EVERSOURCE

Operations Project Authorization Form

Approved on September 29, 2022 EPAC

Link to Meeting Minutes

Project Title: [redacted] Neutral Reactor Replacements	**Project Number: CS00531**
Date Prepared: 09/21/2022	**Company: Eversource CT**
Organization: Asset Management	**Class(es) of Plant: D SS**
Project Initiator: [redacted]	**Project Category: Stations - Reactor**
Managing Organization: Transmission / Major Projects	**Schedule ID#: 80123547**
Project Manager: [redacted]	**Project Type: Specific**
Project Sponsor: [redacted]	**Capital Investment part of original Op Plan: Yes**
Estimated in service date: April 2023	**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: $524K	**Authorization Type: Full Funding**

[1] Executive Summary

[redacted]

In evaluating replacement options, several alternatives were presented to the Solution Design Committee (SDC) on August 3, 2022 and the direct replacement option was approved. Stations Operations management has been aware of potential safety issues related to deteriorated components. Project Management continues to raise awareness of the need to exercise caution while performing replacement work on this equipment.

This project had initial funding of $90K approved in PowerPlan on September 22, 2021. As of July 6, 2022, $49.2K has been incurred to complete preliminary engineering and Project Authorization Form (PAF) development. This Full Funding PAF is for $524K for the replacement of both reactors.

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[2] PROJECT COSTS SUMMARY

Note: Dollar values are in thousands

Line item Category	Prior Authorized	Actuals to Date	2022 to Go	2023	Total
1. ROW / Easements / Land Acquisition	$				
2. Environmental Approvals / Permits	$				
3. Outreach	$				
4. Siting Approvals / Permits	$				
5. Engineering / Design	$	$6	$9	$9	$24
6. Materials (Eversource purchased)	$		$55		$55
7. Construction (incl matl's by contractors)	$	$3	$43	$50	$95
8. Testing / Commissioning	$			$3	$3
9. Project Mgmt Team	$	$19	$15	$59	$93
10. Removals	$			($9)	($9)
11. Other	$				
12. Risks	$			$37	$37
SUBTOTAL DIRECTS W/ RISKS	**$90**	**$28**	**$123**	**$149**	**$300**
13. Indirects/Overhead	$	$21	$70	$98	$189
14. AFUDC	$	$1	$9	$8	$18
PROJECT TOTAL – BASELINE BUDGET	**$90**	**$49**	**$203**	**$256**	**$508**
15. Contingency	$		$8	$8	$16
TOTAL CAPITAL REQUEST	**$90**	**$49**	**$211**	**$264**	**$524**
16. Reimbursables/Customer Contribution	$				
PROJECT TOTAL (LESS REIMBURSABLES)	**$90**	**$49**	**$211**	**$264**	**$524**
O&M	$				
TOTAL REQUEST	**$90**	**$49**	**$211**	**$264**	**$524**

Detail other costs, project risk items and their allocations:

Risk	Allocation
1. Material delays	$15K
2.Severe weather, delays, OT	$10K
3.Structure modifications	$12K
4.	$
5.	$
Total	$37K

Explain unique payment provisions, if applicable: N/A

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

[3] TECHNICAL JUSTIFICATION

Project Need, Objective and Justification

Project Need Statement:

This Full Funding Request is for the replacement of the [redacted]

Project Objectives:

[redacted]

Project Scope

The project scope includes the following:

[redacted]

A constructability review was performed on March 3, 2022 (see Attachment C). Adequate space for project activities is present at the site.

Substation Equipment

Station	Device Position / Nomenclature	Device Removals *include manufacturer*	Device Additions *include manufacturer*
[redacted]			

Background

[redacted]

[redacted]

[4] ALTERNATIVES CONSIDERED

This project was presented to the SDC on August 3, 2022 and the direct replacement alternative was approved.

