Feasibility Analysis for Randolph Davis Solar, LLC 500 kW Solar Project

Located near 0 Davis Road, Randolph, Vermont
Connected to the GMP BE-G29 Circuit in the vicinity of Line 7001, Pole 4, Tag 734371

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0	August 30, 2021	John Jockell	Creation of the document

This document provides Green Mountain Power's results of its Feasibility analysis for the proposed Project. This Feasibility analysis complies with the Vermont Public Service Board Rule 5.505 (B) Fast Track Screening Criteria. If the proposed Project fails a given criterion, supplemental analysis has been included. To the extent that the supplemental analysis confirms that the Project may have adverse impacts on safety or reliability, further study will be required.

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SECTION 1

Project Description and Notes

Project and Distribution System Description

Randolph Davis Solar LLC proposes to install a 500 kW-AC solar project (the Project) in Randolph, Vermont. The Project requests to interconnect to Green Mountain Power (GMP) on the GMP BE-G29 distribution circuit in the vicinity of Line 7001, Pole 4, Tag 734371 (the Point of Interconnection or POI). This circuit has a 7.2/12.47 kV grounded-wye configuration and is supplied by the GMP Bethel substation. This substation serves the BE-G28 and BE-G29 circuits via one power transformer. The Project would be located approximately 9.0 circuit miles from the substation. The power transformer at the substation has a base/top nameplate rating of 10,000 /14,000 kVA. The BE-G29 voltage is regulated at present via three 328 amp regulators, connected per phase. These will be upgraded to 546 amp units if a higher queued project moves forward. However, this upgrade is not required for the Project to move forward.

As of March 10, 2021, the application date for this Project, the total of installed and proposed distributed generation on the Bethel substation was 10,453 kW, including this Project. The total of installed and proposed generation on the BE-G29 is 9,261 kW, including this project. There are no rotating machine generators on the BE-G29 circuit.

The existing installed and proposed projects shall be included in the analysis as part of the total or aggregate distributed resources as necessary. In particular, there is a battery energy storage system proposed for the BE-G29 which requires BE-G29 relay setting changes, an upgrade of the BE-G29 substation regulators to 546 amp units, and the installation of three line voltage regulators in the vicinity of Line 3 Pole 48. For the purpose of this Feasibility Study, these changes/upgrades are assumed to be completed prior to the Project's interconnection. However, none of these upgrades are required for the Project to move forward. The results presented in this study reflect two scenarios:

- with the higher queued project and associated upgrades, and
- without the higher queued project and associated upgrades.

Note: the POI is fed at present via a single phase line which will have to be upgraded to three phase prior to the Project's interconnection. The Supplemental Review presented in Section 3 of this study is based on the three phase upgrade being completed.

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Substation/Circuit Protection and Loading

With higher queued project included

Location	Protective Equipment and Control Type	Maximum Loading Date & Time	Maximum Loading (kW)[1]	Minimum Daytime Loading	Minimum Daytime Loading (kW)	Total Generation Proposed & Connected (kW)
Bethel Substation	Relay w/ breaker	8/28/2018 13:00	8,179	30% of Peak	2,453	10,453
BE-G29 Circuit	Circuit Breaker w/351 SEL Relay	8/28/2018 13:00	4,808	AMI Data	1,640	9,261
Line 7, Pole 1 Tag 651816	Recloser V4H 100A 2A2C	8/28/2018 13:00	826	Load Flow	289	1,742
Line 7, Pole 58X Tag 753131	Recloser V4H 70A 2A2C	8/28/2018 13:00	456	Load Flow	159	1,476
Line 7 Pole 91 Tag 613782	30T fuse	8/28/2018 13:00	5	Load Flow	2	514

Without higher queued project included

Location	Protective Equipment and Control Type	Maximum Loading Date & Time	Maximum Loading (kW)[2]	Minimum Daytime Loading	Minimum Daytime Loading (kW)	Total Generation Proposed & Connected (kW)
Bethel Substation	Relay w/ breaker	8/28/2018 13:00	8,179	30% of Peak	2,453	5,520
BE-G29 Circuit	Circuit Breaker w/351 SEL Relay	8/28/2018 13:00	4,808	AMI Data	1,640	4,325
Line 7, Pole 1 Tag 651816	Recloser V4H 100A 2A2C	8/28/2018 13:00	826	Load Flow	289	1,742
Line 7, Pole 58X Tag 753131	Recloser V4H 70A 2A2C	8/28/2018 13:00	456	Load Flow	159	1,476
Line 7 Pole 91 Tag 613782	30T fuse	8/28/2018 13:00	5	Load Flow	2	514

[1] Circuit level loads are from January 1, 2018 to June 1, 2020. This data captures the most recent peak loads, which occur in summer. The amount of distributed generation on-line at the time of the peak was estimated and is included in these figures.

