Addendum #1

Directorate of Facilities Engineering 21 June 2023

This Addendum modifies, amends, and supplements designated parts of the Contract Documents, Specifications and Drawings for:

Bangor West Microgrid Resiliency Project, New Combined Heat And Power Unit (CHP), Regional Training Institute, 286th North Hildreth Street, Bangor, Maine. DFE Project Number 23SC21-305-D1, BGS Project Number 3279, Bid Number 23-034.

It shall be the responsibility of the Contractor to notify all Subcontractors and Suppliers for various portions of the work of any changes or modifications contained in this Addendum.

Clarification Items:

1. **Project Concern:** The Contractors were asking for more time to bid the project.
   Answer: The Owner shall change the Bid Opening Date to **28 June 2023 at 2:00 p.m**.

2. **Project Concern:** General Note #8 on drawing M000-2 notes to coordinate MEP layout with Fire Protection contractor and move heads if needed. Are we to carry the cost for the fire protection with our own sub or is this by the owner and just coordination by the GC. If by the GC, can we confirm a quantity of heads that all GC's should carry in their bid?
   Answer: No. Impact to fire suppression is anticipated. The note stems from an earlier project scope.

3. **Project Concern:** Are precast site bollards (steel bollard in precast concrete base) with field applied yellow bollard sleeve in lieu of paint an acceptable option?
   Answer: Yes, this is acceptable to ICDS and will be reviewed as a project submittal.

4. **Project Concern:** Concrete Notes call for minimum 4000psi concrete. Detail 5/S100-2 calls for 2500psi minimum. Please clarify.
   Answer: Concrete Notes shall be followed – 4000 psi concrete. Detail for the gas pad will be removed from the scope of work.

5. **Project Concern:** Sonotube footings for the gas meter pad & bollards show to extend 3'-6" below grade. Is this sufficient depth to avoid frost issues?
   Answer: Gas pad and meter will be removed from the scope of work as the gas piping to the CHP unit will be from the existing gas service as a value engineered item. Extend bollard depth to frost depth.

6. **Project Concern:** On drawing M000-2 in the schedule Combined Heat and Power System note 1 indicates that equipment is to be provided by the CHP vendor. Can we get a list of the equipment that is to be included?
   Answer: It is a bulleted list in the upper right hand corner of the same sheet "CHP PACKAGE EQUIPMENT PROVIDED".

7. **Project Concern:** What is the pipe size associated with pump GSP-3?
   Answer: It is 6" to match existing.

8. **Project Concern:** On drawing M201-2 there is a note indicating to tap a new 1 1/4" gas line for boiler B-2. Where is boiler located?
   Answer: The note was from an old scope revision and does not apply.

9. **Project Concern:** On drawing M301-2 there is note indicating that DENOTES LOAD MODULE COMPONETS Provided by CHP manufacture. Will this be a skid that comes all preassembled or will we have to assemble it?
   Answer: From past experience it has come assembled and is part of the vendor's submittal; however, you must confirm that with the vendor.

10. **Project Concern:** On drawing M300-2 it shows a Hydro Separator associated with the GEO-EXCHANGE, can we get a make and model number for this item?
    Answer: Caleffi Model NA548150A.

11. **Project Concern:** Please confirm controls contractor bids to general contractor spec 23 09 00 1.3.
    Answer: Yes, the controls Contractor shall bid to the general Contractor.

12. **Project Concern:** Who provides combined heat and power unit. CHP unit is scheduled on mechanical drawings but is listed in the electrical spec.
    Answer: Mechanical Contractor shall provide the CHP unit. Multiple products shall be obtained by the CHP vendor. Contact Dalkia/Aegis - Kyle Krow, Vice President Of Sale and Business Development. 59 Jackson St., Holyoke, Ma. 01040, Phone 413-536-1156 Mobile Phone 413-427-0591 for detailed list of equipment to be provided by CHP vendor, contact information below.

13. **Project Concern:** Please clarify note "tap new 1 ¼" gas line for boiler 2". M201-2.
    Answer: The note was from an old scope revision and does not apply.

14. **Project Concern:** Who is to carry Bangor Natural Gas costs?
    Answer: The plan is to use the existing service right outside the mechanical room based on the discussions in the walk-thru. Bangor Gas Costs are not applicable. All work shall be downstream of the service.

15. **Project Concern:** Please confirm routing of piping. Note "Penetrate piping just under eave and above the drop ceiling line in the classroom" M200-2. Pipe appears to be routed outside in this area.
    Answer: The note was from an old scope revision and does not apply. Pipe under the eave outside as shown.

16. **Project Concern:** Has the owner discussed the time frame of obtaining an interconnection agreement with Versant Power?
    Answer: No, the Owner has not discussed the timeframe of obtaining an interconnection agreement with Versant Power. Contractor shall be responsible for submission of the utility interconnect agreement with assistance by representatives of MEARNG and engineer. We realize that a signed interconnect agreement may not be possible in the timeframe identified within the project specifications. Additional fees mandated by the utility will need to be treated as project additional costs as there is no way to determine the exact cost at this time. As part of the base bid, all interconnection fees for submitting the interconnect application shall be carried by the Contractor. It is only the unknown

utility upgrades and fees, if any, that shall constitute project additional costs. Project construction activities must be completed as shown within the contract documents; however, the final permission to operate may be authorized after the date identified in the contract documents.

17. **Project Concern:** There are 2 specification sections 0024119 Selective Demolition.
Answer: Use the first 024119 pages #1 through #7. Delete other section 024119 pages #1 though #6.

18. **Project Concern:** 00 52 13 Construction Contract states Substantial Completion of 12/15/23 and final completion of 12/31/23.
Answer: See below specification sections.

19. **Project Concern:** 01 00 00 section 1.02 states Substantial Completion of 12/1/23 and final completion of 12/30/23.
Answer: Section 01 00 00 Administrative Provisions, Substantial Completion has been changed to **1 March 2024.** Final Completion has been changed to **30 March 2024**.

20. **Project Concern:** Assuming this project is anticipated to start in August 2023 with a completion date of Dec 2023. Could you please confirm the estimated schedule anticipates starting in August 2023 and completion December 31, 2023.?
Answer: Section 01 00 00 Administrative Provisions, Substantial Completion has been changed to **1 March 2024.** Final Completion has been changed to **30 March 2024**.

21. **Project Concern:** Please note that the VFDS with Disconnects that are specified have a 4-6 month lead time. With this in mind, we are also looking into the lead times for the major equipment items.
Answer: The project has been extended to 30 January 2024. If manufacturing equipment delivery issues arise at no fault to the Contractor. The Contractor shall provide from the manufacturer, the equipment delivery date and the Government will work with the Contractor to extended the contract date.

22. **Project Concern:** Who is the contact info for the CHP vendor (Aegis)?
Answer: Dalkia/Aegis - Kyle Krow, Vice President Of Sale and Business Development. 59 Jackson St., Holyoke, Ma. 01040, Phone 413-536-1156 Mobile Phone 413-427-0591.

23. **Project Concern:** 2) Concerning piping applications for all systems…is Viega (or equal) "Pro-Press" and/or "Mega-Press" system acceptable?
Answer: Yes.

24. **Project Concern:** 3) Referring to drawing M200-2…what are the specifications for the M&V gas meter and who is responsible to provide?
Answer: See M000-2 (Upper right corner). M&V metering package provided by CHP Supplier.

25. **Project Concern:** Referring to drawing M201-2…what are the model numbers for HS-1 air separator and vent?
Answer: Caleffi Model NA548150A. Comes with auto vent, vent shut-off, and drain valves.

26. **Project Concern:** Referring to drawings M201-2 and M301-2…M201-2 specifies 1.25" CHS&R servicing DWH-2 while M301-2 specifies 2" CHS&R servicing DWH-2. Which pipe size is correct?
    Answer: 2" is the proper size for 25 gpm.

27. **Project Concern:** Referring to drawing M300-2…what is the specification for the hydro separator and who is responsible to provide?
    Answer: The hydro separator on M300-2 is HS-1 same as on M201-2. The mechanical Contractor is responsible to supply.

28. **Project Concern:** Referring to drawing M301-2…just to confirm, all items depicted inside the "dashed" area are provided by the CHP vendor, is that correct?
    Answer: Yes, however, note that ABI#1, is the domestic hot water portion.

29. **Project Concern:** Referring to drawing M301-2…the drawing depicts an Axiom glycol feeder however I am not able to find any glycol specifications. Is the contractor responsible to provide glycol? If so, what is the specification?
    Answer: Glycol specification is on M000-2 "Piping, Insulation & Fluids Schedule.

30. **Project Concern:** Referring to drawing M302-2, note #4…is the PRV noted in #4 the same PRV depicted on drawing M301-2?
    Answer: Yes. Confirm with the CHP supplier any and all piping components supplied by them.

31. **Project Concern:** Referring to drawing M401-2, Legend #9 and #12…what are the required capacities of these PRVs?
    Answer: There is only one T&P valve (Item 12) which comes with the tank (shipped loos). Item 9 is not applicable.

32. **Project Concern:** Referring to drawing M401-2…what are the specifications for MS-1 and who is responsible to provide?
    Answer: Specifications are on that sheet (Intellistation Jr. by Powers and/or Watts). This is part of ABI#1 and should be provided by the Mech/Plumb Contractor.

33. **Project Concern:** Referring to specification section 23-21-13 para. 3.6, A and B (Chemical Treatment)…the specification is very broad and without direction as to what type of chemical is required. How do we capture this cost?
    Answer: That specification line is generic; however, the only fluid provided by the Contractor is the premixed propylene glycol which is inhibited and rated for engine blocks with Aluminum. All other systems are the heat pump source and load systems which are water. Pipes should be cleaned, flushed, and then filled with site water used currently to make up the loops. Water treatment will be by any existing means by the Owner.

34. **Project Concern:** Concerning insulation of equipment…we cannot find an insulation specification for equipment (HS-1, pumps, expansion tank, DHW-2, etc.), please advise if insulation is required and what type/system/thickness.
    Answer: All piping and piping components shall be insulated meeting the piping insulation thicknesses requirements. Pumps need not be insulated. HX-CHP1 shall be insulated (as thick as reasonably achievable) at the CHP factory prior to assembly of the

Load Module. HS-1 shall be wrapped for condensation protection. (See M000-2). DWH-2 comes pre-insulated.

35. **Project Concern:** What is RAD-RTI-1?
    Answer: RAD-RTI-1 is the engine radiator supplied by the CHP Vendor.

