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Operations Project Authorization Form

Approved on August 17, 2022 EPAC

Link to Meeting Minutes

Project Title: [redacted] **Relaying Replacement**	**Project Number: 405259 (T SS), CS00461 (D SS)**
Date Prepared: 07/25/2022	**Company: Eversource CT**
Organization: Asset Management	**Class(es) of Plant: D SS, T SS**
Project Initiator: [redacted]	**Project Category: Stations - Relays**
Managing Organization: Transmission / Major Projects	**Schedule ID#: 405259**
Project Manager: [redacted]	**Project Type: Specific**
Project Sponsor: [redacted]	**Capital Investment part of original Op Plan: Yes**
Estimated in service date: December 2022	**Emergency Related Request? No**
Eng./Constr. Resources Budgeted? Yes	**Facility Type (check all that apply):** ☒ **PTF** ☐ **non-PTF** ☒ **Distribution** ☐ **N/A (General Plant)**
Total Capital Request: $3.464M (D – $2.564M, T - $0.899M)	**Authorization Type: Full Funding**

[1] Executive Summary

This request is for full funding in the amount of $3.464M (D – $2.564M, T - $899K) to replace existing electromechanical type transformer relays on [redacted] The system 1 and system 2 relays will all be replaced.

The primary driver of the project is the replacement of the transformer protection electromechanical relays. [redacted]

This replacement of the electromechanical relays was originally planned for inclusion in the Connecticut Electromechanical Relay Replacement Program CS00488 which had an Initial Funding Request (IFR) approved at EPAC on March 21, 2022, to replace all electromechanical relays and obsolete microprocessor relays still in service at all Eversource CT distribution

substations. This work is being performed prior to the development of the program due to specific known [redacted]. Costs for the transformer relay upgrades will used for unit cost information for program CS00488. Conceptual engineering for the first site of the program has begun, with presentation at Solution Design Committee expected in Q4 2022.

[redacted]

The LTC upgrades and DSCADA connections are part of the DSCADA LTC Receivers Program, CS00407, which has been previously approved at the Solution Design Committee (SDC) meeting on March 17, 2021. Engineering was begun in 2019 as project CS009046 (DSCADA LTC Controls Upgrade), which was part of program CS00090 (2015), and will be completed by this project. Bundling the DSCADA LTC relaying replacement work into this project will save resources as the engineering and field work can be performed at the same time and with the same outages. There are approximately $25k in charges to CS009046 which will be journaled to CS00461.

This project originally had initial funding of $75K (CS00461) and $75K (405259) approved in PowerPlan on March 1, 2021 and March 17, 2021, respectively. The initial funding was revised to $125K (CS00461) and $100K (405259) on April 19, 2022 and May 4, 2022, respectively. As of July 26, 2022, $82K has been spent by project CS00461 and $82K has been spent by project 405259. These funds have been used to complete preliminary engineering, begin detailed engineering, perform constructability walkdowns and develop outage schedules.

This project was presented and approved at the SDC meeting on August 3, 2022.

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[2] Project Costs Summary

Total Project Costs

Note: Dollar values are in thousands

Line-item Category	Prior Authorized	Actuals to Date	2022 to Go	2023	2024	Total
1. ROW / Easements / Land Acquisition		0	0	0	0	0
2. Environmental Approvals / Permits		0	0	0	0	0
3. Outreach		1	0	0	0	1
4. Siting Approvals / Permits		0	0	0	0	0
5. Engineering / Design		34	288	17	0	339
6. Materials (Eversource purchased)		0	69	0	0	69
7. Construction (incl matl's by contractors)		2	871	0	0	874
8. Testing / Commissioning		0	442	0	0	442
9. Project Mgmt Team		65	86	6	0	157
10. Removals		0	15	0	0	15
11. Other		0	0	0	0	0
12. Risks		0	248	10	0	258
SUBTOTAL DIRECTS W/ RISKS	**$225K**	102	2,019	34	0	2,154
13. Indirects/Overhead		58	1,028	22	0	1,109
14. AFUDC		4	103	0	0	107
PROJECT TOTAL – BASELINE BUDGET	**$225K**	164	3,149	56	0	3,369
15. Contingency		0	94	0	0	94
		0	0	0	0	0
TOTAL CAPITAL REQUEST	**$225K**	164	3,244	56	0	3,464
16. Reimbursables/Customer Contribution		0	0	0	0	0
		0	0	0	0	0
PROJECT TOTAL (LESS REIMBURSABLES)	**$225K**	164	3,244	56	0	3,464
O&M		0	0	0	0	0
TOTAL REQUEST	**$225K**	164	3,244	56	0	3,464

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Transmission Costs (405259)

Note: Dollar values are in thousands

Line-item Category	Prior Authorized	Actuals to Date	2022 to Go	2023	2024	Total
1. ROW / Easements / Land Acquisition						
2. Environmental Approvals / Permits						
3. Outreach		$1				$1
4. Siting Approvals / Permits						
5. Engineering / Design		$24	$124			$148
6. Materials (Eversource purchased)			$20			$20
7. Construction (incl matl's by contractors)		$2	$129			$132
8. Testing / Commissioning			$185			$185
9. Project Mgmt Team		$24	$48			$72
10. Removals						
11. Other						
12. Risks			$63			$63
SUBTOTAL DIRECTS W/ RISKS	**$100K**	**$51**	**$569**			**$619**
13. Indirects/Overhead		$29	$192			$221
14. AFUDC		$2	$30			$32
PROJECT TOTAL – BASELINE BUDGET	**$100K**	**$82**	**$790**			**$872**
15. Contingency			$27			$27
TOTAL CAPITAL REQUEST	**$100K**	**$82**	**$817**			**$899**
16. Reimbursables/Customer Contribution						
PROJECT TOTAL (LESS REIMBURSABLES)	$100K	**$82**	**$817**			**$899**
O&M						
TOTAL REQUEST	**$100K**	**$82**	**$817**			**$899**

Detail other costs, project risk items and their allocations:

Risk	Allocation
1. Delays is Material Delivery	$17.5K
2. Severe Weather, Delays, OT	$17.5K
3. Design Development	$15K
4. Labor Resourcing	$12.5K
Total	$62.5K

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Distribution Costs (CS00461)

Line-item Category	Prior Authorized	Actuals to Date	2022 to Go	2023	2024	Total
1. ROW / Easements / Land Acquisition						
2. Environmental Approvals / Permits						
3. Outreach						
4. Siting Approvals / Permits				$0		$0
5. Engineering / Design		$10	$164	$17		$191
6. Materials (Eversource purchased)			$49			$49
7. Construction (incl matl's by contractors)		$0	$742			$742
8. Testing / Commissioning			$257			$257
9. Project Mgmt Team		$41	$38	$6		$85
10. Removals			$15			$15
11. Other						
12. Risks			$185	$10		$195
SUBTOTAL DIRECTS W/ RISKS	**$125**	**$51**	**$1,450**	**$34**		**$1,535**
13. Indirects/Overhead		$29	$836	$22		$888
14. AFUDC		$2	$73			$75
PROJECT TOTAL – BASELINE BUDGET	**$125**	**$82**	**$2,359**	**$56**		**$2,497**
15. Contingency			$67			$67
TOTAL CAPITAL REQUEST	**$125**	**$82**	**$2,427**	**$56**		**$2,565**
16. Reimbursables/Customer Contribution						
PROJECT TOTAL (LESS REIMBURSABLES)	$125	**$82**	**$2,427**	**$56**		**$2,565**
O&M						
TOTAL REQUEST	**$125**	**$82**	**$2,427**	**$56**		**$2,565**

Detail other costs, project risk items and their allocations:

Risk	Allocation
1. Delays is Material Delivery	$30K
2. Severe Weather, Delays, OT	$80K
3. Design Development	$45K
4.Potential UG Obstructions	$30K
Total	$195K

Explain unique payment provisions, if applicable:

NA

Identify and detail any unique O&M impacts resulting from this project:

NA

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[3] Technical Justification

Project Need, Objective and Justification

The primary driver of the project is [redacted] program, CS00488, has been started to replace all electromechanical relaying at all CT distribution substations. This project is being performed in advance of that program due the known issues with the transformer relays at Forestville.

[redacted] (SUB 029).

[redacted] The LTC upgrades and DSCADA connections are part of the DSCADA LTC Receivers Program, CS00407, which has been previously approved. Engineering was begun in 2019 under project CS009046 and will be completed by this project. Bundling the work will save resources because the engineering and field work can be performed at the same time and with the same outages

An outage plan has been created. Outages will be performed from October through November 2022. The transformer relaying upgrades will be performed one system at a time to minimize call back times in case of an emergent failure.

The project objective is to improve system reliability by replacing obsolete and failure prone relays with modern microprocessor relays. The project also aims to increase the reliability of the transformer LTC controls and improve the reliability of their SCADA connections.

A constructability review was performed on May 23, 2022 and found no significant barriers to successful project construction and completion.

Project Scope

The scope of work includes the following:

Project 405259 - [redacted]

Relays:

[redacted]

- [redacted]

Project CS00461 - [redacted]

Relays:

[redacted]

- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]

LTC Controls:

[redacted]

- [redacted]
- [redacted]

- [redacted]

Substation Equipment

Station	Device Position /	Device Removals	Device Additions
[redacted]			

A constructability review was performed on May 20, 2022 (see Attachment C).

Background

[redacted]

[4] Alternatives Considered

Alternative #1: Do Nothing

Do nothing and replace the BDD relays with rebuilt relays as they fail.

Advantages: Less initial capital costs.

Disadvantages: [redacted]

Costs: Estimated costs for this alternative are $68K per transformer for a total cost $204K for the three transformers. This assumes the work is performed with in house resources and does not require an LCE or construction representative. No detailed estimate provided.

Alternative #2: Replace Obsolete Relays (Preferred Solution)

[redacted]

Advantages: [redacted].

Disadvantages: This alternative has higher initial costs than replacing the relays as they fail.

Costs: Estimated costs for this alternative is $3.464M +25% / -25%. The transmission costs would be $899K and the distribution costs would be $2.564M. Refer to Attachments A1 and A2.

[5] Project Schedule

Milestone	Scheduled Completion Date
IFR Approval	3/31/2021
SDC Approval (for applicable projects)	8/4/2022
Preliminary Design Completion (or latest pre-full funding design phase)	6/6/2022
EPAC Full Funding Approval	8/17/2022
Siting Approval (for applicable projects)	NA
Start of Construction	October 2022
Project In-Service Date (ISD)	December 2022

See Attachment B for the P6 schedule.

[6] Regulatory Approvals

NA

[7] Risk and Risk Mitigation Plans

Contingency:

Contingency of $94.7K has been included for this project for unanticipated unknowns.

Risk Mitigation:

Risk	Mitigation
1. Potential UG Obstructions	Risk allocation has been included to address possible unknown underground obstructions within the substation. Drawings and mark outs should be used to mitigate the risk of having underground obstructions. Excavate by hand to minimize risk of damaging existing conduit.

