Invitation for Bid

Power Transformer Procurement, Hospital Road Substation, Devens, MA

Project No.: 23-001

MARCH 2023

Owner:

Massachusetts Development Finance Agency
33 Andrews Parkway
Devens, MA 01434

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MASSACHUSETTS DEVELOPMENT FINANCE AGENCY

INVITATION FOR BID

The Massachusetts Development Finance Agency ("MassDevelopment" or "Owner"), a Massachusetts body politic and corporate established and existing under Chapter 23G of the Massachusetts General Laws, having its principal place of business at 99 High Street, 11th Floor, Boston, Massachusetts 02110, is soliciting sealed bids for **"Power Transformer Procurement, Hospital Road Substation, Devens, MA – Project No. 23-001"** in Devens, Massachusetts, in accordance with the specifications detailed in this Invitation for Bid ("IFB").

I. SUMMARY

The existing Hospital Road Substation ("Hospital Road Substation" or "Substation") is located at 109 Hospital Road, Devens, MA. The Substation is one of five substations used to supply electricity customers in the Devens Regional Enterprise Zone ("Devens" or "DREZ"). The Substation is owned by Owner. In view of anticipated load growth in Devens, owner has determined that an expansion of the Substation is necessary for which the transformers that are the subject of this IFB are a component.

II. SCOPE OF WORK

The following is a synopsis of work to be completed by a vendor, herein referenced as the Vendor. A detailed scope of work is contained in the Specification section.

1. Furnish and Deliver two (2) Power Transformers, 69 kV Delta – 13.8 kV GrdY, 24/32/40 MVA, in accordance with Section 26 12 14.51 of the SPECIFICATION, to the Owner's Substation.

2. Rigging and hoisting required to place the transformers on their foundations at the substation site.

3. Field assembly and field testing of the transformers to make ready for service.

III. PLACE AND TIME FOR SUBMISSION

Bids are due and will be publicly opened at MassDevelopment, 33 Andrews Parkway, Devens, Massachusetts on April 21, 2023 at 2:00 p.m. EDT.

Bids shall be submitted in a sealed envelope bearing on the outside the name of the bidder, its address, and endorsed with **"Power Transformer Procurement, Hospital Road Substation, Devens, MA – Project No. 23-001."** ***If forwarded by mail or delivery service, the sealed envelope***

containing the bid must be enclosed in another envelope and addressed as specified above. Such bids shall be addressed to MassDevelopment as follows:

Massachusetts Development Finance Agency
33 Andrews Parkway
Devens, MA 01434
Attn: Jim Moore, Director of Utilities

Any bid received after this time will be considered a late bid. A late bid shall not be considered for award. Delays in mail deliveries or any other means of transmittals, including couriers, shall not excuse late bid submissions. Bids must be submitted in writing and delivered to the address indicated above.

If the building at which bids are to be received is closed for any reason on the date and time that bids are due, receipt of bids by MassDevelopment will be postponed until the next business day at the time originally stated for receipt of bids.

Any bid may be withdrawn by written request and identification prior to the above scheduled time for the opening of bids or authorized postponement thereof. The bidder agrees that this bid shall be good and may not be withdrawn for the number of days, after the opening of bids, as stipulated in the Form for Bid.

Award of a Contract and Notice to Proceed will be made by MassDevelopment within forty-five (45) working days after the bid opening unless the time is extended by mutual consent of the parties.

MassDevelopment reserves the right to waive any informalities or to reject any or all bids. Award of the contract for the work contemplated by the IFB may be subject to the approval of MassDevelopment's Board of Directors.

IV. BID DOCUMENTS

Bid documents and specifications ("Contract Documents") will be available in electronic format only via email request beginning on March 22, 2023 at Noon EDT to the following:

Jim Moore
Director of Devens Utilities
RE: Power Transformer Procurement, Hospital Road Substation, Devens, MA – Project No. 23-001
Email: jmoore@massdevelopment.com
Phone: (978) 784-2931

V. QUESTIONS ON IFB

All inquiries concerning this IFB must be submitted in writing (email preferred) on or before March 31, 2023 at 5:00 p.m. EDT to the following:

Jim Moore
Attn: Power Transformer Procurement, Hospital Road Substation, Devens, MA – Project No. 23-001
Email: jmoore@massdevelopment.com

Prospective bidders should note that all clarifications and exceptions, including those relating to the terms and conditions of the contract, must be submitted in writing prior to submission of a bid. Answers to all questions of a substantive nature will be given to all prospective bidders in the form of a formal addendum which will become part of the Contract Documents.

VI. SCHEDULE OF IFB SELECTION PROCESS

The schedule is tentatively expected to proceed as follows:

Contract Documents available:	March 22, 2023 at Noon EDT
Deadline for questions:	March 31, 2023 at 5:00 p.m. EDT
Answers to questions sent on or before:	April 7, 2023 at 5:00 p.m. EDT
Bids due:	April 21, 2023 at 2:00 p.m. EDT

VII. OBLIGATIONS OF THE BIDDER

The bidder is expected to examine carefully the Contract Documents before submitting a bid. Failure to do so will not relieve a successful bidder of their obligation to furnish all labor, services, materials, equipment, plant, machinery, apparatus, appliances, tools, supplies, and all other things necessary to conform to the specifications included in the Contract Documents. The submission of a bid shall be considered prima facie evidence that the bidder has made such examination of the Contract Documents and is familiar with the requirements of the Contract Documents.

VIII. DESCRIPTION OF GOOD/REQUIREMENTS

See SPECIFICATION – Power Transformer Procurement, Hospital Road Substation, Devens, MA – Project No. 23-001.

IX. QUALITY REQUIREMENTS

See SPECIFICATION – Power Transformer Procurement, Hospital Road Substation, Devens, MA – Project No. 23-001.

X. PREPARATION OF BID

Each bid must be submitted as detailed in the Specification and the Form for Bid (Appendix A). Any deviation from the Specification requirements must be called out, with an explanation. Any

objections to terms and conditions of the form of contract must be noted. Wordsmithing and minor edits are disfavored. All bidders shall include with their bids written acknowledgement of receipt of all addenda.

After the receipt of a bid, a bidder may not change any provision of the bid in a manner prejudicial to the interests of MassDevelopment or fair competition. Minor informalities may be waived by MassDevelopment, or the bidder may be allowed to correct them. If a mistake as part of the intended bid is clearly evident on the face of the bid document, the mistake may be corrected to reflect the intended correct bid, and the bidder will notified. A bidder may withdraw a bid if a mistake is clearly evident on the face of the bid documents, but the intended correct bid is not similarly evident.

MassDevelopment may consider informal any bid not prepared and submitted in accordance with the provisions hereof and may waive any informalities or reject any and all bids, should MassDevelopment deem it to be in the public interest to do so.

Any or all bids will be rejected if there is reason for MassDevelopment to believe that there is collusion among bidders. Any bid so rejected will disqualify the bidder from consideration in future bids for the same work, and may also disqualify the bidder from bidding on future work.

MassDevelopment may reject bids that, in its sole judgment, are either incomplete, conditional, obscure or not responsive or which contain additions not called for, erasures not properly initialed, alterations, or similar irregularities, or MassDevelopment may waive such omissions, conditions or irregularities. MassDevelopment may also reject bids from bidders it determines are not responsible bidders.

XI. INSURANCE

The bidder shall effect and maintain insurance in amounts as set forth below and with companies satisfactory to Owner, at its own cost and expense, to protect itself from claims under any Worker's Compensation Act; from claims for damages because of bodily injury including sickness, disease or death of any of its employees; from claims for damages because of injury to or destruction of tangible property; and from claims arising out of the performance of professional services caused by errors, omissions or negligent acts for which it is legally liable.

- Commercial general liability, including personal injury and if applicable, product liability/completed operations coverage in the minimum amount of $1,000,000 personal injury, $1,000,000 per occurrence and $2,000,000 general/product/completed operations aggregate;
- Automobile liability coverage for owned, hired and non-owned vehicles in the minimum amount of $1,000,000 per occurrence combined single limit;
- Workers' compensation for all its employees, as required by statute, with employers' liability of $500,000.00 or more including $500,000 accident and $500,000 disease; and
- Umbrella Liability in the minimum amount of $5,000,000 per occurrence and $5,000,000 aggregate.

The bidder shall furnish Owner with certificates of insurance showing that the bidder has complied with this section prior to entering into a contract, and naming Massachusetts Development Finance Agency as an additional insured. Certificates shall provide that written notification of cancellation of the insurance policies required hereunder shall be given to Owner thirty (30) days prior to such cancellation.

The certificate of insurance must indicate the insurance company name and contact person, policy number, limits, and expiration date. All certificates must indicate the event, a description of the time period, location, and any other pertinent information. MassDevelopment will allow five (5) business days for bidder's insurance company to supply these certificates.

The certificate must reflect current dates for coverage. If the certificate is due to expire while bidder will still be conducting business with MassDevelopment, a new certificate must be supplied thirty (30) days prior to expiration.

XII. DIVERSE BUSINESS ENTERPRISE PREFERENCE

It is the policy of the Commonwealth and MassDevelopment to promote equity of opportunity in state contracting; and, to that end, to encourage full participation of Diverse Business Enterprises (as defined below) in all areas of state contracting pursuant to Executive Orders 565, 523, and 526. For purposes of this section, "Diverse Business Enterprise(s)" shall mean a minority business enterprise ("MBE"), women business enterprise ("WBE"), veteran business enterprise ("VBE"), or service–disabled veteran-owned business enterprise ("SDVOBE"), each as certified by or recognized as certified by the Commonwealth of Massachusetts Operational Services Division's Supplier Diversity Office (SDO) pursuant to 425 CMR 2.00. It is MassDevelopment's intention to create a level playing field on which Diverse Business Enterprises can compete fairly for contracts.

In addition to all other equal opportunity employment requirements of the Contract Documents, MassDevelopment strongly encourages the use of Diverse Business Enterprise as consultants, contractors, subconsultants, subcontractors, and suppliers. Lists of Diverse Business Enterprises certified or verified by the SDO are located at www.mass.gov/sdo.

As part of this bid, **bidder shall submit** a Diverse Business Enterprise Participation Schedule ("DBE Participation Schedule"), as set forth in Appendix F, to identify the parts of the contract that may be completed using Diverse Business Enterprises. **The DBE Participation Schedule and copies of any applicable SDO certifications must be submitted with the bid**.

XIII. INFORMATION TO BE INCLUDED WITH THE BID

Each bidder shall attach the documents required in this IFB, including, without limitation, the following:

A. Form for Bid (Appendix A, completed)

B. Executed Affidavit of Compliance with Legal Requirements (Appendix B)
C. Executed Affidavit of Compliance for Corporations (Appendix C)
D. Intentionally Deleted.
E. Certificate of Vote (for signatory to bid) (Appendix E)
F. Diverse Business Participation Schedule (Appendix G, completed) and SDO Certification as applicable

XIV. GENERAL PROVISIONS

MassDevelopment will award a contract to the lowest priced responsive bid and responsible bidder. MassDevelopment reserves the right, in its sole discretion, to waive any informalities, minor deviations, insignificant mistakes and matters of form rather than substance and to seek clarification of the bids. No officer, member, manager, or agent of MassDevelopment is authorized to waive this reservation.

MassDevelopment reserves the right to accept or reject, in whole or in part, any and all bids, to solicit new bids and to award contracts as it deems to be in the best interest of Owner.

Any bid submitted in response to this IFB shall be considered a firm offer and shall remain effective unconditionally for sixty (60) days.

By submitting a bid to MassDevelopment, bidder is certifying that its offer is in all respects bona fide, fair and made without collusion or fraud with any person. As used in this section, "person" shall mean any natural person, joint venture, partnership, corporation or other business or legal entity.

Bidders are hereby notified that issuance of this IFB and receipt of bids does not assure that a bidder will be selected.

Bidders will bear all costs and expenses incurred in preparation of their bids and in the execution of any contract with MassDevelopment. MassDevelopment is not liable for any costs incurred by a bidder in the preparation and production of a bid or for any work performed prior to contract execution.

MassDevelopment is exempt from Massachusetts state sales and use taxes on materials and equipment to be incorporated in the work. Said taxes shall not be included in the bid.

Specification – Power Transformer Procurement,
Hospital Road Substation, Devens, MA – Project No. 23-001

The document beginning on the following page and preceding Appendix A – FORM FOR BID sets forth the specifications and requirements associated with the procurement of power transformers for the Hospital Road Substation in Devens, Massachusetts.

SECTION 01 11 01

POWER TRANSFORMER PROCUREMENT

SUMMARY OF WORK

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Summary of work included in this Contract

B. Pre Award Factory Inspection

C. Schedule and Monthly Status Reports

D. Experience

E. Manufacturing Plant Location

F. Transformer Design Requirements

G. Warranty Requirements

H. Factory Inspection

I. Spare parts and accessories

1.02 WORK INCLUDED

A. Furnish and Deliver two (2) Power Transformers, 69 kV Delta – 13.8 kV GrdY, 24/32/40 MVA, in accordance with Section 26 12 14.51 to the MDFA Hospital Road Substation.

B. Rigging and hoisting required to place the transformers on their foundations at the substation site.

C. Field assembly and field testing of the transformers to make ready for service.

1.03 PRE-AWARD FACTORY INSPECTION

A. The OWNER may, at its discretion, conduct a factory inspection of selected bidders as a part of its bid review and evaluation process.

B. Vendor shall allow OWNER's representatives access to the facilities where the Vendor proposes to manufacture the equipment included in this bid, and shall provide a brief meeting with the proposed design team associated with this project, for the purpose of qualifying the Vendor's capabilities.

1.04 SCHEDULE AND MONTHLY STATUS REPORTS

A. On time delivery is important to OWNER

B. OWNER and MANUFACTURER shall reach agreement with respect to the delivery schedule at the time of contract award.

C. MANUFACTURER shall provide a detailed design and manufacturing schedule for each unit within 4 weeks of award of this Contract. This schedule shall include, at a minimum, the following line items and associated dates:

- Issue mechanical shop drawings

- mechanical drawings returned approved
- Issue electrical shop drawings
- electrical drawings returned approved
- tank fabrication
- core cutting & stacking
- winding
- nest core/coils and drying
- tanking
- factory acceptance tests
- shipment
- delivery to site
- assembled and ready to operate

D. This schedule shall include a column with the required date for each task, and a column with the actual date for each task.

E. MANUFACTURER shall provide a monthly status report and updated schedule (via email) to OWNER and ENGINEER confirming that the design, manufacturing and delivery of the equipment is proceeding in accordance with the schedule.

