Cable Schedule							
Circuit Id	Voltage Rating	Conductor Quantity, Size and Material	Wire Type	Quantity of Conduits	Size of Conduits	Conduit Type	Notes
A	15kV	(3) #4/0 AWG AL, (1) #4/0 AWG AL N	Covered ACSR	-	-	-	MV Overhead
B	15kV	(3) 350 KCMIL AL Jacketed Concentric Neutral	MV-105	1	5"	PVC	MV Underground TR-XLP/133%
C	15kV	(1) #1/0 AWG Jacketed Concentric Neutral	MV-105	1	5"	PVC	MV Underground TR-XLP/133%
D	1kV	8 Sets [(3) 600 KCMIL Cu]	XHHW-2	8	5"	PVC	Smartstack to Transformer
E	600V	(3) #1/0 AWG AL, (1) #8 AWG Cu GND	THWN-2	1	2"	PVC	AUX Transformer to AUX Panel
F	-	(1) CAT6 OR (1) Fiber Optic	-	1	1"	PVC	Communications
G	600V	(3) #6 AWG Cu, (1) #10 AWG Cu GND	THWN-2	1	2"	PVC	AUX Panel to ATR
H	600V	(3) #12 AWG Cu, (1) #12 AWG Cu GND	THWN-2	1	2"	PVC	AUX Panel to FCAB
I	600V	(3) #8 AWG Cu, (1) #10 AWG Cu GND	THWN-2	1	2"	PVC	AUX Panel to DAS

Inverter Protection Settings					
Inverter Protective Function	Enabled	Pickup	Unit	Total Clearing Time Cyc. (Seconds)	Description
27-1	Y	50%	V (L-L)	66 (1.1)	Under Voltage
27-2	Y	88%	V (L-L)	180 (3)	
27-3	N	-	-	-	
59-1	Y	110%	V (L-L)	120 (2)	Over Voltage
59-2	Y	120%	V (L-L)	9.6 (0.16)	
59-I	Y	140%	V (L-L)	-	
81U-1	Y	56.5	Hz	9.6 (0.16)	Under Frequency
81U-2	Y	58.5	Hz	18000 (300)	
81O-1	Y	61.2	Hz	18000 (300)	Over Frequency
81O-2	Y	62	Hz	9.6 (0.16)	
Block Close	N	-	-	-	-
Block Close	N	-	-	-	-
Block Close	N	-	-	-	-
Block Close	N	-	-	-	-
Voltage setting values are L-L					
Settings are based on IEEE-1547, UL 1741 SB, and utility requirements					