[2] Circuit level loads are from January 1, 2018 to June 1, 2020. This data captures the most recent peak loads, which occur in summer. The amount of distributed generation on-line at the time of the peak was estimated and is included in these figures.

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Relevant Studies

There is a study for a higher queued project that is relevant to this Project. The relevant upgrades are listed below.

Existing Materials

There is an existing load flow model.

Upgrades called for in higher queued projects:

The following upgrades are called for by a higher queued project:

- Replace existing BE-G29 substation voltage regulators with 546 amp units.
- Increase the pickup of the G29 substation relays.
- Install three line voltage regulators in the vicinity of Line 3 Pole 48.

However, none of these upgrades are required for the Project to move forward.

Modeling Assumptions:

- This Project has been studied as being served from its normal supply, in this case the BE-G29. There are alternate supplies to this location and in the event of a resupply situation; the Project may need to be taken off line for the duration of the resupply.
- The modeling for this analysis utilizes the electrical one-line diagram submitted for the Project. The Project proposes GMP to install three 167 kVA, 12470/7200 volt grounded-wye to 480/277 volt grounded-wye transformers. GMP assumes an impedance of 3.0% for these units.
- The modeling assumes all upgrades required by higher queued projects are implemented.
- Unless otherwise specified, the power factor for PV projects is assumed to be 100% and the power factor for synchronous and induction generators is assumed to be +/-98% and +/-93%, respectively.
- The short circuit contribution from the Project is assumed to be 150% of the Project's AC capacity.
- The inverter connection type is a three phase, no or low impedance continuous bond to the GMP neutral, also known as an ineffectively grounded or three-wire connection.
- The inverters shall be required to operate with a total demand distortion (TDD) that complies with IEEE 1547 which references IEEE 519 specifically for harmonic contribution limits.
- Regarding voltage flicker for inverter based PV systems; GMP finds that inrush current is not a significant indicator of sudden voltage drop as it would be for rotating machine generators. To measure the sudden change in voltage, GMP's voltage flicker test for inverter based PV systems shall be used to test the impact of the Project to the distribution circuit. The voltage flicker test will consider the cloud shading effects on the PV modules. The cloud shading effect will consider the output drop of 70% for the PV system being studied, i.e. a drop in output from the nameplate ratings to 30% of the nameplate ratings before any voltage regulation can react to the change of voltage. If other PV systems are located within close proximity to the Project being studied, these systems may be included in the voltage flicker test. The percent difference in voltage readings at

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the Project's POI, and at any point in the distribution circuit, shall be validated using the GE flicker table. If the cloud shading results in less than a 1.8% change in primary voltage at any point on the distribution circuit, the Project passes the voltage flicker test.

- Further information on GMP assumptions and requirements can be found in the GMP Distributed Resource Interconnection Guidelines at https://greenmountainpower.com/wp-content/uploads/2017/01/Final-2021-DER-Guidelines-2-2021-03-19.pdf

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SECTION 2

Rule 5.505 (B) Criteria and Fast Track Review

Criteria that are not passed will be colored in red**.**

1) **The Interconnection Requester's proposed Generation Resource meets the applicable codes and standards of Section 5.510 of Vermont Public Service Board Rule 5.500 or is certified equipment package under Section 5.511.**

   The inverters proposed for this project are ten (10) CPS-SCA50KTL-DO/US-480 V2.0 which are compliant with UL1741 and IEEE 1547 standards. If another type of inverter is substituted, GMP shall be made aware of this proposed change.

2) **The proposed interconnection point is not at transmission voltage (i.e. not over 23 kV line to line or 11.38 line to neutral).**

   The Project proposes to interconnect to GMP's BE-G29 distribution circuit, which has a voltage level of 7.2/12.47 kV and a four-wire, grounded-wye line configuration. This distribution circuit is not a transmission line.

3) **For interconnection to a Radial Feeder, the aggregated generation, including the proposed Generation Resource, on the circuit will not exceed 15% of the line section annual peak load as most recently measured at the substation. A line section is that portion of a distribution system connected to a customer bounded by Automatic Disconnect Devices or the end of the distribution line.**

   The BE-G29 circuit peak demand is approximately 4,808 kW. Including the proposed Project, there would be approximately 9,261 kW of existing and proposed DG on this circuit. 9,261 kW / 4,808 kW = 193%.

