmr.com](mailto:jared.reeves@ghmr.com)

Fax:

Ref. Slip Over Current Transformer Inquiry

Thank you for your inquiry. ITEC appreciates this opportunity to offer the following proposal. ITEC products are manufactured and tested in accordance with IEEE C57.13 standards. Also, see our catalog on the internet - [www.ITEC-CTVT.com](http://www.ITEC-CTVT.com).

Item	Qty	Model	Description	Catalog I.D.	Unit Price
1	3	DDC-938	ITEC Current Transformer Molded, Outdoor, Slip-over 0.6 kV class, 10 kV BIL, 60 hz, Ratio: 1000/2000:5 Dual Ratio Rating Factor: 2.0 Accuracy Class / Burden: 0.3 B1.8 on 2000: 5 0.3 B0.9 on 1000:5 Dimensions: 26.00" ID x 36.00" OD x 3.50" H Molded Terminal Compartment Ground Shield	D26D200M3182HT1	\$ 4.117.00 EA
2	3	D938-AL-124-050-04	Mounting Hardware Set, (1) Set per CT Consisting of; (8) Aluminum Brackets, (4) 5/8" Galvanized Steel threaded rods 24" L 5/8" Galvanized Steel nuts, flat washers and lock washers		\$ 350.00 EA

Shipment: 6-8 weeks ARO  
Shipping terms: FOB factory, Freight prepaid and add to invoice.  
Payment terms: Standard, net 30 days  
Price Policy: After 30 days, please contact ITEC for current pricing. Check delivery schedule at time of order placement, since some materials are subject to prior sale.  
Terms and Conditions: ITEC Terms and Conditions included and apply

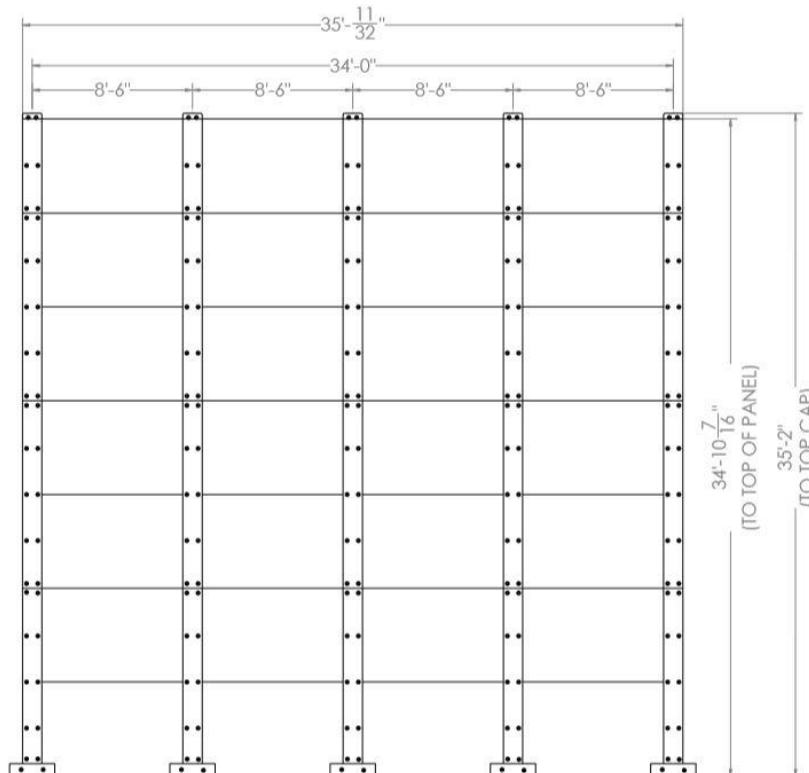
**SECTION 12**

**Blast Wall**

January 15, 2019

## FACTORY DIRECT FIREWALL QUOTE

QUOTE # 01152019-0935-0028-89807  
ONE (1) INTELLI-FIREWALL model IFS 350x350



### Cost

- Firewall: \$ 117,600
- Transportation: \$ 10,241
- **TOTAL: \$ 127,841**

### MILESTONES

- Engineering of the firewalls, including the structural calculations and drawings

January 15, 2019

**INTELLI-FIREWALL QUOTE PROVIDED BY  
COMPOSITE SUPPORT & SOLUTIONS INC, 767  
CHANNEL STREET, SAN PEDRO, CA 90731  
TEL 310 514 3162/ FAX 310 514 3163  
[www.intellifirewall.com](http://www.intellifirewall.com)**

---

- All the materials from the foundation up (panels, covers, bolts & fasteners, etc....)
- The reaction loads for the foundation design
- An installation manual and directions to support firewall assembly