36. **Project Concern:** Will the contractor have access to bathroom facilities?
    Answer: No, Section 01 00 00 Administrative Provisions. Sanitary Facilities,
    1. The Contractor shall provide their Sanitary Facilities.
    .
37. **Project Concern:** Are there dumpsters available for demo debris or will the contractor be responsible to provide a dumpster?
    Answer: No, Section 01 00 00 Administrative Provisions. Removal, Unless otherwise specified, materials to be removed, including all components and accessories, become property of the Contractor and shall be promptly removed from the Contract Site and legally disposed of at Contractor's expense.

38. **Project Concern:** Is there space available in the existing building for a contractor's site office or will a trailer be required?
    Answer: No, Section 01 00 00 Administrative Provisions. The Contractor will provide:
    1. Office Trailer: Weather tight, with lighting, electrical receptacles, heating, cooling and drawing display table. The office trailer will have separate office space for the project manager to conduct his/her daily business.

39. **Project Concern:** Concerning the CHP equipment *CHP-RTI1* and *HX-CHP1*…during the pre-bid meeting a vendor for these items was mentioned (Aegis I believe was the name) however I am not able to find any contact info for this vendor. Will the vendor contact info be made available?
    Answer: See all responses to the clarification items.

40. **Project Concern:** This project is requiring the contractor to do the interconnection paperwork and cover the interconnection costs. This is a level 2 project and will potentially be in the utility queue for a year or more. Also the cost for interconnection will not be known until after the paperwork is submitted. I suggest an allowance for this of 10%. Also Ld's be waived due to the time to bring on line may be years.
    Answer: See all responses to the clarification items.

41. **Project Concern:** I have cc'd versant contacts for you to confirm this with. They are great help and assistance for you.
    Answer: See all responses to the clarification items.

Specification Items:

1. Replace Section 00 11 13 Notice to Contractors, page 1 of 2 with enclosed revised Section 00 11 13 Notice to Contractors, page 1 of 2. The Owner has changed the Bid Opening Date to **28 June 2023 at 2:00 p.m**. The Owner has changed the Final Contractor's Completion Date to **30 March 2024**.

2. Replace Section 00 41 13 Contractor Bid Form, pages 1 through 2 with enclosed revised Section 00 41 13 Contractor Bid Form, pages 1 through 2. An Allowance #1 – Additional Items Required To Connect To Versant Power Net Metering Connection. The Contractor shall carry the cost for the Permitting Fees to Versant Power. Any other costs for items required by Versant Power to connect the net metering system will come from the Allowance #1. The Contractor shall carry an allowance price of **$20,000.00 dollars.**

3. Replace Section 01 00 00 Administrative Provisions, pages 1 through 26 with enclosed revised Section 01 00 00 Administrative Provisions, pages 1 through 26. Allowance #1: The Contractor shall hire Versant Power to connect to Net Metering to Versant Net Metering System as required by the Plans and Specifications. The Contractor shall carry an allowance price of **$20,000.00 dollars**. If the allowance is not used the Owner will deduct Allowance #1 from the contract amount with a Change Order Deduct. The Owner shall also reclaim any portion of the allowance that may not be used from Allowance #1 from the contract amount with a Change Order Deduct.

4. Replace Section 01 00 00 Administrative Provisions, pages 1 through 26 with enclosed revised Section 01 00 00 Administrative Provisions, pages1 through 26 with enclosed revised Section 01 00 00 Administrative Provisions. Substantial Completion has been changed to **1 March 2024.** Final Completion has been changed to **30 March 2024.**

5. Replace Section 00 30 00 Combined Heat & Power Generators, pages 1 through 14 with enclosed revised Section 00 30 00 Combined Heat & Power Generators, pages 1 through 14. The Owner has changed paragraph #.7 Complete Service & Maintenance Warranty By Manufacturer. See section for complete changes.

6. BGS Sample Form. Section 00 52 00 State of Maine Construction. Dates are wrong on the form and can cannot be changed. See Section 01 00 00 Administrative Provisions for correct dates.

7. Pre-bid sign-in sheet was provided in a previous email.

Drawing Items:

1. None.

00 11 13
Notice to Contractors

Bangor West Microgrid Resiliency Project, New Combined Heat And Power Unit (CHP), Regional Training Institute, 286th North Hildreth Street, Bangor, Maine. DFE Project Number 23SC21-305-D1, BGS Project Number 3279, Bid Number 23-034.

This project consists of the installation of a new 75 KW Combined Heat And Power Unit (CHP). The Contractor shall provide a concrete pad for the CHP. The Contractor shall connect the CHP to the Building's electrical system and allow for Net Metering with Versant Power Electric Company. The Contractor shall connect the CHP to the building's heating. The Contractor shall furnish and install all items in accordance with Plans and Specifications.

The cost of the work is approximately $ 1,100,000. The contract shall designate the Substantial Completion Date on or before *1 March 2024*, and the Contract Final Completion Date on or before *30 March 2024*.

1. Bids shall be submitted in sealed envelopes plainly marked "**Bid for *Bangor West Microgrid Resiliency Project, (CHP), Regional Training Institute, Bangor, Maine. DFE Project Number 23SC21-305-D1, BGS Project Number 3279, Bid Number 23-034***" and addressed to the Bid Administrator:

   Directorate of Facilities Engineering
   194 Winthrop Street, Building #7, Camp Keyes
   Augusta, Maine 04333-0033
   Attn: Ms. Sara Thompson
   Email: sara.thompson@maine.gov

   The envelope shall contain a completed Contractor Bid Form, plus bid security when required, to be received no later than **2:00 p.m.** on ***28 June 2023***. Bid submissions will be opened and read aloud at *194 Winthrop Street, Building #7, Camp Keyes, Augusta, Maine 04333-0033* at the time and date noted above.

   Any bid submitted after the noted time will not be considered a valid bid and will remain unopened. Any bid submitted by any other means will not be considered a valid bid.

2. The bid shall be submitted on the Contractor Bid Form (section 00 41 13) provided in the Bid Documents. The Owner reserves the right to accept or reject any or all bids as may best serve the interest of the Owner.

3. Bid security *is required* on this project.
   If noted above as required, the Bidder shall include a satisfactory Bid Bond (section 00 43 13) or a certified or cashier's check for 5% of the bid amount with the completed bid form submitted to the Owner. The Bid Bond form is available on the BGS website.

4. Performance and Payment Bonds *are required* on this project.
   If noted above as required, or if any combination of Base Bid and Alternate Bids amounts selected in the award of the contract exceeds $125,000.00, the selected Contractor shall furnish a 100% contract Performance Bond (section 00 61 13.13) and a 100% contract Payment Bond (section 00 61 13.16) in the contract amount to cover the execution of the Work. Bond forms are available on the BGS website.

00 41 13
Contractor Bid Form

Bangor West Microgrid Resiliency Project, (CHP), Regional Training Institute, Bangor, Maine.
DFE Project Number 23SC21-305-D1, BGS Project Number 3279, Bid Number 23-034.

Bid Form submitted by: *paper documents only to address below*

Bid Administrator:
Department of Defense, Veterans and Emergency Management
Military Bureau
Joint Force Headquarters, Maine National Guard
194 Winthrop Street, Building #7, Camp Keyes
Augusta, Maine 04333-0033
Attn: Ms. Sara Thompson

Bidder:

Signature: _____

Printed name and title: _____

Company name: _____

Mailing address: _____

City, state, zip code: _____

Phone number: _____

Email address: _____

State of incorporation, if a corporation: _____

List of all partners, if a partnership: _____

The Bidder agrees, if the Owner offers to award the contract, to provide any and all bonds and certificates of insurance, as well as Schedule of Values, Project Schedule, and List of Subcontractors and Suppliers if required by the Owner, and to sign the designated Construction Contract within twelve calendar days after the date of notification of such acceptance, except if the twelfth day falls on a State of Maine government holiday or other closure day, or a Saturday, or a Sunday, in which case the aforementioned documents must be received before 12:00 noon on the first available business day following the holiday, other closure day, Saturday, or Sunday.

As a guarantee thereof, the Bidder submits, together with this bid, a bid bond or other acceptable instrument as and if required by the Bid Documents.

00 41 13
Contractor Bid Form

1. The Bidder, having carefully examined the *Bangor West Microgrid Resiliency Project, (CHP), Regional Training Institute, Bangor, Maine* Project Manual dated *26 May 2023*, prepared by *Innovative Construction & Design Solutions, LLC*, as well as Specifications, Drawings, and any Addenda, the form of contract, and the premises and conditions relating to the work, proposes to furnish all labor, equipment and materials necessary for and reasonably incidental to the construction and completion of this project. The **Base Bid** amount of:

   $ _____ .00

2. Allowances *are not included* on this project.
   Bid amount above includes the following Allowances
   Allowance #1 – Additional Items Required To Connect To Versant Power $20,000.00

3. Alternate Bids *are included* on this project.
   Alternate Bids are as shown below
   Any dollar amount line below that is left blank by the Bidder shall be read as a bid of **$0.00**.

   1 ABI #1 – Replace DWH 1 - With Double Coil Indirect Tanks $ _____ .00

   2 ABI#2 – Kitchen/Dining BLDG, Upgrade Existing (BAC) System $ _____ .00

   3 ABI#3 – West Billet BLDG, Upgrade Existing (BAC) System $ _____ .00

   4 ABI#4 – North Billet BLDG, Upgrade Existing (BAC) System $ _____ .00

   5 ABI#5 – East Billet BLDG, Upgrade Existing (BAC) System $ _____ .00

   6 ABI #6-Repair SATCON PV Inverter & Integrate with BAC System $ _____ .00

4. Bid security *is required* on this project.
   If noted above as required, or if the Base Bid amount exceeds $125,000.00, the Bidder shall include with this bid form a satisfactory Bid Bond (section 00 43 13) or a certified or cashier's check for 5% of the bid amount with this completed bid form submitted to the Owner.

5. Filed Sub-bids *are not required* on this project.
   If noted above as required, the Bidder shall include with this bid form a list of each Filed Sub-bidder selected by the Bidder on the form provided (section 00 41 13F).