- Alternative 1: Preferred Solution - [redacted]

Non-preferred Solutions:

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

[5] PROJECT SCHEDULE

Milestone	Scheduled Completion Date
IFR Approval (Complete)	September 2021
SDC Approval (for applicable projects)	August 2022
Conversion of Tx development costs, 183 to 107 (applicable to projects that require SSF approval and/or ISO preferred alternative selection)	N/A
EPAC Partial Funding Approval (for applicable projects)	N/A
Preliminary Design Completion (or latest pre-full funding design phase)	July 2022
EPAC Full Funding Approval	September 2022
Siting Approval (for applicable projects)	N/A
Start of Construction	April 2023
Project In-Service Date (ISD)	April 2023
Project Need Date (for applicable projects)	N/A
ISO Related Milestones: (for applicable projects)	
• ISO Preferred Alternative Selected	N/A
• PAC Presentation	N/A
• TCA Submittal	N/A

See Attachment B for the P6 schedule.

[6] REGULATORY APPROVALS

N/A

[7] Risk and Risk Mitigation Plans

Contingency:

Contingency of $22K is included in the estimate for project unknowns.

Risk Mitigation:

Risk	Mitigation
1. Material delays	Allowance for expedited/alternative shipment, etc.
2.Severe weather, delays, OT	Allowance for OT and additional labor cost
3.Structure modifications	Allowance for additional contractor costs
4.	
5.	

[8] References

References
1. CS00531 - [redacted] Neutral Reactor Replacements - Solution Selection Form (SSF)
2.
3.

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

Attachment	Included in Submittal?
Figure 1 – Reactor Nameplate	*YES*
Figure 2 - 7L-1X Transformer Neutral Reactor	*YES*
A. Cost Estimate	*YES*
B. P6 Schedule	*YES*
C. Constructability Review	*YES*
D. System and Station One-Lines	*YES*