Risk	Mitigation
2. Severe Weather, Delays, OT	Risk allocation has been included for severe weather, delays, and OT. This will be mitigated with by allowing float time in the schedule.
3. Design development	Risk allocation has been included for possible issues associated with design development. Mitigation includes rectify the Engineering Wiring Change, Install relevant Communication system upgrades, and modify the design as per Field Mark ups.
4. Delay in material delivery	Expedite material delivery whenever possible.
5. Labor Resourcing	Use contractors if necessary. Move outages if required.
6. Failure of in-service equipment during outage (SCLL)	One relay system will be replaced at a time to minimize recall time.

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[8] References

References
1. 405259 - CS00461 - [redacted], dated 2/19/21
2. 405259-CS00461-[redacted]-[redacted], dated 4/15/22
3. 405259 CS00461 [redacted], dated 7/25/2022
4. SUB 029: Protection and Control Standards
5. CS00407 - DSCADA LTC Receivers Prgm Upgrades - Prgm Level Initial Funding – PAF, dated 5/20/2021

[9] Attachments (One-Line Diagrams, Images, etc.)

Attachment	Included in Submittal?
A1. Cost Estimate – CS00461 D	YES
A2. Cost Estimate – 405259 T	YES
B. P6 Schedule	YES
C. Constructability Review	YES
D. System and Station One-Lines	NO

INSTRUCTIONS:
It is the responsibility of the initiator to contact the subject matter experts in the listed area disciplines to determine if the project considerations contained in this list are applicable to their project. They should fill out the checklist and determine a transition plan for the purpose of project execution. See the PAF Guide for additional instruction.

Project Checklist - Transmission & Substation Capital Project			
Project Name: [redacted] Relay Upgrades		**Project Number: CS00461, 405259**	
Facility Type: ☐BPS ☐BES ☒PTF ☐PTF non-regional ☐non-PTF ☐CIP ☒Distribution ☐General Plant			
PLANNING			
Is a NX-9 required?		No	
Is an ISO-NE PAC presentation required?		No	
ISO-NE Presentation Date (if completed):		Enter Date	
Cost in ISO-NE Presentation ($M) (if completed):		Enter Cost ($M)	
Is a PPA required?		No	
ISO-NE Approval Date (if completed):		Enter Date	
Is a TCA Application Required?		No	
TCA Submittal Date (if submitted):		Enter Date	
Cost in TCA Submittal ($M) (if submitted):		Enter Cost ($M)	
Enter ISO-NE RSP / Asset Condition ID, if assigned:		Enter ISO-NE ID	
PLANNING/PROTECTION & CONTROLS			
Are RAS/SPS/UVLs affected?		No	
OPERATIONS			
Outage Required?	☒ Primary Equipment (Power Transfer)	☐ Secondary Equipment (P&C only)	☐ Outage Not Required
Do SCLL Conditions Exist?		Yes	
Has an outage schedule been approved?		Yes	
Are Operations & Maintenance procedures/training required?		No	
STANDARDS			
Does the project include standard equipment and designs?		Yes	
SUBSTATION ENGINEERING			
Does this impact Revenue Metering		No	
Is preliminary short circuit/ breaker duty analysis required?		No	
Are there any changes to the baseline audible noise?		No	
Is there an impact to the existing ground grid?		No	
Is a Transient Over Voltage (TOV) analysis required?		No	

Project Checklist - Transmission & Substation Capital Project	
Project Name: [redacted] Relay Upgrades	**Project Number: CS00461 405259**
P&C ENGINEERING	
OP-22 - Are PMUs and DDR required?	No
If BPS, is an NPCC Directory #4 presentation required?	No
Are ISO-NE OP-24 Appendix B updates necessary?	No
TRANSMISSION LINE ENGINEERING	
Are there any changes that affect the baseline EMF?	No
Are there any changes that affect the baseline EMI?	No
SITING	
Is a Siting filing required? *(If yes, list in regulatory approvals section)*	No
PERMITTING	
Is there any permitting required? *(If yes, list in regulatory approvals section)*	No
PROJECT SERVICES (OUTREACH) and ROW WORK COORDINATION	
What is the level of outreach expected?	None
Is any part of this project in an Environmental Justice Community?	No
Has ROW Coordination reviewed this project?	No
Is this project coordinating with other existing scheduled work?	No
INITIATOR	
Has a field constructability review been completed?	Yes
INVESTMENT RECOVERY	
Does the project require development of an Investment Recovery plan?	No
COST ESTIMATING	
What team/firm prepared the cost estimate?	Dist. Estimate was prepared by Eversource Engineering Trans Estimate was prepared by the Eversource Estimating Team
Name of the person who prepared the estimate:	Dist. Est: [redacted] Trans Est: [redacted]
Was the estimate reviewed by Eversource Estimating?	Dist. Est- Yes - Partial Review Trans Est- Yes - Full Review

ESTIMATE SUMMARY

Project Title: [redacted] - Reol Transformer Relavs and Add DSCADA (1X.2X & 3X)
Project Mgr/Lead: [redacted]

Project Number: CS00461
WO & Task #: 80053193
Estimate revision #: 01
Estimate Type - Station work

Estimate #: xx-x-xxx
Date of Estimate:06/08/2022

Estimate done by: [redacted]
In Service date (ISD):12/15/2022

Template Revision # 01.72ct

Alt Estimate Summary for PP4 Calc (escalation separate)

Estimate #: xx-x-xxx
Date of Estimate:06/08/2022

Project Number: CS00461
WO & Task #: 80053193

ESTIMATE SUMMARY

Estimate Type: Planning

WBS	Description	TOTAL	% of Directs	% of Total	Priors	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	TOTAL w/ escal broken out
1	ROW / Easements / Land purchases															ROW / Easements / Land purchas $ -
2	Environmental Approvals / Permits															Environmental Approvals / Permi $ -
3	Outreach															Outreach $ -
4	Siting Approvals / Permits															Siting Approvals / Permits $ 6,500
5	Engineering / Design	$190,700	12.4%	7.4%	$9,600	$163,700	$17,400									Engineering / Design $ 190,200
6	Materials (Eversource purchased)	$49,300	3.2%	1.9%		$49,300										Materials (Eversource purchased $ 49,300
7	Construction (incl matl's by contractors)	$741.700	48.3%	28.9%	$100	$741,600										Construction (incl matl's by cont $ 741,700
8	Testing / Commissioning	$257,000	16.7%	10.0%		$257,000										Testing / Commissioning $ 257,000
9	PMT Project Mgmt Team	$85,300	5.6%	3.3%	$40,900	$38,000	$6,400									PMT Project Mgmt Team $ 85,200
10	Removals	$15,400	1.0%	0.6%		$15,400										Removals $ 15,400
11	Other															Other $ -
12	Risks	$195,000	12.7%	7.6%		$185,000	$10,000									Risks $ 195,000
125																
	Project Directs Total	**$1,534,400**	100.0%	59.8%	**$50,600**	**$1,450,000**	**$33,800**									**$1,540,300**
13	Indirects/Overhead	$887,500		34.6%	$29,300	$835,900	$22,300									Indirects/Overhead $ 886,900
14	AFUDC	$75,100		2.9%	$1,900	$73,200										AFUDC $ 75,100
125																$ -
	Project Total - Baseline Budget	**$2,497,000**		97.4%	**$81,800**	**$2,359,100**	**$56,100**									**$2,502,300**
																$ -
15	Contingency	$67,500		2.6%		$67,500										Contingency $ 67,500
	Project Total - Funding Approval Level	**$2,564,500**		100.0%	**$81,800**	**$2,426,600**	**$56,100**									**$2,569,800**
																$ -
16	Reimbursables/Customer Contribution															$ -
	Project Total (less reimbursables)	**$2,564,500**			**$81,800**	**$2,426,600**	**$56,100**									**$2,569,800**
	Cost per key qty (if appl)	854,833 $'s / EA														
	Amount of Escalation included above	$1,300					$1,300									$ 1,300
6	Total materials - Eversource	$49,300				$49,300										
	Total materials - Contractor															
	Total materials	$49,300				$49,300										
	NOTE: Risk / Contingency is 11.4% of Project Total Costs (incl escal/indirects/AFUDC but excl reimb.)															Escal total **$2,571,100**
																Check total 56,600
	Estimate Range	**-25%**		-	**25%**											
		$1,923,000		-	**$3,206,000**											

COMMENTS:

Project Scope:
Key qty's and UOM (tie to inputs on 3 EA

[redacted]

Assumptions/Clarifications:
Indirect rates based on: 11 - CT . Station work

Engineering to be outsourced with internal review.
Estimate assumes LCE, PM, Electrical construction and construction rep to be outsourced.
Switching to be done with in house resource.
Existing infrastructures to be reused.
Material based on previous projects with similar scope.
The estimate assumes a December 2022 ISD.
No regulatory-siting/permitting required.
Mobile transformer is not required per field engineering. There would be a 4 hour recall time.
December 31, 2022 In Service Date assumes that all material will be available to support construction.
A battery calculation will be performed. If necessary, changes required to the station battery will be implemented under a separate project.

RISKS

Potential UG Obstructions	$ 30,000
Severe Weather. Delays. OT	$ 90,000
Design development	$ 45,000
Delay in material delivery	$ 30,000