F. MANUFACTURER shall immediately notify OWNER of any event that occurs that could cause a delay in the schedule.

1.05 EXPERIENCE

A. MANUFACTURER shall have a minimum of 5 years of experience with the design, assembly and testing of large power transformers that are similar in size and voltage rating to the equipment specified herein. References shall be provided upon request.

1.06 MANUFACTURING PLANT LOCATION

A. The transformer shall be manufactured at a facility located within a 1500 mile radius of Devens, Massachusetts (no exceptions).

1.07 TRANSFORMER DESIGN REQUIREMENTS

A. Transformers shall be of a common design and shall utilize common components and accessories where possible. This shall include, at a minimum:

1. Bushings
2. Arresters
3. Insulators
4. Hardware and fittings
5. LTC

6. Gauges and electronic accessories

7. Radiators and cooling equipment

8. Oil preservation equipment (nitrogen system)

1.08 WARRANTY REQUIREMENTS

A. Include in the base bid cost a warranty that covers a period of 12 months from the date of energization, or 18 months from the date of acceptance by the OWNER, whichever is shorter. Warranty shall include rigging and transport costs to and from the factory if factory repair is required.

B. Provide an additional cost in the appropriate line items on the bid form for five (5) year extended warranty coverage in lieu of the standard warranty above. The five year warranty shall provide coverage for a period of 60 months from energization, or 66 months from date of acceptance by the OWNER, whichever is shorter. The extended Warranty shall include rigging and transport costs to and from the factory for at least the first 12 months after energization or 18 months after date of acceptance if factory repair is required. Any items that are excluded from the extended warranty must be clearly noted as part of the proposal.

1.09 FACTORY INSPECTION

A. Owner will typically witness dielectric testing of the first unit of each size/type to be completed, and may elect to witness additional testing.

B. Provide a minimum of twenty one (21) day advance notice of the transformer inspection dates to allow time for travel arrangements.

1.10 SPARE PARTS AND ACCESSORIES

A. Furnish and deliver spare parts. Make spare parts interchangeable with and same material and workmanship as corresponding original parts. Include the cost of these spare parts in the appropriate item on the Bid Form (not to be included in the Base Bid).

Quantity	Description
3	H Bushings
3	X Bushings
3	H Bushing Surge Arresters
3	X Bushing Surge Arresters
4	One quart containers of touch-up paint
2	Complete sets of gaskets for all removable openings, including cover, manholes and handholes.
2	Complete sets of replaceable contacts and coils for each type of relay furnished
1	Pressure gauge of each type furnished
1	Temperature gauge of each type furnished
1	OSHA compliant tether pole and fall arrest lanyard (one for total order) for personnel to tie off when working on top of transformer tank. Tether pole shall be compatible with the mounting provisions specified in Sections 26 12 14.51.

B. Provide a list with pricing of recommended spare parts for each transformer WITH BID.

C. Provide separate cost for one (1) set of LTC contacts, to include all replaceable current carrying contact parts, along with any items that the Manufacturer recommends replacing with the contacts (springs, etc.)

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01 33 24

SUBMITTALS AND SHOP DRAWINGS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Submittal Procedures

B. Submittal Schedule

C. Number of Copies

D. Final Drawings

1.02 SUBMITTAL PROCEDURES

A. Make submittals as required by the individual specification sections.

B. Coordinate and check all shop drawings furnished by suppliers and subcontractors for accuracy and conformance with requirements of the Contract Documents.

1.03 SUBMITTAL SCHEDULE

A. Provide a submittal schedule within fourteen (14) calendar days after vendor receipt of order indicating anticipated date of each required submittal.

B. Schedule submittals to expedite the project

C. Deliver submittals to the ENGINEER, with copy of transmittal to the OWNER, at the addresses shown in the specifications.

D. Include the following:

1. Description of each submittal

2. Date by which each submittal will be delivered to ENGINEER and OWNER.

3. Date by which each submittal must be approved to maintain project schedule.

4. Relevant specification section reference

E. Allow reasonable time for ENGINEER and OWNER to review shop drawings and for possible resubmittal.

F. Shop drawing submittals are required no later than the following periods after Contract Award:

1. Transformer Outline and weight drawings – 12 weeks after vendor receipt of order

2. Remaining Transformer Drawings – as required to meet delivery schedule

1.04 NUMBER OF COPIES

A. Submit the following:

1. One set of electronic drawing files, compatible with AutoCAD 2007, supplied on CD or via E-Mail. The transmittal shall include any required plot, shape, font or linetype files to allow for proper plotting. Include a written description of the layer naming and line weight conventions and any instructions for setup of files for proper plotting.

2. One full size PDF print of each drawing shall be provided with the drawing submission.

3. Three copies in addition to the number the Vendor wants returned of all preprinted manufacturer's data, brochures and other information submitted.

1.05 PRESENTATION

A. Present in a clear and thorough manner.

B. Identify dimensions, show relation to adjacent or critical features.

C. Use sheet size of not less than 8-1/2 by 11 inches and not more than 24 by 36 inches.

1.06 SHOP DRAWING REVIEW COMMENTS

A. ENGINEER's review will be completed within a reasonable time after receipt by ENGINEER of each submittal in proper sequence, and will be returned to CONTRACTOR with one of the following markings:

"*Approved*" indicates submittal has been reviewed and appears to be in conformance with requirements of the Specifications. CONTRACTOR may proceed with construction shown on the submittal.

"*Make corrections noted*" indicates submittal appears to be in conformance with requirements of the Specifications. CONTRACTOR shall incorporate the corrections noted and may proceed with construction shown on the submittal. No resubmittal is required.

"*Amend - resubmit*" indicates submittal does not appear to be in conformance with the Procurement Documents. ENGINEER's comments will be noted on the submittal or in a separate letter. CONTRACTOR shall recheck, make necessary revisions and resubmit.

"*Submittal not required - no action taken*" indicates that the submittal is not called for by the Specifications and that no action was taken by ENGINEER.

B. Review for conformance with design concepts and compliance with Specifications does not require ENGINEER to review features solely related to construction or all dimensions, quantities and other data. CONTRACTOR shall not rely on ENGINEER's approval as a verification or check of all such items in the submittal or of satisfactory and safe installation and construction. CONTRACTOR shall verify all fabrication and installation requirements, quantities and dimensions.

C. The Vendor's responsibility for errors and omissions in submittals is not relieved by the ENGINEER's review.

D. Shop drawing acceptance by the OWNER or ENGINEER shall not be construed as approving departures from the Contract requirements.

1.07 AS-BUILT DRAWINGS

A. Revise all drawings to reflect the as-shipped condition of all equipment.

B. Submit as-built drawings, except wiring drawings, prior to delivery of the respective equipment.

C. Submit as-built wiring drawings no later than two (2) weeks after date of shipment of equipment.

D. Indicate "As-Built" in revision block and sign. Show all changes and revisions to date of completion. Submit the following quantities:

1. All Drawings – two (2) black on white full size prints (included with O&M manuals, see section 01 78 23).

2. One set of electronic drawing files, compatible with AutoCAD 2007, supplied on CD or via E-Mail. The transmittal shall include any required plot, shape, font or linetype files to allow for proper plotting. Include a written description of the layer naming and line weight conventions and any instructions for setup of files for proper plotting.

3. One full size PDF print of each drawing shall be provided with the drawing submission.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01 66 02

DELIVERY, STORAGE AND HANDLING

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Products

B. Transportation and handling

1.02 PRODUCTS

A. Products: means new material, machinery, components, equipment, fixtures, systems and manufactured units used in Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work.

B. Provide interchangeable components of the same manufacturer, for similar components.

1.03 TRANSPORTATION AND HANDLING

A. Prepare and load Products in such a manner as to provide protection from damage during shipment. Securely cover and protect Product so that it is not damaged during shipment by environmental factors such as rain, wind, snow, etc. or by physical conditions such as rocks or other objects.

B. Provide advance copy of weight list for each shipment. Weight list to be received by OWNER in accordance with the minimum delivery notice requirements.

C. Ship heavy or bulky equipment in open-top truck to facilitate unloading at OWNER's site.

D. Where appropriate, mount heavy parts on skids or crates, and box or bundle securely small parts that may be lost. Mark packaged items for ready identification. Arrange Products exceeding 200 pounds in weight so that slings may be properly attached for lifting by crane.

E. Mark all parts for ease of field assembly.

F. Provide notices and packing lists required by Contract Documents

G. Vendor to retain responsibility for any damage to Product until delivery is accepted by OWNER.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 78 23

OPERATION, MAINTENANCE AND INSTALLATION MANUALS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Preparation

B. Contents

C. Submittal

1.02 PREPARATION

A. Provide complete Operations, Maintenance and Installation Manuals covering the Goods furnished under this Contract, as follows:

B. Prepare Manuals in 8 1/2" x 11" format, bound in a substantial binder with three (3) D-type rings (Avery Heavy-duty binder or equal, with clear cover pockets).

C. Internally subdivide the binder contents with permanent page dividers logically organized in accordance with the general table of contents below. Tab titles shall be clearly printed on reinforced, laminated plastic tabs, and keyed to a table of contents.

D. Each copy of the manuals shall be assembled and bound in a substantial binder imprinted on the backbone (spine) and cover with the following:

MASS DEVELOPMENT FINANCE AGENCY
DEVENS, MASSACHUSETTS

HOSPITAL ROAD SUBSTATION
69–13.8 KV POWER TRANSFORMERS
(DATE OF DELIVERY)

Manufacturer's Name
Manufacturer's Address

E. Identify individual volumes as “1 of 2", “2 of 2", etc. on backbone and cover if manual requires multiple volumes.

F. Prepare a detailed table of contents for each binder, with material, equipment or system identified, to describe each section of the manual.

1.03 CONTENTS

A. The instruction manuals shall include, as a minimum, the following:

1. Directory listing the Name, address and contact telephone numbers of CONTRACTOR and any local field service facilities

2. General Table of Contents

a. Descriptions of equipment furnished

b. Specifications, test data, and curves

c. Instructions in the methods of receiving, inspection, storage, handling, and maintenance

d. Methods of installation and trial operation of the equipment

e. Assembly drawings

f. Parts list

g. Recommended spare parts with pricing

h. Lubrication instructions (if applicable)

i. Nameplate information

j. Shop order numbers for each item of equipment or component

1.04 SUBMITTAL

A. Two sets of printed instruction manuals shall be sent at time of shipment of equipment.

B. The manuals shall include complete printed documentation for each electronic accessory that is furnished.

C. ENGINEER shall review and approve the manuals and any additional information shall be furnished in sufficient quantities to allow for insertion.

D. Following approval, two (2) electronic copies of each instruction manual shall also be provided. Electronic files shall be in Adobe (PDF) format, and shall be provided on portable digital media. Electronic files shall include the entire instruction manual, with each component in a separate PDF file (ie. do NOT make the entire manual one very large PDF file).

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 26 12 14.51

69 -13.8 KV POWER TRANSFORMER

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Design, manufacture and testing of outdoor oil-immersed substation power transformer.

B. Transport of transformer from MANUFACTURER to substation site, off-loading and placement of transformer on foundation, final assembly, dressing out, and field testing of transformer, as needed to make ready for service. All external wiring connections (primary, secondary, control and grounding) will be done by others.

1.02 REFERENCES

Design, manufacture and test in accordance with this section and applicable sections of the latest revision of the following standards.

A. ANSI C57 and NEMA TR-1, Transformer, Regulators and Reactors

B. ANSI C57.19, Apparatus Bushings

C. ANSI C62, Surge Arresters

D. ASCE 7, Minimum Design Loads for Buildings and Other Structures

E. ANSI Z55.1, Standard Gray Finishes for Industrial Apparatus and Equipment

F. ANSI C80.1, Standard Specifications for Rigid Steel Conduit

G. ANSI B16.5, Slip-on Welding Flanges

H. ANSI C57.92, NEMA TR-98 regarding loading

I. ASTM D-3487, Mineral Insulating Oil Used in Electrical Apparatus

J. IEEE, Latest Short Circuit Withstand Requirements

K. ICEA, Specifications for Wire and Cable

L. NEC, Current rating of Control Wiring

1.03 DESIGN AND PERFORMANCE REQUIREMENTS

A. Application: oil immersed three phase, three-winding, delta/wye-grounded power transformer, applied as a distribution substation step-down transformer.

B. Supply voltage: nominal 69 kV within a range of 69 kV, plus or minus 5 percent.

C. Design transformers and all ancillary equipment with overload capabilities in accordance with ANSI C57.92 and NEMA TR-98.

D. Provide load tap changing capability on low voltage windings and de-energized tap changing capability on high voltage windings.

E. Design transformers to be capable of withstanding short circuit forces in accordance with ANSI C57.12.00 and C57.12.90. Certified short circuit test data for a transformer of similar design, voltages and MVA capacity showing no evidence of failure during the short circuit test shall be provided to document the capability of the transformer plant and design. A description of the test code under which the transformer was tested shall be provided.

F. A vapour phase system shall be utilized to dry and impregnate the completed core and coil assembly.

G. Design 13.8 kV cable termination compartment cable collector bus and supporting insulators to be capable of withstanding all short circuit forces assuming a phase to phase fault and infinite primary source capacity.

H. The Transformer and its accessories shall be qualified in accordance with IEEE Standard 693-1997, IEEE Recommended Practice for Seismic Design of Substations. The seismic qualification level shall be “MODERATE”.

I. Loss Evaluation

1. No Load loss factor: $10,423 per kW at nominal voltage ratings.

2. Load loss factor: $2,053 per kW at ONAN rating.

If the tested losses for the transformer do not exceed the quoted guaranteed maximum losses, the transformer will be accepted.

If the tested No Load losses for the transformer do exceed the quoted guaranteed maximum No Load losses, a sum equal to the excess amount of the No Load loss times the No Load loss factor will be deducted from the contract dollar amount. Credits will not be issued for tested losses below quoted values.

If the tested Load-Loss losses for the transformer do exceed the quoted guaranteed maximum Load-Loss values, a sum equal to the excess amount of the Load-Loss times the Load-Loss factor will be deducted from the contract dollar amount. Credits will not be issued for tested losses below quoted values.

1.04 SUBMITTALS

A. Submit the following in accordance with Section 01 33 24

1. Product Data: Catalogs and cut sheets.

2. Shop Drawings

a. Outline showing general arrangement, legend, plan, elevation, base details, shipping and installed weights, dimensions, gallons of oil, with location of centers of gravity on outline, and material list detailing all major accessories, including OEM manufacturer’s catalogue numbers.