Figure 1 - Reactor Nameplate

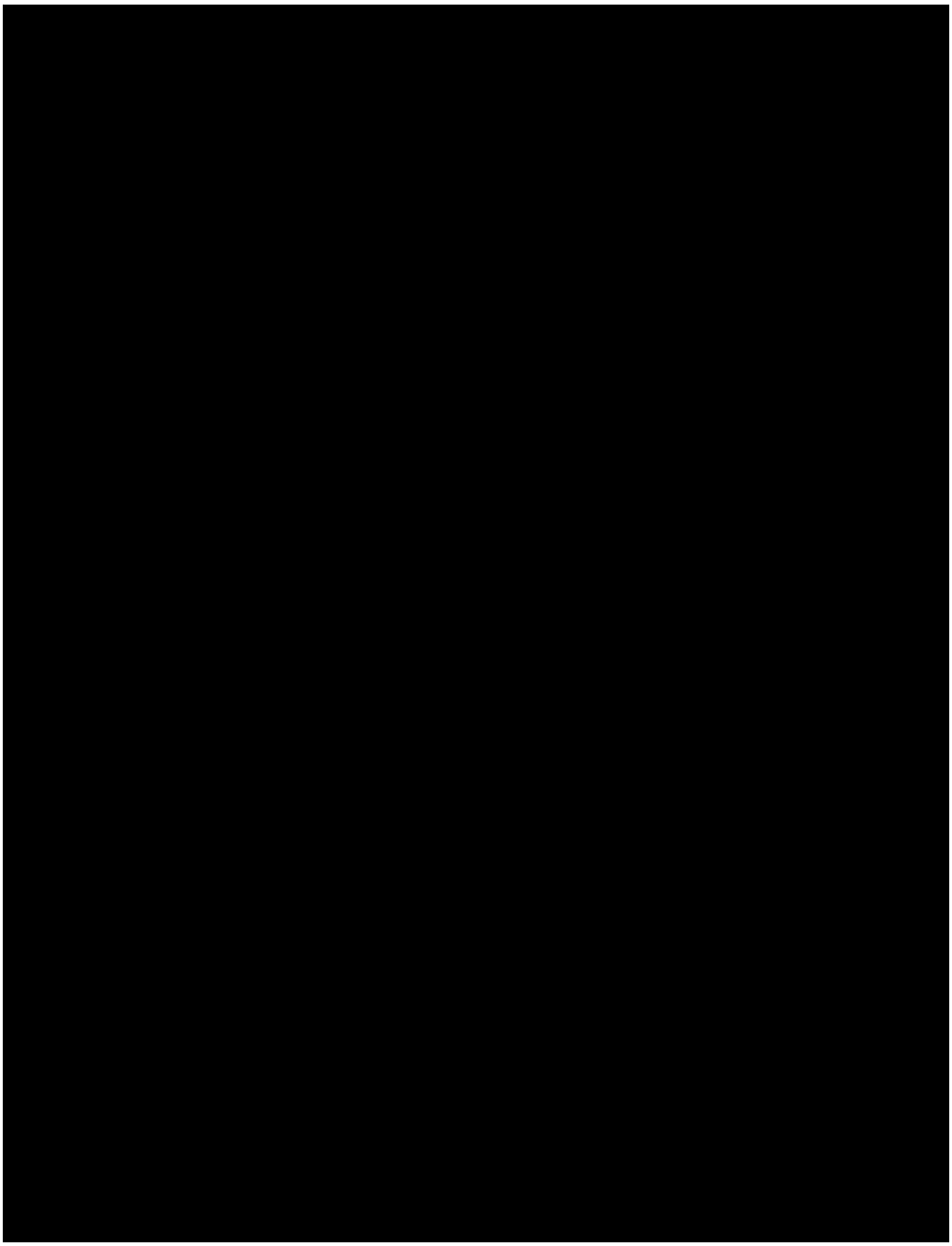
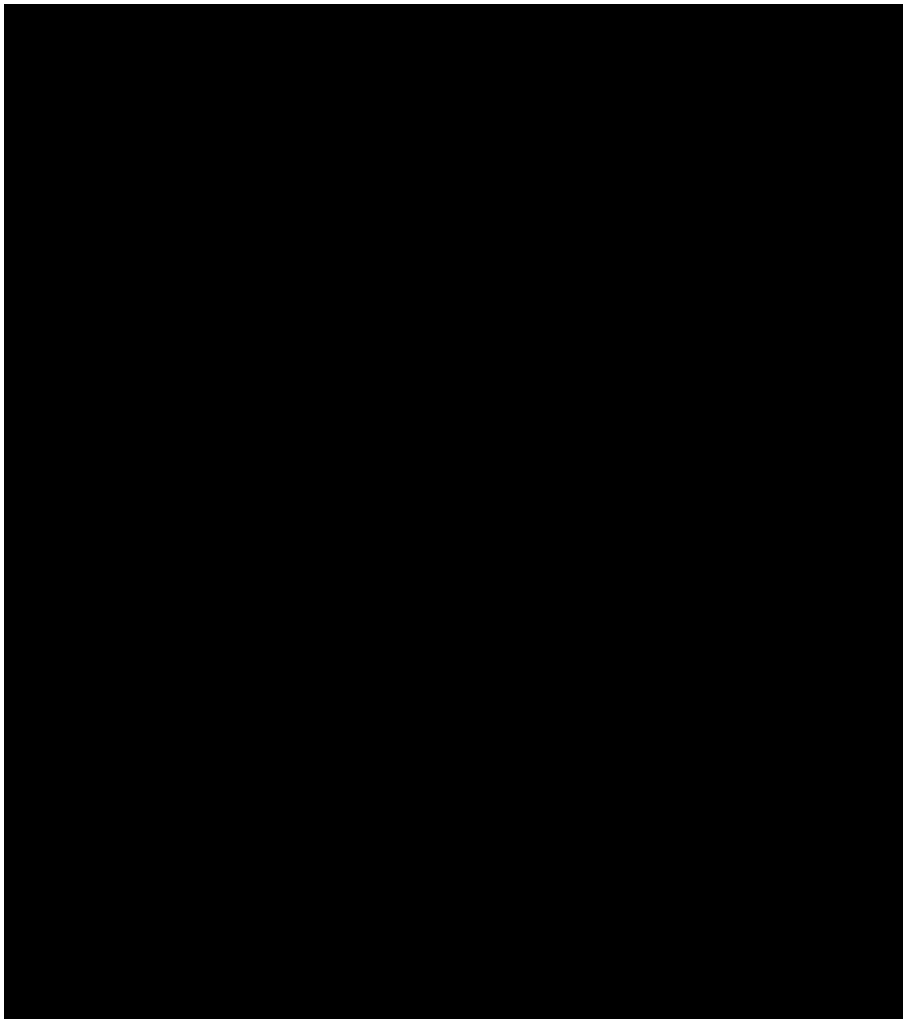