CSTXX-CONSTRUCTION	R	Prior Mhrs	Prior DOLLARS	2022 Mhrs	2022 DOLLARS	2023 Mhrs	2023 DOLLARS	2024 Mhrs	2024 DOLLARS	2025 Mhrs	2025 DOLLARS	2026 Mhrs	2026 DOLLARS	2027 Mhrs	2027 DOLLARS	2028 Mhrs	2028 DOLLARS	2029 Mhrs	2029 DOLLARS	2030 Mhrs	2030 DOLLARS	2031 Mhrs	2031 DOLLARS	TOTAL DOLLARS
Electrical Construction	LT																							
General Construction	LT $ 47.40		$126																					$126
SCADA / Automation	LT $ 52.50																							
Telecom - Field	LT $ 49.40																							
Construction Reps (internal)	LT $ 52.50																							
Support Switch/Tag	LT $ 61.16				$26,910																			$26,910
Other (specify)	LT $ -																							
Other (specify)	LT $ -																							
Other (specify)	LT $ -																							
LT Total			$126		$26,910																			$27,036
Employee Expenses	AE 5%				$1,346																			$1,346
Construction Purchased Material	AM 1%				$6,334																			$6,334
Outside Construction Vendor	AQ				$633,378																			$633,378
Sales tax on Constr. Vendor																								
Vehicles (now in indirects section)	AV																							
Inspection services (Outside Vendor)	AQ $ 148.00																							
Construction Rep (Outside vendor)	AQ $ 148.00				$79,920																			$79,920
Rents and Leases	BR																							
CSTXX Subtotal			$126		$747,888																			$748,014
Escalation																								
CSTXX Total			$126		$747,888																			$748,014
ENRXX-TG ENGINEERING/DESIGN																								
Project Services/Drafting	LT $ 48.40				$21,296		$1,936																	$23,232
T- Line Engineering/Design	LT $ 48.40																							
D- Street Engineering/Design	LT $ 48.40																							
Civil Engineering/Design	LT $ 48.40																							
Substation (T) Engineering/Design	LT $ 52.50																							
Substation (D) Engineering/Design	LT $ 52.50				$7,350		$1,050																	$8,400
Protection & Controls Engineering	LT $ 56.70		$9,174		$10,206		$1,134																	$20,514
Survey Engineering	LT																							
SCADA / Automation Engineering	LT $ 55.60																							
Telecom Engineering	LT $ 55.60																							
Other - specify(PE)	LT $ -																							
Other - specify(PE)	LT $ -																							
LT Total			$9,174		$38,852		$4,120																	$52,146
Employee Expenses	AE 5%				$1,943		$206																	$2,149
Contractor Engineering - T-Lines	AQ $ 156.00																							
Contractor Engineering - D-Street	AQ $ 156.00																							
Contractor Engineering - T -Station	AQ $ 157.00																							
Contractor Engineering - D-Station	AQ $ 157.00				$53,380		$6,280																	$59,660
Contractor Engineering - P&C	AQ $ 158.00		$392		$69,520		$6,320																	$76,232
Contractor Engineering - Survey	AQ																							
Contractor Engineering - SCADA / Automation	AQ $ 155.00																							
Contractor Engineering - Telecom	AQ $ 155.00																							
Contractor Engineering - Specify	AQ $ 155.00																							
Contractor Engineering - Specify	AQ $ 155.00																							
Contractor Engineering - Specify	AQ $ 155.00																							
Vehicles (now in indirects section)	AV																							
ENRXX Subtotal			$9,566		$163,695		$16,926																	$190,187
Escalation																								
ENRXX Total			$9,566		$163,695		$16,926																	$190,187
LNDXX-TG LAND																								
Real Estate	LT $ 56.70																							
Employee Expenses	AE 5%																							
Purchase Land	AM																							
Vehicles (now in indirects section)	AV																							
Fees and Payments	BF																							
LNDXX Subtotal																								
Escalation																								
LNDXX Total																								
MATXX-TG MATERIAL																								
Eversource	AM				$41,409																			$41,409
Outside Services	AM																							
	AM																							
Freight																								
Sales Tax Eversouce/outside services	3.9% 3.9%				$1,600																			$1,600
Other																								
MATXX Subtotal					$43,009																			$43,009
Escalation																								
MATXX Total					$43,009																			$43,009
PSMXX-PROJECT MANAGER & SUPPORT																								
Project Management (PM)	LT $ 54.60																							
Project Planning/Cost (IP)	LT $ 49.40				$1,976																			$1,976
Contracts/Purchasing (CIP)	LT $ 53.60																							
System Planning	LT $ 71.10																							
Environmental	LT																							
SCS - None	LT																							
Legal	LT $ 95.80																							
Estimating	LT $ 59.20		$132		$4,736																			$4,868
Siting - Local Zoning	LT																							
Asset Management	LT $ 56.70																							
Other -	LT $ 57.70																							
Other -	LT $ -																							
Other -	LT $ -																							
Other -	LT $ -																							
LT Total			$132		$6,712																			$6,844
Employee Expenses	AE 5%				$336																			$336
Project Support Vendor - PM	AQ $ 155.00		$40,809		$31,000		$6,200																	$78,009
Project Support Vendor - IP	AQ $ 155.00																							
Project Support Vendor - CIP	AQ $ 155.00																							
Project Support Vendor - System Planning	AQ $ 155.00																							
Project Support Vendor - Enviromental	AQ																							
Project Support Vendor - SCS - None	AQ																							
Project Support Vendor - Legal	AQ $ 155.00																							
Project Support Vendor - Estimating	AQ $ 155.00																							
Project Support Vendor - Siting - Local Zoning	AQ				$6,400		$100																	$6,500
Project Support Vendor - Asset Management	AQ $ 155.00																							
Project Support Vendor - Other	AQ $ 155.00																							
Project Support Vendor - Other	AQ $ 155.00																							
Project Support Vendor - Other	AQ $ 155.00																							
Project Support Vendor - Other	AQ $ 155.00																							
Vehicles (now in indirects section)	AV																							
Property or CWIP tax large proj. allowance	BR																							
Builder All risk insurance excluding deductables(if project is over $50m)	BR																							
Fees and Payments - Enviromental	BF																							
Fees and Payments - Siting	BF																							
Fees and Payments - Other	BF																							
PSMXX Subtotal			$40,941		$44,448		$6,300																	$91,689
Escalation																								
PSMXX Total			$40,941		$44,448		$6,300																	$91,689
REMXX-TG REMOVAL																								
Engineering/Design	LT $ 55.60																							
Internal Construction	LT																							
LT Total																								
Employee Expenses	AE 15%																							
Outside Services	AO																							
Contractor Labor	AQ				$15,392																			$15,392
Vehicles (now in indirects section)	AV																							
Rents and Leases	BR																							
REMXX Subtotal					$15,392																			$15,392
Escalation																								
REMXX Total					$15,392																			$15,392
TSTXX-TG TEST																								
Test / Field Engr. Labor (In House)	LT $ 64.00																							
Lead Commissioning Engr. (LCE) (internal)	LT $ 64.00																							
Employee Expense	AE 10%																							
Test / Field Engr. Labor (contractor)	AQ $ 185.00				$162,800																			$162,800
Lead Commissioning Engr. (LCE) (contactor)	AQ $ 214.00				$94,160																			$94,160
Vehicles (now in indirects section)	AV																							
TSTXX Subtotal					$256,960																			$256,960
Escalation																								
TSTXX Total					$256,960																			$256,960
SUBTOTAL PROJECT DIRECT COST		-	**$80,633**		**$1,271,392**		**$23,226**																	**$1,345,251**
Risk																								
Risk					$185,000		$10,000																	$195,000
					$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	
					$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	
Risk Total					$185,000		$10,000																	$195,000
TOTAL PROJECT DIRECT COST (w risk)		-	**$80,633**		**$1,456,392**		**$33,226**																	**$1,540,251**
INDIRECTS																								
Non-Productive Time Allocation (**ZNP**)	17.0%		$1,549		$12,321		$700																	$14,570
Payroll Benefits Allocation (**ZPB**) incl NPT	44.0%				$13,853																			$13,853
Gen SVC CO Overhead (**ZGS**) incl NPT	80.0%		$6,779		$42,648		$3,856																	$53,283
E&S Allocations (**ZEB,ZEL,ZES**)	50.0%		$20,296		$643,623		$13,788																	$677,707
AS&E Allocations (**ZAS**)	1.3%		$662		$24,798		$520																	$25,980
Stores Expense Allocation (**ZST**)	8.0%				$3,313																			$3,313
Lobby Stock			$0																					$0
MDEC (**ZMI**)	6.0%				$75,061		$1,667																	$76,728
Vehicles (**ZVE**)	28.0%		$24		$20,293		$1,154																	$21,471
Indirects Subtotal			$29,310		$835,910		$21,685																	$886,905
TOTAL PROJECT COST - Direct & Indirect (excl AFUDC)			**$79,943**		**$2,292,302**		**$54,911**																	**$2,427,156**
AFUDC																								
AFUDC (ZK)			$1,940	6.50%	$73,170	6.50%		6.50%		6.50%		6.50%		6.50%		6.50%		6.50%		6.50%		6.50%	1	$75,110
In Service Dollars																								
Cumulative IS$					-		-		-		-		-		-		-		-		-			
AFUDC Subtotal			$1,940		$73,170																			$75,110
TOTAL PROJECT COST - Baseline Budget			**$81,883**		**$2,365,472**		**$54,911**																	**$2,502,266**
Contingency																								
Contingency					$67,452																			$67,452
Other			$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	
Contingency SubTotal					$67,452																			$67,452
TOTAL PROJECT COST - Approved Funding			**$81,883**		**$2,432,924**		**$54,911**																	**$2,569,719**
Reimbursables / Customer Contribution																								
Reimbursables / Customer Contribution (enter as negative)			$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	
TOTAL PROJECT COST			**$81,883**		**$2,432,924**		**$54,911**																	**$2,569,719**

ESTIMATE SUMMARY

Project Title: Forestville 115kV Bus A2 Relay Installation Project #405259
Project Mgr/Lead: [redacted]

Project Number: 405259
WO & Task #: 80053199
Estimate revision #: 01
Estimate Type - Station work

Estimate #: C-22-278
Date of Estimate:07/27/2022

Estimate done by: [redacted]
In Service date (ISD):12/14/2022

Template Revision:# 01.7Oct

ESTIMATE SUMMARY

Estimate Type: Planning

WBS	Description	TOTAL	% of Directs	% of Total	Priors	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	ROW / Easements / Land purchases														
2	Environmental Approvals / Permits														
3	Outreach	$800	0.1%	0.1%	$800										
4	Siting Approvals / Permits														
5	Engineering / Design	$148,100	23.9%	16.5%	$23,900	$124,200									
6	Materials (Eversource purchased)	$19,800	3.2%	2.2%		$19,800									
7	Construction (incl matl's by contractors)	$131,500	21.2%	14.6%	$2,100	$129,400									
8	Testing / Commissioning	$184,900	29.9%	20.6%		$184,900									
9	PMT Project Mgmt Team	$71,700	11.6%	8.0%	$23,800	$47,900									
10	Removals														
11	Other														
12	Risks	$62,500	10.1%	7.0%		$62,500									
125															
	Project Directs Total w/Risks	**$619,300**	100.0%	68.9%	**$50,600**	**$568,700**									
13	Indirects/Overhead	$221,000		24.6%	$29,300	$191,700									
14	AFUDC	$31,600		3.5%	$1,900	$29,700									
125															
	Project Total - Baseline Budget	**$871,900**		97.0%	**$81,800**	**$790,100**									
15	Contingency	$27,100		3.0%		$27,100									
	Project Total - Funding Approval Level	**$899,000**		100.0%	**$81,800**	**$817,200**									
16	Reimbursables/Customer Contribution														
	Project Total (less reimbursables)	**$899,000**			**$81,800**	**$817,200**									
	Cost per key qty (if appl)	449,500	$'s / EA 115 kV bus relay installation												
	Amount of Escalation included above														
6	Total materials - Eversource	$19,800				$19,800									
	Total materials - Contractor														
	Total materials	$19,800				$19,800									

NOTE: Risk / Contingency is 11.1% of Project Total Costs (incl escal/indirects/AFUDC but excl reimb.)