1) All user interface points (conduit entrance plates, flanges, etc.) shall be dimensioned on the outline drawing.

2) Outline drawing shall clearly show the details of the 13.8 kV cable terminal compartment and the 13.8 kV cable collector bus connection and mounting arrangement.

3) Shop drawings for removable insulating boots for the 13.8 kV cable terminal compartment. Include these components on material list on outline drawing.

b. Connection, alarm, control and auxiliary schematic diagrams.

c. Internal wiring and connection diagrams (tabular format is not acceptable). **Wiring diagrams shall utilize an address (destination) system**.

d. Bushing current transformers:

1) Excitation and ratio correction factor curve for each secondary ratio.

2) Resistance of current transformer secondary and connecting leads for each ratio.

3) Actual current ratio and turn ratio for each tap.

4) Mechanical and thermal short time (one second) rating.

e. Nameplate data, including current transformer taps. Resubmit nameplate drawing after factory tests with all fill-in data completed.

f. Physical drawings of control cabinets showing equipment arrangement, terminal block locations, cable entrance and panel layout.

g. Bushing lifting accessories and ground pad outlines.

h. Notes and symbols.

i. Bill of material.

3. Design Data

a. MANUFACTURER's certification that all equipment and assemblies conform to the seismic performance requirements stated in Article 1.03.

b. Certified short circuit withstand test results on units of comparable rating and design.

4. Test Reports

a. All test reports shall be provided electronically in PDF format on portable digital media.

b. two (2) copies of certified factory test reports of transformer after final test.

c. two (2) copies of certified factory test reports for all accessories.

d. two (2) copies of certified field test reports of transformer after installation and assembly.

5. As-Built Drawings

a. Show all changes and revisions to date of equipment shipment.

6. Pictures

a. Take a minimum of five (5) digital high resolution color photographs of the core and coil assembly prior to placement in the tank, one each from the top and each of the four sides. Pictures shall show internal construction and connection details and leads.

b. Provide two complete high-resolution 8” x 10” printed sets of the transformer pictures.

c. Provide two (2) copies of digital files for pictures on portable digital media.

B. Operation, Maintenance and Installation Manuals

1. In accordance with Section 01 78 23.

1.05 QUALITY ASSURANCE

A. Assemble, adjust and complete routine production tests in accordance with Table 19 of ANSI C57.12.00-2000, NEMA TR-1 and these specifications. In addition, complete the following other tests (all tests to be performed on each unit under this contract unless noted).

1. Insulation Resistance

a. High Voltage to Low Voltage

b. High Voltage to Low Voltage grounded

c. Low Voltage to High Voltage grounded

d. Each core to ground with core ground strap removed

2. Turns ratio test shall be performed for all three phases, on all De-energized Tap Changer positions with LTC in neutral and on all LTC positions with DETC in center position. Energize the LTC control and verify that the control indicates correct LTC position on all taps.

3. Polarity and Phase Relationship tests shall be performed on each phase to verify subtractive polarity and correct angular displacement and phase sequence.

4. No-load Loss and Excitation Current Tests

a. Perform tests at 90%, 100% and 110% of rated voltage on the exciting winding, with the other winding on rated voltage tap.

b. Perform single-phase excitation test on all three phases, in all De-energized Tap Changer positions, with LTC in neutral.

5. Impedance and Load Loss Tests

a. Test values to be corrected to 85˚C.

b. Perform tests at the ONAN and top ONAF ratings, for all De-energized Tap Changer positions and LTC in neutral, and for highest loss tap combination.

c. Report impedance values in percent on the base ONAN rating of the high voltage winding.

6. Noise Tests

a. Conduct noise tests on the first unit of each rating only.

b. Measure and report the A-weighted sound level, in accordance with ANSI C57.12.90, for all ratings.

c. Perform the noise test with the actual auxiliary equipment (radiators, fans, external compartments, etc.) that will be supplied with the transformer.

d. Perform the noise test on the fixed tap and LTC tap position that results in the highest noise level.

7. Temperature Rise Tests

a. Conduct a temperature rise test in accordance with ANSI C57.12.90 for both the ONAN and top ONAF ratings. Take sufficient measurements to ensure that no portion of the transformer exceeds the maximum allowable temperature rise.

b. Temperature rise tests to be conducted at the tap and connection configuration that is expected to product the highest temperature rise.

c. Temperature rise tests shall utilize the actual cooling equipment that will be furnished with the transformer, not substitute equipment.

d. DGA tests shall be performed in accordance with ANSI C57.104 before the Temperature rise test, and immediately after each test (one after ONAN rating test and one after top ONAF rating test).

8. Dielectric Tests

a. Insulation Power Factor

1) Test and report the following readings:

a) High Voltage to Low Voltage and Ground

b) Low Voltage to High Voltage and Ground

c) High Voltage and Low Voltage to Ground

d) Low Voltage to Ground, Guard on High Voltage

e) High Voltage to Ground, Guard on Low Voltage

f) High Voltage to Low Voltage, Guard on Ground

2) Tests shall be performed utilizing the Doble M4000 test set. Provide electronic copy of test file for each unit.

3) Tests shall be performed as close as practical to 20°C to minimize inaccuracies from correction factors. Readings shall be corrected to 20°C for reporting and analysis.

4) Direct failure criteria shall be based on ANSI C57.12.90, Method II. If any corrected insulation power factor reading listed in Method II is greater than 0.5%, then the OWNER must be consulted prior to shipment. The OWNER reserves the right to reject any transformer with an insulation power factor reading (corrected to 20°C) that is greater than 0.5% in accordance with ANSI C57.12.90, Method II.

5) The OWNER reserves the right to require that corrective actions be taken, at the OWNER's expense, if any corrected insulation power factor reading required by this specification but not listed in Method II is greater than 0.5%.

b. Class II Power Transformer Impulse tests, in accordance with ANSI C57.12.90.

c. Partial discharge measurement concurrent with Class II Power Transformer Induced Voltage test. Failure detection criteria shall be in accordance with ANSI C57.12.90-1999, 10.8.5.

d. DGA tests shall be performed in accordance with ANSI C57.104 both before and immediately after the Dielectric Tests.

9. Sweep Frequency Response Tests: Test equipment shall be the Doble M-series test set or similar approved equipment. Provide test file.

10. Leakage Reactance test

11. Accessory Tests

a. Bushings:

1) Test each bushing in accordance with routine tests as detailed in ANSI C 76.1 and C37.09a.

2) Where applicable, test bushing power factor, C1 and C2 with Doble M4000 test set. Include results in transformer test file.

b. Surge Arrestors

1) Test each surge arrester in accordance with ANSI standards.

2) Where applicable, test surge arrestor power factor with Doble M4000 test set. Include results in transformer test file.

c. Test each auxiliary device (fans, gauges, controls, relays, etc.) for proper operation and in accordance with Manufacturer recommendations.

d. Perform dielectric tests on control devices and wiring per NEMA IC-1, “Standard for Industrial Control".

e. Perform the following tests on each current transformer:

1) Low frequency, one-minute 2,500 volts to ground dielectric test on secondaries

2) Proper nameplate and polarity marking check

3) Polarity and ammeter ratio check after installation in bushing

B. Provide a certified factory test report for each individual transformer that is to be furnished. Test reporting shall generally be in accordance with ANSI/IEEE C57.12.90. Test results shall be tabulated and furnished where appropriate. Test report shall include results for additional tests that are required by this specification.

C. OWNER may inspect unit and/or witness all or a portion of the testing procedure.

1. The secondary air terminal chamber shall be fully assembled at the time of OWNER’s plant inspection.

D. Manufacturer shall notify OWNER within 24 hours of failure of any factory test that could impact the delivery schedule.

E. Test Failure (factory or field tests)

1. Grounds for rejection

a. Failure to attain satisfactory test results

b. Failure to meet applicable standards

2. In the event of failure of test:

   a. Submit details of the test failure in writing.

   b. Submit a recommended procedure and schedule for equipment repair and retesting to the OWNER and ENGINEER for approval.

   c. Obtain ENGINEER approval before proceeding.

   d. Notify OWNER and ENGINEER as soon as practical before retesting is to occur, allowing enough time for attendance if desired.

   e. Furnish new equipment which meets the requirements of the Specification if rejected equipment cannot be rectified to the satisfaction of the OWNER and ENGINEER.

   f. Retest after rectification or replacement of equipment in presence of OWNER or ENGINEER unless waived.

3. Assume responsibility for all costs associated with any test failure, including but not limited to:

   a. Loss or damage due to testing

   b. Rectification

   c. New equipment to replace damaged or non-rectifiable equipment

   d. Retesting

   e. Replacement equipment, including installation, removal, delivery, transportation, field service, etc.

   f. Witness of retesting by OWNER and ENGINEER, including travel, lodging, meals, and payroll, at no additional cost to OWNER.

F. Submit factory test report to OWNER for approval prior to shipment of transformer. Do not ship transformer until factory test report is approved.

G. Submission of certified factory or field test reports does not relieve manufacturer of responsibility for meeting the requirements of the Specification.

H. For units that are shipped filled with dry air, a dew point measurement shall be taken with the transformer on the shipping vehicle, 24 hours after filling the tank with dry air. The dew point shall meet the MANUFACTURER's standard requirements for oil filling, but shall be at least -30°C at 20°C ambient temperature. The results shall promptly be reported to OWNER. The OWNER reserves the right to reject or require corrective actions to the transformer if it does not pass this test.

I. Complete field testing in accordance with Part 3 - Execution of these specifications.

1.06 DELIVERY, STORAGE AND HANDLING

A. Proceed in accordance with Section 01 66 02.

B. Deliver assembled to fullest extent possible, f.o.b. to substation foundation. MANUFACTURER is responsible for arranging, paying freight and shipping, and handling equipment between factory and foundation. MANUFACTURER is responsible for all charges caused by delays in offloading transformer associated with damage or impact recording during shipment, including excess crane, demurrage and personnel charges.

C. MANUFACTURER is responsible for all required transportation surveys, routing and permitting. MANUFACTURER is advised to inspect site during bid period to identify any site access concerns.

D. Deliver all accessories, including oil if required, to the Project Site. MANUFACTURER is responsible for arranging for, coordinating and paying for delivery and handling of accessories.

E. It is OWNER's strong preference that transformer and associated equipment be shipped via truck. Delays related to shipment by rail, including an allowance for extra handling time between rail siding and project site, shall be factored into the proposed manufacturing and delivery schedule. Transformers shall not be shipped by rail unless initially internally designed and braced for rail shipment.

F. Transformer shall be shipped either oil-filled, or if not practical then filled with breathable dry air.

G. Firmly attach three-way impact recorder accelerometer with GPS position transmitter to transformer tank during transportation period. Recorder shall transmit geographic position and impacts recorded at least 12 times per day. Information that is transmitted shall be stored and shall be made available to OWNER on a real time basis via internet connection. Provide login and password information to OWNER and ENGINEER prior to shipment. Recorder to be removed only at designated f.o.b. delivery point. MANUFACTURER's representative shall be present along with OWNER, and both shall inspect the transformer upon delivery for any obvious signs of damage. MANUFACTURER shall maintain a copy of the position and impact recording data and a copy shall be furnished to OWNER upon request.

H. Equipment to be unloaded by MANUFACTURER.

I. Concrete foundation to be provided by OWNER.

1.07 PROJECT/SITE CONDITIONS

Isokeraunic level	30 thunderstorm - days/year
Snow Load	40 pounds per square foot
Elevation above sea level	less than 3,300 feet NGVD
Temperature range (min/max)	-30 degrees F/plus 104 degrees F
Precipitation	40-45 inches/year average

PART 2 - PRODUCTS

2.01 PRINCIPAL RATINGS AND ELECTRICAL CHARACTERISTICS

A. Furnish power transformer with the following principal ratings and electrical characteristics.

1. Overload capabilities: in accordance with ANSI C57.92, NEMA TR-98.
2. Number of phases 3
3. Frequency ..... 60 Hz
4. Cooling class ONAN/ONAF1/ONAF2
5. Continuous Ratings and Impedance:

a. ONAN, 65 degrees C rise: ..... 24 MVA

b. ONAF1, 65 degrees C rise, first stage forced cooling: ..... 32 MVA

c. ONAF2, 65 degrees C rise, second stage forced cooling: ..... 40 MVA

d. High Voltage to Secondary Voltage Impedance at ONAN Rating: .....10.0 %

(ANSI Standard Tolerance)

6. High Voltage Winding

a. Voltage ..... 69,000 V

b. Connection ..... Delta

c. Basic Impulse Level (BIL) ..... 350 kV

d. De-Energized Tap Changer Plus or minus 5 percent in four 2.5 percent steps

7. Low Voltage Winding

a. Rated voltage ..... 13,800 GRDY/7,970 V

b. Connection ..... Wye-grounded

c. Basic Impulse Level (BIL) ..... 110 kV

d. Basic Impulse Level (BIL) Neutral..... 110 kV

e. Load tap changer 32-5/8 percent taps, 10 % above and 10 % below rated voltage

8. Maximum Temperature Rise

a. By Resistance ..... 65 degrees C

b. By Hot Spot ..... 80 degrees C

9. Duty ..... Continuous

10. Angular displacement.....Dyn1

11. Noise level ..... 10 dBA below NEMA standard, or quieter, for all cooling levels, on all no-load and LTC tap positions

2.02 COMPONENTS

A. Transformer Tank

1. Welded steel plate construction, liquid tight, with bolted and gasketed manhole(s) on top of tank. Mounted on steel skid base, suitable for skidding in any direction. Use care to avoid tank or component distortion during welding operations. Assembled transformer base shall be sufficiently flat to be installed on a flat concrete foundation without supplemental shims.

2. Adequately designed and braced to allow full vacuum filling and vacuum drying operations in the field.

3. Provide jacking lugs and pulling eyes for lifting or moving along either axis when completely assembled and oil-filled. Lifting lugs to be mounted near the top of the tank. Jacking lugs shall be installed with approximately 13 inches of clearance to the bottom of the base plate.

4. Provide two NEMA 2-hole copper faced or stainless steel ground pads at diagonally opposite corners of transformer tank near base, with two-bolt terminal connectors for 4/0 AWG copper conductors.

5. Provide NEMA 2-hole copper faced or stainless steel ground pads at Surge Arrester ground points, and on tank cover adjacent to secondary bushing X0.

6. Maintain positive pressure continually to prevent ingress of moisture during shipping.

7. Provide an adequately braced domed or sloped top on all major surfaces. Design tank and fittings to prevent water puddling on surfaces or in cavities.

8. Provide raised flanges with thru-bolts for all removable cover penetrations, including bushings, manhole/handhole covers and removable equipment. Welded studs are not acceptable.