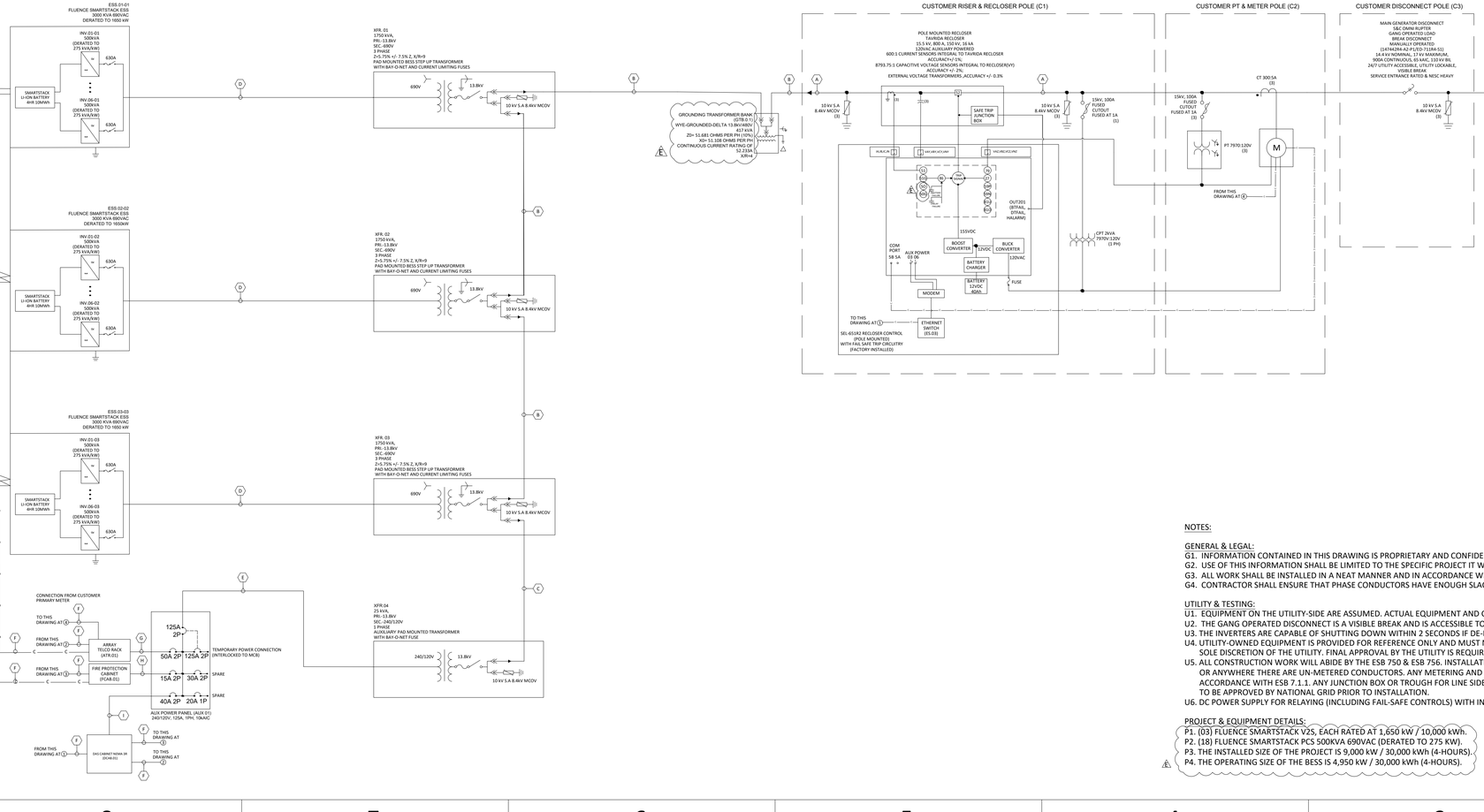
Relay Protection Settings								
Relay Protective Functions	Trip Output	Enabled (Relay Designation)	Voltage Settings (Sec.) Pri (P.U.)	Frequency Setting (Hz)	Total Clearing Time Cyc. (Sec.)	Current Setting Sec (PRI)	Relay Setting Time Cyc. (Seconds)	Torque Control
27P1 - Fast Undervoltage	X	Y (Relay.01)	(60) 3983.7 (0.5)	-	66 (1.1)	-	63 (1.05)	-
27P2 - Undervoltage	X	Y (Relay.01)	(105.6) 7011.3 (0.88)	-	180 (3)	-	177 (2.95)	-
27P3 - Undervoltage	-	N	-	-	-	-	-	-
59P1 - Overvoltage	X	Y (Relay.01)	(132) 8764.2 (1.1)	-	120 (2)	-	117 (1.95)	-
59P2 - Fast Overvoltage	X	Y (Relay.01)	(144) 9560.9 (1.2)	-	9.6 (0.16)	-	6.6 (0.11)	-
59N1 - Neutral Voltage Displacement	X	Y (Relay.01)	(15.6) 1035.8 (0.13)	-	120 (2)	-	117 (1.95)	-
59N2 - Neutral Voltage Displacement	-	N	-	-	-	-	-	-
81UP1 - Underfrequency	X	Y (Relay.01)	-	56.5	9.6 (0.16)	-	6.6 (0.11)	-
81UP2 - Underfrequency	X	Y (Relay.01)	-	58.5	18000 (300)	-	17997 (299.95)	-
81OP1 - Overfrequency	X	Y (Relay.01)	-	61.2	18000 (300)	-	17997 (299.95)	-
81OP2 - Overfrequency	X	Y (Relay.01)	-	62	9.6 (0.16)	-	6.6 (0.11)	-
50 - Instantaneous Overcurrent	X	Y	-	-	5 (0.083)	1.29 (776.6A)	-	HBLT2
51 - Overcurrent	X	Y (Relay.01)	-	-	CURVE: U4 TD: 2.0	0.43 (258.9A)	-	-
50G - Instantaneous Ground Overcurrent	X	Y	-	-	5 (0.083)	0.65 (388.3A)	-	HBLT2
51G - Ground Overcurrent	X	Y (Relay.01)	-	-	CURVE: U4 TD: 1.0	0.14 (86.3A)	-	-
67 - Directional Overcurrent	-	N	-	-	-	-	-	-
Block Close	-	Y (Relay.01)	(110) 7306.1 (0.917) ≤ V ≤ (126) 8365.8 (1.05)	59.5 ≤ f ≤ 60.1	18000 (300)	-	-	-
32F - Directional Power	-	N	-	-	-	-	-	-
32R - Reverse Power	-	N	-	-	-	-	-	-
THD-O Total Harmonic Distortion	-	N	-	-	-	-	-	-
Relay Fail Alarm	X	Y (Relay.01)	-	-	3 (0.05)	-	-	-
Primary voltage setting values are L-N								
Time delay shown is total clear time, which includes mechanical operation time of 3 cycles (0.05 sec)								
Autorestoration is enabled following voltage and frequency trips only. The relay will lockout for any overcurrent trips								

LINE DIAGRAM SYMBOL LEGEND

KWH METER
KW INVERTER
DC/DC CONVERTER
POTENTIAL TRANSFORMER
CURRENT TRANSFORMER
POWER TRANSFORMER
CABLE TERMINATION
SEPARABLE CONNECTOR
SURGE ARRESTER
FUSE
CIRCUIT BREAKER
FUSED CUT OUT
GANG OPERATED DISCONNECT
FUSED DISCONNECT
SOLID BLADE DISCONNECTS
NORMALLY CLOSED CONTACT
NORMALLY OPEN CONTACT
CAPACITIVE DIVIDER VOLTAGE SENSING ELEMENT
SHUNT TRIP