Estimate Range	**-25%**	-	**25%**	
	$674,000	-	**$1,124,000**	

COMMENTS:

Project Scope: [redacted]
Key qty's and UOM (die to inputs 2 EA 115 kV bus relay installation

[redacted]

Assumptions/Clarifications:
Indirect rates based on: 1T - CT - Station work

All work is in Eversource own Substation
PPS schedule was provided see AAD Grant Chart Schedule
Civil work not included in this estimate
See substation estimate CS00461 estimate #C-22-270 [redacted] Relay Replacement & DSCADA LTC's Upgrade dated 6/8/2022
Prior costs provided by Asset Management - see 80053199_Actuals into WBS dated 7/27/2022
Engineering outsourced with internal review - per requestor e-mail dated 6/27/2022
Construction Rep. internal - per requestor e-mail dated 6/27/2022
PM internal - per requestor e-mail dated 6/27/2022
Remote substations work is not part of scope and not included in this estimate
No removals pe [redacted] CFRR Project Scope Rev. 0_#04-12-2021 LCE dated 4/12/2021
Current protection for this bus is the 2X protection and there are no removal costs due to this.
Panel 1P for the 3X relaying is included in the Distribution Estimate and not in this estimate - see e-mail dated 6/27/2022

Pe [redacted] CFRR Project Transformer Relays Replacement & 115kV A2 Bus Relays Installation - P&C Scope dated 4/12/2021
[redacted]

Per Estimate Request Form dated 6/3/2021
Electrical construction outsourced
Siting none
Project services none
Prior costs are included in this estimate
Transmission Asset

Per Substation Constructability Review Forestville Preliminary Design dated 5-20-22
Test and LCE outsourced
Ten hour days, six days a week for planned outages
Ten hour days, five days a week for construction
Mobile generator not needed
Mobile battery not needed
No SCLL requirements

Revision #01 - see revised Estimate Request Form provided on 7/27/2022
Change in schedule
Update of prior costs - dated 7/27/22

RISKS

Delays in Material Delivery	$ 17,500
Severe Weather. Delays. OT	$ 17,500
Design Development	$ 15,000
Labor Resourcing	$ 12,500

Alt Estimate Summary for PP4 Calc (escalation separate)

Estimate #: C-22-278
Date of Estimate:07/27/2022

Project Number: 405259
WO & Task #: 80053199

	TOTAL w/ escal broken out
ROW / Easements / Land purchas	$ -
Environmental Approvals / Permi	$ -
Outreach	$ 800
Siting Approvals / Permits	$ -
Engineering / Design	$ 148,100
Materials (Eversource purchased	$ 19,800
Construction (incl matl's by cont	$ 131,500
Testing / Commissioning	$ 184,900
PMT Project Mgmt Team	$ 71,800
Removals	$ -
Other	$ -
Risks	$ 62,500
	$619,400
Indirects/Overhead	$ 221,000
AFUDC	$ 31,600
	$ -
	$872,000
	$ -
Contingency	$ 27,100
	$899,100
	$ -
	$ -
	-
	$899,100
	$ -
Escal total	**$899,100**
Check total	$100

UNESCALATED LINE ITEM DOLLARS

Project Number: 405259
Date of Estimate:07/27/2022
Estimate revision #: 01

Escalation Rate | E Rate $ [redacted] | 1

CSTXX-CONSTRUCTION	R	Prior Mhrs	Prior DOLLARS	2022 Mhrs	2022 DOLLARS	2023 Mhrs	2023 DOLLARS	TOTAL Mhrs	TOTAL DOLLARS
Electrical Construction	LT		$126						$126
General Construction	LT								
SCADA / Automation	LT								
Telecom - Field	LT								
Construction Reps (Internal)	LT				$788				$788
Support Switch/Tag	LT				$7,828				$7,828
Other (specify)	LT								
Other (specify)	LT								
Other (specify)	LT								
LT Total			$126		$8,616				$8,742
Employee Expenses	AE				$431				$431
Construction Purchased Material	AM				$1,204				$1,204
Outside Construction Vendor	AQ				$120,358				$120,358
Sales tax on Constr. Vendor									
Vehicles (now in indirects section)	AV								
Inspection services (Outside Vendor)	AQ								
Construction Rep (Outside vendor)	AQ		$1,980						$1,980
Rents and Leases	BR								
CSTXX Subtotal			$2,106		$130,609				$132,715
Escalation									
CSTXX Total			$2,106		$130,609				$132,715
ENRXX-TG ENGINEERING/DESIGN									
Project Services/Drafting	LT				$3,872				$3,872
T- Line Engineering/Design	LT								
D- Street Engineering/Design	LT								
Civil Engineering/Design	LT								
Substation (T) Engineering/Design	LT		$5,504		$2,100				$7,604
Substation (D) Engineering/Design	LT								
Protection & Controls Engineering	LT		$3,670		$7,938				$11,608
Survey Engineering	LT								
SCADA / Automation Engineering	LT								
Telecom Engineering	LT				$2,224				$2,224
Other - specify	LT								
Other - specify	LT								
LT Total			$9,174		$16,134				$25,308
Employee Expenses	AE				$807				$807
Contractor Engineering - T-Lines	AQ								
Contractor Engineering - D-Street	AQ								
Contractor Engineering - T -Station	AQ		$14,747		$107,231				$121,978
Contractor Engineering - D-Station	AQ								
Contractor Engineering - P&C	AQ								
Contractor Engineering - Survey	AQ								
Contractor Engineering - SCADA / Automation	AQ								
Contractor Engineering - Telecom	AQ								
Contractor Engineering - Specify	AQ								
Contractor Engineering - Specify	AQ								
Contractor Engineering - Specify	AQ								
Vehicles (now in indirects section)	AV								
ENRXX Subtotal			$23,921		$124,172				$148,093
Escalation									
ENRXX Total			$23,921		$124,172				$148,093
LNDXX-TG LAND									
Real Estate	LT								
Employee Expenses	AE								
Purchase Land	AM								
Vehicles (now in indirects section)	AV								
Fees and Payments	BF								
LNDXX Subtotal									
Escalation									
LNDXX Total									
MATXX-TG MATERIAL									
Eversource	AM				$17,863				$17,863
Outside Services	AM								
	AM								
Freight									
Sales Tax Eversouce/outside services	3.9%				$700				$700
Other									
MATXX Subtotal					$18,563				$18,563
Escalation									
MATXX Total					$18,563				$18,563
PSMXX-PROJECT MANAGER & SUPPORT									
Project Management (PM)	LT		$132		$2,184				$2,316
Project Planning/Cost (IP)	LT								
Contracts/Purchasing (C/P)	LT				$2,144				$2,144
System Planning	LT								
Environmental	LT								
SCS - None	LT								
Legal	LT								
Estimating	LT								
Siting - None	LT								
Asset Management	LT								
Other -	LT								
Other -	LT								
Other -	LT								
Other -	LT								
LT Total			$132		$4,328				$4,460
Employee Expenses	AE				$216				$216
Project Support Vendor - PM	AQ		$23,683		$37,200				$60,883
Project Support Vendor - IP	AQ								
Project Support Vendor - C/P	AQ								
Project Support Vendor - System Planning	AQ								
Project Support Vendor - Environmental	AQ								
Project Support Vendor - SCS - None	AQ		$791						$791
Project Support Vendor - Legal	AQ								
Project Support Vendor - Estimating	AQ				$6,200				$6,200
Project Support Vendor - Siting - None	AQ								
Project Support Vendor - Asset Management	AQ								
Project Support Vendor - Other	AQ								
Project Support Vendor - Other	AQ								
Project Support Vendor - Other	AQ								
Project Support Vendor - Other	AQ								
Vehicles (now in indirects section)	AV								
Property or CWIP tax large proj. allowance	BR								
Builder All risk insurance excluding deductables(if project is over $50m)	BR								
Fees and Payments - Enviromental	BF								
Fees and Payments - Siting	BF								
Fees and Payments - Other	BF								
PSMXX Subtotal			$24,606		$47,944				$72,550
Escalation									
PSMXX Total			$24,606		$47,944				$72,550
REMXX-TG REMOVAL									
Engineering/Design	LT								
Internal Construction	LT								
LT Total									
Employee Expenses	AE	15%							
Outside Services	AO								
Contractor Labor	AQ								
Vehicles (now in indirects section)	AV								
Rents and Leases	BR								
REMXX Subtotal									
Escalation									
REMXX Total									
TSTXX-TG TEST									
Test / Field Engr. Labor (In House)	LT	[redacted]							
Lead Commissioning Engr. (LCE) (internal)	LT	[redacted]							
Employee Expense	AE	15%							
Test / Field Engr. Labor (contractor)	AQ	[redacted]			$103,600				$103,600
Lead Commissioning Engr. (LCE) (contactor)	AQ	[redacted]			$81,320				$81,320
Vehicles (now in indirects section)	AV								
TSTXX Subtotal					$184,920				$184,920
Escalation					-				
TSTXX Total					$184,920				$184,920
SUBTOTAL PROJECT DIRECT COST		-	**$50,633**		**$506,208**				**$556,841**
Risk									
Risk					$62,500				$62,500
					$ -		$ -		
					$ -		$ -		
Risk Total					$62,500				$62,500
TOTAL PROJECT DIRECT COST (w risk)		-	**$50,633**		**$568,708**				**$619,341**
INDIRECTS									
Non-Productive Time Allocation (**ZNP**)	17.0%		$1,549		$4,943				$6,492
Payroll Benefits Allocation (**ZPB**) incl NPT	44.0%				$4,436				$4,436
Gen SVC CO Overhead (**ZGS**) incl NPT	80.0%		$6,779		$19,152				$25,931
E&S Allocations (**ZES,ZEL,ZES**)	30.0%		$20,296		$154,055				$174,351
AS&E Allocations (**ZAS**)	0.8%		$662		$5,510				$6,172
Stores Expense Allocation (**ZST**)	8.0%				$1,429				$1,429
Lobby Stock									
MDEC (**ZMI**)									
Vehicles (**ZVE**)	7.5%		$24		$2,181				$2,205
Indirects Subtotal			$29,310		$191,706				$221,016
TOTAL PROJECT COST - Direct & Indirect (excl AFUDC)			**$79,943**		**$760,414**				**$840,357**
AFUDC									
AFUDC (ZK)			$1,940	7.00%	$29,651	7.00%		1	$31,591
In Service Dollars				-		-			
Cumulative ISS									
AFUDC Subtotal			$1,940		$29,651				$31,591
TOTAL PROJECT COST - Baseline Budget			**$81,883**		**$790,065**				**$871,948**
Contingecy									
Contingency					$27,132				$27,132
Other			$ -		$ -		$ -		
Contingency SubTotal					$27,132				$27,132
TOTAL PROJECT COST - Approved Funding			**$81,883**		**$817,197**				**$899,080**
Reimbursables / Customer Contribution									
Reimbursables / Customer Contribution (enter as negative)			$ -		$ -		$ -		
TOTAL PROJECT COST			**$81,883**		**$817,197**				**$899,080**