SECTION 01 00 00

ADMINISTRATIVE PROVISIONS

PART 1 GENERAL

1.01 CONTRACT REQUIREMENTS

A. Scope of Work

1. The Work of the Contract includes the installation of a new 75 KW Combined Heat and Power Unit (CHP). The Contractor shall provide a concrete pad for the CHP. The Contractor shall connect the CHP to the Building's electrical system and allow for Net Metering with Versant Power Electric Company. The Contractor shall carry all costs for permits and connection fees to connect to Versant Power Electric Company. The Contractor shall connect the CHP to the building's heating system. The existing Administration Building will receive a completely new Niagara #4 Tridium Building Automation Control System (BAC). The Contractor shall furnish and install all items in accordance with Plans and Specifications.

B. Contract Method

1. Basis of award of this Contract will be in accordance with Section 1 Instructions to Bidder, Paragraph 2.

2. Contract type: State of Maine – Bureau of General Services, Construction Contract, Section 00 52 13.

3. The project will be constructed under a single lump sum contract.

C. Work Sequence

1. Work of the Contract and related provisions are as described in the Contract Documents.

D. Contractor Use of Premises

1. Work of this Contract includes coordinating the work with the daily operations of the Owner.

2. Limit use of premises for Work and construction operations only, allow for Owner occupancy, work by other Contractors, and public access.

4. Federal and State Holiday Schedule. The Contractor may not work on Federal or State Holidays; non-working days of this Contract for FY 2023 are 4 July, 4 Sept., 9 Oct., 10, 23, 24 Nov., 25 Dec.. FY 2024 are 1, 15 Jan., 19 Feb.

4. Limit access to Owner's site, hours of operations are 7:00 A.M. - 4:00 P.M. If

Contractor would like to work on a federal or state holidays, he/she must request permission from Owner three working days in advance. The Owner reserves the right to accept or reject Contractor's request.

5. The Contractor must work with each organization to gain access to certain area through-out the building. When the Contractor needs to gain access to certain areas, he must notify each organization seven working days in advance.

6. Coordinate use of premises under direction of Owner.

7. The Contractor shall be responsible for his/her security in Construction Area until substantial completion. The contractor shall coordinate security of Building with Owner.

8. Winter Conditions – Snow Plowing and Snow Removal. The Contractor shall be responsible to snow plow all their areas of operations and laydown areas. The Contractor shall be responsible to keep their areas free of snow and ice. Snow and ice shall be cleared in accordance with OSHA and Life Safety requirements. When the snow begins to impede safety requirements. The Contractor shall be responsible to relocate snow to designated snow pile areas on the property. The Owner shall show the Contractor the designated snow pile areas.

E. Owner Occupancy

1. Owner will occupy surrounding areas during entire period of construction, to conduct Owner's normal operations. The Contractor shall cooperate with Owner to minimize conflict to the Owner's operations.

F. Owner-furnished Products: Not Used

G. Schedule of Allowances:

1. Allowance #1: The Contractor shall hire Versant Power to connect to Net Metering to Versant Net Metering System as required by the Plans and Specifications. The Contractor shall carry an allowance price of **$20,000.00 dollars**. If the allowance is not used the Owner will deduct Allowance #1 from the contract amount with a Change Order Deduct. The Owner shall also reclaim any portion of the allowance that may not be used from Allowance #1 from the contract amount with a Change Order Deduct.

H. Alternate Bids:

1. ABI #1 - Replace The existing 30 KW electric water heater DWH-1 with a double coil indirect tank, (Boiler Feeds Top, CHP Feeds Bottom). The Contractor shall furnish and install all items in accordance with Plans and Specifications.

2. ABI #2 - The existing Kitchen/Dinning Building will receive a completely new Niagara #4 Tridium Building Automation Control System (BACS). The Contractor shall furnish and install all items in accordance with Plans and Specifications.

3. ABI #3 - The existing West Billet Building will receive a completely new Niagara #4 Tridium Building Automation Control System (BACS). The Contractor shall furnish and install all items in accordance with Plans and Specifications.

4. ABI #4 - The existing North Billet Building will receive a completely new Niagara #4 Tridium Building Automation Control System (BACS). The Contractor shall furnish and install all items in accordance with Plans and Specifications.

5. ABI #5 - The existing East Billet Building will receive a completely new Niagara #4 Tridium Building Automation Control System (BACS). The Contractor shall furnish and install all items in accordance with Plans and Specifications.

6. ABI #6-Repair SATCON PV Inverter & Integrate with BAC System. The BACS Contractor shall repair local HMI AT SATCON PV Inverter and integrate control points identified to new Niagara 4 based building automation control system (BACS) control panel VIA RS485 Modbus RTU. See specifications and drawings.

I. Unit Prices: Not Used

J. Applications for Payment:

1. Submit Six (6) copies of each application under procedures of 00 72 13 Section 31, on B.G.S. Form "Requisition for Payment", revised 1 May 2020.

K. Coordination:

1. Work of this Contract includes coordination of the entire Work of the Project.

2. The Contractor shall contact the **City of Bangor** to coordinate required permitting. The Contractor shall obtain and pay for all necessary construction/building permits. The Contractor shall send **two (2)** copies of all permits to the Owner.

3. Coordinate work with all utilities. Interruption of services shall be coordinated with an appropriate official at the facility to minimize the disruption of operations within the facility.

4. Notify an appropriate official at the facility at least **three days** in advance of the need to move furnishings, equipment, materials, etc. from areas to be affected by the construction.

5. Control on-site activities to minimize the disruption of the occupants.

6. Coordinate the work of equipment and material suppliers and subcontractors.

7. Make arrangements for the timely delivery of materials and supplies to the job site and for their temporary storage on site.

8. Maintain the project site in a neat condition.

9. Assist the Owner during periodic site visits and in the review of construction.

10. Maintain up to date progress records and as-built drawings.

L. CONFLICTS

1. Contractor shall notify Owner in writing of any real or apparent conflicts in the Contract Documents and, except in cases of emergency, await Owner's determination before proceeding.

2. The **Owner's Project Manager - Robert W. Palmer III** shall resolve conflicts that arise during construction.

3. If two or more solutions are indicated in the Contract Documents, the Contractor shall assume the cost of the more expensive solution unless otherwise directed by the Owner.

M. Field Engineering

1. The Contractor shall be responsible for all field engineering as required.

2. The Contractor shall be responsible for all special inspections required to obtain a Building Permit from the **City of Bangor**.

N. Field Testing and Inspections:

1. The Contractor shall carry all costs for material testing and inspections required by the Contract Documents. The Contractor shall hire only Consultant approved and Owner approved independent testing agencies to perform all testing and inspections.

O. Reference Standards

1. For products specified by association or trade standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

2. The date of the standard is that in effect as of the Bid date, or date of Owner-Contractor Agreement when there are no bids, except when a specific date is given.

3. Obtain copies of standards when required by Contract Documents. Maintain copy at job site during progress of the specific work.

1.02 SCHEDULING AND PHASING OF WORK

A. Substantial Completion: Work of the Contract must be Substantially Completed by ***1 March 2024*** so that the Owner can have full use of interior space.

1. Except as otherwise specified, Substantial Completion is hereby defined to mean a stage of completion sufficient for the Owner to have full beneficial use and occupancy of the structure involved, less only minor corrections and repairs that can be performed without undue annoyance to building occupants which shall be documented on the "punch list" as specified hereinafter. Beneficial use and occupancy means removal of all debris, interior and exterior scaffolding, surplus equipment and material and cleaning as required under the Contract completed.

B. Final Completion of all Work of this Contract shall be by ***30 March 2024***.

1. Except as otherwise specified, Final Completion is when the Work of the Contract has been completed in accordance with the terms and conditions of the contract documents with no “punch list” items open, and is ready for final payment.

C. The expiration date of this Contract is ***30 August 2024***.

1. Except as otherwise specified, Expiration Date is hereby defined to mean the date when all engagements of the parties has ended, except to those which arise from the non-fulfillment of obligations created during its existence, such as warranties.

D. Normal building operations will continue throughout the length of the Project. The successful Contractor shall develop a schedule of work that is respectful of the Owner's needs but with a mutual understanding that temporary relocation of personnel within the building will be required.

E. Within ten (10) working days following receipt of the fully executed formal Contract Agreement by the Contractor, the Contractor shall prepare a proposed Progress Schedule. The final Schedule shall be as mutually agreed to by the Owner and Contractor, and within the following guidelines:

1. The Owner's business operations must continue throughout the entire construction period.

2. Work within the building interior must comply with the Owner's requirements for continued use and occupancy.

3. Applicable egress codes must be complied with during the construction period. In particular building entrances and exit ways must be kept open at all times.

1.03 REGULATORY REQUIREMENTS

A. Conform to Local, State and Federal codes.

1.04 PROJECT MEETINGS

A. Requirements:

1. Contractor shall, upon acceptance of a Contract and before commencing Work, contact the Owner and request a pre-construction conference as required in 00 72 13 Section 1.

B. Pre-construction Conference

1. The OWNER will administer pre-construction conference for execution of Owner-Contractor Agreement and exchange of preliminary submittals.

C. Progress Meetings

1. The Contractor shall schedule and administer Project meetings throughout progress of the Work, called meetings, and pre-installation conferences. This project shall have Bi-Weekly Project Meetings.

2. The Contractor shall make physical arrangements for meetings, prepare agenda with copies for participants, preside at meetings, record minutes, and distribute copies within two days to Owner, participants, and those affected by decisions made at meetings.

3. Attendance: Job superintendent, major Subcontractors and suppliers, Owner and those appropriate to agenda topics for each meeting.

4. Suggested Agenda: Review of Work progress, status of progress schedule and adjustments thereto, delivery schedules, submittals, maintenance of quality standards, pending changes and substitutions, and other items affecting progress of Work.

1.05 SUBMITTALS

A. Procedures

1. In all submittals always refer to project number **23SC21-305-D1.**

2. Refer to schedule of Contractor Deliverables provided by Owner/Designer.

3. Submit the number of copies which Contractor requires, plus two copies, which will be retained by OWNER.

4. Submittals can be delivered electronically to both the Designer and Owner. If submitting by e-mail, submit to the Designer for approval, and the Owner for review, at the e-mail address below:

Designer: Dan Fisher - dfisher@icdsllc.com
Designer: Scott Fitch - sfitch@icdsllc.com

Owner: Robert W. Palmer III - robert.w.palmer.nfg@mail.mil

5. Submittals can be delivered in paper form. Deliver copies of submittals to Designer for approval at the address below:

   Innovative Construction & Design Solutions, LLC
   419A Whitfield Street
   Guilford, CT 06437

   And one (1) copy to the Owner for review:

   Directorate of Facilities Engineering
   194 Winthrop Street
   BLDG 7, Camp Keyes – ATTN: **Robert W. Palmer III**
   Augusta, ME 04330

6. Submittal Sheets:
   a. Transmit each item under "Transmittal of Shop Drawings, Equipment Data, Material Samples, or Manufacturer's Certificates of Compliance" located at the end of this Section;
   b. Identify Project, Contractor, Subcontractor, major supplier;
   c. Identify drawing sheet and detail number, and Specification Section number, as appropriate;
   d. Identify deviations from Contract Documents.