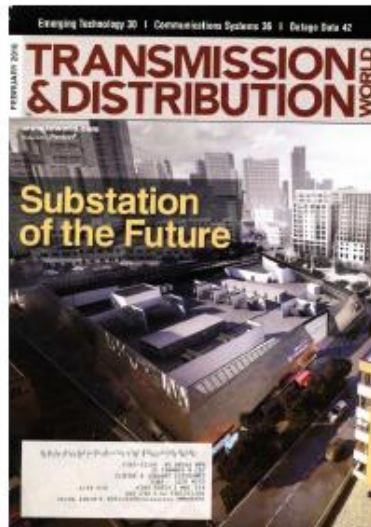
**ESTIMATED TIME TO ERECT: 2 DAYS**

**SHIPPING: EIGHT WEEKS AFTER RECEIPT OF PURCHASE ORDER/  
THIS QUOTATION IS VALID FOR 45 DAYS**

**INTELLI-FIREWALL QUOTE PROVIDED BY  
COMPOSITE SUPPORT & SOLUTIONS INC, 767  
CHANNEL STREET, SAN PEDRO, CA 90731  
TEL 310 514 3162/ FAX 310 514 3163  
[www.intellifirewall.com](http://www.intellifirewall.com)**

January 15, 2019

**NOTE: CSSI has been selected to supply firewalls to “THE SUBSTATION OF THE FUTURE.”**



### APPENDIX I: DBE Certificate for CSSI



January 15, 2019

## APPENDIX: Similar Installations

### 1. KUB Engineering-Lonsdale Substation – Louisville, Kentucky (Bruce Webb 865 546 9322)



### 2. PG&E L-Shaped Firewall Configuration Installed in Northern California (Eureka) [zero firewall damage in two subsequent earthquakes of 6.5 and 6.0]





January 15, 2019

### **3. Angled Firewall Installation at Honeywell Engine Testing Facility**



### **4. Angled Firewall Installation to Protect an Apparatus/ Control Building in Trinidad**



January 15, 2019

The Intelli-Firewall™ features and benefits include:

- Ceramic composite material [green] that is manufactured using a 'green' process technology.
- Exceeded tests for strength and impact established by a large electric utility.
- Rated and certified for 4 hours of hydrocarbon fire exposure at the Southwest Research Laboratories [TX].
- Modular design using light weight [320 lb] panels that facilitate handling and installation.
- Designed to minimize load bearing impact at the base of the wall.
- Steel columns, casings and nuts are protected using patent pending materials.
- Easy retrofit/installation in existing substations.
- Rapid removal and reassembly to optimize flexibility.
- Fast and safe installation – one standard wall [35 feet long by 30 feet high] in one day.
- Custom manufacturing to meet unique requirements.
- Installation services provided.
- Rapid installation reduces outage time and related activities.
- Made in the U.S.A.



**About CSSI**

Composite Support & Solutions Inc. [CSSI] was established in 2001 to expand the knowledge base in composite material technology with the objective of developing innovative new products. Significant time and resources have been directed at successfully developing and introducing the Intelli-Firewall™ to the marketplace. CSSI has also successfully developed and completed several other innovative infrastructure projects/products.

Phone: (310) 514-3162  
Roy Scholvineck: roy@intellifirewall.com  
Clem Hiel: clem@intellifirewall.com

**Composite Support & Solutions Inc.**

**Intelli-Firewall™**



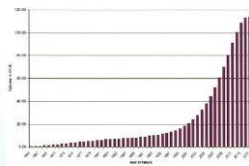
ASCE 2008 CHARLES PANKOW AWARD FOR INNOVATION



**Composite Support & Solutions, Inc.**

**THE PROBLEM**

Much of the US grid is relying on 50-year old substation transformers with a 40-year design life. The Hartford Steam Boiler Inspection and Insurance Company [HSB] projects substation transformer failures to increase 300% over the next ten years.



Predicted failure rates of transformers (HSB)