Activity Flag	Activity ID	Activity Name	At Completion Duration	Start	Finish	Resources
405259 [redacted] Add A2 bus relays (405259)			621	12/21/20 00 A	06/12/23 16	
405259.WBS_Standard WBS STANDARD_06June22 - USE THIS ONE			621	12/21/20 00 A	06/12/23 16	
	PT1000	Project Timeline	621	12/21/20 00 A	06/12/23 16	
405259.WBS_Standard.01 PROJECT PLANNING & FUNDING			468	12/21/20 00 A	10/31/22 16	
	PPF1000	Project Planning & Funding	468	12/21/20 00 A	10/31/22 16	
405259.WBS_Standard.01.01 T-Minus Milestones			368	10/29/21 08 A	10/31/22 16	
405259.WBS_Standard.01.01.06 P&C T-Minus Milestones			368	10/29/21 08 A	10/31/22 16	
	AT3001	Engr Project Scoping Document Issued (Scope Lockdown) ** Re-instated **	0		10/29/21 08 A	
	AT3041	A-T-24.04 Determine / Assign Commissioning Engineer	0		05/20/22 08 A	
ENG-PF	AT2605	Preliminary Design / Engineering Completed	0		06/06/22 08 A	
	AT0901	T-09 Protection System Data - OP-24 Requirement (Tie to First Outage Milestone Phase)	0		08/01/22 16	
TOA	AT1801	A-T-18.01 All Firm TOA Applications Due to LCC	0		08/10/22 16*	
ENG-D	AT1811	Detail Design / Engineering Completed	0		08/16/22 16	
CONST	AT0814	A-T-08.14 Construction Contracts / PSA in Place	0		08/30/22 16	
P&C-IFC	AT0805PC	IFC - P&C w/BOM	0		09/14/22 16	
AG-IFC	AT0805E	IFC - Electrical (AG) w/BOM	0		09/14/22 16	
	AT1202	P/C Description / Draft OI Issued To LCC	0		09/14/22 16	
COMM-	AT0805M	IFC - Communications w/BOM	0		09/14/22 16	
	AT3181	A-T-04.01 Final Material Receipt Review Completed *ES Purchased*	0		09/21/22 16	
	AT3211	A-T-02.03 Go / No-Go [CAN] Construction Authorization Notice Form Complete	0		09/28/22 16	
	AT0404	All Final Relay Protective Settings Issued	0		10/03/22 16	
	A1095	A-T-00 - Start of Construction (Forestville)	0	10/17/22 08*		
	AT1301	Commissioning Plan Complete	0		10/31/22 16	
405259.WBS_Standard.01.02 Project Funding			388	02/16/21 08 A	08/29/22 16	
405259.WBS_Standard.01.02.02 Initial Funding			84	02/16/21 08 A	06/14/21 16 A	
PM-AM	PI1410	Assign Project Manager (Forestville)	3	02/28/21 08 A	03/03/21 16 A	[redacted]
PPA-IF	PI1630	Initial Funding EPAC / PowerPlan Approval (Forestville)	3	02/28/21 08 A	03/03/21 16 A	
	PI1210	Project Initiator Develop & Submit Intitial Funding Request (Forestville)	30	02/16/21 08 A	03/29/21 16 A	
EPAC-I	PI1310	Initial EPAC Funding Request Approved (Forestville)	0		03/31/21 16 A	

TASK filter: All Activities

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Activity Flag	Activity ID	Activity Name	At Completion Duration	Start	Finish	Resources
PM	PI1510	Assign Scheduler (Forestville)	6	06/07/21 08 A	06/14/21 16 A	[redacted]
	PI1620	Assign Cost Analyst (Forestville)	6	06/07/21 08 A	06/14/21 16 A	
405259.WBS_Standard.01.02.05 Full Funding			70	05/20/22 08 A	08/29/22 16	
405259.WBS_Standard.01.02.05.01 PAF - FF			58	05/20/22 08 A	08/11/22 16	
	DE1910	Conduct Detail Constructability Walk Down (Forestville)	1	05/20/22 08 A	05/20/22 16 A	
	DE1710	Conduct Initial Risk Management & SCLL Review (Project Initiator & PM) (Forestville)	5	05/23/22 08 A	05/27/22 16 A	
Cons	DE2010	Project Constructability Review Complete (Forestville)	2	05/26/22 08 A	05/27/22 16 A	
	PAFF2010	Submit Full Funding PAF for Internal Review (Forestville)	2	05/31/22 08 A	06/01/22 16 A	
PAF Submi	PAFF2120	Incorporate Internal Review Comments & Submit Full Funding PAF to EPAC for Review (Forestville)	1	06/02/22 08 A	06/02/22 16 A	
EST-FU	DE1610	Create Planning Grade Estimate (+/-25% Full Funding) (Forestville)	18	05/20/22 08 A	06/15/22 16 A	
	PAFF2215	Revise estimate and submit revised Full Funding PAF for Internal Review (Forestville)	30	06/13/22 08 A	07/25/22 16	
PAF Submi	PAFF2220	Incorporate Internal Review Comments & Submit Full Funding PAF to EPAC for Review (Forestville)	1	07/26/22 08	07/26/22 16	
	PAFF2210	Incorporate EPAC Full Funding PAF Review Comments (Forestville)	5	08/05/22 08	08/11/22 16	
405259.WBS_Standard.01.02.05.02 EPAC - FF			7	08/04/22 16	08/15/22 16	
	PAFF2130	Full Funding Approval EPAC Meeting (Forestville)	0		08/04/22 16*	
EPAC	FF1620	Full Funding Approval (Forestville)	0		08/15/22 16	
405259.WBS_Standard.01.02.05.03 Power Plan - FF			10	08/16/22 08	08/29/22 16	
PPA-FI	FF1010	Full Funding PowerPlan Approval (Forestville)	10	08/16/22 08	08/29/22 16	
405259.WBS_Standard.01.08 P&C Conceptual & Preliminary Engineering Design			273	05/05/21 08 A	06/06/22 16 A	
405259.WBS_Standard.01.08.01 P&C Conceptual Design			12	05/05/21 08 A	05/20/21 16 A	
ES-CONC	PE1400	Develop P&C Conceptual Engineering Scope Design in Accordance with Deliverables Checklist (Forestville)	10	05/05/21 08 A	05/18/21 16 A	
	PE1710	Create Engineering Scope Document (Forestville)	1	05/19/21 08 A	05/19/21 16 A	
Scope C	PE1720	Engineering Scope Document Complete (Forestville)	0		05/20/21 16 A	
405259.WBS_Standard.01.08.02 P&C Preliminary Design			116	12/20/21 08 A	06/06/22 16 A	
V-PRELIM	DE2090	Vendor Engineer Develop P&C Preliminary Design (Forestville)	101	12/20/21 08 A	05/13/22 16 A	
V-PREL	A1090	LTC DSCADA Design	30	04/04/22 08 A	05/13/22 16 A	

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Activity Flag	Activity ID	Activity Name	At Completion Duration	Start	Finish	Resources
ES-PRE	A1085	ES Engineering Review of LTC DSCADA Design	10	05/16/22 08 A	05/27/22 16 A	[redacted]
ES-PRE	DE2100	ES Engineering Review P&C Preliminary Design (Forestville)	15	05/16/22 08 A	06/06/22 16 A	
405259.WBS_Standard.01.10 Project Management			446	12/21/20 00 A	09/28/22 16	
CASCADE	CSD1030	PE Initiate CASCADE Forms (Appendix A) for Construction Package (Forestville)	5	09/08/22 08	09/14/22 16	
405259.WBS_Standard.01.10.01 Scope Development			0	12/21/20 00 A	12/21/20 00 A	
	START10	SCHEDULE START MILESTONE (Forestville)	0	12/21/20 00 A		
405259.WBS_Standard.01.10.02 Compliance Authorization Notification			10	09/15/22 08	09/28/22 16	
	A1015	Prepare CAN (Construction Authorization Notice) (Forestville)	10	09/15/22 08	09/28/22 16	
405259.WBS_Standard.01.10.04 Outage Permits / TOAs Request			6	08/03/22 08	08/10/22 16	
	A1020	Construction Rep SUBMIT OUTAGE REQUESTS for NON-transformer equipment (4 weeks before outage) (Forestville)	6	08/03/22 08	08/10/22 16	
405259.WBS_Standard.05 ENGINEERING DETAILED / IFC DESIGN			83	06/07/22 08 A	10/03/22 16	
	ENG1000	Engineering Detailed / IFC Design	83	06/07/22 08 A	10/03/22 16	
405259.WBS_Standard.05.06 P&C Engineering			83	06/07/22 08 A	10/03/22 16	
405259.WBS_Standard.05.06.01 P&C Engineering Detailed Design			50	06/07/22 08 A	08/16/22 16	
V-DTL	PC1110	Vendor Engineer Develop P&C Detail Design (Forestville)	40	06/07/22 08 A	08/02/22 16	
ES-DTL	PC1120	ES Engineering Review P&C Detail Design (Forestville)	10	08/03/22 08	08/16/22 16	
405259.WBS_Standard.05.06.02 P&C Relay Settings Development			50	07/25/22 08	10/03/22 16	
V-RSET	PC1340	Vendor Engineer Develop IFR Relay Settings (Forestville)	25	07/25/22 08	08/26/22 16	
ES-RSE	PC1350	ES Engineering Review IFR Relay Settings (Forestville)	10	08/29/22 08	09/12/22 16	
ES-RSE	PC1410	Complete IFR Relay Settings (Forestville)	15	09/13/22 08	10/03/22 16	
405259.WBS_Standard.05.06.04 P&C Engineering OP-24			6	07/25/22 08	08/01/22 16	
	OP1010	P&C Validation of PAF's Initial Assessment Go/No-Go (Forestville)	1	07/25/22 08	07/25/22 16	
	OP1020	P&C Updates OP-24 Appendix B (Forestville)	4	07/26/22 08	07/29/22 16	
OP-24	OP1030	P&C Submits OP-24 Appendix B to ISO-NE (Forestville)	1	08/01/22 08	08/01/22 16	
405259.WBS_Standard.05.06.06 P&C Engineering IFC Design			20	08/17/22 08	09/14/22 16	
V-IFC	PC1320	Vendor Engineer Develop P&C IFC (Forestville)	10	08/17/22 08	08/30/22 16	
	PC1330	ES Engineering Review P&C IFC (Forestville)	10	08/31/22 08	09/14/22 16	