LINE DIAGRAM LINE STYLE LEGEND

COMMUNICATION CABLE
NOT IN SERVICE



NOTES:

GENERAL & LEGAL:
- G1. INFORMATION CONTAINED IN THIS DRAWING IS PROPRIETARY AND CONFIDENTIAL BELONGING TO NEXAMP OF BOSTON, MA.
- G2. USE OF THIS INFORMATION SHALL BE LIMITED TO THE SPECIFIC PROJECT IT WAS DEVELOPED FOR AND SHALL NOT BE REPRODUCED WITHOUT CONSENT FROM NEXAMP, INC.
- G3. ALL WORK SHALL BE INSTALLED IN A NEAT MANNER AND IN ACCORDANCE WITH THE APPLICABLE VERSION OF THE NATIONAL ELECTRICAL CODE(NEC) AND ALL OTHER LAWS AND STANDARDS.
- G4. CONTRACTOR SHALL ENSURE THAT PHASE CONDUCTORS HAVE ENOUGH SLACK TO BE RELOCATED TO ANY PHASE BUSHING AS NEEDED TO ACCOMMODATE UTILITY PHASE ROTATION.

UTILITY & TESTING:
- U1. EQUIPMENT ON THE UTILITY-SIDE ARE ASSUMED. ACTUAL EQUIPMENT AND CONFIGURATION SHALL BE VERIFIED BY THE UTILITY. UTILITY'S STANDARDS FOR INTERCONNECTION WILL BE FOLLOWED.
- U2. THE GANG OPERATED DISCONNECT IS A VISIBLE BREAK AND IS ACCESSIBLE TO THE UTILITY 24/7.
- U3. THE INVERTERS ARE CAPABLE OF SHUTTING DOWN WITHIN 2 SECONDS IF DE-ENERGIZED.
- U4. UTILITY-OWNED EQUIPMENT IS PROVIDED FOR REFERENCE ONLY AND MUST NOT BE USED FOR CONSTRUCTION PURPOSES. ALL SUCH EQUIPMENT REMAINS SUBJECT TO MODIFICATION AT THE SOLE DISCRETION OF THE UTILITY. FINAL APPROVAL BY THE UTILITY IS REQUIRED PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION ACTIVITIES INVOLVING OR ADJACENT TO SAID EQUIPMENT
- U5. ALL CONSTRUCTION WORK WILL ABIDE BY THE ESB 750 & ESB 756. INSTALLATIONS WILL NOT INCLUDE ANY KIND OF TAPS, METER COLLARS OR ADAPTERS INSIDE METER SOCKETS, METER CABINETS OR ANYWHERE THERE ARE UN-METERED CONDUCTORS. ANY METERING AND DISCONNECTS WILL NEED TO BE GROUPED, POTENTIALLY LOCATED OUTSIDE AND 24/7 LOCKABLE AND ACCESSIBLE, IN ACCORDANCE WITH ESB 7.1.1. ANY JUNCTION BOX OR TROUGH FOR LINE SIDE TAP WILL NEED TO BE 24/7 LOCKABLE AND ACCESSIBLE. ALL EQUIPMENT & FINAL EQUIPMENT LOCATIONS WILL NEED TO BE APPROVED BY NATIONAL GRID PRIOR TO INSTALLATION.
- U6. DC POWER SUPPLY FOR RELAYING (INCLUDING FAIL-SAFE CONTROLS) WITH INCLUDED UTILITY RESTORATION SETTINGS, WILL DEPICT THAT THE BATTERY IS RATED TO LAST FOR >8 HOURS"

PROJECT & EQUIPMENT DETAILS:
- P1. (03) FLUENCE SMARTSTACK V2S, EACH RATED AT 1,650 kW / 10,000 kWh.
- P2. (18) FLUENCE SMARTSTACK PCS 500KVA 690VAC (DERATED TO 275 KW).
- P3. THE INSTALLED SIZE OF THE PROJECT IS 9,000 kW / 30,000 kWh (4-HOURS).
- P4. THE OPERATING SIZE OF THE BESS IS 4,950 kW / 30,000 kWh (4-HOURS).

OWNER | NATIONAL GRID MA

GRIT APPROVAL
Reviewed By: S Dudek
Date: 09/29/2026

Approved
A.Ali 09/30/2026

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Rev	Issued For	Date	Init
A	UIA	11/05/2024	-
B	UIA	03/03/2025	UQ
C	UIA	08/14/2026	AI
D	UIA	09/04/2026	AI
E	UIA	09/29/2026	AI

P.E. seal//Consultant:

Project:
133693 - Pleasant Street Standalone Storage
950 Pleasant Street,
Leominster, MA 01453
42.49374, -71.77159

Drawing Title:
AC Single Line Diagram
Drawn by: A.Imran
Scale: N.T.S

Dwg No: E-601
Size: D
Sheet Rev: E

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