9. All gasket surfaces shall be machined true and smooth, and shall have a recess or raised stops to properly seat the gasket and limit compression to design values.

10. Provide manholes and handholes as required to properly access internal components that require maintenance or connection, including but not limited to bushing connections and current transformers. A minimum of one manhole cover, a minimum of 24 inches in diameter, shall be provided to allow access to the top of the tank without lowering the oil below the top of the core.

11. Tether Pole

    a. Provide safety tether pole mounting provisions as near as practical to the center of the tank cover.

B. Drain, Fill and Sampling Valves

1. All valves and plugs for oil handling shall be of brass or bronze, unless otherwise noted.

2. All valves for oil handling shall be supplied with a threaded plug or cap to seal the end when not in use.

3. Provide combination fitting for tank drain, lower filter press connection and oil sampling point. This fitting shall be located where it will be readily accessible for oil handling and sampling activities, and not below a radiator bank. This fitting shall be at the base of the transformer tank low enough to fully drain the entire volume of oil. This fitting shall include one (1) two inch globe valve for drain and filter press connection, and one 3/8 inch oil sampling valve with a 5/16 inch – 32 male thread and cap.

4. Provide one (1) two inch globe valve for tank filling, located in the tank sidewall near the top of the tank (just below the 25 C oil level).

5. Provide one (1) 3” ball valve for vacuum filling. Locate valve at top of tank and far enough from the top oil valve connection to prevent oil spray from being drawn into vacuum line. Provide 90 degree elbow fitting between tank and valve so valve and connection are horizontal.

6. Provide ball valve and fittings to allow nitrogen pressurization of the head space.

7. Provide ball valves and fittings suitable for all external accessories such as fault gas monitors, etc.

C. Core

1. Highest quality, non-aging, cold-rolled, grain-oriented, stress free, thin silicon steel laminations, having high permeability and low hysterisis loss.

2. Properly annealed, with smooth surfaces at edges.

3. Have each sheet provided with an insulated surface treatment which is impervious to hot transformer oil.

4. Carefully assembled, rigidly clamped and blocked to prevent deteriorating vibrations, interference with oil circulation, objectionable noise conditions and short circuit and shipment distortions.

5. Provide a core ground lead connected to an external bushing for each separate core. Provide a flexible ground strap to connect the terminal of the bushing to the transformer tank, thereby grounding the transformer core. Provide a suitable cover or deflector to protect the core ground bushing from damage from falling objects. Provide an engraved nameplate clearly indicating the function of the bushing. Provide a separate core ground bushing and ground strap for each separate core (main core, preventative auto, etc.). If core ground bushings are located in a box, no other connections (CT, etc.) shall be made in that box.

6. Provided with means for properly handling core assembly when untanked.

7. Core: cruciform shape, fabricated with sheets stepped in dimension to approximate a circle and minimize the clearance from core steel to windings.

D. Windings

1. Electrolytic copper with high conductivity characteristics.

2. Winding type: circular in plan view. Sheet type windings are not acceptable.

3. Provided with thermally upgraded insulation system of high dielectric and mechanical strength, arranged to permit free circulation of oil.

4. Made up, shaped and braced to provide for expansion and contraction due to temperature changes and avoid abrasion of insulation.

5. Adequately braced to prevent distortion due to any normal or abnormal operating condition.

6. Brazed joints and pressure connectors are acceptable. Soldered connections are not allowed. No more than one connection shall be made in a single lead. Crimp connectors shall be “long barrel” type, with a minimum of two crimps each end.

7. Each lead for connection to tap changers, bushings, etc. shall be permanently identified.

8. Leads shall be adequately supported to resist movement due to normal or abnormal operating conditions, including maximum rated short circuit.

9. The maximum hot spot temperature of any lead shall not exceed the hot spot for any winding under operating condition, including specified overload ratings.

E. Cooling Equipment

1. Type: Two-stage ONAF conforming to ratings previously specified.

2. Radiators and Manifolds

    a. Fully supported by the main tank (no external support points will be permitted).

    b. Mounted to ANSI Segment 3 to the greatest extent practical.

    c. Of nominal dimensions and interchangeable.

    d. Radiators to be galvanized steel.

    e. Welded construction, with flanged connection and provisions for draining and venting, and without external cavities that would collect moisture.

    f. Provided with lifting eyes or lugs.

    g. Provided with oil-tight valves at connections to main tank that will allow removal of radiators without taking transformer out of service.

3. Fans

    a. Weatherproof construction with motors designed for fan duty.

    b. Mounted on sides of radiators. Bottom mounting is not acceptable.

    c. Provided with weatherproof locking type plug and socket connections.

    d. Provide with OSHA approved blade guards.

    e. Connected for 120/240V (single phase) station service.

4. Controls

    a. Automatically controlled by the winding temperature device, provided with automatic starting switches, auxiliary relays, alarm contacts, selector switch for AUTOMATIC-OFF-MANUAL operation and any other necessary devices.

    b. Provide separate circuit breaker of suitable rating for each fan stage.

    c. Where possible, design fan controls to alternate fan banks (lead and lag).

    d. Provide jumpered contact on terminal block to connect OWNER supplied external lockout relay contact to disable all fan operation.

    e. Mounted in main transformer control cabinet.

F. Transformer Oil

1. Pure inhibited mineral oil obtained by a hydrogen or a solvent extraction process from naphthalenic base crudes, meeting the requirements of ASTM D 3487 and ANSI C57.106.

2. Prepared and refined especially for transformer use, free of moisture, acid, alkali, PCB's and injurious sulphur compounds.

3. Free from deposit formation under normal operating temperatures.

4. Dielectric strength not less than 30,000 volts between one inch discs spaced 1/10 inch apart.

G. Oil Preservation System

1. Type: positive pressure nitrogen blanket system, designed to automatically maintain a blanket of dry nitrogen gas above the oil level at a positive pressure, not to exceed 5 psig.

2. Include sufficient dry nitrogen gas for the initial gas supply, including any gas needed to purge the tank prior to operation. There shall be at least one full cylinder remaining when the transformer is fully assembled and ready for service.

3. Provide a weatherproof enclosure with a full-height, gasketed hinged door, mounted at ground level, to contain active nitrogen cylinder, spare nitrogen cylinder, and regulator, valve and alarm assemblies. Locate enclosure so that the bottom is no more than one (1) inch above the base of the Transformer.

4. Size the enclosure such that the cylinders can be installed so as to not damage hoses or wiring. **Regulator and valves shall be supported by a chain hanger connected to the enclosure, not only by hose connection.**

5. Include a separate sample/fill valve, connected through independent piping to the gas space so that gas can be sampled for analysis.

6. Include a three-stage pressure regulator, with cylinder pressure and tank pressure/vacuum gauges. Include the following alarm contacts, wired through terminal strips to annunciator:

   a. Nitrogen cylinder low pressure (set to alarm <200 psig.)

   b. Transformer low pressure alarm

   c. Transformer high pressure alarm

7. Include an engraved metallic plate on the inside of the cylinder enclosure door that contains a diagram of the nitrogen system and detailed instructions for use.

H. Low Voltage Air Terminal Compartment

1. Purpose: Interconnection of 13.8 kV cables to OWNER's switchgear.

2. Location: Main transformer tank sidewall - ANSI segment 1.

3. Construction: welded plate steel unless noted.

4. Compartment may be removable for shipping purposes if necessary.

5. Height: Minimum six (6) feet from bottom plate to bottom of secondary bushing extensions (cable collector bus).

6. Width: As required to accommodate and assemble internal components and cables.

7. Depth: Design compartment to project a minimum of 60 inches beyond the sidewall of the transformer tank.

8. Internal Clearances: Provide no less than 15" phase-phase and 8" phase-ground spacing to all live parts or surfaces within enclosure, including cable terminal lugs.

9. 13.8 kV Cable Collector Bus

   a. Material: copper bar.

   b. Drill bars to accommodate four (4) sets of NEMA 2-hole lugs (total of eight holes) spaced horizontally at 3" OC, to accommodate up to eight cables with four on each side of the bar.

   c. Support: from the roof of the compartment with minimum of two 15 kV rated polymer standoff insulators per phase. Utilize bent copper bar to attach collector bus to insulators.

d. Short Circuit Capability: Insulator supports to be sufficient to prevent damage during a worst case (phase to phase) external fault (based on infinite primary source capacity). Polymer body station post type Insulators with multiple attachment bolts per face shall be used.

e. No mechanical force is to be transferred to the bushings.

f. Bus Bar Continuous Rating: 2,000 amperes minimum (size for specified ampacity within enclosed space of terminal compartment).

g. Provide 2,000 ampere minimum rated (sized for operation within enclosed terminal compartment) pre-fabricated flexible connectors from secondary bushings to extension bars.

1) Type: flat braided straps, Burndy, or approved equal. Utilize multiple straps to attain require ampacity.

10. Insulating Boots

a. Provide removable boot-type insulated covers to insulate the secondary bushings, surge arresters, flexible connectors, bus extension bars and cable terminations.

b. All live parts shall be provided with insulated covers – no exposed live parts shall be present in the air terminal chamber.

c. Insulated covers shall utilize multiple components, one set (outer) for the bushings and flexible connections and a second set (inner) for the bus bars, cable terminations, surge arresters, etc. The intent is to permit removal of the outer boots only in order to detach the flexible straps from the bushings (to allow for testing of the transformer) without disturbing the cable terminations, bus extension bars and their insulating boots.

11. Conduit Entrance Plate

a. Provide a substantial removable **aluminum** gasketed bottom plate for power conduit entry.

b. Plate shall be of sufficient size to accommodate at least six (6) 6” trade size conduits.

c. Plate shall be centered on the X2 bushing extension bus.

d. Provide a “collar” mounted to the bottom of the compartment, with the plate mounted to the top of the “collar”. The intent is to allow the plate to be dropped over the conduits, but to allow the “collar” to be removed from below to facilitate transformer removal without removing the cable terminations from the cables.

e. Provide two handles to assist in plate removal.

12. See additional requirements contained herein for ground pads at base of enclosure, neutral bus and surge arresters, to also be housed in this compartment.

13. Provide three large hinged, gasketed, weatherproof doors for access to the air terminal compartment (one on front and one on each side). Doors shall be of substantial plate type construction (not sheet metal). Each door shall be secured with nuts to threaded studs welded to the enclosure on all four edges. Hinges shall be slotted to allow the door to be pulled back off the studs before swinging open. Each door shall be removable from its’ hinges to allow full access to the inside. The doors shall be sized to allow as much access as is practical without compromising the structural integrity of the enclosure. Doors shall be provided with lifting handles to facilitate lifting by hand or hoist.

I. Bushings

1. Bushing studs: Threaded, stud type, silverplated. Provide stud connectors with NEMA standard 4-hole (minimum) pad drilling sized to accommodate the full rating of the bushing.

2. Porcelain glazing: Free of imperfections.

3. Color: ANSI Z 55.1, No. 70, Light Gray.

4. High Voltage Bushings (H1, H2, H3)

   a. Type ..... Interchangeable

   b. BIL Rating ..... 350 kV minimum

   c. Current Rating ..... 800 amperes minimum

   d. Creepage Distance ..... Standard

   e. Mounting .....On Tank Cover – Segment 3

   f. Material: Porcelain, manufactured by the wet process

   g. Manufacturer: PCore, ABB or Approved Equal

5. Low Voltage Phase and Neutral Bushings (X1, X2, X3, X0)

   a. Type ..... Interchangeable

   b. BIL Rating ..... 150 kV minimum

   c. Continuous current rating:..... 2,000 amperes minimum

   d. Ratings shall be based on installation within the enclosed air terminal chamber.

   e. Creepage Distance ..... Standard

   f. Mounting: On tank sidewall - Segment 1, inside low voltage air terminal compartment

   g. Material: Porcelain, manufactured by the wet process

   h. Manufacturer: PCore, ABB or Approved Equal

J. Neutral Bus

1. Type: Copper bar.

2. Rating: as required to accommodate maximum phase to ground fault current, assuming an infinite capacity source (minimum 1/4" x 3").

3. Routing: along inside wall of air terminal compartment from neutral bushing to ground pad at bottom of air terminal compartment, then outside, following contour of transformer tank, from ground pad at base of air terminal compartment to NEMA standard 2-hole ground pad located near base of transformer (for connection to ground grid by OWNER).

4. Provide flexible connector between neutral bus and neutral bushing.

5. Provide eight (8) 1/2" holes for connection of cable shields.

6. Provide four (4) pairs of holes for connecting NEMA standard 2-hole lugs for OWNER's neutral connection. Holes shall be spaced approximately 6" apart, starting approximately

18" above bottom of compartment, drilled so that lugs will be at approximately a 45 degree angle angled down toward the removable bottom plate.

K. Bushing Current Transformers

1. Windings: fully distributed.

2. Minimum thermal rating factor: 2.0

3. Leads

a. Bring out to short circuiting-type terminal blocks located in main control cabinet.

b. Terminate leads from each current transformer on a separate terminal block.

c. Mark leads with permanent sleeve markers to indicate taps and polarity.

d. Use #10 AWG minimum, stranded copper with oil proof insulation

4. Current Transformers (for OWNER’s Use)

a. Multi-ratio, 5 lead, bushing type for relaying duty

1) Two 1200 - 5A MR, C400 Accuracy Class, on H1, H2, and H3 bushings

2) Two 2000 - 5A MR, C400 Accuracy Class, on X1, X2, and X3 bushings

3) Two 1200 - 5A MR, C400 Accuracy Class, on X0 bushing

5. Current Transformers (for Internal Use)

a. One CT, on X1 bushing for line drop compensation control of load tap changer

b. One CT, on one low voltage bushing for winding temperature indicator

L. Surge Arresters

1. Type: Outdoor, station class, gapless, metal oxide, for mounting connected to Transformer H and X bushings.

2. H Bushings - Ratings

a. Nominal Line Voltage ..... 69 kV

b. Maximum Line Voltage ..... 72.5 kV

c. Duty-Cycle Voltage ..... 72 kV

d. Maximum Continuous Operating Voltage (MCOV) ..... 57 kV

e. TOV Capability, rms kV (L-N) at one second ..... per ANSI

f. Creepage Distance ..... 80 inches, min.

g. Hardware and fittings for assembly and installation of the surge arresters: MANUFACTURER's design.

h. Mounting: brackets attached to tank, so that top terminals of arresters approximately 3” below the elevation of the 4-hole pad on the stud connector provided for the bushing terminals.