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Activity Flag	Activity ID	Activity Name	At Completion Duration	Start	Finish	Resources
405259.WBS_Standard.06		**PROCUREMENT LONG LEAD MATERIAL**	86	05/20/22 08 A	09/21/22 16	
	PLLM1000	Procurement Long Lead Material	86	05/20/22 08 A	09/21/22 16	
405259.WBS_Standard.06.06		**P&C Long Lead Material**	86	05/20/22 08 A	09/21/22 16	
405259.WBS_Standard.06.06.01		**Cable Wire**	25	08/17/22 08	09/21/22 16	
DR-RM	A1160	Issue DR for Cable / Wire (Forestville)	5	08/17/22 08	08/23/22 16	
DR-AGI	A1170	Above Grade Material Ordered (Forestville)	0		08/23/22 16	
	A1165	Issue PO and Procure Cable / Wire (Forestville)	20	08/24/22 08	09/21/22 16	
405259.WBS_Standard.06.06.02		**Relays**	49	05/23/22 08 A	08/01/22 16	
DR-RM	A1135	Issue DR for Microprocessor Relays (stock coded) (Forestville)	5	05/23/22 08 A	05/27/22 16 A	
	A1140	Issue PO and Procure Microprocessor Relays (stock coded) (Forestville)	40	06/06/22 08 A	08/01/22 16	
405259.WBS_Standard.06.06.03		**Panels - Installed Pre-Wired Relays**	50	05/20/22 08 A	08/01/22 16	
DR-RM	A1150	Issue DR for Relay Panel (Forestville)	5	05/20/22 08 A	05/26/22 16 A	
	A1145	Issue PO and Procure Relay Panel (approx 16 weeks) (Forestville)	40	06/06/22 08 A	08/01/22 16	
405259.WBS_Standard.061		**PROCUREMENT MATERIAL - BALANCE OF MATEI**	0	07/25/22 08	07/25/22 08	
	PBOM1000	Procurement Material - Balance of Material	0	07/25/22 08	07/25/22 08	
405259.WBS_Standard.062		**PROCUREMENT OF SERVICE CONTRACTS**	229	10/01/21 08 A	08/30/22 16	
	PSC1000	Procurement of Service Contracts	229	10/01/21 08 A	08/30/22 16	
405259.WBS_Standard.062.01		**Engineer of Choice - Direct Award or Bid**	114	10/01/21 08 A	03/18/22 16 A	
	A1125	Decision Required Regarding Engineering Staffing (ES, COC, BID) (Forestville)	1	10/01/21 08 A	10/01/21 16 A	
	TMP1180	N/REngineering of Choice (EOC) - EOC Committee Reviews at Monthly Meeting & Approves (Forestville)	0	11/15/21 08 A	11/15/21 08 A	
	TMP1140	NR Engineering of Choice (EOC) - Provide RFP to Single Vendor (Forestville)	0	11/15/21 08 A	11/15/21 08 A	
	TMP1200	NR Engineering of Choice (EOC) - DR Prepared by Project Engineer & Project Controls (Forestville)	0	11/15/21 08 A	11/15/21 08 A	
	TMP1220	NR Engineering of Choice (EOC) - PO Issued for Vendor - Preliminary Design Effort (Forestville)	0	11/15/21 08 A	11/15/21 08 A	
	TMP1150	N/R Engineering of Choice (EOC) - Vendor Responds with Proposal (Forestville)	0	11/15/21 08 A	11/15/21 08 A	
	A1130	Change Order for DSCADA LTC Design	23	02/15/22 08 A	03/18/22 16 A	

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Activity Flag	Activity ID	Activity Name	At Completion Duration	Start	Finish	Resources
405259.WBS_Standard.062.02 Constructor of Choice - Direct Award or Bid			20	08/03/22 08	08/30/22 16	
405259.WBS_Standard.062.02.02 Constructor of Choice - Direct Award or Bid			20	08/03/22 08	08/30/22 16	[redacted]
	A21950	Prepare Specifications / Scope of Work (Electrical Contractor) (Compo)	2	08/03/22 08	08/04/22 16	
	EOC1230	Construction Contractor of Choice (EOC) - Create & Provide RFP to Single Vendor	3	08/05/22 08	08/09/22 16	
	EOC1245	Construction Contractor of Choice (EOC) - Vendor Responds with Proposal	6	08/10/22 08	08/17/22 16	
	EOC1225	Construction Contractor of Choice (EOC) - EOC Committee Reviews at Monthly Meeting & Approves	1	08/18/22 08	08/18/22 16	
	EOC1235	Construction Contractor of Choice (EOC) - DR Prepared by Project Engineer & Project Controls	2	08/19/22 08	08/22/22 16	
	EOC1240	Construction Contractor of Choice (EOC) - DR Approval & PO Issued for Vendor	6	08/23/22 08	08/30/22 16	
405259.WBS_Standard.07 CONSTRUCTION			73	08/30/22 08	12/14/22 16	
	CON1000	Construction	73	08/30/22 08	12/14/22 16	
405259.WBS_Standard.07.01 Outages			41	10/17/22 08	12/14/22 16	
CRH	CSM	Construction Start Milestone (Forestville)	0	10/17/22 08		
OUT	TOA-Const70	OUTAGE / General Construction Work - Relays (Forestville)	20	10/17/22 08	11/14/22 16	
	CFM	Construction Finish Milestone (Forestville)	0		12/14/22 16	
ISD	ISD	EQUIPMENT IN SERVICE DATE (requires FOOB constraint) (Forestville) | December 2022	0		12/14/22 16*	
405259.WBS_Standard.07.08 P&C Construction			72	08/30/22 08	12/13/22 16	
	A1010	Construction - P&C Implement Relay Settings	5	08/30/22 08	09/06/22 16	
	A1070	Remove Existing Relays (Forestville)	20	10/17/22 08	11/14/22 16	
	A1075	Install New Equipment (Forestville)	20	11/15/22 08	12/13/22 16	
	A1080	Install Wiring (Forestville)	20	11/15/22 08	12/13/22 16	
405259.WBS_Standard.09 TEST & COMMISSIONING			0	07/25/22 08	07/25/22 08	
	TC1000	Test & Commissioning	0	07/25/22 08	07/25/22 08	
405259.WBS_Standard.10 PROJECT CLOSE OUT			123	12/15/22 08	06/12/23 16	
	PCO1000	Project Close Out	123	12/15/22 08	06/12/23 16	
405259.WBS_Standard.10.06 P&C Close Out			60	02/02/23 08	04/27/23 16	

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Activity Flag	Activity ID	Activity Name	At Completion Duration	Start	Finish	Resources
ES-ASB	PC8510	Eversource Engineering Prepares & Sends Electrical Field Mark Up Packge to Vendor (Forestville)	5	02/02/23 08	02/08/23 16	[redacted]
V-ASB	PC8520	Vendor Engineering Verifies P&C Mark Ups and Updates As-Built Drawing Package. Submits Final Package to ES (Forestville)	30	02/09/23 08	03/23/23 16	
ES-ASB	PC8530	Eversource Engineering Verifies Quality of Submitted P&C Drawings (Forestville)	20	03/24/23 08	04/20/23 16	
ES-ASB	PC8540	P&C Transmittal, Approve Final As-Built Package, and EDC Files and Issue Drawings to Field (Forestville)	5	04/21/23 08	04/27/23 16	
405259.WBS_Standard.10.11	**Project Management Close Out**		123	12/15/22 08	06/12/23 16	
	A1025	Construction Rep Finalize CASCADE Forms (within 14 days folloiwng ISD) (Forestville)	10	12/15/22 08	12/29/22 16	
	A1110	PM Prepares Closeout Documentation, Lessons Learned Meeting, etc. (Forestville)	30	12/15/22 08	01/30/23 16	
	A1120	Prepare TD-707 Document (Forestville)	30	12/15/22 08	01/30/23 16	
	A1100	Cost Analyst Prepares FINAL Units of Property (Forestville)	30	12/15/22 08	01/30/23 16	
	A1105	Asset Management Complete Asset Update(s) in CASCADE (Forestville)	30	12/15/22 08	01/30/23 16	
	FINISH	Project / Work Order Complete (FINAL SCHEDULE TASK/MILESTONE) (Forestville)	0		06/12/23 16	
405259.WBS_Standard.11	**NOT REQUIRED ACTIVITIES**		271	03/29/21 08 A	04/25/22 16 A	
	AT1805	N/R - T-18 NX-9 Rating to LCC + ISO for New 'T' Equipment	0		03/29/21 08 A	
	AT3191	N/R - A-T-04.08 TCA (12C) Application Submitted (Forestville)	0		03/29/21 08 A	
	AT0301	N/R (PER KN 01-24-22) T-03 NX-9 Ratings to LCC & ISO for Existing Equipment	0		01/24/22 00 A	
	NX9A-EM220	N/R (PER KN 01-24-22) LTRC Reviews and Makes "GO / NO-GO" Decision for 1-Line Nomenclature (Forestville)	1	01/24/22 08 A	01/24/22 16 A	
	NX9A-EM230	N/R (PER KN 01-24-22) PE Updates 1-Line Nomenclature Dwgs & Complete PE Checklist	1	01/24/22 08 A	01/24/22 16 A	
	NX9A-EM240	N/R (PER KN 01-24-22) P&C Develops and Provides LTRC with P&C Checklist (M7-EN-3006.1) (Forestville)	1	01/24/22 08 A	01/24/22 16 A	
	NX9A-EM250	N/R (PER KN 01-24-22) TRC Review and Submit NX-9 Data	1	01/24/22 08 A	01/24/22 16 A	
	NX9A-EM260	N/R (PER KN 01-24-22) LTRC Requests P&C Checklist (Forestville)	1	01/24/22 08 A	01/24/22 16 A	

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Activity Flag	Activity ID	Activity Name	At Completion Duration	Start	Finish	Resources
NX-9	NX9A-EM280	N/R (PER KN 01-24-22) LTRC Sends Thermal Rating Data for Approval & Submit to NURS (Forestville)	1	01/24/22 08 A	01/24/22 16 A	[redacted]
	NX9A-EM290	N/R (PER KN 01-24-22) TRC Reviews and Approves Thermal Rating Data (Forestville)	1	01/24/22 08 A	01/24/22 16 A	
	NX9A-EM300	N/R (PER KN 01-24-22) LTRC Reviews and Sends Thermal Rating Data for TRC Review (Forestville)	1	01/24/22 08 A	01/24/22 16 A	
	NX9A-EM310	N/R (PER KN 01-24-22) Scheduler @ NURS email "Submitted for DOE Monitoring" - Updates T-3, EquipDOE,	1	01/24/22 08 A	01/24/22 16 A	
	NX9A-EM320	N/R (PER KN 01-24-22) LTRC Submits1-Line Nomenclature	1	01/24/22 08 A	01/24/22 16 A	
	NX9A-EM330	N/R (PER KN 01-24-22) LTRC Reviews and Makes "GO / NO-GO" Decision for Thermal Ratings (Forestville)	1	01/24/22 08 A	01/24/22 16 A	
	NX9A-EM270	N/R_Scheduler @ NURS email "Submitted for PP Review" - Updates NURS with DOE (Forestville)	1	04/25/22 08 A	04/25/22 16 A	
405259.09 TEST AND COMMISSION			145	05/19/22 08 A	12/15/22 16	
405259.09.02 LCE PLANNING			114	05/19/22 08 A	10/31/22 16	
	LCE100	PM to Request Lead Commissioning Engineer GO/NO-GO {Preliminary design is often the predecessor} (Forestville)	2	05/19/22 08 A	05/20/22 16 A	
	LCE200	Assign Lead Commissioning Engineer (Forestville) - Pete Avery	1	05/23/22 08 A	05/23/22 16 A	
	LCE400	Develop Test and Commissioning Plan (Forestville)	20	09/02/22 08	09/30/22 16	
	LCE500	Eversource LCE Review and Approve Testing and Commissioning Plan (Forestville)	20	10/03/22 08	10/31/22 16	
405259.09.04 TEST ACTIVITIES			73	08/31/22 08	12/15/22 16	
	LCE310	Mobilize Commissioning Engineer Prior to Construction (Forestville)	2	08/31/22 08	09/01/22 16	
	LCE320	Mobilize Testing Vendor Prior to Construction (Forestville)	2	08/31/22 08	09/01/22 16	
	LCE610	LCE Oversee Execution of Test and Commissioning Plan (Forestville)	30	11/01/22 08	12/14/22 16	
	LCE620	Execute Test and Commissioning Plan (Forestville)	30	11/01/22 08	12/14/22 16	