7. Comply with progress schedule for submittals related to Work progress. Coordinate submittal of related items.

8. DESIGNER shall have 14 calendar days for review of submittals.

9. DESIGNER shall have 7 calendar days for review of (RFI) request for information.

10. After **DESIGNER** review of submittal, revise and resubmit as required identifying changes made since previous submittal.

11. Distribute copies of reviewed submittals to concerned persons. Instruct recipients to promptly report any inability to comply with provisions.

B. Quality Assurance; Substitutions, in accordance with Section 01 00 00, para. 1.08 (E).

C. Construction Progress Schedule
   1. Submit an Initial Progress Schedule in duplicate. See 1.05.A.3 this section for submission information. After review by OWNER revise and resubmit as required.
   2. The Contractor shall submit **two (2)** copies of the Final Construction Progress Schedule within 4 calendar days of OWNER review.
   3. Submit revised schedules with each Application for Payment, reflecting changes since previous submittal.

D. Submittal Schedule

1. Submit a Submittal Schedule in duplicate within **twenty (20)** working days following receipt of the fully executed formal Contract Agreement by the Contractor. After review by **OWNER** revise and resubmit as required.

2. Prepare the schedule in chronological order. Provide the following information:
   a. Schedule date for the initial submittal.
   b. Related section number.
   c. Submittal category (Shop Drawings, Product Data, or Samples).
   d. Name of Subcontractor.
   e. Description of the part of Work covered.
   f. Scheduled date for resubmittal.
   g. Scheduled date for the Architect's final release of approval.

3. Show submittal dates required for Shop Drawings, Product Data, and Samples, and product delivery dates, including those furnished by Owner and those under Allowances as applicable.

E. Schedule Of Values

1. Submit Contract Schedule Of Values in duplicate within **ten (10)** days after date of Owner - Contractor Agreement. The Contractor shall include in their Contract Schedule of Values a Closeout Documentation Line Item. The Closeout Documentation Line Item shall consist of 5% of the total contract amount. This Closeout Documentation Line Item is to ensure that all Closeout Documentation are provided to the Owner and Consultant in a timely manner as stated in these Contract Documents.

2. Submit typed schedule on "Requisition for Payment", Form Section 00 62 76, BGS revised 5 April 2021.

3 Format: Table of Contents of this Project Manual.

4. Include in each line item a directly proportional amount of Contractor's overhead and profit.

5. Revise schedule to list change orders, for each application for payment.

F. Shop Drawings

1. Shop drawings will be submitted to Owner, in accordance with para. 1.05 of this Section.

G. Product Data

1. Mark each copy to identify applicable products, models, options, and other data; supplement manufacturers' standard data to provide information unique to the Work.

2. Provide data certifying that each product complies with the provisions contained in the Buy American Act, see Special Conditions 00 73 00, Section 15.

3. The Equipment Manufacturers and the Material Manufacturers shall supply the certificate of compliance documents. The Contractor must provide to the Owner the certificate of compliance document that materials and equipment comply with the provision of the Build America, Buy America Act. See Section 1.08 Material And Equipment.

3. Submit the number of copies required in 1.05.A.3, this Section.

H. Manufacturer's Instructions

1. Submit the number of copies required in 1.05.A.3, this Section, of Manufacturer's Instructions.

I. Samples Not Used

J. Field Samples Not Used

K. Attic Stock/Extra Materials

1. Attic Stock/Extra Materials specified throughout the contract documents supplied by the Contractor. At Substantial Completion the Contractor shall provide the Attic Stock List. The Contractor shall work with the Owner and Owner Onsite Representative to receive and inventory the Attic Stock.

L. Contractor's Required Training List

1. The Contractor shall review specifications and create a Project Training List. The Project Training List shall comprise of all training requirement specified throughout contract documents. At Substantial Completion the Contractor shall provide the Project Training List. The Contractor shall work with the Owner and Owner's Designer to schedule required training.

M. Background Check Requirements:

1. Anyone allowed into the facility by the contracted vendor's personnel is considered to be a representative of the contractor and is required to have a prior approved background check before gaining access into the facility.

2. All Contractors/vendors must be in possession of a valid (not suspended, revoked, or expired) official government issued photo credential (i.e. driver's license, state issued identification card, etc.) and be screened through National Crime Information Center prior to being issued a Contractor Badge.

3. The Contractor shall supply a list of personnel who may be either involved in the work effort or be present at the facility to the Owner. The list shall be supplied to Owner within two weeks after the award of the contract or two weeks prior to the

beginning of the contract work, whichever comes first. Owner will provide Contractor with an excel spreadsheet to fill in with required employee information.

4. The required employee information shall include: Company name, first name, middle initial, last name, suffix, maiden name(s), date of birth, gender, Driver License Number and State, Social Security Number, and Address with street, city and state for each person.

5. Results from the NCIC background check are controlled under the Privacy Act of 1974 and not permitted to be given to anyone not acting in a Security Force capacity. No details of the background check will be revealed other than a pass/fail or suspended/revoked.

6. The Department retains the right to screen and restrict from the facility, personnel employed by or who represent the contractor, who do not receive a satisfactory/passing background check.

7. The Department will provide to the Contractor the names of those personnel that are acceptable for access to facilities and those who are not acceptable for unescorted access.

8. Contractors/vendors with acceptable background checks will be issued Contractor Badges for that individual's unescorted entry. The badges will be issued for the duration of the contract, or service agreement, not to exceed two years.

1.06 QUALITY CONTROL

A. Quality Control, General

1. Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

B. Workmanship

1. Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.

2. Perform work by persons qualified to produce workmanship of specified quality.

3. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.

C. Manufacturers' Instructions

1. Comply with instructions in full detail, including each step in sequence. Should instructions conflict with Contract Documents, request clarification from Owner before proceeding.

D. Manufacturers' Certificates

1. When required by individual Specifications Section, submit manufacturer's certificate, in duplicate, those products that meet or exceed specified requirements.

1.07 CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

A. Electricity

1. All temporary work shall be provided in conformity with the National Electric Code, State laws, and requirements of the power company
2. The Contractor shall be allowed to hook to existing electrical panel in building, for temporary power. The Contractor will not disrupt power at building. The Owner will only pay for cost of electricity.
3. The Contractor shall provide all temporary electrical panels.
4. The Contractor shall be responsible to fix any damages, caused by modifications for temporary services.

B. Lighting

1. The Contractor shall provide source of lighting.

C. Temporary Heat

1. The Contractor shall prove temporary heat and equipment in interior spaces:
   a. The Contractor shall not use electrical heating units if the Owner is supplying electrical power to the Contractor.
   b. The Contractor shall be completely responsible for providing all equipment and labor required to comply with this section.
   c. The Contractor shall utilize the services of a qualified Heating subcontractor for providing Temporary Heat. These services shall be paid for by the Contractor.
   d. At no time shall any part of the building served by the boiler be allowed to be without heat if called upon by the building control system.
2. Temporary heating system work shall be performed under the direct supervision of individuals properly licensed to perform the necessary work.
3. All temporary work shall be provided in conformity with all applicable codes, State laws, and requirements of the utility company.
4. The Contractor shall pay the costs of all fuel required for temporary heating until Substantial Completion, unless specified otherwise.
5. Utilizing the Permanent Heat Distribution System for Temporary Heat:
   a. The Contractor may, with the approval of the Owner, elect to utilize the

permanent heat distribution system for temporary heat.

b. If the permanent heat distribution system cannot be utilized or if work requires a shutdown of the existing system the Contractor shall make arrangements, acceptable to the Owner, to comply with this requirement at no additional cost to the Owner.

c. The Contractor shall furnish and pay the costs of any materials and equipment which are not part of the permanent heating system and which may be required to operate the permanent heat distribution system on a temporary basis.

6. Unit heaters, if used, shall be of the smokeless type and be installed and operated in such a way that finished work will not be damaged. "Salamanders" shall not be used.

7. Providing temporary heating service and equipment for exterior work:

a. Installation of weather protection and heating devices shall comply with all safety regulations including provisions for adequate ventilation and fire protection devices.

b. Unit heaters, if used, shall be of the smokeless type and be installed and operated in such a way that finished work will not be damaged. "Salamanders" shall not be used.

D. Water

1. The Contractor shall be allowed to hook to existing water in building, for temporary water supply. The Contractor will pay for cost of water usage for dust control and compaction [large amounts of water].

E. Sanitary Facilities

1. The Contractor shall provide their Sanitary Facilities.

F. Barriers

1. Provide as required to prevent public entry to construction areas, to provide for Owner's use of site, and to protect existing facilities and adjacent properties from damage from construction operations.

G. The Contractor will provide:

1. Office Trailer: Weather tight, with lighting, electrical receptacles, heating, cooling and drawing display table. The office trailer will have separate office space for the project manager to conduct his/her daily business.

2. Storage Sheds for Tools, Materials, and Equipment: Weather tight, with adequate space for organized storage and access, and lighting for inspection of stored materials.

3. His/her own on-site telephone, if so required for the conduct of his/her business.

4. Protected storage, if necessary.

5. Temporary barricades to separate the Contract Site areas from the Owner's area or public area.

H. Protection And Restoration

1. The Contractor shall be responsible for all damages to furnishings, equipment, supplies, existing construction, including finished surfaces, caused by Work of Contract.

2. The Contractor shall be fully responsible for maintaining weather-tight integrity of the roofing system and wall systems, including permanent and temporary flashings, during the entire construction period.

3. The Contractor's responsibilities shall include the cost to repair damage to the existing building's structure, finishes and contents associated with the Contractor's failure to maintain the watertight integrity of the roofing system and wall system, whether permanent or temporary, at no additional cost to the Owner.

4. The Contractor shall protect paved areas and lawns around the Building from damage associated with the construction. Costs to repair damage to paved areas and lawns will be deducted from Contractor's final payment to cover Owner's expenses to repair damage. The Owner will determine if damages to lawns are minor or major.

I. Security

1. Provide security program and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, and theft. Coordinate with Owner's security program.