   The Project fails this criterion.

4) **The aggregated generation, including the proposed Generation Resource, on a distribution circuit will not contribute more than 10% to the distribution circuit's maximum fault current at the point on the high voltage (primary) level nearest the proposed interconnection point.**

   The maximum available fault current at the POI, without distributed generation, is calculated as 808 amps (three-phase fault). With all distributed generation on-line, the maximum fault current at the POI increases to 949 amps (three-phase fault). The aggregate generation contributes 17% of the circuit's maximum fault current at the POI.

   The Project fails this criterion.

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5) **The aggregated generation, including the proposed Generation Resources, on a distribution circuit will not cause any distribution protective devices and equipment (including, but not limited to, substation breakers, fuse cutouts, and line reclosers), or customer equipment on the system to exceed 85% of the short-circuit interrupting capability; nor is the Generation Resource proposed for a circuit that already exceeds 85% of the short-circuit interrupting capability.**

The maximum fault current contribution from the aggregate generation does not exceed 85% of the short-circuit interrupting capability of any existing protective device or equipment.

6) **For interconnection of a proposed single-phase or effectively-grounded three-phase Generation Resource where the primary distribution System is three-phase, four-wire, the Generation Resource will be connected line-to-neutral. For interconnection of a proposed single-phase or three-phase Generation Resource where the primary distribution system is three-phase, three-wire, the Generation Resource will be connected line-to-line.**

This circuit is a three phase, four wire multi-grounded neutral system, otherwise known as "grounded wye". The proposed Project will be connected through a grounded wye-grounded wye transformer. The Project connection is considered as ineffectively grounded with three-phase inverter based sources.
The Project can proceed with interconnection provided the following is met:

a) *The DER shall limit its overvoltage contribution according to the latest version of IEEE Std. 1547 section 7.4 (Limitation of overvoltage contribution). The Project shall provide a letter from the inverter manufacturer or a National Recognized Testing Laboratory (NRTL) confirming that the requirements from the standard are met. The letter shall be on the manufacturer or NRTL letterhead and include the firmware version and serial numbers of each inverter for the installation. Test data and/or standards certification supporting these statements may also be required at the discretion of GMP. In the alternative, a PCC recloser will be required.*

b) *GMP also requires the inverters used for this project to comply with the "Inverter Source Requirement Document of ISO New England". As part of the ISO-NE SRD requirement, GMP requires the Project to enter "momentary cessation" for over voltage conditions while operating in the "Permissive Operation" mode (Table III: Inverters Voltage Ride-through Capability and Operational Requirements). GMP requires the inverters to enter "Permissive Operation with Momentary Cessation" with a Maximum Response of 0.1s. If the proposed inverters are not capable of this Maximum Response Time, a Category III inverter shall be used instead which can comply with this requirement (IEEE 2018 6.4.2 Table 16). Inverter responses to under voltages while operating in the Permissive Operation mode are specified in the ISO-NE SRD at footnotes a and b.*

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7) **Voltage drop due to starting the proposed generator is within acceptable limits, meaning that inrush current, due to starting the proposed Generation Resource up to once per hour, is not greater than 3% of the available fault current. Voltage drop due to starting the proposed Generation Resource more than once per hour meets a tighter inrush-current tolerance, to be determined by the Interconnecting Utility.**

   The test for voltage drop is discussed above in Section 1 under Modeling Assumptions. For cloud shading with or without the higher queued project included, the maximum voltage change is 0.9%, which is acceptable.

8) **For any single Generation Resource, the available utility short circuit current at the Point of Interconnection divided by the rated output current of the Generation Resource is no less than:**
   a) **50 for Generation Resource of less than 100 kW;**
   b) **40 for Generation Resources from 100 kW to less than 500 kW; and**
   c) **20 for Generation Resources equal to or greater than 500 kW.**

   The maximum available fault current at the POI is calculated as 808 amps three-phase. The rated output current of the Project is 23.2 amps. The ratio of fault current to Project output current is 35, which is greater than the required 20 for generation resources equal or greater than 500 kW.

9) **Aggregate generation, including the Generation Resource, on a circuit will not exceed 2 MVA in an area where there are known or posted transient stability limitations to generating units located in the general electrical vicinity (e.g. three or four busses from the point of interconnection).**

   GMP is not aware of transient stability limitations in this area.