3. X Bushings - Ratings

a. Nominal Line Voltage ..... 13.8 kV

b. Maximum Line Voltage ..... 14.4 kV

c. Duty-Cycle Voltage ..... 12 kV

d. Maximum Continuous Operating Voltage (MCOV) ..... 10.2 kV

e. TOV Capability, rms kV (L-N) at one second ..... per ANSI

f. Creepage Distance ..... 11.1 inches, min.

g. Hardware and fittings for assembly and installation of the surge arresters: MANUFACTURER's design.

h. Mounting: inside secondary air terminal compartment

4. Housing

a. Material: polymer composite body with internal epoxy fiberglass wrap around metal-oxide varistor blocks.

b. Color: ANSI No. 70, Light Gray.

5. Manufacturer: Ohio Brass Type EVP.

6. Grounding: Connect ground end terminals of arresters with copper cable or straps (minimum 4/0 CU equiv.) to stainless steel or copper-faced two-hole ground pad attached to transformer tank side. Locate ground pad near base of arresters, but located so that there is a direct path for discharge current to flow to the two transformer ground pads at the base of the transformer tank without having to pass through a structural bolted connection (cover to tank, etc.).

7. Connect live end terminals of X-bushing arresters to secondary bus extensions with 15 kV insulated cable with compression lugs (minimum 1/0 CU). Provide insulating caps over arrester live terminals.

M. De-Energized Tap Changer (DETC)

1. Externally operated when transformer is de-energized

2. Provide with indicating pointer, dial, and means for locking in any tap position. Include provisions for OWNER supplied padlock.

3. Mount at a convenient operating height.

4. Capable of withstanding full transformer short circuit current without damage.

5. Configured to prevent leaving a winding open or short circuited when operating handle is in locked position.

6. Provided with full capacity taps as specified herein.

N. Automatic Load Tap Changer (LTC)

1. Electrical Location: Low voltage winding

2. Physical Location: ANSI Segment 2 (preferred)

3. Manufacturer: Reinhausen type RMV-II

4. Regulating range: 10 percent above to 10 percent below rated voltage in 32 approximately 5/8 percent steps.

5. Rating: capable of delivering full rated transformer kVA at the rated (nominal) secondary voltage position and all positions above rated voltage. The transformer shall be capable of delivering current corresponding to rated secondary current at nominal tap for all positions below nominal tap. These values shall include the overload capabilities stated in Article 1.03.

6. Tap Selector Switch and Mechanism

    a. Mount in oil-filled compartment separate from main transformer tank.

    b. Maintain physical isolation so it is not necessary to drain oil or break seal of main transformer tank when servicing LTC.

    c. Type: Inductive bridging with vacuum interrupters.

    d. Tank Accessories

        1) Hinged maintenance door with oil-resistant gasket

        2) Drain, filter, and sampling valves

        3) Magnetic level indicator with low level alarm and low-low level trip contacts

        4) Breather

7. Controls

    a. Type: Automatic, solid state

    b. Primary Control

        1) Provide a primary LTC control with the following minimum features:

            a) Adjustable bandwidth and voltage level

            b) High limit/low limit blocking

            c) Line drop compensation

            d) Integrated SCADA Cutout Switch (Local/remote)

            e) SCADA communications via Ethernet with MODBUS and DNP 3.0 protocols.

            f) Integrated two step voltage reduction switch

            g) Integrated SCAMP SCADA Controlled Auto/Manual Pushbutton

        2) Provide required components and wiring to allow this control and LTC to be operated in parallel with the other unit purchased under this order.

3) Primary control to be **Beckwith M-2001D**, with required adapter panel and associated equipment.

c. Backup Control

1) Provide independent backup LTC control to prevent voltage excursions out of acceptable range if the primary LTC control fails.

2) Backup control to provide block raise and block lower functions to inhibit the primary control signals, a lower command contact to force the LTC to a lower voltage if the voltage is unacceptably high, and an alarm contact to indicate operation of the backup control (backup control operation presumes primary control failure).

3) Backup control to be **Beckwith M-0329B** or approved equivalent.

8. Accessories

a. Position indicator with resettable drag hands to indicate maximum travel.

b. Limit switches and stops to prevent travel beyond extreme tap positions.

c. Crank or handwheel for manual operation during maintenance

d. Positioning devices and off-position contacts.

e. Operations counter.

f. Transmitter mounted on the LTC drive mechanism to provide LTC tap position indication to the Beckwith M-2001D control. Transmitter to be Beckwith M-2748/2749 or M-2761/2762 as appropriate, with M-2025D current loop module for connection to the M-2001D control.

g. Self-synchronous transmitter mounted on the LTC drive mechanism to operate a remote position monitor (Incon Model 1250-LTC). Remote position monitor provided by others.

h. Control circuit protective devices.

i. Control switches for RAISE-LOWER, AUTOMATIC-MANUAL. Provide status contacts for OWNER switch position indication for AUTOMATIC-MANUAL. Manual LTC controls shall be located in the main transformer control cabinet. If LTC is supplied with manual controls located in its cabinet, then an additional set of manual controls shall be installed in the transformer control cabinet for ease of OWNER use.

9. Voltage Reduction

a. Provide voltage reduction feature to reduce output voltage by 2.5% or 5%.

b. Include selector switch in transformer compartment to select Normal, 2.5% reduction or 5% reduction. Provide LOCAL-REMOTE switch with status contact for OWNER indication for voltage reduction function.

c. Include provisions to initiate by OWNER’s dry contact closure (for remote operation).

d. Provide status contact in order to provide positive remote indication that voltage reduction function is engaged.

10. Mounting: In easily accessible location in control cabinet.

11. Wiring: extended to main terminal cabinet and connected to terminal blocks. Wire power supply switch, light and convenience outlet, space heater and switch to main terminal cabinet.

O. Wire and Terminal Blocks

1. Wiring:

a. 600 volt insulated copper, 90 degrees C rating.

b. No. 10 AWG minimum for current transformer wiring within control cabinet

c. No. 12 AWG minimum for auxiliary circuits

d. No. 14 AWG minimum for control circuits

e. AC auxiliary circuit neutral wires shall utilize white insulation.

f. Power circuits shall be connected to separate power terminal blocks.

g. AC auxiliary power shall be routed separately from the control and Indication circuits.

h. All wiring shall be installed and routed so as to be protected from damage. All holes and sheet metal edges shall be fitted with suitable grommets or guards to prevent wire damage.

i. All wiring shall be run continuous from terminal to terminal. All terminal points shall be accessible. Splicing within conduits or raceways is NOT allowed.

2. Terminations

a. Made using short-shank, non-insulated ring-tongue terminal connectors.

b. Crimped using ratcheting type crimping tools designed to ensure a proper crimp by not releasing the connector until the crimp is fully complete (AMP "Certicrimp" hand tools or equivalent).

c. Made with no more than two conductors per terminal stud

d. Identify at each wire end using white tubular plastic wire markers securely gripping the wire, with black markings in accordance with schematic and wiring diagrams. Wire markers shall indicate the destination (other end) of the respective wire. Wire markers shall completely surround the wire, shall be oriented so as to be easily read when the wiring is installed, and shall not be removable once termination has been crimped on.

3. Terminal Blocks:

a. Rated 30 amperes, 600 volts minimum, or as required by circuit conductors (GE type EB-25 or approved equal).

b. Equipped with insulating barriers between poles and washer-head binding screws on each pole.

c. Furnished with marking strips and installed in sufficient quantity to provide a minimum of 20 percent spare terminal points for each type block. Spare terminal points shall be grouped logically in each cubicle, not distributed throughout the group of terminal strips.

d. Short circuiting type for current transformer terminations (GE type EB-27 or approved equal).

e. Marked to identify source and function

P. Conduit

1. Wiring shall be installed in galvanized conduit when external to control cabinets or enclosures.

2. Galvanized conduit shall be properly treated and painted to match the adjoining surface.

3. Conduit runs shall be neat, parallel where multiple conduits are run together, generally parallel to the main dimensions of the tank, and secured properly to the tank.

4. Short sections of flexible, liquid-tight conduit are acceptable where a flexible connection to equipment is desired.

Q. Main Transformer Control Cabinet

1. Connections to auxiliary devices shall be wired to terminal blocks in the main transformer control cabinet by MANUFACTURER.

2. Location: ANSI Segment 1, left side

3. Size cabinet, swing panels, etc. and locate equipment such that items that require routine contact by the OWNER are located at easily accessible heights (generally from 36” above the ground up to72’ above the ground). This includes but is not limited to all user accessible control devices (LTC, fans, etc), the LTC primary control, and the annunciator.

4. Make weatherproof. Provide sloped lip over door(s) to deflect water away from the door opening when open.

5. Fasten securely to transformer tank.

6. Doors: quantity as required, maximum width 24”, with removable center latch post if two doors are used, vertically hinged, with provisions for OWNER’s padlock.

7. Conduit entrance: Removable, gasketed bottom plate, attached to underside of control cabinet, field drilled by OWNER.

8. Mount terminal blocks and equipment at least 6 inches above bottom plate.

9. Provide anticondensation space heaters powered from transformer auxiliary supply. Heaters shall be rated at 240 V ac, operated at 120 V ac, and properly sized for reduced output. Provide an ammeter to measure heater current. Provide a nameplate indicating “Control Compartment Heater Ammeter - Normal =____ A”. Fill in normal amp reading. Heaters to be energized continuously (not thermostatically controlled).

R. Auxiliary and Control Power

1. 120/240 volts ac, 1-phase, 3-wire source for fans, space heaters and other accessories.

2. 125 volts dc for control functions.

S. Gauges and Instruments

1. Protect all gauges and instruments with protective guards and mount at eye level when operator is standing on ground level.

2.03 NAMEPLATES

A. Main Transformer Nameplate

1. The nameplate shall be of weatherproof corrosion resistant stainless steel construction and shall be mounted on the transformer at approximate eye level. The nameplate shall be in accordance with the latest ANSI Standards and shall also include:

a. Date of Manufacture

b. Sound level in dB

c. Type of metal used as conductor in each winding for each voltage rating.

d. Volume of insulating oil in gallons

e. Actual tested impedance.

f. A statement that the transformer oil contains no PCB's at the time of manufacture

g. Special devices included in the transformer (i.e. winding surge suppressors).

h. State core design (e.g. shell, core)

i. If transformer is equipped with an LTC, state the actual tap voltages for the LTC.

j. Weights of core, tank, oil etc.

k. Accurately depicted drawing of internal equipment and core orientation.

B. Device Nameplates

1. Provide a weatherproof corrosion resistant stainless steel engraved nameplate at each external device (gauge, relay, etc.) indicating its designation and ANSI function number where applicable.

C. Prior to shipment, the nameplates and labels shall be inspected to ensure that all information is readily visible and that they are clean.

2.04 ACCESSORIES

A. Provide the following accessories with power transformer:

1. Loss of AC auxiliary relays wired to indicate loss of AC power to each fan circuit and the associated fan control circuit. Relays shall have a time delay settable to a minimum of 60 seconds to avoid un-necessary alarming for upstream events.

2. Loss of DC auxiliary relay wired to indicate loss of DC power to the sudden pressure relay and annunciator circuit, with contacts wired to terminal block for OWNER's use. Relays shall have a time delay settable to a minimum of 60 seconds to avoid un-necessary alarming for upstream events.

3. Sudden pressure relay, under oil type, 125 Vdc (Qualitrol Series 900 or equal) mounted to a suitably sized full port gate or ball valve on the side of the transformer main tank. Manufacturer shall determine the optimum location.

4. Sudden pressure auxiliary relay, 125 Vdc.

5. Oil level indicators, with non-adjustable contact(s), as follows:

a. Main Tank oil level indicator, with low level alarm and low-low level trip contacts.

b. LTC Tank oil level indicator, with low level alarm and low-low level trip contacts.

6. Oil temperature indicator (Qualitrol 104/tr6000), with adjustable alarm and trip contacts, resettable drag hands and 0-1ma output for input to SCADA.

7. Winding temperature indicator (Qualitrol 104/tr6000), with adjustable alarm and trip contacts, resettable drag hands and 0-1ma output for input to SCADA.

8. Pressure relief valves, self-resealing, with visual signal flag, alarm and trip contacts (Qualitrol XPRD, No Exceptions). Pipe discharged oil towards the base of the transformer but away from locations where personnel are likely to be standing while accessing transformer components. Discharge pipe to run to a point approximately 2 feet above the base of the transformer.

   a. Locations:

      1) Main tank

      2) LTC tank

9. A 120 volt, LED light fixture with SPST switch and a 120 volt, 20 ampere single-phase duplex GFI receptacle, complete with protective fuses.

10. Other standard accessories per ANSI, C57.12.10, Table 11.

11. Annunciator

   a. 12 point, self contained, LED Indicators, with 125V DC power supply.

   b. Manufacturer: Seekirk Series B1002R/O-A-S14/43

   c. Provide engraved nameplates for all annunciator windows indicating function of each alarm point.

   d. Mount annunciator on swing panel in transformer main control cabinet.

   e. Wire all transformer alarms to individual annunciator points, in accordance with the following list:

      1) 49T – Winding Temperature Alarm

      2) 26T – Liquid Temperature Alarm

      3) 71L – Low Oil Level – Main Tank

      4) 71Q – Low Oil Level – LTC Tank

      5) 63PR1 – Pressure Relief – Main Tank

      6) 63PR2 – Pressure Relief – LTC Tank

      7) 63XP – Sudden Pressure

      8) High or Low Transformer Tank Pressure

      9) Nitrogen Cylinder Low Pressure

      10) LTC Trouble

11) Loss of Cooling Auxiliary Power

12) Hydrogen/Water Monitor Alarm

f. Provide two sets of “repeater” contacts for each annunciator point. Wire repeater contacts to terminal blocks for Owner connection.

12. Dissolved Hydrogen and Water Monitor

a. Manufacturer: Doble/Morgan Schaffer Systems

b. Type: Calisto

c. Install mounted to main transformer tank, and connect in accordance with MANUFACTURER’s instructions.

d. Provide solid copper or stainless steel tubing with suitable ball valves for oil connections to main tank. Carefully bend and train tubing and support as required to prevent damage to tubing or connections due to inadvertent contact. Do not use flexible tubing.

e. Wire all external connections, including Ethernet communications, to transformer control cabinet for OWNER connection.

f. Wire alarm contacts to annunciator as “Hydrogen/Water Monitor Alarm”.

g. Provide the following accessories:

1) Any special tools required for installation, removal and calibration.