J. Water Control

1. Water control is the responsibility of the Contractor.

K. Cleaning during Construction

1. Throughout the construction period the Contractor shall be responsible for maintaining building and site areas affected by the Work in a standard of cleanliness.

   a. Retain stored items in an orderly arrangement allowing maximum access, not impeding traffic or drainage, and providing protection of materials.

   b. Completely remove all scrap, debris, waste material and other items not required for construction from the site at least once a week.

   c. Provide adequate storage for all items awaiting removal from the job site, observing requirements for fire protection and protection of the ecology.

2. Conduct daily inspection, more often if necessary, to verify that requirements for cleanliness are being satisfied.

3. Provide required personnel, equipment and materials needed to maintain the specified standard of cleanliness.

4. Use only those cleaning materials and equipment that are compatible with the surface being cleaned, as recommended by the manufacturer of the material.

L. Removal

1. Unless otherwise specified, materials to be removed, including all components and accessories, become property of the Contractor and shall be promptly removed from the Contract Site and legally disposed of at Contractor's expense.

2. Remove temporary materials, equipment, services, and construction prior to Substantial Completion inspection.

3. Clean and repair damage caused by installation or use of temporary facilities. Restore existing facilities used during construction to specified, or to original, condition.

4. The Contractor shall be responsible for removing and disposing of solid wastes (including construction/demolition debris) per Section 01 35 43.

1.08 MATERIAL AND EQUIPMENT

A. Products

1. Products include material, equipment, and systems.
2. Comply with Specifications and referenced standards as minimum requirements.
3. Components required to be supplied in quantity within a Specification section shall be the same, and shall be interchangeable.
4. Do not use materials and equipment removed from existing structure, except as specifically required, or allowed, by Contract Documents.
5. Build America, Buy America Act

a. The Infrastructure Investment and Jobs Act ("IIJA"). Pub. L. No. 117-58, which includes the Build America, Buy America Act ("the Act"). Pub. L. No. 117-58, §§ 70901-52. The Act strengthens Made in America Laws and will bolster America's industrial base, protect national security, and support high-paying jobs. The Act requires that the head of each Federal agency shall ensure that "none of the funds made available for a Federal financial assistance program for infrastructure may be obligated for a project unless all of the iron,

steel, manufactured products, and construction materials used in the project are produced in the United States." American Act.

b. The Equipment Manufacturers and the Material Manufacturers shall supply the certificate of compliance documents. The Contractor must provide to the Owner the certificate of compliance document that materials and equipment comply with the provision of the Build America, Buy America Act.

6. Purchased products must meet the Federal sustainability procurement requirements and the State sustainable procurement preferences. See Special Conditions 00 73 00, Section 17 for specific requirements.
7. ACBM (ASBESTOS CONTAINING BUILDING MAT'LS) NOT ALLOWED, materials containing asbestos in any manner or quantity are not allowed on this Project. If such materials are installed they shall be removed and replaced at no additional cost to the Owner.

B. Transportation and Handling

1. Transport products by methods to avoid product damage; deliver in undamaged condition in manufacturer's unopened containers or packaging, dry.
2. Provide equipment and personnel to handle products by methods to prevent soiling or damage.
3. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.

C. Storage and Protection

1. For exterior storage of fabricated products, place on sloped supports above ground. Cover products subject to deterioration with impervious sheet covering; provide ventilation to avoid condensation.
2. Arrange storage to provide access for inspection. Periodically inspect to assure products are undamaged, and are maintained under required conditions.
3. Products Specified by Reference Standards or by Description Only: Any product meeting those standards.
4. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not specifically named.

D. Products List

1. Within 15 days after date of Owner-Contractor Agreement, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

E. Substitutions

1. Substitutions shall be submitted to Designer a minimum of 72 hours prior to the bid date for review. Any substitutions not submitted 72 hours prior to the bid date shall not be reviewed or considered.

2. Do not assume that "or Equal" or terms of similar meaning indicate automatic approval of substitute products.

3. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.

4. Request constitutes a representation that the Contractor:

   a. Has investigated proposed product and determined that it meets or exceeds, in all respects, specified product.

   b. Will provide the same warranty for substitution as for specified product.

   c. Waives claims for additional costs, which may subsequently become apparent.

5. The OWNER will determine acceptability of proposed substitution, and will notify the Contractor of acceptance or rejection in writing within a reasonable time.

1.09 CONTRACT CLOSEOUT

A. Closeout Procedures

1. Submit Closeout Documentation to the Architect/Engineer 10 days prior to the Substantial Completion Date. The Architect/Engineer shall confirm that the Contractor has fulfilled the Contract Closeout Documentation Requirements 10 days prior to the Substantial Completion Date. The Contractor shall not submit for Final Application for Payment until the Architect/Engineer has notified the Owner that Contractor has fulfilled the Contract Closeout Documentation Requirements.

2. When the Owner considers the Work of this contract has reached Substantial Completion, the Contractor and Owner shall sign a Certificate of Substantial Completion (Section 00 65 16). Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use. This Certificate of Substantial Completion will be prepared by the Architect/Engineer as stated in Specification 00 72 13, Section 37.4. When the Certificate of Substantial Completion has been signed by the Owner and the Contractor, the completed Certificate of Substantial Completion shall set the date for Substantial Completion of the work or a designated portion of the work.

3. When the Contractor considers the Work of this contract has reached final completion, the Contractor shall submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for OWNER's inspection. This written notification shall be submitted to the Owner 7 calendar days prior to the proposed inspection date. Per Specification 00 72 13, Section 36.4, the Contractor shall not call for final inspection of any portion of the Work that is not complete and permanently installed. The Contractor may be found liable for the expenses of individuals called to final inspection meetings prematurely.

4. In addition to submittals required by the conditions of the Contract, provide release of all liens, claims (Section 00 65 19) and submit final requisition.

5. The Contractor's failures to comply with Closeout Procedures, if the Closeout Documentation Requirements are not completed by the Substantial Completion Date. The Owner reserves the right to recover the costs to complete the Closeout Documentation Requirements from the Schedule of Values item Closeout Documentation Line Item. The Owner reserves the right to hire an Architect/Engineer to complete the required Contract Closeout Documentation.

6. Liquidated Damages, the minimum liquidated damages for this project shall be applied as described under Section 00 72 13 General Conditions, paragraph 37.5. The minimum liquidated damages for this project is in accordance with Section 00 52 13, State of Maine, Bureau of General Services, Construction Contract, Article 2. The work to be performed under this contract shall be completed on or before **1 December 2023**. For each calendar day the project remains uncompleted **$150.00 dollars per day beyond the substantial completion date shall be charged as liquidated damages**.

B. Final Cleaning

1. Execute prior to final inspection.

2. Clean site; sweep hard surfaced areas, rake clean other surfaces.

3. Remove waste and surplus materials, rubbish, and construction facilities from the Project and from the site. Owner will be responsible for cleaning after acceptance.

C. Project Record Documents

1. Store documents separate from those used for construction.

2. Keep documents current; do not permanently conceal any work until Owner has inspected and required information has been recorded.

3. At Contract closeout, submit documents with transmittal letter containing date, Project title, Contractor's name and address, list of documents, and signature of Contractor.

PART 2 PRODUCTS Not Used

PART 3 EXECUTION

3.01 FINAL CLEANING

A. Execute final cleaning before final project assessment.

B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

C. Clean equipment and fixtures to sanitary condition with cleaning materials appropriate to surface and material being cleaned.

D. Replace filters of operating equipment.

E. Clean debris from roofs, gutters, downspouts, and drainage systems.

F. Clean site; sweep paved areas, rake clean landscaped surfaces.

G. Remove waste and surplus materials, rubbish, and construction facilities from site.

3.02 STARTING OF SYSTEMS

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify Architect/Engineer seven days before start-up of each item.

C. Verify each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.

D. Verify tests, meter readings, and specified electrical characteristics agree with those required by equipment or system manufacturer.

E. Verify wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of applicable manufacturer's representative in accordance with manufacturers' instructions.

G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation before start-up, and to supervise placing equipment or system in operation.

H. Submit a written report stating the equipment or system has been properly installed and is functioning correctly.

3.03 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate operation and maintenance of products to Owner's personnel two weeks before date of Substantial Completion.

B. Use operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

C. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at equipment location.

D. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

E. Required instruction time for each item of equipment and system is specified in individual sections.

3.04 TESTING, ADJUSTING AND BALANCING

A. The Contractor shall provide to the Owner one set of the copies of the test certification certificates that shall be provide to the State of Maine Fire Marshall’s Office and or any other testing requirements that have been performed on the system.

B. Owner will appoint and employ services of independent firm to perform testing, adjusting, and balancing. Contractor shall pay for services.

C. Independent firm will perform services specified in Section 01 00 00 para. 1.01.N.1.

D. Reports will be submitted by independent firm to Architect/Engineer indicating observations and results of tests and indicating compliance or non-compliance with requirements of Contract Documents.

3.05 PROTECTING INSTALLED CONSTRUCTION

A. Protect installed Work and provide special protection where specified in individual specification sections.

B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

E. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

F. Prohibit traffic from landscaped areas.

3.06 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:

1. Drawings.

2. Specifications.

3. Addenda.

4. Change Orders and other modifications to the Contract.

5. Reviewed Shop Drawings, Product Data, and Samples.

6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress, not less than weekly.

E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:

1. Manufacturer's name and product model and number.

2. Product substitutions or alternates used.

3. Changes made by Addenda and modifications.

F. Red-Line Drawings: Legibly mark each item to record actual construction including:

1. Measured depths of foundations in relation to finish main floor datum.

2. Measured horizontal and vertical locations of underground utilities and an appurtenances, referenced to permanent surface improvements.

3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.

4. Field changes of dimension and detail.

5. Details not on original Contract drawings.

G. Submit Closeout Documentation to the Designer 10 days prior to the Substantial Completion Date. The Designer shall confirm that the Contractor has fulfilled the Contract Closeout Documentation Requirements 10 days prior to the Substantial Completion Date.

3.07 OPERATION AND MAINTENANCE DATA

A. Submittal Requirements:

1. Submit three (3) copies of data on 8-1/2 x 11-inch (A4) text pages, bound in three (3) separate D side ring binders with durable plastic covers.

2. **Contractor shall provide the O&M Manual in electronic form on CD/DVD**. All sections of the electronic form of the O&M Manual shall be **searchable**, excluding drawings and warranties. Every effort should be made to have the "Technical Data" section searchable as well, with the understanding this may not be possible in some instances.