10) **No System Upgrades, in excess of limited preparation that do not necessitate a Facilities Study, are required to facilitate the interconnection of the Generation Resource.**

    This criterion cannot be determined by Section 2 alone. See the Supplemental Review (Section 3) and the Conclusion (Section 4).

11) **For interconnection of the proposed Generation Resource to the load side of spot network protectors, the proposed Generation Resource utilizes inverter-based equipment and aggregate generation, including proposed Generation Resource, will not exceed the smaller of 5% of a spot network's maximum load or 50 kW. Synchronous generators cannot be connected to a secondary network.**

    There are no spot networks on the GMP system.

12) **If the Generation Resource is to be connected on a shared, single-phase secondary, aggregate generation capacity on the shared secondary, including the proposed generation, will not exceed 20 kVA.**

    Not Applicable. The Project is three-phase.

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13) If the Generation Resource is single-phased and is to be interconnected on a center tap neutral of a 240 volts service, its addition will not create an imbalance between the two side of the 240 volt service of more than 20% of the service transformer nameplate.

Not Applicable. The Project is three-phase.

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SECTION 3

Supplemental Review

This section assesses whether failed criteria identified in Section 2 can be addressed, to ensure safe and reliable interconnection of the Project, using known solutions that would not require a System Impact Study. This supplemental review may also address potential issues that are not covered in the existing fast track criteria, such as islanding, transmission impacts, steady state voltages, and protection.

Fast Track Summary

The Project did not pass the following criteria:

Criterion 3: Temporary Over Voltage (TOV), Protection Device Loading & Coordination, Reverse Flow, Transmission, Voltage, Thermal Loading, Islanding, and Impact to other Utilities
Criterion 4: Protection device loading and coordination
Criterion 6: Temporary Over Voltage (TOV)
Criterion 10: System upgrades

Further analysis is described below.

Protection Device Loading & Coordination: FAIL

This test considers whether the total generation beyond a protective device can cause enough current flow that would erroneously cause the protective device to operate. This test considers a worst-case scenario of no load with generation at 100%. The results are presented below:

- Station high-side breaker: The high-side breaker at the Bethel substation has a 251 amp pickup. Under the conditions described above, there would be approximately 127 amps of reverse flow through this breaker with the higher queued project included and approximately 68 amps of reverse flow through this breaker without the higher queued project included. PASS
- BE-G29 substation breaker:
    - With higher queued project: The BE-G29 circuit breaker is assumed to have a 742a phase pick-up as required by a higher queued project. GMP sets the continuous current limit due to DG through this breaker at 742/1.2 or 653 amps. Under the conditions described above, there would be a maximum current flow of 417 amps through this breaker. PASS
    - Without higher queued project: The BE-G29 circuit breaker is assumed to have the existing 480a phase pickup. GMP sets the continuous current limit due to DG through this breaker at 4802/1.2 or 400 amps. Under the conditions described above, there would be a maximum current flow of 207 amps through this breaker. PASS
- Recloser: Line 7, Pole 1, there is a set of three 100 amp V4H reclosers. GMP limits the reverse flow through a recloser to 100% of its continuous rating, or in this case, 100 amps. Under the conditions described above, there

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would be maximum current flow of approximately 89 amps through these reclosers. Loading on these reclosers is independent of the higher queued project. PASS

- Recloser: Line 7, Pole 58X, there is a set of three 70 amp V4H reclosers. GMP limits the reverse flow through a recloser to 100% of its rating, or in this case, 70 amps. Under the conditions described above, there would be maximum current flow of approximately 83 amps through these reclosers. Loading on these reclosers is independent of the higher queued project. **FAIL Even when 30% minimum load is accounted for, there would still be approximately 75 amps through these reclosers.**
- Fuse: Line 7 Pole 91 30T fuse. GMP limits reverse flow through a fuse to 100% of its rating, or in this case, 30 amps. Under the conditions described above, there would be maximum current flow of approximately 25 amps through these fuses. Loading on this fuse is independent of the higher queued project. PASS
  However, to properly protect the distribution circuit with the inclusion of the Project, this will need to be upgraded to 65T fuses.

Thermal Loading: PASS

This test considers whether current flow due to generation can result in thermal overloads on equipment including, but not necessarily limited to, overhead conductors, cables, switches, fuses, sectionalizers, reclosers, breakers, regulators, and, reactors. The thermal overload limits are set by the GMP Interconnection Guidelines. After review, GMP found no thermal overload issues resulting from this interconnection apart from the reclosers at Line 7 Pole 58X mentioned above.