2) Host PC software

13. Ethernet Switch

a. Type: SEL-2725 five-port unmanaged Ethernet switch with two fiber and three copper ports, 125V DC supply, Schweitzer Cat#: 2725#BGG9

b. Mount in main transformer control cabinet.

c. Furnish and install shielded Category 5E Ethernet cables between the LTC control and the switch, and between the hydrogen/water in oil monitor and the switch.

B. Provide MSDS sheets for all applicable items furnished with the transformer, including but not limited to Mineral Oil, paint, nitrogen.

2.05 PAINTING

A. Clean and treat tank interior and exterior transformer surfaces according to MANUFACTURER's standards. Carefully treat all exposed metal, including galvanized surfaces, to properly receive paint.

B. Apply one prime coat to the exterior surface. Ensure that all surfaces are coated, including areas partially blocked by conduit or equipment.

C. Apply two finish coats of Light Gray (ANSI 70) color to the exterior surface. Ensure that all surfaces are coated, including areas partially blocked by conduit or equipment.

D. Top surface of transformer tank and LTC compartment to be coated with non-skid paint

E. Paint interior of transformer tank and all cabinets white.

2.06 SPARE PARTS

A. See Section 01 11 01

PART 3 - EXECUTION

3.01 DELIVERY

A. MANUFACTURER is responsible for arranging and paying for delivery of power transformer and all accessories (including separate oil delivery, if required) to substation site. MANUFACTURER shall provide a qualified technical representative to receive transformer and accessories on site and supervise rigging activities. The technical representative shall be a regular full time employee of the MANUFACTURER.

B. MANUFACTURER is responsible for arranging and paying for all transportation, rigging and hoisting services required to place transformer on OWNER-furnished foundation, and hoisting and rigging of transformer accessories. Site and foundation drawings will be provided to MANUFACTURER upon request following final foundation design, to take place following receipt of transformer outline and weight shop drawings.

C. Transformer accessories (radiators, bushings, etc.) will be delivered to an OWNER designated location within the project site. Due to ongoing construction constraints, it may not be possible to store these items directly adjacent to the transformer. MANUFACTURER will be responsible for moving these items from where they are stored to the transformer at no additional cost to the OWNER.

3.02 FIELD ASSEMBLY AND TESTING

A. MANUFACTURER shall fully assemble all parts required to make the transformer ready for service, including but not limited to radiators, bushings, surge arresters, and air terminal chamber.

B. Upon completion of the transformer assembly, add oil required to fill transformer and accessories in accordance with MANUFACTURER's requirements. Perform a dew point measurement prior to filling unit with oil. The measurement shall meet the MANUFACTURER's requirements for oil filling, but shall be at least -30°C at 20°C ambient temperature. OWNER reserves the right to reject the transformer or require corrective actions in the event that the dew point does not meet these standards.

C. Perform a dielectric test on a sample of oil from each shipping container in accordance with ASTM method D-877. Advise ENGINEER immediately if the dielectric test is less than 30 kV. OWNER reserves the right to refuse oil delivery if dielectric strength is less than 30 kV. Filter and process the insulating oil, as required, to fill the transformer tank to the required levels. Take proper precautions to prevent contamination of the insulating oil during handling.

D. MANUFACTURER shall remove from the site and properly dispose of all associated shipping and packing materials and debris, wipe clean all porcelain, unwrap and clean all gauges, remove surface contamination resulting from shipping from the entire unit, and properly touch up any damaged paint.

E. The OWNER shall provide all required external wiring connections to each transformer, including primary, secondary, control, and grounding connections.

F. The MANUFACTURER shall perform the following field testing after site assembly (prior to placing unit in service). Certified test reports of all field testing shall be provided to the OWNER and ENGINEER before final payment. At a minimum, field tests shall include the following:

1. Turns Ratio on all DETC positions (LTC on neutral)

2. Turns Ratio on all LTC positions (DETC on nominal Tap)

3. Megger (2500 volt)

   a. High Voltage to Low Voltage

   b. High Voltage to Low Voltage grounded

   c. Low Voltage to High Voltage grounded

   d. Each core to ground with core ground strap removed

4. Insulation power factor

   a. Test and report the following readings:

      1) High Voltage to Low Voltage and ground

      2) Low Voltage to High Voltage and ground

      3) High Voltage and Low Voltage to Ground

      4) Low Voltage to ground, Guard on High Voltage

      5) High Voltage to ground, Guard on Low Voltage

      6) High Voltage to Low Voltage, Guard on ground

   b. Tests shall be performed as close as practical to 20°C to minimize inaccuracies from correction factors. Readings shall be corrected to 20°C for reporting and analysis.

   c. Direct failure criteria shall be based on ANSI C57.12.90, Method II. If any corrected insulation power factor reading listed in Method II is greater than 0.5%, then the OWNER must be consulted prior to acceptance. The OWNER reserves the right to reject or require corrective measures to any transformer with an insulation power factor reading (corrected to 20°C) that is greater than 0.5% in accordance with ANSI C57.12.90, Method II.

5. Bushing power factor test (both C1 and C2), where appropriate. Bushing Power Factor and Capacitance test results should be within tolerances specified by Doble Engineering Test Assistant software when compared to Bushing Nameplate values.

6. Surge arrester power factor test, where appropriate. Test results should be within tolerances specified by Doble Engineering Test Assistant software when compared to surge arrester nameplate values.

7. Sweep Frequency Response Tests: Test equipment shall be the Doble M-series test set or similar approved equipment

8. Oil testing, per MANUFACTURER's standards, but minimum to include PPM water, dielectric strength and DGA.

9. Check gauges, relays, heaters, convenience outlet and light, and other auxiliary circuits to assure proper working condition.

10. Check and operate cooling equipment to verify proper operation.

11. Additional testing and start-up as normally performed by the manufacturer or as listed in their instruction books shall also be completed.

G. Check tank thoroughly for evidence of oil or gas leaks.

H. Make arrangements to correct any deficiencies identified during field testing.

I. OWNER will make available a 120/240V single-phase power source for use during assembly.

END OF SECTION

APPENDIX A
FORM FOR BID

Power Transformer Procurement,
Hospital Road Substation, Devens, MA – Project No. 23-001

A. Lump Sum price constituting full compensation for supplying and delivering the power transformers, and all associated start-up services pursuant to the Specification:

$_____ [bid amount in numbers]

_____[total bid in words].

Point of Destination for goods: 109 Hospital Road Devens, MA 01434 Delivery Time from order receipt to delivery date: *Please note: Bid prices must be inclusive, but not restricted to, all freight, packaging, handling, taxes, and duties for a delivery at the point of destination above. MassDevelopment will not pay separate customs duties for shipments, and will refuse to accept any material requiring such payment.*
Prompt Payment Discounts: All bidders doing business with MassDevelopment shall provide a Prompt Payment Discount (PPD) for receiving early payments. Bidder shall provide a Prompt Payment Discount percentage (%) off the invoice payment, for each of the payment issue dates listed. If no discount is offered, enter 0%.

10 days	[%]	15 days	[%]	20 days	[%]	30 days	[%]

[Attach additional pages as needed for the following]

B. Warranty terms: _____.

C. List exceptions to any terms and conditions of this IFB, including any exception to the provisions of the form of contract (Appendix H): _____.

D. Attach all statements and certifications required in the Specification.

E. Attach all certifications and DBE Participation Schedule required by the Appendices.

F. Attach acknowledgment that any/all addenda have been received (list the addenda, if any).

G. Attach Certificate of Insurance.

Except as noted above, the Bidder certifies that it has complied fully with the requirements of this Invitation for Bid.

The undersigned understands that MassDevelopment reserves the right to reject any or all bids and to waive any informalities in the bidding.

The undersigned agrees that this bid shall be good and may not be withdrawn for a period of Sixty (60) days, Saturdays, Sundays and legal holidays excluded, after the opening of bids.

Bidder: [name of bidder]

_____

Signature of Authorized Representative

Name, Title

APPENDIX B
AFFIDAVIT OF COMPLIANCE WITH LEGAL REQUIREMENTS

This form shall be submitted by all bidders.

Date: _____, 2023

I, _____, duly authorized representative of [insert legal name of bidder] _____ _____ (the "Bidder"), do hereby certify, under pains and penalties of perjury, as follows:

1. Taxation. Is in compliance with all Massachusetts laws relating to the payment of taxes, reporting of employees and contractors, and withholding and remitting of child support, as required by M.G.L. c. 62C, § 49A, and has either (i) filed all tax returns and paid all taxes required by law; (ii) has filed a pending application for abatement of such taxes; (iii) has a pending petition before the appellate tax board contesting such taxes; or (iv) does not derive taxable income from Massachusetts Sources such that it is subject to taxation by the Commonwealth of Massachusetts.

2. Executive Order 481. As required by Executive Order 481, the bidder (i) shall not knowingly use undocumented workers in connection with the performance of the Contract or any contract with MassDevelopment; (ii) shall verify, pursuant to federal requirements, the immigration status of all workers assigned to perform services under this Contract without engaging in unlawful discrimination; and (iii) shall not knowingly or recklessly alter, falsify, or accept altered or falsified documents from any such worker(s). Any breach of the foregoing requirements shall constitute a material breach of this Contract subjecting the bidder to sanctions, including but not limited to monetary penalties, withholding of payments, and/or suspension or termination of the Contract or any other contract with MassDevelopment.

3. Childcare Requirements. [Check the appropriate box, below]

☐ I am familiar with the provisions of the Child Care Act St. 1990, c. 521, section 7, as amended by St. 1991, c. 329, and the associated regulations, 102 CMR 12.00 *et. seq.*, as they relate to parties that enter into contracts with the Commonwealth and its authorities. I further certify that bidder provides child care benefits to its employees sufficient to make it a "Qualified Employer" as defined by the Child Care Act and associated regulations;

OR

☐ As of the date of award of the above-described contract, bidder will have/has fewer than fifty (50) full-time employees, and is therefore an "Exempt Employer" under the Child Care Act St. 1990, c. 521, section 7, as amended by St. 1991, c. 329, and the associated regulations, 102 CMR 12.00 *et. seq.*.

4. Northern Ireland. [Check the appropriate box, below:] As required by M.G.L. c. 7, §§22C -22F, Bidder:

☐ does not employ ten or more employees in an office or other facility located in Northern Ireland and is not engaged in the manufacture, distribution or sale of firearms, munitions, including rubber or plastic bullets, tear gas, armored vehicles or military aircraft for use or deployment in any activity in Northern Ireland;

OR

☐ does employ ten or more employees in an office or other facility located in Northern Ireland and (i) does not discriminate in employment, compensation, or terms, conditions and privileges of employment on account of religious or political belief; (ii) promotes religious tolerance within the work place, and the eradication of any manifestations of religious and other illegal discrimination; and (iii) is not engaged in the manufacture, distribution or sale of firearms, munitions, including rubber or plastic bullets, tear gas, armored vehicles or military aircraft for use or deployment in any activity in Northern Ireland.

5. Non Collusion. This bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used in this paragraph, the word "person" shall mean any natural person, joint venture, partnership, corporation or any other business or legal entity.

6. OSHA. Where applicable, Bidder will ensure that all employees working on the manufacture of the filter system or the testing and startup of the system have or will have no less than ten (10) hours of OSHA-approved safety and health training.

7. Equal Employment Opportunity and Non-Discrimination. Bidder shall comply with the equal employment opportunity and non-discrimination laws of the federal government and the Commonwealth of Massachusetts.

Signed, under penalties of perjury on the date first above written.

_____

(Name of person signing bid or proposal

_____

(Name of business)

APPENDIX C
AFFIDAVIT OF COMPLIANCE FOR CORPORATIONS

1. Check one, if applicable to the nature of business organization of the bidder.

_____ Massachusetts Business Corporation

_____ Limited Liability Company

_____ Non-profit organization

_____ Foreign (Non-Massachusetts) corporation

_____ Other

2. I,_____, _____President ____ Clerk of

_____

whose principal office is located at

_____

do hereby certify that the above-named corporation has filed with the Secretary of State all certificates and annual reports required by c. 156B and chapter 181, sections 3, 4 and 5 (foreign corporations) and
c. 180, §26A (non-profit corporation) and any other applicable sections of the Massachusetts General Laws and is in good standing with the Secretary of the Commonwealth

Signed under penalties of perjury this _____day of _____, 2023

Signature of responsible corporate officer _____.

APPENDIX E
CERTIFICATE OF VOTE

(to be filed if Contractor is a Corporation)

I, _____, hereby certify that I am the duly qualified and acting Secretary of
(Secretary of Corporation)

_____ and I further certify that a meeting of the Directors of said
(Name of Corporation)

Company duly called and held on _____, at which all members were present and
(Date of Meeting)
voting, the following vote was unanimously passed:

VOTED: To authorize and empower

_____

_____

_____

_____

_____

Anyone acting singly, to execute Forms for General Bid, Contracts or Bonds on behalf of the Corporation.

I further certify that the above vote is still in effect and has not been changed or modified in any respect.

By:_____
(Secretary of Corporation)

A True Copy:

Attest: _____
(Notary Public)

My Commission Expires:_____
(Date)

APPENDIX F
DIVERSE BUSINESS PARTICIPATION PROGRAM

1. Owner Policy

A. It is the policy of the Commonwealth and Owner to promote equity of opportunity in state contracting; and, to that end, to encourage full participation of Diverse Business Enterprises (as defined below) in all areas of state contracting pursuant to Executive Orders 565, 523, and 526. For purposes of this section, "Diverse Business Enterprise(s)" shall mean a minority business enterprise ("MBE"), women business enterprise ("WBE"), veteran business enterprise ("VBE"), or service-disabled veteran-owned business enterprise ("SDVOBE"), each as certified by or recognized as certified (as of the Effective Date of the Contract) by the Commonwealth of Massachusetts Operational Services Division's Supplier Diversity Office (SDO) pursuant to 425 CMR 2.00. It is Owner's intention to create a level playing field on which Diverse Business Enterprises can compete fairly for contracts.

B. In addition to all other equal opportunity employment requirements of this Contract, Owner strongly encourages the use of Diverse Business Enterprises as consultants, contractors, subconsultants, subcontractors, and suppliers. Lists of Diverse Business Enterprises certified or verified by the SDO are located at www.mass.gov/sdo.

C. For purposes of VBEs only, in the employment of mechanics and apprentices, teamsters, chauffeurs, and laborers in the performance of Work in the Commonwealth, preference shall first be given to citizens of the Commonwealth who have been residents of the Commonwealth for at least six months at the commencement of their employment and who are veterans as defined in M.G.L. c.4, s.7 (34), and who are qualified to perform the work to which the employment relates and, within such preference, preference shall be given to service-disabled veterans; and secondly, to citizens of the Commonwealth generally who have been residents of the Commonwealth for at least six months at the commencement of their employment, and if they cannot be obtained in sufficient numbers, then to citizens of the United States.