3. Prepare binder cover with printed title "OPERATION AND MAINTENANCE", title of project, location, project number, and subject matter of binder when multiple binders are required. A spine label with same information should also be provided.

4. Subdivide each binder's contents with permanent page dividers, logically organized, with tab titles clearly printed. Tabs should be organized and titled based on the Table of Contents.

B. Manual Submission

1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect/Engineer will review draft and return one copy with comments.

2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.

3. Submit one copy of completed volumes 15 days before final inspection. Draft copy will be reviewed and returned after final inspection, with Architect/Engineer comments. Revise content of document sets as required before final submission.

4. Submit two sets of revised final volumes in final form within 10 days after Receipt from Owner.

C. Contents

1. Project Summary: The first page in binder should include a paragraph describing the Project followed by a Contact List. The Contact List is to include DFE Project Manager name along with company name, contact name, address, and telephone number for the Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.

2. Drawings: Provide reduced copies of each plan printed on 11 x 17 pages and insert them after the Project Summary page. Also provide a CD/DVD in the back of each binder containing Record Drawing files in both Adobe PDF and AutoCAD Release 2018 format. AutoCAD drawings shall be delivered as stand-alone without X-references. If Drawing originally had X-references, Bind them using the Insert option and do not explode inserted block. The Architect shall also provide the AutoCAD Plot Style (CTB file) used for the drawings along with any and all images used within the drawings.

3. Table of Contents: Provide a Table of Contents(TOC) for the binder and place behind the reduced plans. If multiple binders are necessary, include a TOC for the entire submission, then a TOC for the individual binder. TOC should be a listing of all products or systems and the 6 required components below each.

4. Product/System Components: Provide the following information for each product and/or system. Provide additional requirements as specified in individual product specification sections.

    a. OVERVIEW and INFORMATION:
        i. Equipment Register: equipment description, model number(s), date of installation, installer w/contact info, supplier w/contact info, manufacturer w/contact info, warranty date, warranty details, estimated life / useful life.
        ii. Description of Complete Installation: A general description of the installation to provide a general understanding of the equipment and its operation.
        iii. Specific System Description: A technical description of each system of the installation, written to ensure it can be clearly understood by persons not familiar with the installation.
        iv. Performance Data: Technically description of the mode of operation of each system provided. This section provides functionality details.
        v. When applicable, include charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

    b. OPERATIONS:
        i. Manufacturers' technical literature as appropriate. For other than common accessories, where no manufacturer literature is available, provide a precise and concise description of the operation procedure in plain English.
        ii. Safe start-up, break-in, routine operation, shut-down, and emergency operations for the equipment installed including a logical step-by-step sequence of instructions for each procedure. Include summer, winter and special operating instructions.
        iii. List of all limiting conditions for equipment.
        iv. Control Sequence and flow diagrams for the system installed.

v. A legend for color-coded services. A legend of the symbols used on the drawings, unless included on the drawings.
vi. Schedules of the parameter settings of each protective device, including fixed and adjustable circuit breakers, protective relays, adjustable photoelectric switches, pressure switches, and any other control and monitoring device, as established during commissioning and maintenance.

c. MAINTENANCE
i. Emergency procedures, including telephone numbers for emergency services, and procedures for fault-finding.
ii. Manufacturers' technical literature, as appropriate. Include original manufacturers' parts list, illustrations, assembly drawings, and diagrams required for maintenance.
iii. Detailed recommendations for the frequency of performance of routine maintenance tasks
iv. List of procedures and tasks associated with preventative (routine) maintenance.
v. Procedures for safe trouble shooting, disassembly, repair and reassembly, cleaning, alignment, inspection and adjustment, including a logical step-by-step sequence of instructions for each procedure.
vi. Include summer, winter and special maintenance instructions.
vii. Maintenance Schedule: schedule of the frequency of the required or recommended maintenance, testing and inspection for each type of equipment. The schedule is to include weekly and monthly attendance times.
viii. Installation and dismantling instructions: Instructions for the proper installation and dismantling of the equipment.
ix. Spares and Consumables:
1. Schedule of spares (including bearings) with an expected operating life less than 40,000 hours. Include expected replacement frequency, item label manufacturer name, address, and telephone number, catalogue number name and address of local distributor.
2. Schedule of Consumable Items (oil, grease, belts, bearings) to be used during servicing.
3. Furnish spare parts, consumable items, and extra products in quantities specified in individual specification sections and/or as recommended by manufacturer or requested by Owner. Deliver to project site and place in location as directed by Owner; *obtain receipt before final payment*.

d. TECHNICAL DATA
i. Manufacturers' technical literature assembled specifically for the project and **excluding irrelevant matter.**
ii. Each product data sheet marked to clearly identify the specific products and components used in the installation and the data applicable. Additional instructions and illustrations, as required, to identify and changes to the manufacturers' data or to illustrate the function of each component in the installation.
iii. Provide performance curves and engineering data
iv. Include control diagrams by controls manufacturer as installed.

v. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
vi. Shop drawings when provided

e. WARRANTIES
i. Provide originals of Manufacturers' warranties and bonds executed in duplicate by responsible subcontractors, suppliers, and manufacturers, *within ten days after completion of applicable item of work*
ii. All Guarantees
iii. Certificates of compliance for all electrical and plumbing works, where applicable.
iv. If installation is not by the manufacturer, and product warranty is conditional on the manufacturer's approval of the installer, submit the manufacturer's approval of the installing firm.

f. COMMISSIONING REPORTS
i. Air and water balance reports
ii. Include test and balancing reports as specified in Section 01 91 13.
iii. Records of test results
iv. Records of Commissioning Data

3.08 PRODUCT WARRANTIES AND PRODUCT BONDS

A. Execute and assemble transferable warranty documents and bonds from subcontractors, suppliers, and manufacturers.

B. Verify documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Submit before final Application for Payment.

E. Time of Submittals:

1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.

2. Make other submittals within ten days after Date of Substantial Completion, before final Application for Payment.

3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within ten days after acceptance, listing date of acceptance as beginning of warranty or bond period.

END OF SECTION 01 00 00

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE (Read instructions on page two prior to initiating this form.)	DATE:	TRANSMITTAL NO

SECTION I – REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS (This section will be initiated by the contractor.)

TO:	**FROM:**	**DFE PROJECT NUMBER**	**CHECK ONE:** ☐ THIS IS A NEW SUBMITTAL ☐ THIS IS A RESUBMITTAL OF TRANSMITTAL NO. ____
SPECIFICATION SEC NO. (Cover only one section with each transmittal)	**PROJECT TITLE AND LOCATION:**		

ITEM NO. a.	DESCRIPTION OF ITEM SUBMITTED (Type size, model number/etc.) b.	MFG OR CONTR. CAT., CURVE DRAWING OR BROCURE NO. c.	NO. OF COPIES d.	CONTRACT REFERENCE DOCUMENT		FOR CONTR-ACTOR USE CODE g.	VARIATION (See instr. #6) h.	FOR DFE USE CODE i.
				SPEC PARA NO. e.	DRAWING SHEET NO. f.			
							☐	
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REMARKS	I certify that the above submitted items have been reviewed in detail and are correct and in strict compliance with the contract drawings and specifications except as otherwise stated. _____ SIGNATURE OF THE CONTRACTOR NAME:

SECTION II – APPROVAL ACTION

ENCLOSURES RETURNED (List by Item No.)	NAME, TITLE OF APPROVING AUTHORITY	DATE

DFE SUBMITTAL FORM, AUG 2010 SHEET 1 of 1

INSTRUCTIONS

1. Section I will be initiated by the Contractor in the required number of copies.

2. Each transmittal shall be numbered consecutively in the space provided for "Transmittal No.". This number, in addition to the DFE Project Number, will form a serial number for identifying each submittal. For example: 23SR10-470-D-T1

3. For new submittals or resubmittals mark the appropriate box; on resubmittals, insert transmittal number of last submission as well as the new submittal number.

4. Submittals requiring expeditious handling will be submitted on a separate form.

5. A separate transmittal form will be used for submittals under separate sections of the specifications.

6. A check shall be placed in the "Variation" column (Section I, Column h) when a submittal is not in accordance with the plans and specifications. Also, a written statement to that effect shall be included in the space provided for "Remarks".

7. The form is a self-transmittal, i.e. letter of transmittal is not required.

8. When a sample of material or Manufacturer's Certificate of Compliance is transmitted, indicate "Sample" or "Certificate" in Section I, Column c.

9. Directorate of Facilities Engineering approving authority will assign action codes as indicated below in space provided in Section I, Column i to each item submitted. In addition, they will ensure enclosures are indicated and attached to the form prior to return to the Contractor. The Contractor will assign action codes as indicated below in Section I, Column g to each item submitted.

THE FOLLOWING ACTION CODES ARE GIVEN TO ITEMS SUBMITTED

A – Approved as submitted
B – Approved, except as noted on drawings
C – Approved, except as noted on drawings. Refer to attached sheet resubmission required.
D – Will be returned by separate correspondence.
E – Disapproved (See Attached)
F – Receipt acknowledged.
FX – Receipt acknowledged, does not comply as noted with contract requirements.
G – Other (Specify)

10. Approval of items does not relieve the Contractor from complying with all the requirements of the contract plans and specifications

SECTION 263000 – CHP ENGINE GENERATORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes packaged engine-generator sets for grid-connect combined heat and power application with the following features:

1. Natural gas driven engine.
2. Thermal recovery system.
3. Remote cooling radiator.
4. Load following capability under grid-connect mode.
5. Load banks.
6. Outdoor enclosure.

B. Related Sections include the following:

1. Section 23 11 23 "Facility Natural-Gas Piping"
2. Section 23 12 13 "Hydronic Piping"
3. Section 23 09 00 "Building Automation System - Instrumentation & Controls”

1.3 DEFINITIONS

A. Operational Bandwidth: The total variation from the lowest to highest value of a parameter over the range of conditions indicated, expressed as a percentage of the nominal value of the parameter.

B. NG: Natural Gas

C. HHV: Higher Heating Value of Fuel

D. LHV: Lower Heating value of Fuel

1.4 ACTION SUBMITTALS

A. Product Data: For each type of packaged engine generator indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. In addition, include the following:

1. Thermal damage curve for generator.

2. Time-current characteristic curves for generator protective device.

B. Shop Drawings:

1. Dimensioned outline plan and elevation drawings of engine-generator set and other components specified.
2. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Wiring Diagrams: Power, signal, and control wiring.
4. Piping Diagrams: Exhaust, natural gas, and hydronic piping connections and required devices.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For installer.