Figure 2 – 7L-1X Transformer Neutral Reactor



Project Checklist - Transmission & Substation Capital Project			
Project Name: [redacted] **Neutral Reactor Replacements**		**Project Number: CS00531**	
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?	No		
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] Neutral Reactor Replacements	**Project Number: CS00531**
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?	Estimate was prepared by the Eversource Estimating Team
Name of the person who prepared the estimate:	[redacted]
Was the estimate reviewed by Eversource Estimating?	Yes - Full Review

ESTIMATE SUMMARY

Project Title: Neutral Reactor Replacements
Project Mgmt ead[redacted]
Project Number: C800531
WO & Task #: 80123547
Estimate revision # 02
Estimate Type - Station work

Estimate #: C-22-300
Date of Estimate: 09/29/2022
Estimate done by [redacted]
In Service date (ISD): 05/15/2023

Template Revision # 01.75c1

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														
4	Siting Approvals / Permits														
5	Engineering / Design	$24,400	8.1%	4.7%	$6,300	$9,300	$8,800								
6	Materials (Eversource purchased)	$55,500	18.5%	10.6%		$55,500									
7	Construction (Incl matl's by contractors)	$95,500	31.8%	18.2%	$2,600	$42,900	$50,000								
8	Testing / Commissioning	$3,500	1.2%	0.7%			$3,500								
9	PMT Project Mgmt Team	$93,100	31.0%	17.8%	$18,900	$15,400	$58,800								
10	Removals	-$8,500	-2.8%	-1.6%			-$8,500								
11	Other														
12	Risks	$37,000	12.3%	7.1%			$37,000								
125	**Project Directs Total w/Risks**	**$300,500**	100.0%	57.3%	**$27,800**	**$123,100**	**$149,600**								
13	Indirects/Overhead	$188,900		36.0%	$20,700	$70,200	$98,000								
14	AFUDC	$18,400		3.5%	$700	$9,500	$8,200								
125	**Project Total - Baseline Budget**	**$507,800**		96.9%	**$49,200**	**$202,800**	**$255,800**								
15	Contingency	$16,200		3.1%		$8,100	$8,100								
	Project Total - Funding Approval Level	**$524,000**		100.0%	**$49,200**	**$210,900**	**$263,900**								
16	Reimbursables/Customer Contribution														
115	**Project Total (less reimbursables)**	**$524,000**			**$49,200**	**$210,900**	**$263,900**								
	Cost per key qty (if appl)	262,000	$'s / EA 800 Amp Neutral Reactor Replacements												
	Amount of Escalation included above	$6,100					$6,100								
6	Total materials - Eversource	$55 500				$55 500									
	Total materials - Contractor														
	Total materials	$55 500				$55 500									
	NOTE: Risk / Contingency is 11.3% of Project Total Costs (incl escal/indirects/AFUDC but excl reimb.)														

Estimate Range	-25%	25%
	$393,000	**$655,000**

COMMENTS

[redacted]

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

- Project management & Construction Rep outsourced
- Engineering Inhouse
- Neutral reactor installations/removals outsourced.
- Testing Inhouse
- ISD 5/13/2023 Per PE Schedule
- Mobile transformer NOT included with this estimate revision.
- Prior Costs as of 6/21/2022 per project team email dated 6/21/2022 included.
- Existing connections to bus and transformer to be re-used.

[redacted]

RISKS

Material Delays.	$	15.000
Severe Weather. Delays. OT	$	10.000
Structure Modifications	$	12.000

Alt Estimate Summary for PP4 Calc (escalation separate)

Estimate #: C-22-300
Date of Estimate: 09/29/2022

Project Number: C800531
WO & Task #: 80123547

		TOTAL w/ escal broken out
ROW / Easements / Land purchas	$	-
Environmental Approvals / Permi	$	-
Outreach	$	-
Siting Approvals / Permits	$	-
Engineering / Design	$	24,100
Materials (Eversource purchased	$	55,500
Construction (Incl matl's by cont	$	94,000
Testing / Commissioning	$	3,400
PMT Project Mgmt Team	$	91,300
Removals	$	(8,300)
Other	$	-
Risks	$	37,000
		$297,000
Indirects/Overhead	$	186,000
AFUDC	$	18,400
	$	-
		$501,400
	$	-
Contingency	$	16,200
		$517,600
	$	-
	$	-
	$	-
		$517,600
	$	6,100
Escal total		**$523,700**
Check total		-$300