An example of a transformer fire

**THE SOLUTION**



Our Intelli-Firewall™ installations

**ONE DAY INSTALLATION**



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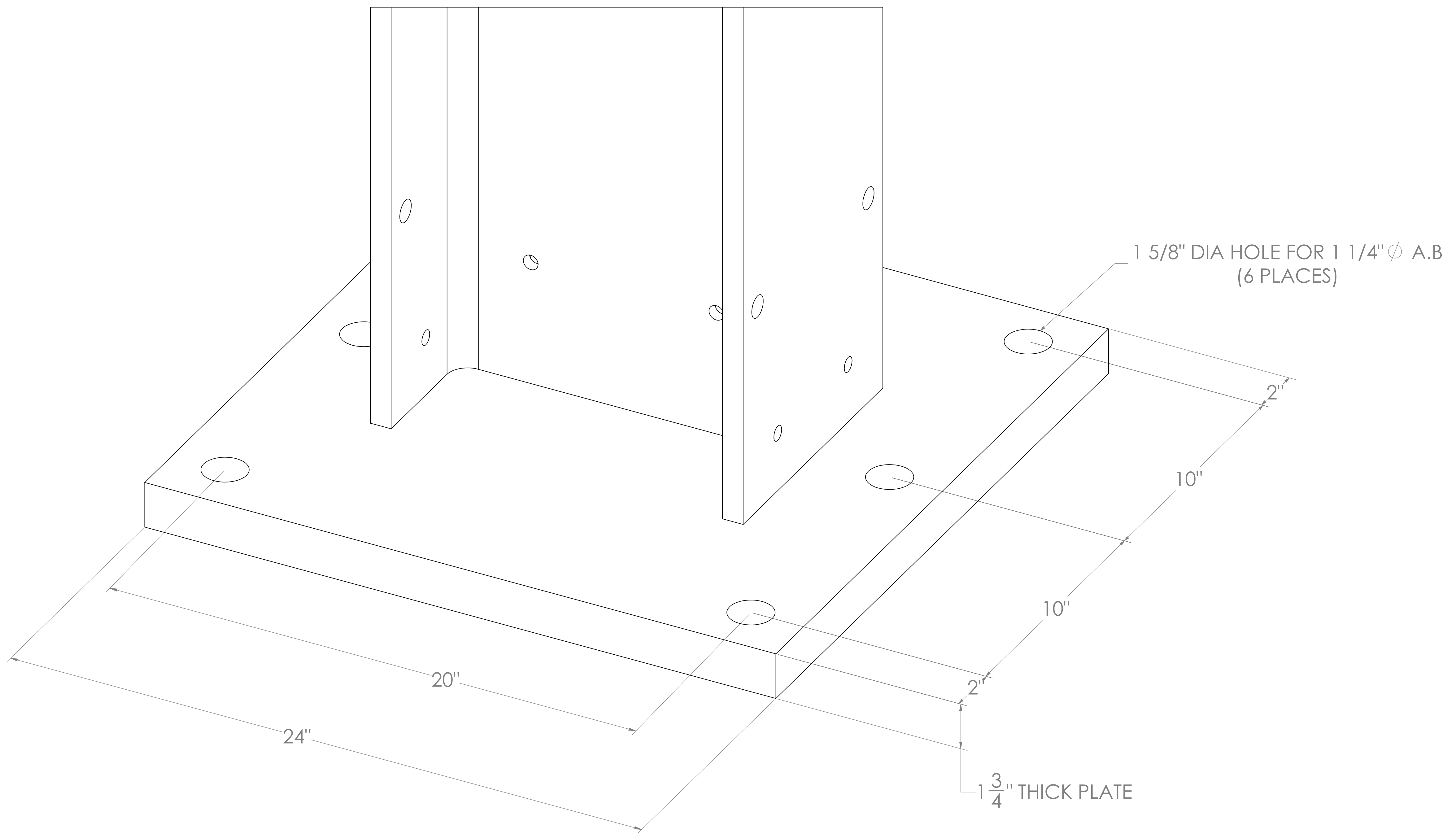