D. Owner encourages the participation of SDVOBE in its construction and design projects pursuant to Chapter 108 of the Acts of 2012. A SDVOBE for purposes of the Commonwealth's program, is a Service-Disabled Veteran-Owned Small Business ("SDVOSB") as designated by the federal government pursuant to 15 USC §632, whose status as a SDVOSB can be verified on the U.S. VetBiz Vendor Information Page located at www.VetBiz.gov.

2. Diverse Business Enterprise Participation Schedule – Appendix G

A. As part of this bid, Contractor shall submit a Diverse Business Enterprise Participation Schedule ("DBE Participation Schedule") [Appendix G] as set forth below to identify the parts of the Contract that may be completed using Diverse Business Enterprises. The DBE Participation Schedule and copies of any applicable SDO certifications must be submitted with the bid.

B. At the time the Contract is executed, Contractor shall submit its final, certified DBE Participation Schedule to Owner. Contractor shall cooperate with Owner and exercise good faith efforts to seek opportunities for Diverse Business Enterprise participation.

APPENDIX G
MassDevelopment's Diverse Business Enterprise (DBE)[1] Participation Schedule

PART 1: CONTRACTOR INFORMATION

Business Name and Address:_____
Contact Name and Phone Number:_____
Email Address:_____

Contractor **is/is not** Supplier Diversity Office certified as a DBE:

☐ Yes ☐ No, not a certified DBE

If yes, check appropriate category(ies) below (**attach** any SDO Certification Letters):

☐ MBE ☐ WBE ☐VBE ☐SDVBE

PART 2: NARRATIVE (if applicable)

For contracts with values $50,000.00 or more, contractor **must attach** to this schedule a narrative containing: (1) communications regarding DBE outreach, (2) identification of the work that may be completed by any DBEs, (3) a dispute resolution process with DBEs, and (4) procedures for the replacement of DBEs if termination is required.

PART 3: CONTRACTOR'S DBE SUBCONTRACTORS/SUBCONSULTANTS

Have you sought out DBE Participation at the subcontract/subconsultant level: ☐Yes ☐No ☐N/A

If yes, which methods did you use: ☐ Solicitation placed in trade publications ☐Written notification

☐ Assist DBEs in obtaining required bonding or insurance ☐ COMMBUYS

☐Other:_____

If yes, complete the below list:

Name and Address of Planned Diverse Business Enterprise Subcontractors/ Subconsultants	Circle Appropriate Certification and **attach** Certification Letter from SDO	Dollar Amount of Participation on a Massachusetts fiscal year (July 1 – June 30) basis
	MBE / WBE / VBE / SDVBE	
	MBE / WBE / VBE / SDVBE	
	MBE / WBE / VBE / SDVBE	
	MBE / WBE / VBE / SDVBE	
	MBE / WBE / VBE / SDVBE	

PART 4: CERTIFICATION (REQUIRED)

Under the pains and penalties of perjury, I certify that the information provided on this form and all attachments is accurate.

Signature: _____
Written Name: _____

[1] For purposes of this schedule, DBE shall collectively refer to enterprises certified or verified by the Supplier Diversity Office (SDO) as Minority, Women, Service Disabled Veteran Owned Business Enterprises and Veteran Owned Business Enterprises (each respectively a MBE, WBE, SDVBE, and VBE). The SDO certifications are located at www.mass.gov/sdo

APPENDIX H
FORM OF CONTRACT

[Begins on next page]

AGREEMENT FOR THE SUPPLY OF GOODS AND SERVICES

THIS AGREEMENT FOR THE SUPPLY OF GOODS AND SERVICES (the "Agreement") is made and entered into as of _____, 2023, (the "Effective Date") by and between the **MASSACHUSETTS DEVELOPMENT FINANCE AGENCY**, a body politic and corporate created and established under Chapter 23G of the Massachusetts General Laws, having a principal place of business at 99 High Street, 11th Floor, Boston, MA 02110 (the "Agency"), and _____, a _____, having a principal place of business at _____ (the "Vendor").

WITNESSETH THAT

WHEREAS, pursuant to a competitive public procurement process, the Vendor was selected to provide certain goods and services to the Agency;

WHEREAS, the Agency desires to retain the Vendor to supply and perform the goods and services described in **Exhibit A** attached hereto and made part hereof (the "Goods/Services"); and

WHEREAS, the Vendor is qualified and desires to supply and perform the Goods/Services for the Agency.

NOW, THEREFORE, for the consideration hereinafter set forth, the parties hereto do mutually agree as follows:

1. ARTICLE 1. Vendor Definition.

Whenever the word "Vendor" is used in this Agreement, it shall be understood to include its heirs, executors, administrators, successors, assigns, employees, agents, and representatives. The Vendor shall do all the work and furnish all the material, equipment and labor, except as herein otherwise specified, necessary or proper for supplying and performing the Goods/Services.

2. ARTICLE 2. Agency Definition.

Whenever the word "Agency" is used in this Agreement, it shall be understood to mean the Massachusetts Development Finance Agency, acting through its President/CEO, either directly or through her properly authorized assistants or agents, acting severally within the scope of the particular duties entrusted to them.

3. ARTICLE 3. Scope.

(a) The Vendor agrees to perform, at the Vendor's own expense, all the work and furnish all the vehicles, material, equipment, and labor necessary and proper to supply and perform the Goods/Services, all in accordance with the terms and provisions of this Agreement, in accordance with the additional requirements set forth in the Schedule of Goods/Services attached hereto as **Exhibit A** (the "Schedule"), in a proper, thorough, and workmanlike manner, and to the reasonable satisfaction of the Agency.

(b) Unless otherwise requested by the Agency in writing, the Goods/Services shall be delivered and performed completely within the timeframe set out in the Schedule.

(c) Unless otherwise requested by the Agency in writing, the Goods/Services shall be delivered and performed at the location specified in the Schedule.

(d) The Agency may request changes, additions, or deletions to the Goods/Services of the Vendor to be supplied and performed hereunder. Such changes, including any increase or decrease in the amount of the Vendor's compensation, shall be mutually agreed upon in writing and incorporated in the Agreement.

(e) *Inspection and Approval; Conformance with Specifications*. Vendor represents and warrants to Agency that all labor, products, materials and services furnished pursuant to this Agreement shall perform substantially in conformance with all specifications and warranties contained in any written proposal made by the Vendor to the Agency, and with those contained in any request for proposals delivered by the Agency to the Vendor. All materials shall be new and of first quality. All materials and work furnished by the Vendor shall be subject to final inspection and approval by the Agency after delivery ("Acceptance"), and the Agency reserves the right to reject non-conforming products and services. Notwithstanding prior payment, the parties hereto expressly agree that payment will not constitute final Acceptance. Vendor agrees, at its own expense, to diligently correct any work and replace any materials deemed unsatisfactory by the Agency.

(f) *Warranty*. The Vendor warrants that the Goods/Services will be supplied and performed by appropriately qualified and trained resources, (i) with due care and diligence and to a high and professional standard of quality as is customary in the industry; (ii) in compliance with the Schedule, all applicable specifications, and the terms and conditions of this Agreement; (iii) in accordance with all applicable professional standards for the Vendor's field of expertise; and (iv) in accordance with all applicable laws and regulations. The Vendor shall devote such time, energy, attention, and efforts to the Goods/Services provided hereunder in order to promptly, efficiently, and satisfactorily deliver such Goods/Services. Unless a product warranty is specifically addressed in a separately executed agreement, or unless the Vendor provides the Agency with a manufacturer's product warranty upon product delivery, goods purchased by the Agency hereunder shall carry a minimum of a two-year warranty.

4. ARTICLE 4. Performance and Payment.

(a) The Agency agrees to pay the Vendor fees upon the supply and performance of the Goods/Services, in the amounts and rates set forth in the Schedule. Total fees hereunder shall not exceed _____ ($_____), which shall include all direct costs, expenses, and reimbursables. There are no allowable price escalators under this Agreement.

(b) Itemized records of time spent and costs incurred in the supply and performance of the Goods/Services under this Agreement shall be kept by the Vendor, on the basis of generally accepted accounting principles consistently applied, and shall be submitted to the Agency along with the Vendor's invoice(s).

(c) Invoices for Goods/Services supplied and rendered and costs incurred hereunder shall be prepared by the Vendor on the Vendor's standard form, as approved by the Agency, and submitted along with the Vendor's itemized records to the Agency. The invoices shall reflect costs for actual goods supplied and services performed and otherwise conform to the requirements of this Article. An invoice in proper form shall be paid by the Agency to the Vendor within thirty (30) days of presentation to the Agency.

(d) *Not to Assign or Subcontract*. The Vendor shall: (i) give its personal attention constantly to the faithful supply and performance of the Goods/Services; (ii) keep the same under its personal control; and (iii) not assign, by power of attorney or otherwise, nor subcontract the work or any part thereof, without the previous written consent of the Agency, and (iv) not, either legally or equitably, assign any of the moneys payable under this Agreement, or its claim thereto, unless by, and with the written consent of, the Agency.

(e) *Prevailing Wage*. The Vendor shall comply, and shall cause its subcontractors to comply, with M.G.L. c. 149, § 27B, which requires that a true and accurate record be kept of all persons employed on a project for which the prevailing wage rates have been provided. The Vendor and all subcontractors shall keep these records and preserve them for a period of six (6) years from the date of completion of the Agreement. Such records shall be open to inspection by any authorized representative of the Agency at any reasonable time, and as often as may be necessary. The Vendor shall, and shall cause its subcontractors to, submit weekly copies of their weekly payroll records to the Agency. In addition, the Vendor and each subcontractor shall furnish to the Executive Department of Labor within fifteen (15) days after completion of its portion of the Goods/Services a signed statement in the form required by the Agency. Prevailing wage rates for the electrical service work described on the Schedule, valid until _____, are attached hereto as **Exhibit B**. The Vendor shall notify the Agency of any other work under this Agreement subject to M.G.L. c. 149, § 27B (including electrical work to be performed after _____), and prior to undertaking the work, the Agency shall provide the Vendor a copy of the relevant prevailing wage rates to the Vendor, who shall comply with the provisions of this paragraph.

5. ARTICLE 5. Relationship between the Parties.

(a) *Agency's Liability*. The Agency's liability under this Agreement shall be limited to the payments due hereunder. In no event shall the Agency be liable for any additional amounts, including without limitation, any indirect, special, or consequential damages.

(b) *Indemnity*. The Vendor shall indemnify, defend, and hold harmless the Agency and its successors and assigns, and all of its officers directors, lenders, shareholders, beneficial owners, trustees, partners, affiliates, agents, and employees from and against any and all claims, suits, actions, judgments, demands, losses, costs, attorney's fees, expenses, damages and liability to the extent caused by, resulting from, or arising out of the intentional acts, negligent acts, errors, omissions, or allegations thereof, of the Vendor, its employees, agents or representatives in the performance of the Services under the Agreement.

(c) *Independent Contractor*.

(i) It is understood and agreed that the Vendor is an independent contractor of the Agency and that the Vendor shall supply and perform the Goods/Services. The Vendor shall determine, in the Vendor's sole discretion, the manner and means by which the Goods/Services are rendered, subject to the express condition that the Vendor shall at all times comply with applicable law and act in good faith. The Vendor shall supply and perform the Goods/Services in a professional and competent manner. It is expressly understood and agreed that neither the Vendor, nor the Vendor's employees and agents, if any, shall be considered agents or employees of the Agency, and they shall have no authority whatsoever to bind the Agency, by contract or otherwise.

(ii) The Vendor represents that it has, or will, secure, at its own expense, all personnel required in supplying and performing the Goods/Services under this Agreement. The Vendor shall assign such personnel, subject to the approval of the Agency, and such personnel shall not be employees, of nor have any contractual relationship with, the Agency. The Vendor further agrees that its personnel will not hold themselves out as, nor claim to be, officers or employees of the Agency due to this Agreement.

(iii) The Vendor acknowledges and agrees that it shall be the obligation of the Vendor to report to the proper authorities all fees received by the Vendor pursuant to this Agreement, and the Vendor agrees to indemnify, defend, and hold harmless the Agency to the extent of any obligation imposed by law on the Agency to pay any withholding taxes, social security, unemployment, worker's compensation insurance, or similar items in connection with any payments made to the Vendor by the Agency pursuant to this Agreement on account of the Goods/Services of the Vendor or the Vendor's employees or agents, if any.

6. ARTICLE 6. Insurance.

(a) *Minimum Insurance Coverages*. The Vendor shall effect and maintain insurance in amounts as set forth below with companies licensed to do business in the Commonwealth of Massachusetts, having an A.M. Best Company rating of "A-, VII" and otherwise satisfactory to the Agency, at its own cost and expense to protect itself from claims under any Worker's Compensation Act; from claims for damages because of bodily injury including sickness, disease or death; from claims for damages because of injury to or destruction of tangible property; and from claims arising out of the performance of professional services caused by errors, omissions or negligent acts for which it is legally liable.

(i) Commercial general liability, including personal injury and if applicable, product liability/completed operations coverage in the minimum amount of $1,000,000 personal injury, $1,000,000 per occurrence and $2,000,000 general/product/completed operations aggregate;

(ii) Automobile liability coverage for owned, hired and non-owned vehicles in the minimum amount of $1,000,000 per occurrence combined single limit;

(iii) Workers' compensation for all its employees, as required by statute, with employers' liability of $500,000.00 or more including $500,000 accident and $500,000 disease; and

(iv) Umbrella liability in the minimum amount of $5,000,000 per occurrence and $5,000,000 aggregate.

(b) *Additional Insured*. The Vendor shall furnish the Agency with certificates of insurance showing that the Vendor has complied with Article 6(a), above, prior to entering into this Agreement and **naming "Massachusetts Development Finance Agency, its successors and/or assigns, as their interests may appear," as an additional insured**, which certificates shall provide that written notification of cancellation of the insurance policies required hereunder shall be given to the Agency thirty (30) days prior to such cancellation.

7. ARTICLE 7. Duration of Agreement.

(a) This Agreement shall commence as of the Effective Date and shall expire on _____ (the "Term").