B. Source quality-control test reports.
1. Certified Summary of Performance Tests: Certify compliance with specified requirement to meet performance criteria for sensitive loads.
2. Report of factory test on units to be shipped for this Project, showing evidence of compliance with specified requirements.
3. Report of sound generation.
4. Report of exhaust emissions showing compliance with applicable regulations.
5. Certified Torsional Vibration Compatibility: Comply with NFPA 110.

C. Field quality-control test reports.

D. Warranty: Shall provide details applicable to required warranty

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For packaged engine generators to include operation, and maintenance manuals including the following:

1. List of tools and replacement items recommended to be stored at Project for ready access. Include part and drawing numbers, current unit prices, and source of supply.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Fuses: One for every 10 of each type and rating, but no fewer than one of each.
2. Indicator Lamps: Two for every six of each type used, but no fewer than two of each.
3. Filters: One set each of lubricating oil, fuel, and combustion-air filters.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

1. Maintenance Proximity: Not more than five hours' normal travel time from Installer's place of business to Project site.

B. Manufacturer Qualifications: A qualified manufacturer. Maintain, within 400 miles of Project site, a service center capable of providing training, parts, and emergency maintenance repairs.

C. Source Limitations: Obtain packaged generator sets and auxiliary components through one source from a single manufacturer.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

E. Comply with ASME B15.1.

F. Comply with NFPA 37.

G. Comply with NFPA 70.

H. Comply with UL 2200.

I. Engine Exhaust Emissions: Comply with applicable state and local government requirements.

1.9 PROJECT CONDITIONS

A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service according to requirements indicated:

1. Notify Owner no fewer than 7 days in advance of proposed interruption of electrical service.
2. Do not proceed with interruption of electrical service without Owner’s written permission.

B. Environmental Conditions: Engine-generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:

1. Ambient Temperature: -5 to 40 Deg C
2. Relative Humidity: 0 to 95 percent.
3. Altitude: Sea level to 200 feet

1.10 COORDINATION

A. Coordinate size and location of concrete bases for package engine generators and remote radiators mounted on grade. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.

1.11 WARRANTY – Not Used

1.12 MAINTENANCE SERVICE

A. Maintenance Service: Beginning at Substantial Completion, provide annual service contracted maintenance by skilled employees of manufacturer's designated service organization. Include monthly/quarterly scheduled preventive maintenance services as recommended by the manufacturer for proper operation and engine life. Provide parts and supplies same as those used in the manufacture and installation of original equipment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: This project has been carefully designed around a basis of design reciprocating engine CHP system; however, alternate manufacturers may submit an alternate for approval.
   1. Basis of Design: Tecogen Cm75 KW Induction CHP System Including, but not limited to:
      - 75 Kw, 460v, 60 Hz, 3-Phase, 3w
      - EPA Certified Industrial Natural Gas Engine (V-8, 454 Cid)
      - Microprocessor Controls
      - Engine Jacket, Oil and Exhaust Heat Recovery
      - Open Protocol Interface (Modbus-Based)
      - Emissions Control Package
      - Remote Monitoring & Control System Including Web Browser Capability
      - Standard Electrical Protective Switchgear Panel
      - Steel Skid and Vibration Isolators
      - Critical Grade Silencer
      - Complete Factory Assembly
      - Factory Full-Load Test Run
      - Outdoor Enclosure
      - Tecogen Insight Panel for Data Collection
      - Load And Pumping Modules (Based On Mechanical Plans)
      - Engine Radiator (Sized and Selected By Chp Mfr To Match Engine)
      - Beckwith Power Protection Panel and Associated Cts
      - M&V Metering Package (Gas, Electrical and Thermal) With Interconnection To BACS
      - Start-Up, Testing and Commissioning

2. Alternate Manufacturers: Basis of design is a 75 kW engine capable of operation down to 30 kW with minimal efficiency loss. Alternates shall provide documentation stating operational range, efficiencies and provide technical design proposal locating engine within the same space as shown on the contract drawings.

3. Alternate Manufacturers MUST meet the material and manufacturing requirements of the Build America, Buy America Act (Pub. L. No. 117-58, §§ 70901-52)

4. NOTE: Refer to Section 3.7 for additional Service and Maintenance Warranty Related requirements to be provided.

2.2 ENGINE-GENERATOR SET

A. Factory-assembled and -tested, engine-generator set.

B. Mounting Frame: Maintain alignment of mounted components without depending on concrete foundation; and have lifting attachments.

1. Rigging Diagram: Inscribed on metal plate permanently attached to mounting frame to indicate location and lifting capacity of each lifting attachment and generator-set center of gravity.

C. Capacities and Characteristics:

1. Power Output Ratings: 75 kW with reduced modulated output to 30 kW, 480 VAC
2. Output Connections: Three-phase, 3 wire.
3. Nameplates: For each major system component to identify manufacturer's name and address, and model and serial number of component.

D. Generator-Set Performance:

1. Steady-State Voltage Operational Bandwidth: 3 percent of rated output voltage from no load to full load.
2. Transient Voltage Performance: Not more than 20 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within three seconds.
3. Steady-State Frequency Operational Bandwidth: 0.5 percent of rated frequency from no load to full load.
4. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.
5. Transient Frequency Performance: Less than 5 percent variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within five seconds.
6. Output Waveform: At no load, harmonic content measured line to line or line to neutral shall not exceed 5 percent total and 3 percent for single harmonics. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50 percent.
7. Sustained Short-Circuit Current: For a 3-phase, bolted short circuit at system output terminals, system shall supply a minimum of 250 percent of rated full-load current for not

less than 10 seconds and then clear the fault automatically, without damage to generator system components.

8. Start Time: Comply with NFPA 110, Type 10, system requirements.

E. Generator-Set Performance for Sensitive Loads:

1. Oversizing generator compared with the rated power output of the engine is permissible to meet specified performance.

    a. Nameplate Data for Oversized Generator: Show ratings required by the Contract Documents rather than ratings that would normally be applied to generator size installed.

2. Steady-State Voltage Operational Bandwidth: 1 percent of rated output voltage from no load to full load.
3. Transient Voltage Performance: Not more than 10 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within 0.5 second.
4. Steady-State Frequency Operational Bandwidth: Plus or minus 0.25 percent of rated frequency from no load to full load.
5. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.
6. Transient Frequency Performance: Less than 2-Hz variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within three seconds.
7. Output Waveform: At no load, harmonic content measured line to neutral shall not exceed 2 percent total with no slot ripple. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50 percent.
8. Sustained Short-Circuit Current: For a 3-phase, bolted short circuit at system output terminals, system shall supply a minimum of 300 percent of rated full-load current for not less than 10 seconds and then clear the fault automatically, without damage to winding insulation or other generator system components.
9. Excitation System: Performance shall be unaffected by voltage distortion caused by nonlinear load.

2.3 ENGINE

A. Fuel: Natural gas

B. Lubrication System: The following items are mounted on engine or skid:

1. Filter and Strainer: Rated to remove 90 percent of particles 5 micrometers and smaller while passing full flow.
2. Thermostatic Control Valve: Control flow in system to maintain optimum oil temperature. Unit shall be capable of full flow and is designed to be fail-safe.
3. Crankcase Drain: Arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps, siphons, special tools, or appliances.

C. Engine Fuel System:
   1. Natural Gas System:

      a. Carburetor.
      b. Secondary Gas Regulators: One for each fuel type.
      c. Fuel-Shutoff Solenoid Valves: One for each fuel source.
      d. Flexible Fuel Connectors: One for each fuel source.

A. Cooling System: Closed loop, liquid cooled, with integral heat recovery module and remote radiator

   1. Configuration: Horizontal air discharge.
   2. Radiator Core Tubes: Nonferrous-metal construction other than aluminum.
   3. Size of Radiator: Adequate to reject 100% of heat at highest anticipated ambient temperature.
   4. Expansion Tank: Diaphragm type and rated to withstand maximum closed-loop coolant system pressure for engine used.
   5. Fan: Driven by totally enclosed electric motor with sealed bearings.
   6. Coolant: Solution of 50 percent propylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer. Basis of design is Houghton Green Mountain
   7. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.

B. Muffler/Silencer: Critical type, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements.
   1. Sound level measured at a distance of 10 feet (3 m) from exhaust discharge after installation is complete shall be 70 dBA or less with engine enclosed.

C. Air-Intake Filter: Engine-mounted air cleaner with replaceable dry-filter element and "blocked filter" indicator.

D. Starting System: 12/24-V electric (or as required), with negative ground.

   1. Components: Sized so they will not be damaged during a full engine-cranking cycle with ambient temperature at maximum specified in Part 1 "Project Conditions" Article.
   2. Cranking Motor: Heavy-duty unit that automatically engages and releases from engine flywheel without binding.
   3. Battery: Adequate capacity within ambient temperature range specified in Part 1 "Project Conditions" Article to provide specified cranking cycle at least three times without recharging.
   4. Battery Cable: Size as recommended by engine manufacturer for cable length indicated. Include required interconnecting conductors and connection accessories.
   5. Battery Compartment: Factory fabricated of metal with acid-resistant finish and thermal insulation. Thermostatically controlled heater shall be arranged to maintain battery above 10 deg C regardless of external ambient temperature within range specified in Part 1 "Project Conditions" Article. Include accessories required to support and fasten batteries in place.
   6. Battery-Charger: Factory mounted on engine with solid-state voltage regulation

2.4 CONTROL AND MONITORING

A. Automatic Starting System Sequence of Operation: When mode-selector switch on the control and monitoring panel is in the automatic position, remote-control contacts in one or more separate automatic transfer switches initiate starting and stopping of generator set. When mode-selector switch is switched to the on position, generator set starts. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of a remote emergency-stop switch also shuts down generator set.

B. Configuration: Operating and safety indications, protective devices, basic system controls, and engine gages shall be grouped in a common control and monitoring panel mounted on the generator set. Mounting method shall isolate the control panel from generator-set vibration.

C. Indicating and Protective Devices and Controls:

1. AC voltmeter.
2. AC ammeter.
3. AC frequency meter.
4. DC voltmeter (alternator battery charging).
5. Engine-coolant temperature gage.
6. Engine lubricating-oil pressure gage.
7. Running-time meter.
8. Ammeter-voltmeter, phase-selector switch(es).
9. Generator-voltage adjusting rheostat.
10. Start-stop switch.
11. Overspeed shutdown device.
12. Coolant high-temperature shutdown device.
13. Coolant low-level shutdown device.
14. Oil low-pressure shutdown device.
15. Generator overload.