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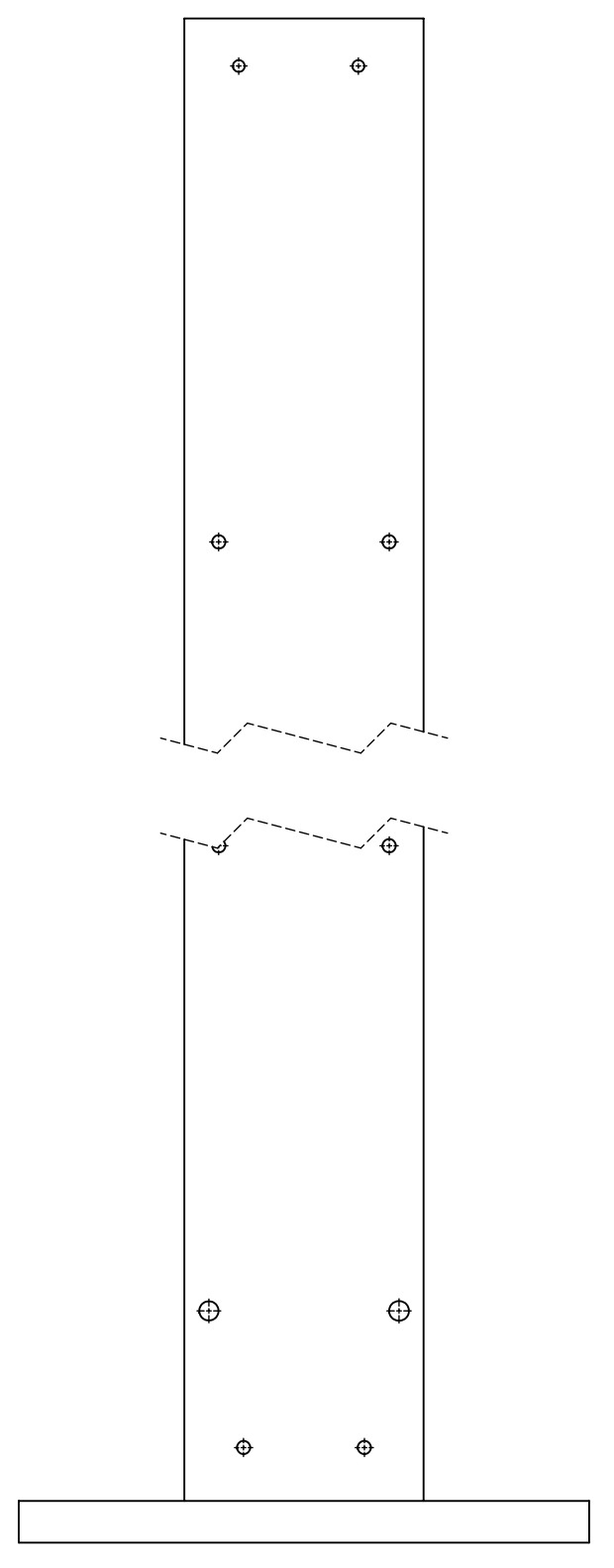
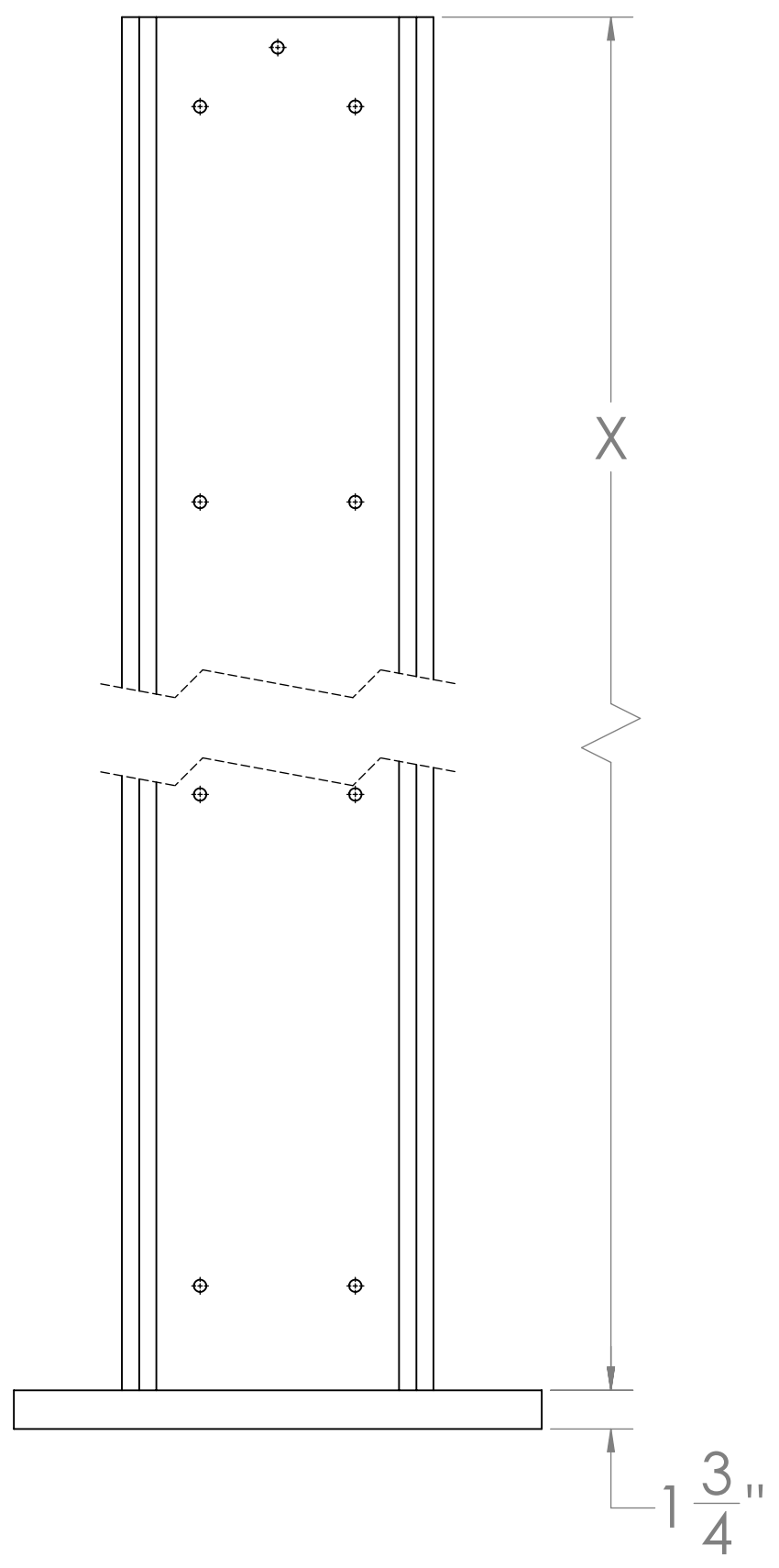
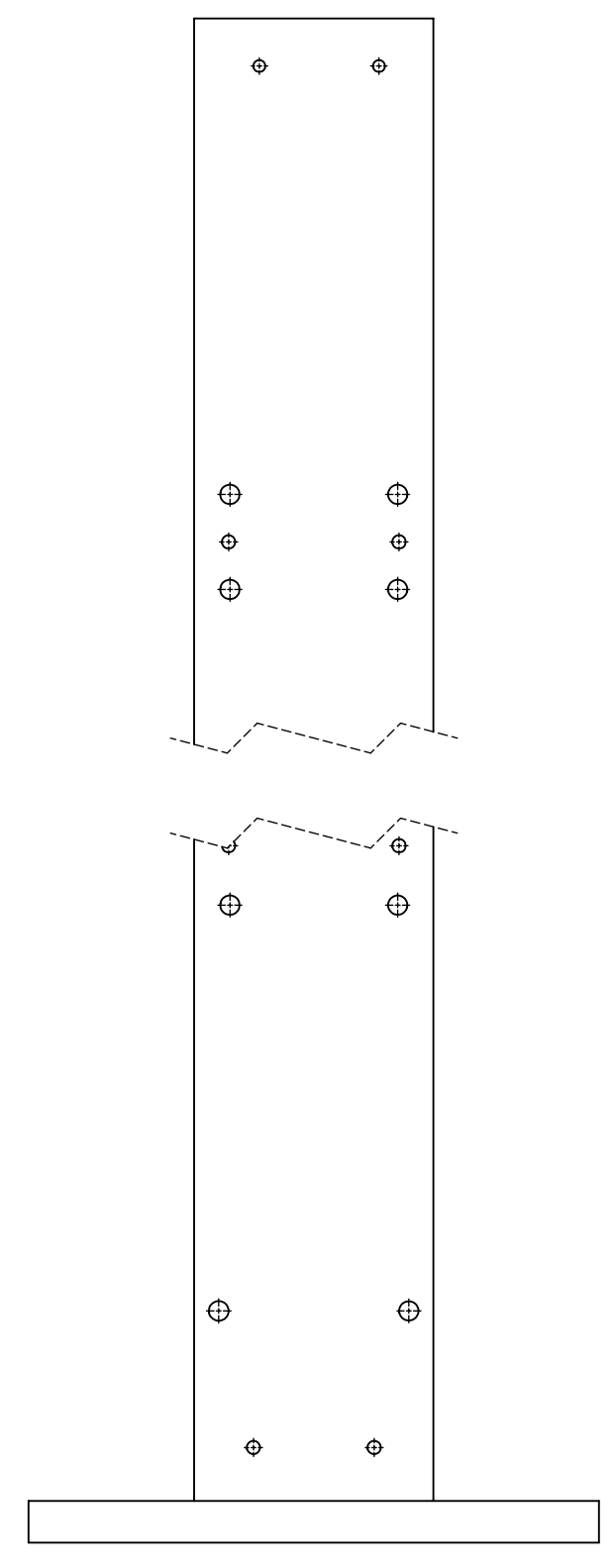
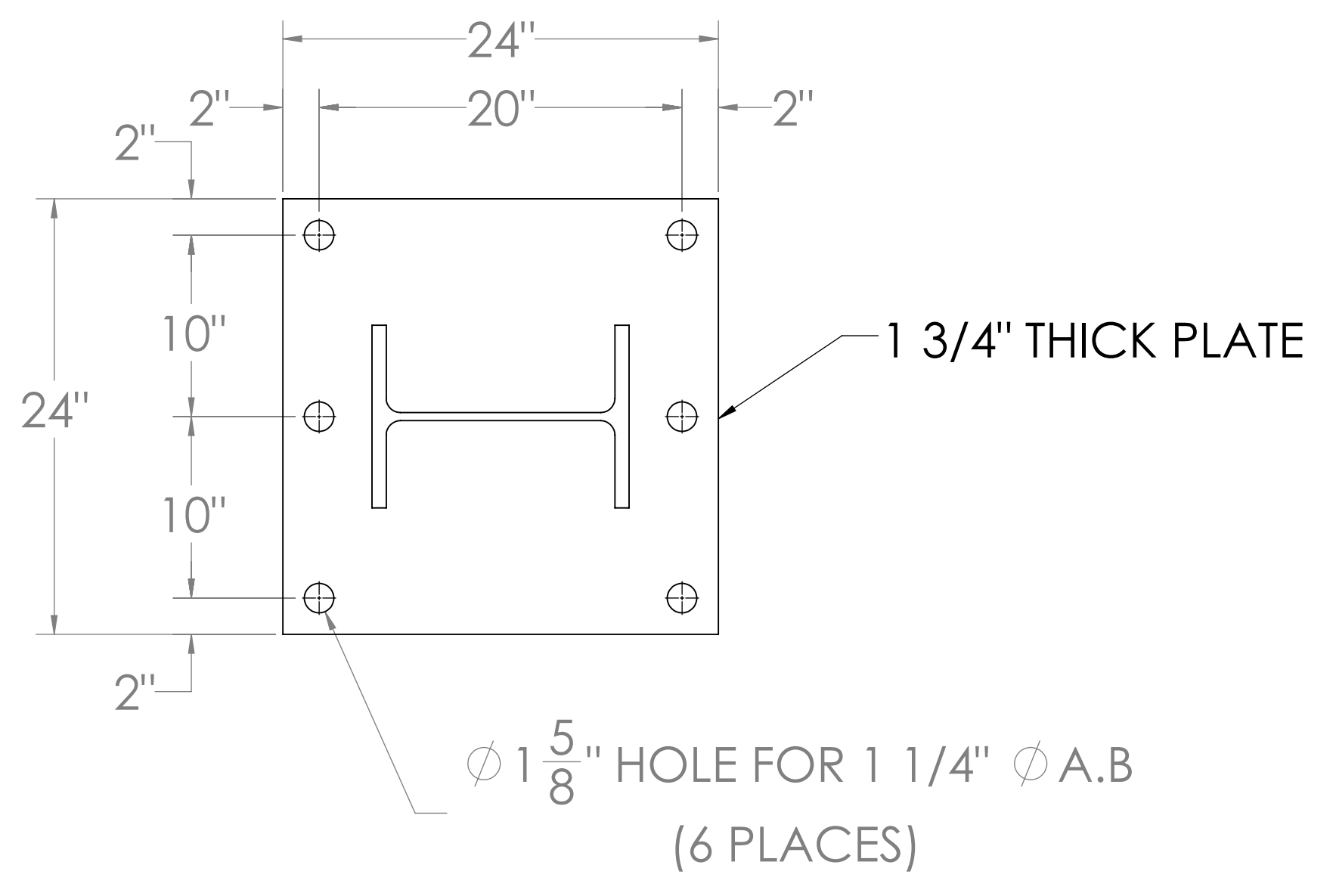