Substation and Transmission Capacity: PASS

This test considers whether current flow due to generation can overload the substation transformer, high-side fusing (or breaker) or, the transmission line entering the substation. When all feeders connected to the station are considered, a total of 9.26 MW of reverse flow would occur if the load was at 0% while the generation was at 100%. The top nameplate rating of substation transformer is 14 MVA; this amount of generation would not cause an overload. After review, GMP found no overloads. This test also passes without the higher queued project included in the analysis.

System Voltages: PASS

Steady state voltage: PASS

This test considers whether there could be reverse power flow on any regulators, and if so, whether they are capable of proper regulation in the reverse direction. This test also considers whether there are any other steady state voltage issues (i.e. voltages that fall outside of the limits specified by ANSI C84.1)

- **Reverse flow controls:** PASS –
  - With the higher queued project, there will be four sets of regulators between the BE-G29 breaker and the Project. At minimum load and maximum generation, reverse flow can occur on all four sets. The controls for the existing three sets of regulators are capable of, and have been set for, reverse flow. The additional set of regulators called for if the higher queued project moves forward must be capable of and programmed for reverse flow.

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- Without the higher queued project, there will be three sets of regulators between the BE-G29 breaker and the Project. At minimum load and maximum generation, reverse flow can occur on all four sets. The controls for these existing three sets of regulators are capable of, and have been set for, reverse flow.

- **Voltage levels:** PASS – In the most conservative case of peak generation and no load, steady state voltages remain within ANSI limits. This holds true with or without the higher queued project.

- **Voltage imbalance:** PASS – The imbalance in all sections of the three-phase line serving three-phase or two-phase load are less than 3% both before and after this Project. This holds true with or without the higher queued project.

Ground Fault Over Voltage (GFOV): CONDITIONAL PASS

- **GFOV on the distribution system**: CONDITIONAL PASS - The possibility of GFOV on the distribution system (DGFOV) is of concern when the minimum load to generation ratio is less than 2. Based on review, the minimum load to aggregate generation ratio on the circuit is less than 2.

  This Project conditionally passes if it meets the requirements of Section 2, Criterion 6.

- **GFOV on the subtransmission**: PASS - The possibility of ground fault over voltage on the transmission system (TGFOV) is a concern when there is a reverse flow of power onto the transmission system that cannot be dampened during line-to-ground faults on the transmission**.** TGFOV can also occur with no reverse flow when the minimum load-to-generation ratio for the section of the transmission system at issue is less than 2. Reverse flow due to distributed generation is possible from the Bethel substation onto the GMP 46 kV subtransmission supply.

  TGFOV mitigation is already in place for the Bethel substation and is not an issue.

- **GFOV beyond a stepdown**: PASS - There are no transformers, stepdown or otherwise, between the Project and the station bus excluding the Project's local GSU.

Flicker Voltage Fluctuation: PASS

- **Natural transients** (fast moving cloud cover): PASS - This test considers whether voltage fluctuation due to rapidly moving clouds is within limits. This issue was covered under Section 2, Criterion 7. Voltage fluctuation due to rapidly moving clouds for the proposed 500 kW Project is within established limits whether or not the higher queued project is included in the analysis.

- **Generator Reconnection:** CONDITIONAL PASS – Traditionally, inverter-based distributed generation is assumed to reconnect to a system, following the operation of a protective device that caused the

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generation to go off-line, five minutes after healthy grid voltage is detected. GMP is concerned, however, that simultaneous reconnection of substantial amounts of distributed generation can result in temporary high voltages and excessive voltage regulator operation. Given the large amount of distributed generation on this circuit, GMP requires that the Project reconnect at seven and a half minutes following the detection of healthy voltage.

- **Generator Synchronization:** PASS – This generation connects to GMP via an inverter which complies with IEEE & UL standards.

Unintentional Islanding: PASS

GMP considers whether the proposed Project, along with other generation on a circuit, is capable of supporting an unintentional island. To test for the possibility of unintentional islanding, GMP employs the following test:[3]

- First, GMP ensures that the Project's inverters meet applicable standards for anti-islanding.
  - After review, GMP finds that the Project's inverters conform to standards UL 1741 and IEEE 1547.

- Second, GMP considers the size of the Project, and for each line segment upstream of the Project, considers the aggregate amount of DER on that line segment, the percentage of this DER that is rotating machine or non-certified, and the line segment's minimum load.
  - After review, GMP finds no significant risk of unintentional islanding.