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Activity Flag	Activity ID	Activity Name	At Completion Duration	Start	Finish	Resources
	LCE700	LCE Ensure Test Group Prepare Electrical Field Mark Ups (Forestville)	1	12/15/22 08	12/15/22 16	[redacted]
405259.10 PROJECT CLOSE OUT			123	12/15/22 08	06/12/23 16	
	TD1100	Complete TD-707 Turnover Document / Forward to SOC & Mailing List (Forestville)	5	12/15/22 08	12/21/22 16	
V-FLDASB	PC8000	Field Prepare P&C Field Mark Ups (Forestville)	21	01/03/23 08	02/01/23 16	
PM	PM1110	PM to Document Electrical As-Built Drawings Complete (P&C) (Forestville)	1	04/28/23 08	04/28/23 16	
ES-FLSASB	EV1510	FE Files Substation Design Drawings at Station (Forestville)	30	05/01/23 08	06/12/23 16	
ES-FLSASB	PC8500	FE Files P&C Design Drawings at Station (Forestville)	30	05/01/23 08	06/12/23 16	
405259.10.04 Test Closout			11	12/15/22 08	12/30/22 16	
	LCE800	LCE Ensures Marked up Prints Ready for Pick-up (Forestville)	1	12/15/22 08	12/15/22 16	
	LCE900	LCE Review Test Data and Issue Commissioning Report (Forestville)	10	12/16/22 08	12/30/22 16	
405259.10.05 SITE RESTORATION CLOSEOUT			10	12/15/22 08	12/29/22 16	
	A1115	Restore / Remediate Site (Forestville)	10	12/15/22 08	12/29/22 16	

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Constructability Review Form: **Substation**

Project Title: [redacted] **Relaying Replacement**	☒	Prior Constructability Review Performed?
	☐	Program Related Site Specific Review?
Project Numbers(s): 405259, CS00461	**Project Constructability Phase:**	
Date(s) of Constructability Review: **05/20/2022** 05/20/2022	☐ Conceptual Engineering Design ☒ Preliminary Engineering Design ☐ Detailed Engineering Design	
Project Scope Statement: [redacted]		

Department Review/Walkdown Attendees*:

Required [X]	Attended [X]	Department	Name	Required [X]	Attended [X]	Department	Name
☐	☒	Project Management	[redacted]	☐	☐	S/S Engineering	
☐	☐	Asset Management		☐	☒	P&C Engineering	[redacted]
☐	☒	Constr. Management	[redacted]	☐	☐	Civil Engineering	
☐	☐	S/S Technical / LCE		☐	☐	Telecom	
☐	☐	S/S Operations**		☐	☐	Environmental	
☐	☐	Field Engineering		☐	☐	Real Estate	
☐	☐	Line Engineering		☐	☐	T&D ROW	
☐	☐	Vegetation Management		☐	☐	Survey Engineering	
☐	☐	Siting		☐	☐	Cost Estimating	
☐	☐	Safety		☐	☐	Outreach (SCS)	
☐	☐	SCADA		☐	☐	Material Procurement	

* **Sign-off in the table above for the Detailed Engineering Design Constructability Review indicates that all Action Items/Concerns from prior Constructability Reviews have been mitigated/resolved as documented in this form. Not every department is required to attend walkdowns for every project but should be consulted for project impact considerations**

** Internal Eversource Substation Operations must be included in the review even if external construction resources are planned

[redacted] certifies that this review was performed to completeness, that all applicable departments were informed of the project and have had opportunity to provide input to this review:

[redacted] _____ *5-23-22*

Name / Signature *Date*

EVERSOURCE

Constructability Review Form: **Substation**

Documents available for use prior to Constructability Review					
[X]	**Document**	**[X]**	**Document**	**[X]**	**Document**
☐	Initial Scope -Birdseye site plan -General Arrangement	☒	Preliminary Drawings -Civil Site Drawing -Electrical Drawing -Section Drawings	☐	Prints in hand for marking up -Panel Front/Read View -Control Enclosure Layout -Floor / Wall Plans
☐	Detailed Scope Document	☐	Proposed Schedule	☐	Construction Sequence/Timeline
☐	Previous Notes / Comments / Observations	☐	Major Material / Equipment List	☐	Replace / Reuse of equipment

Action Items and Resolutions:

Item No.	Const. Review Action Item/Concern	Design Resolution/Mitigation:
1	The use of a new panel at the location of panel 1P could result in a delay, the existing panel can be re-used to avoid this risk.	Reuse the existing panel. I'm afraid, Not OK. This is a big Relay and it's a Transmission asset – 115kV.
2	Security conduit next to the existing DSCADA cabinet is blocking access to it for the new LTC controls.	Arrange for security to relocate the conduit
3	The as built drawings for the underground work are severely lacking.	Specify hand excavation for all underground control wire and conduit.
4	Control wiring path from the new DSCADA panels to the control house DSCADA panel.	Conduit and control wiring will be routed to the Aux. switchgear section and then into the control house.
5		

	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
A	**Engineering & Asset Management**		
1	**Scope of Work** - Is scope adequately developed and sufficiently detailed for intended deliverable? - Any complimentary projects or other adjacent obsolete equipment for inclusion? - Any overlapping projects that could impact work/outages? - Consider Physical Installation, P&C Scope, Civil Scope, Engineering studies, Design standard adherence - Any remote station impacts? - Engineering Estimates for Design and Technical Support? (EE and EOC) Total Project	✔	

EVERSOURCE

Constructability Review Form: **Substation**

	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
2	**Materials Identified/Ordered** -Any concerns with BOM/Major Materials? Review BOM lead times and project need dates -Specialty Major Materials: Identify Specialty Equipment & Materials potentials - temporary/replacement - long lead items? -Any Materials needed to facilitate construction access?	☐	Changed the design to re-use the existing panel in lieu of a new one for the bus protection relays. If lead time is not too long, I recommend we still replace this 24" width panel. Relay's width is approximately 20". The DR for some of the major materials have been submitted. A second DR will be submitted on Friday for processing and ordering.
3	**Control House** - Review Unmapped equipment interferences, Control/Battery Enclosure Layout, HVAC System (if equipment added), space for new or modified equipment, AC / DC station breaker availability and service loading, Panel Space, Expansion, one-line and/or riser type panelboard drawings, other..	☐	Noted a security conduit next to the DSCADA cabinet which will need to be relocated so that a new 2 inch EMT can be installed.
4	**Ratings & Dimensions** for Major Equipment. Any concerns upon field review? Equipment Rating One Line (and/or equipment thermal ratings tables) - Review for any errors in field	☐	- none
5	**Wall, Fence, Gate, and Foundation Considerations** -Any permanent / temporary alterations or relocations required? -Pre-Project Sound Measurements Needed? Sound Walls? -Take measurements for Foundation quantities, dimensions and concrete volumes -CIP Review/Ballistic needs. Any Physical Security Requirement Consideration? -Assess condition of existing yard equipment foundations and viability for reuse (if proposed) -Review station expansion areas (if needed) for structures, old foundations, etc. -Any Steel Structural Plan Considerations? -Any impacts to construction plan?	☐	- none. Existing columns will be used for mounting of DSCADA controls for each transformer.
6	**Below Grade / Enclosure Raceway** - If possible, evaluate existing raceway and review spacing requirements. Review for any subsurface investigation needs or potential below grade obstructions. GPR/test pits needed? Geotechnical Investigation - is soil boring or resistivity investigation needed?	☐	- As builts for underground work are vague, so as to avoid damage to existing underground conduit all excavation will need to be done by hand.

EVERSOURCE

Constructability Review Form: **Substation**

	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
7	**Underground Obstructions** -Drawing review concerns? -Is preconstruction or test excavation needed? -Is reuse of underground control cables / Conduits /replace Non-Shielded Cable feasible (if applicable) -Are spare conduits available? Are they useable? -Review if any areas will need to be plated for increased load bearing for equipment access (i.e. large Xfmr, etc.)	☐	- See item 6 comments.
8	**Grounding Plan (Ground Grid)** - Will footprint impact layout or other equipment? Identify locations to improve grounding. Impacts to foundations and ground grid plans. Observations on wetlands or ability to perform tests	NA	- NA
9	Nomenclature / Switching One-Line Diagram -Any obvious deviations from diagrams provided?	☐	- none
10	BPS Separation Requirements - Is this BPS Substation? Y/N (part of PAF) - Changes to pre-existing BPS standards?	NA	-
11	IEC 61850 Substation Automation and Communication Requirements - Any Impacts/Retrofit needed?	NA	-
12	Any Upgrades to ES Standards - Is retrofit needed to bring up to ES standards? Can that be done?	NA	-
B	**Construction**		
1	**Any safety hazards specific to the facility? i.e. Low Bus, Deterioration, etc.**	☐	- none
2	**Prior known Site Specific Conditions** -Common or Obvious station Issues -Missing scope items that could impact costs?	☐	- None
3	**Identify/Consider Required Depts for Construction?** -Who is constructor: Internal vs External Resources -S/S Ops, GO, Test, Field Engineering, etc -Specialty Contractors Required? -Required Oversite Needed - Estimated level of CR and LCE support needed	☐	- External test and electrical contractor will be used.

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Constructability Review Form: **Substation**

	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
4	**Site Plan, Access, and Temporary Construction Facilities:** -Confirm maintenance access for proposed new or replaced equipment -Verify clear footprint for yard equipment / Property Plan -General access to site, can areas outside substation be utilized? -Substation Entry Plan (driveway and drive path modifications) - Identification of Unique Requirements, i.e. (access bridges, station service, etc.) -Site Development Plan (grading and drainage) with Cut/Fill -Existing Rock Conditions? Potential Impacts (rock quantity)? -Any police details needed for deliveries, restricted hours, and/or need for extended hour approvals -Any Sanitary Civil Requirements? (Septic tanks, etc) -Review turning radius for delivery trucks (if critical) -Any Substation Access and site/yard access Limitations? -Office Trailer Needs: Facilities, Utilities, Restroom, Container, Dumpster Space -Weather impacts to Site (Snow Placement) -Identify Material Laydown and Security -Where will new vs removed equipment go? -Construction permit for trailers outside substation fence?	☐	- Test, Electrical, & the LCE will may need trailers which could be a line item in the “Schedule of Values” - Port-o-potty: list in the “Schedule of Values” - Mixed Metals Dumpster: Allocate funding, CR will obtain - Trash Dumpster: Allocate funding, CR will arrange for them -
5	Unique Equipment Considerations: Gas insulated substation, Gas insulated line, Gas insulated bus, Pass Breaker, Statcom, Sync Condenser		- None.