(b) Termination Rights. Either party may terminate this Agreement by written notice to the other party if:

(i) The other party commits any material breach of this Agreement which is not capable of being remedied;

(ii) The other party commits a breach of this Agreement which is capable of being remedied and fails to remedy the breach within 30 days after receipt of written notice of the default or within such longer period as may be specified in the notice of default;

(iii) The other party ceases, or proposes to cease to carry on business or an application is made, proceedings are commenced, or a resolution is passed or proposed in a notice of meeting for the winding up, dissolution, official management or administration of the other party or the other party enters into any arrangement, compromise or composition with, or any assignment for the benefit of its creditors or any class of them, or a receiver, receiver and manager, official manager or provisional liquidator is appointed with respect to the other party or any of its assets;

(iv) The Agreement may also be terminated by the Agency for its convenience, but only upon thirty (30) days written notice to the Vendor.

(c) In the event of termination not the fault of the Vendor, the Vendor shall be compensated for all the Goods/Services supplied and performed and costs incurred up to the date of termination for which the Vendor has not been previously compensated.

(d) Upon receipt of notice of termination from the Agency, the Vendor shall discontinue its services hereunder (unless otherwise directed by the Agency) and shall deliver to the Agency all materials as may have been accumulated by the Vendor in the performance of the Agreement.

(e) Notwithstanding the above, in the event of termination, the Vendor shall not be relieved of liability to the Agency for injury or damages sustained by the Agency by virtue of the Agreement, and the Agency may withhold any payment to the Vendor for the purposes of set-off until such time as the exact amount of damages due to the Agency is determined.

(f) The provisions of Articles 3(f), 4(e), 5, and any other provisions where equity would require survival shall be deemed to survive and remain binding upon the parties following the termination of this Agreement.

8. ARTICLE 8. Nondiscrimination.

(a) In connection with the execution of this Agreement, the Vendor shall not discriminate against any qualified employee or applicant for employment because of race, color, national origin, ancestry, age (as defined by law), sex, sexual orientation, religion, or physical or mental handicap. The Vendor agrees to comply with all applicable federal and state statutes prohibiting discrimination in employment including Title VII of the Civil Rights Acts of 1964, the Age Discrimination in Employment Act of 1967, Section 504 of the Rehabilitation Act of 1973, and M.G.L. c. 151B, § 4(1).

(b) In the event of the Vendor's noncompliance with the provisions of this Article 8, the Agency shall impose such sanctions as it deems appropriate, including, but not limited to: (i) withholding of payments due the Vendor under the Agreement until the Vendor complies; or (ii) termination or suspension of the Agreement, which termination or suspension shall be deemed the fault of the Vendor.

9. ARTICLE 9. Certifications.

(a) By signing this Agreement, the Vendor certifies, under the pains and penalties of perjury, that it is in compliance with, and shall remain in compliance with, all legal requirements governing performance of this Agreement and the Vendor's authority to transact business in Massachusetts, and that the Vendor:

(i) is in compliance with all Massachusetts laws relating to the payment of taxes, reporting of employees and contractors, and withholding and remitting of child support, as required by M.G.L. c. 62C, § 49A, and has either (A) filed all tax returns and paid all taxes required by law; (B) has filed a pending application for abatement of such taxes; (C) has a pending petition before the appellate tax board contesting such taxes; or (D) does not derive taxable income from Massachusetts Sources such that it is subject to taxation by the Commonwealth of Massachusetts;

(ii) is a "Qualified Employer" or an "Exempt Employer" as defined under Chapter 521 of the Massachusetts Acts of 1990, as amended by Chapter 329 of the Massachusetts Acts of 1991, and 102 CMR 12.00 *et seq.*;

(iii) is in compliance with all federal and state laws and regulations prohibiting discrimination, including without limitation Executive Order 11246;

(iv) is not currently debarred or suspended from doing business with any governmental entity by the Commonwealth of Massachusetts, or any of its entities or subdivisions under any Commonwealth law or regulation, including without limitation M.G.L. c. 29, § 29F and M.G.L. c. 152, § 25C, and that it is not currently debarred or suspended from doing business with any governmental entity by the Federal government under any federal law or regulation;

(v) is in compliance with federal anti-lobbying requirements of 31 U.S.C. § 1352;

(vi) is in compliance with all laws of the Commonwealth relating to unemployment compensation contributions and payments in lieu of contributions pursuant to M.G.L. c. 151A, § 19A(b), or has notified the Agency in writing that M.G.L. c. 151A does not apply to Vendor because Vendor does not have any individuals performing services for it within the Commonwealth of Massachusetts to the extent that Vendor would be required to make any such contributions or payments to the Commonwealth;

(vii) is not employing ten or more employees in an office or other facility located in Northern Ireland, and is not engaged in the manufacture, distribution or sale of firearms, munitions, including rubber or plastic bullets, tear gas, armored vehicles or military aircraft for use or deployment in any activity in Northern Ireland; or, if applicable, is employing ten or more employees in an office or other facility located in Northern Ireland and (A) does not discriminate in employment, compensation, or terms, conditions and privileges of employment on account of religious or political belief; (B) promotes religious tolerance within the work place, and the eradication of any manifestations of religious and other illegal discrimination; and (C) is not engaged in the manufacture, distribution or sale of firearms, munitions, including rubber or plastic bullets, tear gas, armored vehicles or military aircraft for use or deployment in any activity in Northern Ireland; and

(viii) (A) shall not knowingly use undocumented workers in connection with the performance of the Agreement or any contract with the Agency; (B) shall verify, pursuant to federal requirements, the immigration status of all workers assigned to perform Services under this Agreement without engaging in unlawful discrimination; and (C) shall not knowingly or recklessly alter, falsify, or accept altered or falsified documents from any such worker(s).

(b) Any breach of the foregoing requirements shall constitute a material breach of this Agreement subjecting the Vendor to sanctions, including but not limited to monetary penalties, withholding of payments, and/or suspension or termination of this Agreement or any other contract with the Agency.

10. ARTICLE 10. Special State Employee.

(a) The Vendor understands that any person providing services under the Agreement will be a "special state employee," for purposes of M.G.L. c. 268A, but shall otherwise be an independent contractor and not an employee of the Agency. The Vendor further agrees to comply with said M.G.L. c. 268A, as "special state employee," and to promptly disclose to the Agency any activity under the Agreement by the Vendor or an employee thereof that is or may result in a violation thereof.

(b) The Agency acknowledges that the Vendor can perform services for other clients during the duration of this Agreement, provided such clients do not conflict with the services required under this Agreement and subject to applicable law.

11. ARTICLE 11. Diverse Business Enterprises.

(a) It is the policy of the Commonwealth and the Agency to promote equity of opportunity in state contracting; and, to that end, to encourage full participation of Diverse Business Enterprises (as defined below) in all areas of state contracting pursuant to Executive Orders 565, 523, and 526. For purposes of this section, "Diverse Business Enterprise(s)" shall mean a minority business enterprise, women business enterprise, veteran business enterprise, or service–disabled veteran-owned business enterprise, each as certified by or recognized as certified by the Commonwealth of Massachusetts Operational Services Division's Supplier Diversity Office pursuant to 425 CMR 2.00. It is the Agency's intention to create a level playing field on which Diverse Business Enterprises can compete fairly for contracts.

(b) In addition to all other equal opportunity employment requirements of this Agreement, the Agency strongly encourages the use of Diverse Business Enterprises as consultants, contractors, subconsultants, subcontractors, and suppliers. Lists of Diverse Business Enterprises certified or verified by the Supplier Diversity Office (SDO) are located at www.mass.gov/sdo.

(c) The Vendor shall cooperate with the Agency and exercise good-faith efforts to seek opportunities for Diverse Business Enterprise participation. At the time this Agreement is executed, Vendor shall submit a certified Diverse Business Enterprise Participation Schedule, in the form attached hereto as **Exhibit C**, to the Agency. The Diverse Business Enterprise Participation Schedule is incorporated by reference into this Agreement.

12. ARTICLE 12. Notice.

(a) All notices required or permitted under this Agreement shall be in writing and shall be deemed sufficiently served when delivered by hand if a receipt is obtained therefore, or when actually received if delivered by mail, and if delivered by mail shall be mailed registered or certified first class mail, return receipt requested, postage pre-paid, and in all cases shall be addressed as follows:

To the Agency:	Massachusetts Development Finance Agency 99 High Street, 11th Floor Boston, MA 02110
Attention:	Director of Devens Utilities
With a copy to:	Massachusetts Development Finance Agency 99 High Street, 11th Floor

Boston, MA 02110
Attention: General Counsel

To the Vendor: **[TBD]**

Attention:

(b) Each party authorizes the other to rely in connection with their respective rights and obligations under this Agreement upon approval by the parties named above or any person designated in substitution or addition hereto by notice, in writing, to the party so relying.

(c) This Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective successors and assigns where permitted by this Agreement.

(d) Each party to this Agreement represents that the individual executing this Agreement on its behalf is duly authorized to bind such party to this Agreement according to its terms.

(e) This Agreement may be executed in one or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. In the event that any signature is delivered by facsimile transmission or by e-mail delivery of a ".pdf" format data file, such signature shall create a valid and binding obligation of the party executing (or on whose behalf such signature is executed) with the same force and effect as if such facsimile or ".pdf" signature page were an original thereof.

13. ARTICLE 13. Miscellaneous.

(a) *Compliance with Laws*. The Vendor shall comply with, and be solely responsible for, any violation of all federal, state and local laws, ordinances, rules, regulations or orders that are applicable to the Goods/Services being provided hereunder and in the performance of the Agreement. Agreement shall be considered to incorporate by reference all applicable federal, state and local laws and rules and regulations of all authorities having jurisdiction over the work as though such provisions were set forth in full herein.

(b) *Choice of Law/Forum*. The Agreement shall be governed by and construed in accordance with the laws of the Commonwealth of Massachusetts. Any actions arising out of this Agreement shall be governed by the laws of Massachusetts, and shall be brought and maintained in a State or federal court in Massachusetts, which court shall have exclusive jurisdiction thereof.

(c) *Non-Waiver*. No failure, waiver of successive failures ,or waivers on the part of either party hereto, their successors or permitted assigns, in the enforcement of any condition, covenant, or section of this Agreement, shall operate as a discharge of any such condition, covenant, or section, nor render the same invalid, nor impair the right of either party hereto, their successors, or permitted assigns to enforce the same in the event of any subsequent breaches by the other party hereto, its successors, or permitted assigns.

(d) *Force Majeure*. Neither party shall be liable to the other or be deemed to be in breach of this Agreement for any failure or delay in rendering performance arising out of causes beyond its reasonable control and without its fault or negligence. Such causes may include, but are not limited to, acts of God or the public enemy, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, or unusually severe weather (each a “Force Majeure Event”). Dates or times of performance shall be extended to the extent of delays excused by this Article 13(d), **provided that** the party whose

performance is affected notifies the other promptly of the existence and nature of such delay and takes reasonable steps to mitigate the effects of the Force Majeure Event. Nothing contained in this Article 13(d) shall derogate from or affect the Agency's rights to terminate this Agreement pursuant to Article 7 above.

(e) *Severability*. If any provision of this Agreement is declared or found to be illegal, unenforceable, or void, then both parties shall be relieved of all obligations under that provision. The remainder of this Agreement shall remain enforceable to the fullest extent permitted by law.

(f) *Headings*. The headings used herein are for reference and convenience only and shall not enter into the interpretation of this Agreement.

(g) *Amendments*. No amendment to this Agreement shall be effective unless it is signed by authorized representatives of both parties and accepted for filing at the offices of the Agency.

(h) *Extent of Agreement*. This Agreement, together with any and all materials presented by the Agency or delivered by the Vendor to the Agency in connection with the procurement of the Goods/Services shall represent the entire and integrated agreement between the Agency and the Vendor and supersedes and replaces all terms and conditions of any prior agreements, arrangements, negotiations or representations, written or oral, with respect to the subject matter hereof.

[*Remainder of page left blank; signatures on following page*]

IN WITNESS WHEREOF, this Agreement has been executed by the duly authorized representatives of the Agency and the Vendor as of the date first written above.

Approved as to Form:

_____
Agency Counsel

MASSACHUSETTS DEVELOPMENT FINANCE AGENCY

By: _____
Name:
Title:

[VENDOR]

By: _____
Name:
Title:

Contract Number:
Contract Amount:

[*Signature Page of Agreement for the Supply of Goods and Services between Massachusetts Development Finance Agency and* _____]

EXHIBIT A
SCHEDULE OF GOODS/SERVICES

[SUBJECT TO CHANGE BASED UPON FINAL TERMS]

1. Contract Sum (Cost of Goods and Cost/Rates for Services):

[TBD]

2. Goods:

[TBD]

3. Time for Delivery:

[TBD]

4. Services:

[TBD]

5. Time for performance:

[TBD]

6. Location of delivery:

[TBD]

7. Intended Use(s):

[TBD]

EXHIBIT B
PREVAILING WAGE RATES

[See following pages]

EXHIBIT C

MassDevelopment's Diverse Business Enterprise (DBE) Participation Schedule

PART 1: VENDOR INFORMATION

Business Name and Address:_____
Contact Name and Phone Number:_____
Email Address:_____

Vendor **is/is not** Supplier Diversity Office certified as a DBE:

☐ Yes ☐ No, not a certified DBE

If yes, check appropriate category(ies) below (**attach** any SDO Certification Letters):

☐ MBE ☐ WBE ☐VBE ☐SDVBE

PART 2: NARRATIVE (if applicable)

For contracts with values $50,000.00 or more, vendor **must attach** to this schedule a narrative containing: (1) communications regarding DBE outreach, (2) identification of the work that may be completed by any DBEs, (3) a dispute resolution process with DBEs, and (4) procedures for the replacement of DBEs if termination is required.

PART 3: VENDOR'S DBE SUBCONTRACTORS/SUBCONSULTANTS

Have you sought out DBE Participation at the subcontract/subconsultant level: ☐Yes ☐No ☐N/A

If yes, which methods did you use: ☐ Solicitation placed in trade publications ☐Written notification

☐ Assist DBEs in obtaining required bonding or insurance ☐ COMMBUYS

☐Other:_____

If yes, complete the below list:

Name and Address of Planned Diverse Business Enterprise Subcontractors/ Subconsultants	Circle Appropriate Certification and **attach** Certification Letter from SDO	Dollar Amount of Participation on a Massachusetts fiscal year (July 1 – June 30) basis
	MBE / WBE / VBE / SDVBE	
	MBE / WBE / VBE / SDVBE	
	MBE / WBE / VBE / SDVBE	
	MBE / WBE / VBE / SDVBE	
	MBE / WBE / VBE / SDVBE	

PART 4: CERTIFICATION (REQUIRED)

Under the pains and penalties of perjury, I certify that the information provided on this form and all attachments is accurate.

Signature: _____
Written Name: _____