Impact to Other Utilities: PASS - There are no impacts to other utilities due to this Project.

[3] GMP recognizes that, even if a project passes its anti-islanding test, it is theoretically possible for an unintentional island to form. Specifically, an unintentional island could form in the very rare instance that: 1) a circuit switching device is opened in a *non-fault* situation; 2) at the moment of switching, downstream of this device, there is a near-perfect match between real power generation and load; and 3) at the moment of switching, downstream of this device, there is a near-perfect match between reactive power generation and load. GMP notes that from a worker and public safety perspective, this situation is analogous to that of a customer's back-up generator inadvertently feeding back onto a part of the distribution system that may otherwise be considered to be de-energized. As a result, and to maximize safety, GMP relies on its existing operational practices to protect the public and its workers. Among these is the practice that, at all times, lines are considered to be energized until a qualified GMP employee is on site to verify that the line has in fact been de-energized and is safe to be approached.

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SECTION 4

Conclusion

Regardless of the status of the higher queued project mentioned in this study, the Project can move forward, without a System Impact Study or Facilities Study, on the condition that the following measures are completed before interconnection:

1) Upgrade approximately 1,100' of existing single phase distribution line to three phase 1/0 AAAC.

2) Installation of an approximately 875' three-phase line extension, using 1/0 AAAC conductor, from the Project to Line 7001, Pole 4+-, together with the installation of a set of 3-167 kVA transformers. The poles, conductors, recloser and transformers need to be accessible by GMP trucks. The exact location of the take-off pole and line extension poles will be determined by a GMP distribution designer. At Line 7001, Pole 4, the line extension to the Project should be connected through a set of three 40T fuses.

3) Upgrade 30T fuse at L7 P91 to three 65T fuses

4) Replace existing V4H 100 amp reclosers at Line 7 Pole 1 with a three phase Viper ST recloser

5) Replace existing V4H 70 amp reclosers at Line 7 Pole 57X with a three phase Viper ST recloser

6) GMP requires the ability to monitor the Project's status and output. This requirement can be met by either the installation of a GMP remote terminal unit (RTU) interfacing with the Project or, in the alternative, by the installation of a GMP PCC recloser. The Project will be responsible for the recurring monthly cost of the SCADA communications to the RTU (or PCC recloser).

7) Confirmation that the inverters used for this project comply with the Inverter Source Requirement Document of ISO New England (ISO-NE SRD). As part of the ISO-NE SRD requirements, the project shall enter Momentary Cessation for over voltage conditions while operating in the Permissive Operation mode (Table III: Inverters' Voltage Ride-through Capability and Operational Requirements). The inverters shall also enter Momentary Cessation while operating in the Permissive Operation mode with a Maximum Response Time of 0.1s. If the proposed inverters are not capable of this Maximum Response Time, a Category III inverter shall be used instead which can comply with this requirement (IEEE 2018 6.4.2 Table 16). Inverter responses to under voltages while operating in the Permissive Operation mode are specified in the ISO-NE SRD at footnotes a and b.

8) GMP requires that the site comply with Section 2-Criterion 6. The DER shall limit its overvoltage contribution according to the latest version of IEEE Std. 1547 section 7.4 (Limitation of overvoltage contribution). The Project shall provide a letter from the inverter manufacturer or a National Recognized Testing Laboratory (NRTL) confirming that the requirements from the standard are met. The letter shall be on the manufacturer or NRTL letterhead and include the firmware version and serial numbers of each inverter for the installation. Test data and/or standards certification supporting these statements may also be required at the discretion of GMP. In the

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alternative, a PCC recloser will be required. GMP also requires the inverters used for this project to comply with the "Inverter Source Requirement Document of ISO New England"

9) Adjustment of the generator reconnection time from the default setting to seven and a half (7.5) minutes.

10) The Project is required to execute a DG Project Notice to Proceed with the appropriate GMP distribution designer when the Project is physically ready for interconnection to GMP's system.

The costs of measures 1) through 10) above are the responsibility of the Project. The costs for measures 1) through 5) will be developed by a GMP distribution designer.

Note that at the time of this report, the longest lead-time material for the GMP portion of this Project is approximately twenty-six (26) weeks. Lead times for all materials required for this Project are subject to change based upon manufacturer availability and delivery times. GMP will order materials for this Project when the customer provides payment. GMP cannot guarantee the availability of materials out of its stock.