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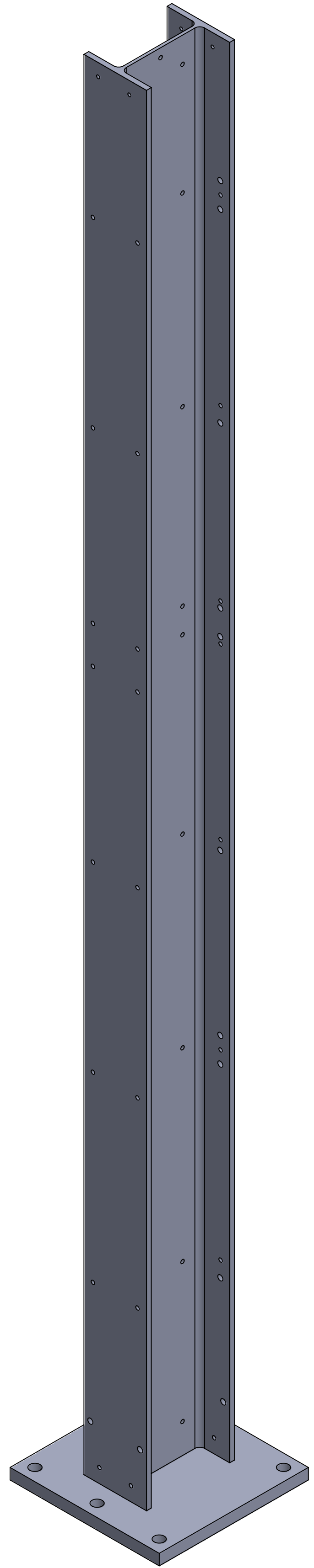
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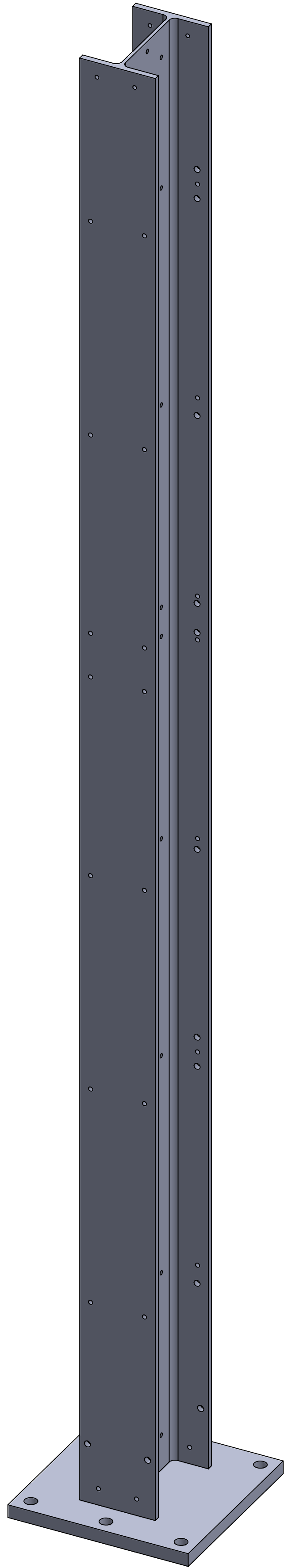