D. Supporting Items: Include sensors, transducers, terminals, relays, and other devices and include wiring required to support specified items. Locate sensors and other supporting items on engine or generator, unless otherwise indicated.

E. Connection to Data Link: Remote monitoting of status and all alarms via Modbus RTU (RS 485) output for use with existing building automation system.

F. Common Remote Audible Alarm: Comply with NFPA 110 requirements for Level 1 systems. Include necessary contacts and terminals in control and monitoring panel.

1. Overcrank shutdown.
2. Coolant low-temperature alarm.
3. Control switch not in auto position.
4. Battery-charger malfunction alarm.

5. Battery low-voltage alarm.Engine high-temperature shutdown.
6. Lube-oil, low-pressure shutdown.
7. Overspeed shutdown.

8. Remote emergency-stop shutdown.
9. Engine high-temperature prealarm.
10. Lube-oil, low-pressure prealarm.
11. Low coolant level.

G. Generator Circuit Breaker: Molded-case, thermal-magnetic type; 100 percent rated; complying with NEMA AB 1 and UL 489.

1. Tripping Characteristic: Designed specifically for generator protection.
2. Trip Rating: Matched to generator rating.
3. Shunt Trip: Connected to trip breaker when generator set is shut down by other protective devices.
4. Mounting: Adjacent to or integrated with control and monitoring panel.

H. Generator Disconnect Switch: Molded-case type, 100 percent rated.

1. Rating: Matched to generator output rating.
2. Shunt Trip: Connected to trip switch when signaled by generator protector or by other protective devices.

I. Ground-Fault Indication: Comply with NFPA 70, "Emergency System" signals for ground-fault. Integrate ground-fault alarm indication with other generator-set alarm indications.

2.5 GENERATOR, EXCITER, AND VOLTAGE REGULATOR

A. Comply with NEMA MG 1.

B. Drive: Generator shaft shall be directly connected to engine shaft. Exciter shall be rotated integrally with generator rotor.

C. Electrical Insulation: Class H or Class F.

D. Stator-Winding Leads: Brought out to terminal box to permit future reconnection for other voltages if required.

E. Construction shall prevent mechanical, electrical, and thermal damage due to vibration, overspeed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.

F. Enclosure: Dripproof.

G. Instrument Transformers: Mounted within generator enclosure.

H. Voltage Regulator: Solid-state type, separate from exciter, providing performance as specified.

1. Adjusting rheostat on control and monitoring panel shall provide plus or minus 5 percent adjustment of output-voltage operating band.

I. Strip Heater: Thermostatically controlled unit arranged to maintain stator windings above dew point.

2.6 COMBINED HEAT AND POWER CYCLE EFFICIENCY

A. System shall be capable of 88.8% minimum combined cycle efficiency (CCE)
   1. CC Efficiency = (electric + thermal) / (input fuel at LHV)

B. Unloaded Efficiency: The CCE performance shall meet the following or better:

Electrical Output (kW)	Fuel Usage (BTU/hr)	Heat Recovery (BTU/hr)	Electrical Efficiency (%)	Overall Efficiency (%)
75	897,000	450,000	28.5	78.7
60	769,000	401,000	26.6	78.8
50	683,000	369,000	25.0	79.0
30	511,800	304,000	20.0	79.4

2.7 EMISSIONS

A. The emissions of the CHP engine shall meet the following requirement:
   1. Nitrogen Oxides (NOx): <0.07 lbs/MWh or less
   2. Volatile Organic Compounds: <0.1 lbs/MWh or less
   3. Carbon Monoxide (CO): <0.2 lbs/MWh or less

2.8 VIBRATION ISOLATION DEVICES

A. Restrained Spring Isolators: Freestanding, steel, open-spring isolators with seismic restraint.

   1. Housing: Steel with resilient vertical-limit stops to prevent spring extension due to wind loads or if weight is removed; factory-drilled baseplate bonded to 1/4-inch- (6-mm-) thick, elastomeric isolator pad attached to baseplate underside; and adjustable equipment mounting and leveling bolt that acts as blocking during installation.
   2. Outside Spring Diameter: Not less than 80 percent of compressed height of the spring at rated load.
   3. Minimum Additional Travel: 50 percent of required deflection at rated load.
   4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
   5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.

2.9 FINISHES

A. Indoor and Outdoor Enclosures and Components: Manufacturer's standard finish over corrosion-resistant pretreatment and compatible primer.

2.10 SOURCE QUALITY CONTROL

A. Project-Specific Equipment Tests: Before shipment, factory test engine-generator set and other system components and accessories manufactured specifically for this Project. Perform tests at rated load and power factor. Include the following tests:

1. Test components and accessories furnished with installed unit that are not identical to those on tested prototype to demonstrate compatibility and reliability.
2. Full load run.
3. Maximum power.
4. Voltage regulation.
5. Transient and steady-state governing.
6. Single-step load pickup.
7. Safety shutdown.
8. Provide 14 days' advance notice of tests and opportunity for observation of tests by Owner's representative.
9. Report factory test results within 10 days of completion of test.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, equipment bases, and conditions, with Installer present, for compliance with requirements for installation and other conditions affecting packaged engine-generator performance.

B. Examine roughing-in of piping systems and electrical connections. Verify actual locations of connections before packaged engine-generator installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install packaged engine generator to provide access, without removing connections or accessories, for periodic maintenance.

B. Install packaged engine generator with restrained spring isolators having a minimum deflection as required by the manufacturer’s calculations on 4-inch- (100-mm-) high concrete base. Secure sets to anchor bolts installed in concrete bases.

C. Install remote radiator with restrained spring isolators having a minimum deflection of 1 inch on elevation stand and 6” concrete pad (Ref. drawings).

D. Install pitched sheet metal room over radiator to prevent snow from accumulating on top of radiator. Reinforce roof to carry a minimum of 2 feet of snow load.

E. Install Schedule 40, black steel piping with welded joints for cooling water piping between engine-generator set and [heat exchanger] [remote radiator]. Piping materials and installation requirements are specified in Section 232113 "Hydronic Piping."

F. Install Engine Rated exhaust stack in accordance with Metal FAB Installation Manual L2592.
   1. In lieu of the engineered stack provide an alternate with deduct for a Schedule 40, black steel piping with welded joints and connect to engine muffler. Install thimble at wall. Piping shall be same diameter as muffler outlet. Provide flexible connectors for expansion/contraction.

   2. Install condensate drain piping to muffler drain outlet full size of drain connection with a shutoff valve, stainless-steel flexible connector, and Schedule 40, black steel pipe with welded joints.

G. Electrical Wiring: Install electrical devices furnished by equipment manufacturers but not specified to be factory mounted.

3.3 CONNECTIONS

A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping and specialties.

B. Connect fuel, cooling-system, and exhaust-system piping adjacent to packaged engine generator to allow service and maintenance.

C. Connect cooling-system/heat recovery module to the remote radiator and building heating system (Refer to project drawings for details)

D. Connect engine exhaust pipe to engine with flexible connector.

E. Connect fuel piping to engines with a gate valve and union and flexible connector.
   1. Natural-gas piping, valves, and specialties for gas distribution are specified in Section 231123 "Natural Gas Distribution".

F. Ground equipment in accordance with the electrical drawings.

G. Connect wiring in accordance with the electrical drawings.

3.4 IDENTIFICATION

A. Identify system components according to Section 230553 "Mechanical Identification" and the electrical drawings.

3.5 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Tests and Inspections:

1. Perform tests recommended by manufacturer and each electrical test and visual and mechanical inspection[(except those indicated to be optional)] for "AC Generators and for Emergency Systems" specified in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. Battery Tests: Equalize charging of battery cells according to manufacturer's written instructions. Record individual cell voltages.

    a. Measure charging voltage and voltages between available battery terminals for full-charging and float-charging conditions. Check electrolyte level and specific gravity under both conditions.
    b. Test for contact integrity of all connectors. Perform an integrity load test and a capacity load test for the battery.
    c. Verify acceptance of charge for each element of the battery after discharge.
    d. Verify that measurements are within manufacturer's specifications.

3. Battery-Charger Tests: Verify specified rates of charge for both equalizing and float-charging conditions.
4. System Integrity Tests: Methodically verify proper installation, connection, and integrity of each element of engine-generator system before and during system operation. Check for air, exhaust, and fluid leaks.
5. Exhaust Emissions Test: Comply with applicable government test criteria.
6. Voltage and Frequency Transient Stability Tests: Use recording oscilloscope to measure voltage and frequency transients for 50 and 100 percent step-load increases and decreases, and verify that performance is as specified.
7. Harmonic-Content Tests: Measure harmonic content of output voltage under 25 percent and at 100 percent of rated linear load. Verify that harmonic content is within specified limits.

C. Test instruments shall have been calibrated within the last 12 months, traceable to standards of NIST, and adequate for making positive observation of test results. Make calibration records available for examination on request.

D. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.

E. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.

F. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

G. Remove and replace malfunctioning units and retest/re-inspect as specified above.

H. Retest: Correct deficiencies identified by tests and observations and retest until specified requirements are met.

I. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation resistances, time delays, and other values and observations. Attach a label or tag to each tested component indicating satisfactory completion of tests.

J. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each power wiring termination and each bus connection. Remove all access panels so terminations and connections are accessible to portable scanner.

1. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan 11 months after date of Substantial Completion.
2. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
3. Record of Infrared Scanning: Prepare a certified report that identifies terminations and connections checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain packaged engine generators. This shall be completed even if a factory service contract is utilized.

3.7 COMPLETE SERVICE & MAINTENANCE WARRANTY BY MANUFACTURER

A. The Combined Heat-Power unit System Manufacturer shall provide a comprehensive maintenance program on each Combined Heat-Power unit and associated equipment. The service period is defined as commencing on the date of start-up to the first manufactures required scheduled oil change based on engine run hours (5,000 hours anticipated for 1st year). This shall include all items provided by the manufacturer to include:

1. An annual scheduled inspection of the unit(s) in the fall and spring over and above any scheduled maintenance.
2. Both scheduled and unscheduled service of each Combined Heat-Power unit module shall be included, including parts, labor, travel, and consumables during this period.
3. In addition, complete engine and/or generator replacements or overhauls shall be included (parts and labor), as needed.
4. The manufacture/maintenance contractor will provide a monthly report to include run hours, kWh production, and any service performed during the service period.

END OF SECTION 263000