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	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
6	**Outage & Energization Plan and Construction Sequence:** *Review electrical working clearances for equipment during construction, Detailed look at protection zone changes, Locked sequence or random outages, Outage durations minimized.* ***Considerations:*** -Approach Distances – Outage Requirements to maintain electrical clearances throughout proposed installation -Distribution Clearances -Clearance Holder Assignments -Drawings vs Field Conditions -Outage boundaries and interconnections -Phased approach needs for additional mobilizations -Verify outage sequence supports the planned construction sequence and timeline. (Lead Commissioning Engineer "LCE", Substation Operations, and Outage Planner input) -Any design alterations or considerations to Eliminate SCLL Conditions, Reduce Recall Time, Reduce Outage durations, Special Conditions -Additional outage requirements: Railroad Catenaries, Fiber outage, SCADA outage, Relay permissions -Seasonal or weather conditions impacts	☐	The outage application has been developed and will be ready for submittal within two weeks. All items noted have been taken into consideration
7	**Equipment Testing & Acceptance** -Grounding plans / Resources? Will we need grounds hung? -Hi-pot testing and where will the equipment be set up?	NA	-
8	Need for mobile generator and where connected (if needed)	☐	- Confirmed, none needed.
9	Need for mobile battery and where connected (if needed)	☐	- Confirmed, none needed.
10	OT work required or Notable Permit Conditions (special hours)?	☐	- Ten hour days, six day weeks will be used during outages. Non-outage scheduled to use ten hour days, five days per week.
11	Coordination of boundaries/seams (Identification of point of demarcation for connection to existing equipment and/or for coordination with other municipalities)	NA	-

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Constructability Review Form: **Substation**

	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
C	**Environmental**		
1	Soil Pre-Characterization or Grab Sampling Completed/Planned	NA	
2	**Desktop investigation and EAD Review** -Required Permits -Stormwater Considerations -Dewatering requirements -Wetland and buffer review		
3	Risk or presence of PCB's/Asbestos/Lead/SF6		
4	Transformer Spill Containment Recommended?		
5	Expanding Footprint / New Buildings or future Expansion Plans? (Enviro Impact)		
6	Environmental oversight considerations? (Inspection type/Interval)		
7	Environmental mitigations - Any matting or seasonal needs? Review D&M Plan with CR.		
D	**Siting, S&CS, and T&D Real Estate**		
1	**Any regulatory concerns or approvals needed?** - Consider scope/design alterations to mitigate concerns - Consider Visual screening considerations (feasibility or location) -Zoning Relief and Permits required	NA	
2	**Neighbor/Abutter impacts:** - Any noise, visual impacts, or sensitive abutters - Any changes to lighting or additional lighting needed?		
3	Review for roadway, gate access, trailers, equip height, noise, weekend/night work, or any potential public disturbance related to work		
4	Installation within Eversource Rights - Is Rights and Restrictions Review required?		
5	Expanding Footprint / New Buildings or future Expansion Plans?		
6	Proposed Equipment on same property? - Any Encroachments		
F	**Protection & Controls**		
1	Panel Graphic additions and/or Modifications	NA	-
2	Space on existing panels for new equipment? (front & rear of panel fronts)	☐	- Checked by vendor engineer, appears sufficient; - Need new 30" Panel to replace PNL 1P for SEL-487B Relay.
3	Panel fronts conform to drawings	☐	- yes
4	Access to bring new panels into control enclosure	☐	- yes
5	Nameplate list and location of nameplates	☐	-

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	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
6	Verifies that relays and meters that will be an interconnected project work are as shown on the drawings.	☐	-
7	Temporary protection, relays, control cable needed? How long will they be required?	☐	-
8	Will relay setting changes be needed? Any additional outage requirements for changes?		-
G	**Telecom Engineering**		
1	Review telecom equipment in existing control enclosure	NA	-
2	Review path to get telecom circuits into the station and paths within the control house. Determine whether new underground duct or overhead tray work is needed.		
3	Review current or proposed Telecom equipment power connections and validate with P&C any need for system 1 and system 2 separation.		
4	Review current Telecom fiber diversity and validate with P&C any fiber diversity requirements.		
5	Review and list any remote station impacts/updates		
6	Confirm whether correct interface equipment is available (i.e.) for fiber termination or multiplexor termination		
7	Confirm whether existing communications cabinets are enough to support additional telecommunications equipment installed		
8	Review space for any required additional communications cabinets which may be required to support additional telecommunications equipment installed		
9	Review third party Telecommunications at substation and confirm whether additional capacity or Ground Potential Rise protection is required		

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Photos

(Ex. Equipment control cabinet, Breakers, MODs, CCVTs, PTs, Transformers)

Panel 2R	Panel 4R
[redacted]	
Panel 6R	Panel 2R Rear
[redacted]	

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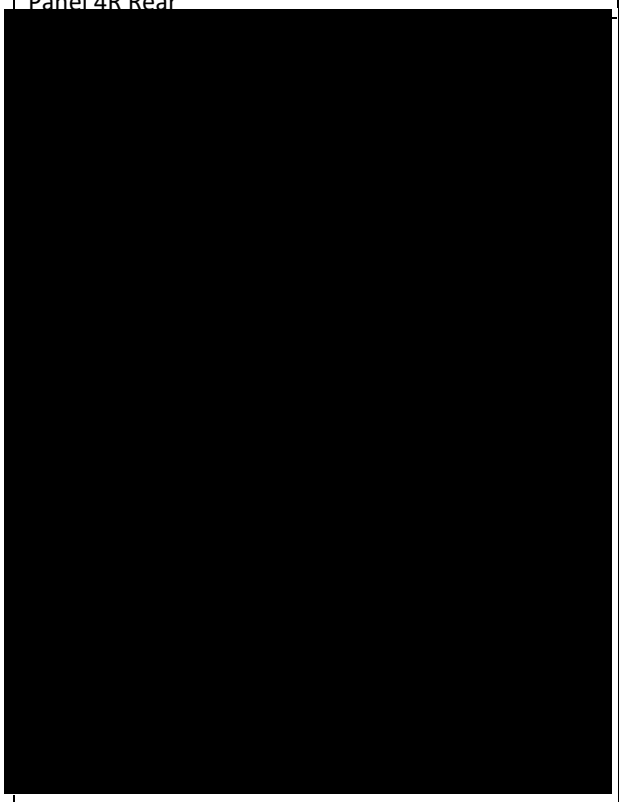
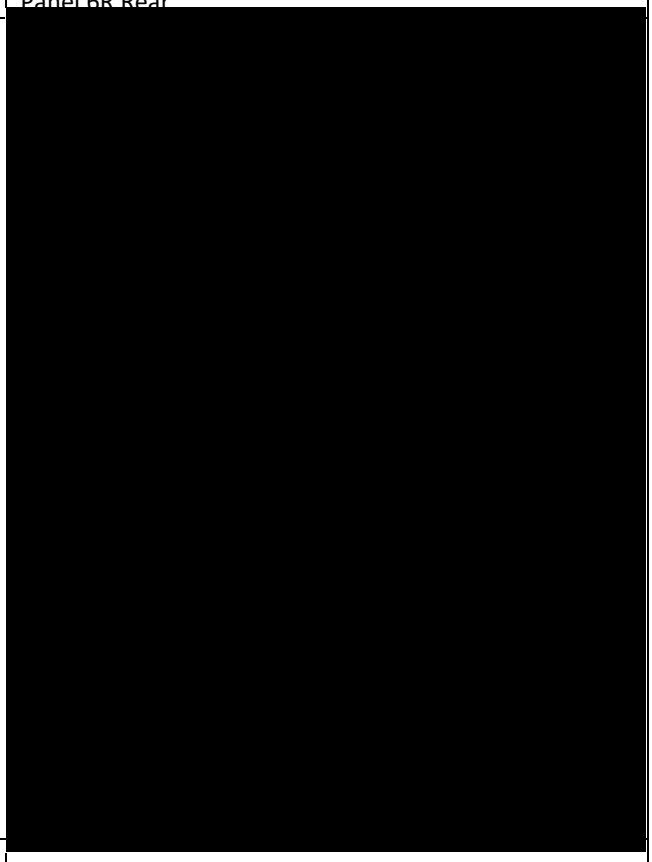
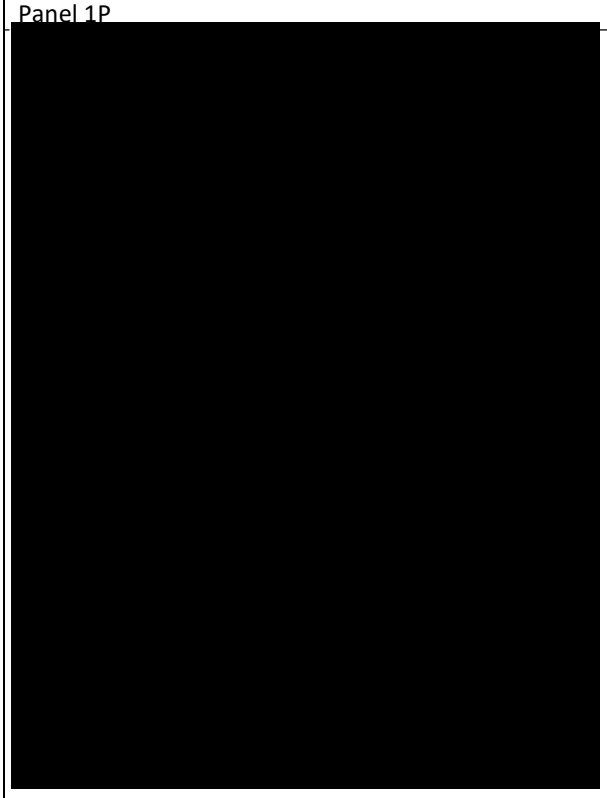
Panel 4R Rear

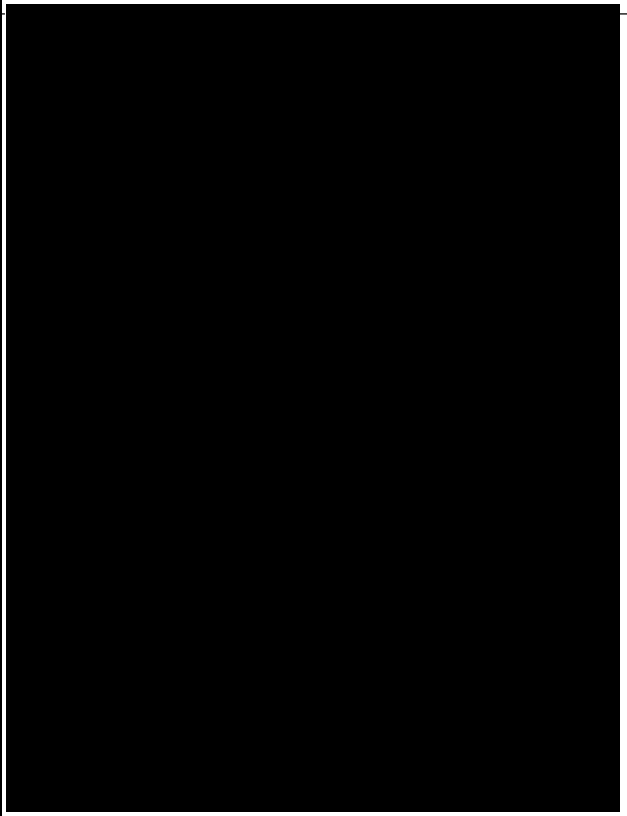


Panel 6R Rear



Panel 1P





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Exising Tranformer Contol Panel, Planned DSCADA Panel Location	
[redacted]	