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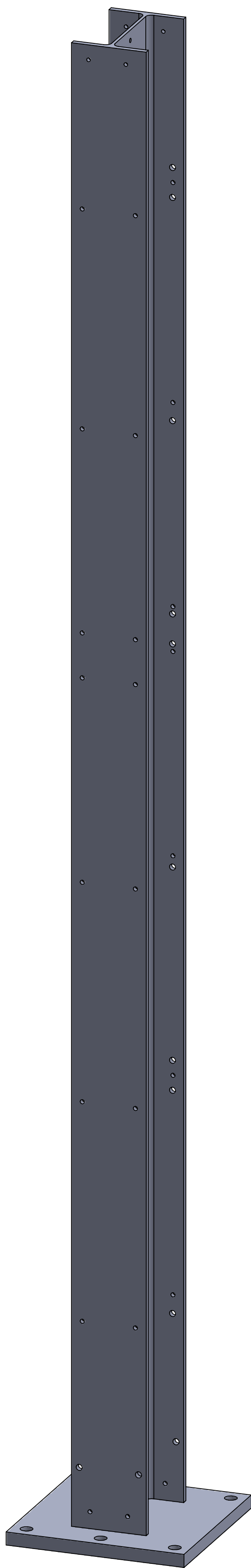
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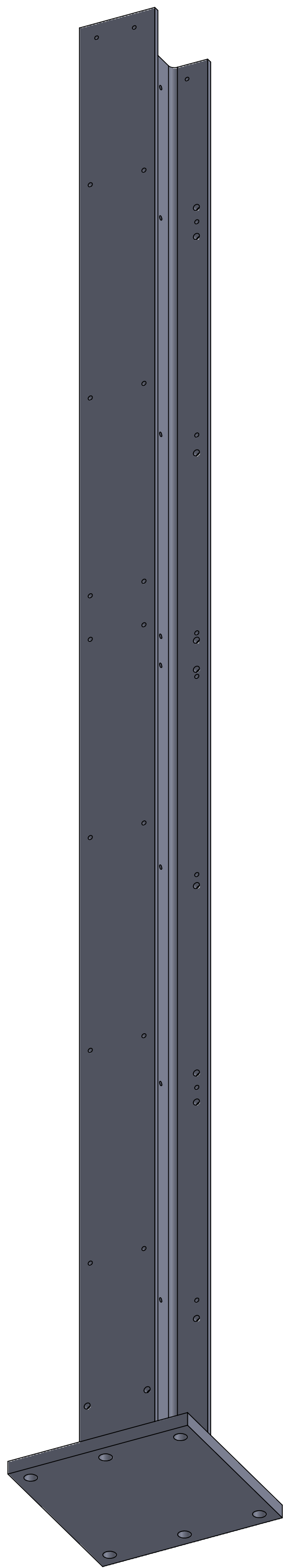
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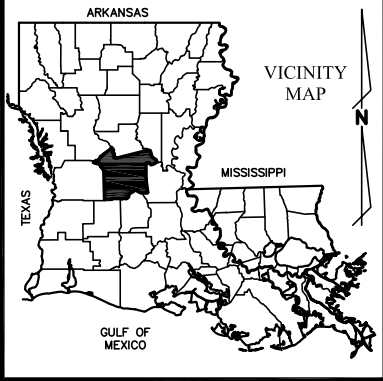
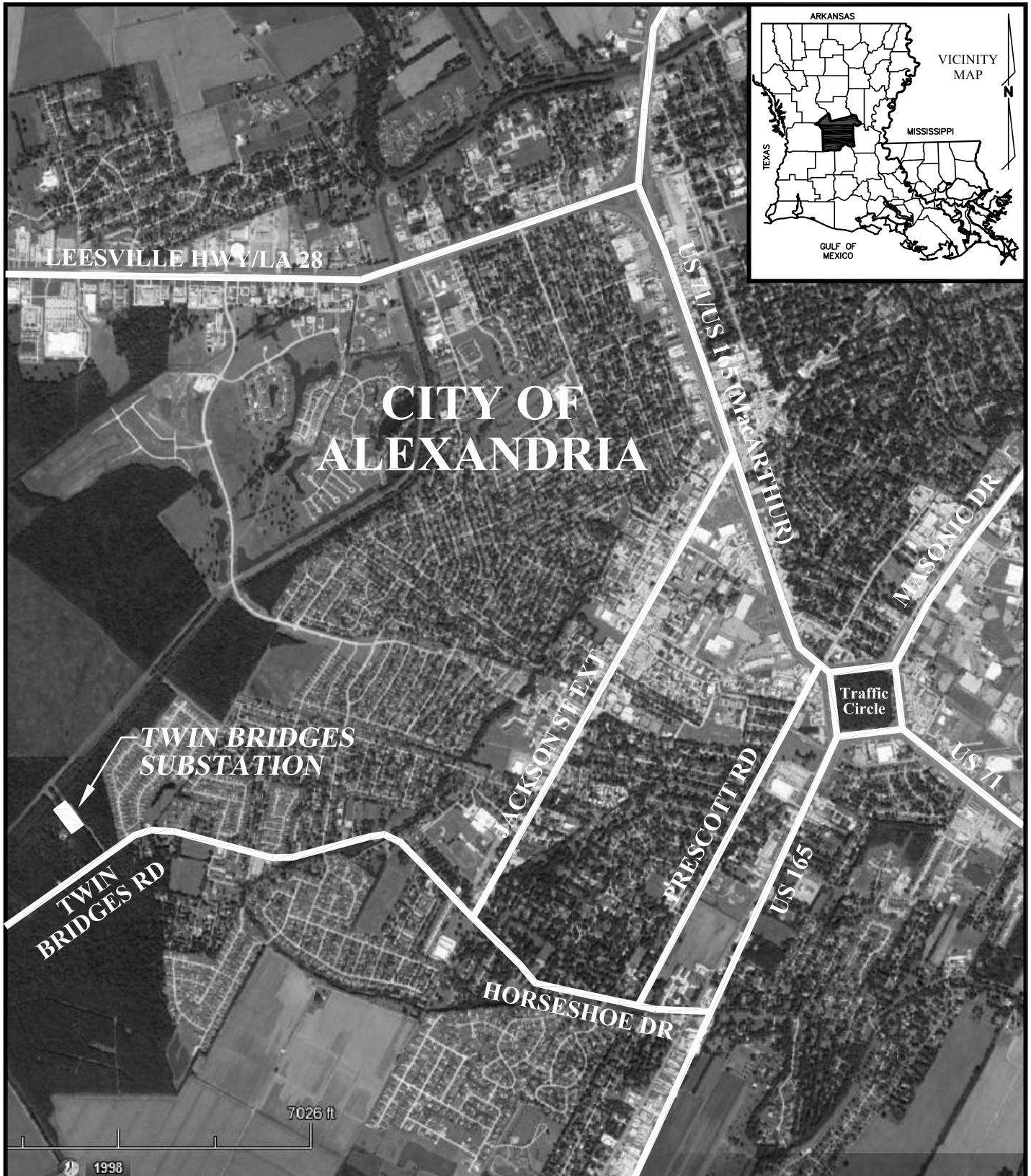
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**SECTION 13**  
**VICINITY MAP**



# CITY OF ALEXANDRIA

TWIN BRIDGES SUBSTATION

Traffic Circle

7026 ft

1998

## BHA, INC.

BATON ROUGE, LOUISIANA

VICINITY MAP  
for  
TWIN BRIDGES  
SUBSTATION  
for  
THE CITY OF ALEXANDRIA, LOUISIANA

SCALE : N.T.S.	DATE : 7/31/17	PROJECT NO. : 2019-E	
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**SECTION 14**

**DRAWINGS**

(Under Separate Cover)

## DRAWING LIST

Cover Sheet

TBTA-01	Site Plan
TBTA-01A	Partial Site Surfacing Plan
TBTA-02	Partial One-Line Diagram
TBTA-03	Partial Structure Plan
TBTA-03A	Structure Elevations
TBTA-03B	Structure Elevations
TBTA-03C	Miscellaneous Details
TBTA-04	Overall Grounding Plan
TBTA-04A	Partial Grounding Plan
TBTA-04B	Grounding Details
TBTA-05	Partial Foundation Plan
TBTA-05A	Transformer Foundation Plan & Details
TBTA-05B	Foundation Details
TBTA-05C	Foundation Details
TBTA-05D	Control Building Foundation Plan & Details
TBTA-05E	Oil Containment Pit Plan & Details
TBTA-06	Partial Conduit Plan
TBTA-06A	Conduit & Wiring Schedules
TBTA-06B	Conduit, Wiring & Pull Box Details
TBTA-06C	Pull Box Details
TBTA-06D	AC & DC Panels
TBTA-06E	230kV 3Ø Rapides Line PT Junction Box
TBTA-07	New Control Building Layout
TBTA-07A	New Control Building Interior Elevations
TBTA-07B	Existing Control Building Layout