UNESCALATED LINE ITEM DOLLARS

Project Number C606631
Date of Estimate 01/07/2022
Estimate revision # 02

Escalation Rate		E Rate $							
		Prior		2022		2023	1	TOTAL	
OSTXX-CONSTRUCTION	R	Mhrs	DOLLARS	Mhrs	DOLLARS	Mhrs	DOLLARS	Mhrs	DOLLARS
Electrical Construction	LT								
General Construction	LT		$1,132						$1,132
SCADA / Automation	LT								
Telecom - Field	LT								
Construction Reps (Internal)	LT								
Support Switch/Tag	LT						$3,914		$3,914
Other (specify)	LT								
Other (specify)	LT								
Other (specify)	LT								
LT Total			$1,132				$3,914		$5,046
Employee Expenses	AE						$196		$196
Construction Purchased Material	AM				$355				$355
Outside Construction Vendor	AO				$35,462				$35,462
Sales tax on Constr. Vendor									
Vehicles (now in Indirects section)	AV								
Inspection services (Outside Vendor)	AO								
Construction Rep (Outside vendor)	AO		$1,493		$7,400		$44,400		$53,293
Rents and Leases	BR								
OSTXX Subtotal			$2,625		$43,237		$48,510		$94,372
Escalation									
OSTXX Total			$2,625		$43,237		$48,510		$94,372
ENRXX-TG ENGINEERING/DESIGN									
Project Services/Drafting	LT						$1,549		$1,549
T- Line Engineering/Design	LT								
D- Street Engineering/Design	LT								
Civil Engineering/Design	LT								
Substation (T) Engineering/Design	LT								
Substation (D) Engineering/Design	LT		$5,579		$2,100		$2,100		$9,779
Protection & Controls Engineering	LT				$4,536		$2,268		$6,804
Survey Engineering	LT								
SCADA / Automation Engineering	LT				$2,224		$2,224		$4,448
Telecom Engineering	LT								
Other - specify	LT								
Other - specify	LT								
LT Total			$5,579		$8,860		$8,141		$22,580
Employee Expenses	AE				$443		$407		$850
Contractor Engineering - T-Lines	AO								
Contractor Engineering - D-Street	AO								
Contractor Engineering - T -Station	AO								
Contractor Engineering - D-Station	AO		$662						$662
Contractor Engineering - P&C	AO								
Contractor Engineering - Survey	AO								
Contractor Engineering - SCADA / Automation	AO								
Contractor Engineering - Telecom	AO								
Contractor Engineering - Specify	AO								
Contractor Engineering - Specify	AO								
Contractor Engineering - Specify	AO								
Vehicles (now in Indirects section)	AV								
ENRXX Subtotal			$6,241		$9,303		$8,548		$24,112
Escalation									
ENRXX Total			$6,241		$9,303		$8,548		$24,112
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				$53,000				$53,000
Outside Services	AM								
Freight	AM								
Sales Tax Eversource/outside services	3.9%				$2,100				$2,100
Other									
MATXX Subtotal					$55,100				$55,100
Escalation									
MATXX Total					$55,100				$55,100
PSMXX-PROJECT MANAGER & SUPPORT									
Project Management (PM)	LT		$201						$201
Project Planning/Cost (IP)	LT				$2,371		$1,186		$3,557
Contracts/Purchasing (CiP)	LT								
System Planning	LT								
Environmental	LT								
SCS - None	LT		$34						$34
Legal	LT								
Estimating	LT				$474				$474
Siting - None	LT								
Asset Management	LT								
Other -	LT								
Other -	LT								
Other -	LT								
Other -	LT								
LT Total			$235		$2,845		$1,186		$4,266
Employee Expenses	AE				$142		$59		$201
Project Support Vendor - PM	AO		$10,661		$6,200		$49,600		$74,461
Project Support Vendor - IP	AO								
Project Support Vendor - CiP	AO								
Project Support Vendor - System Planning	AO								
Project Support Vendor - Environental	AO								
Project Support Vendor - SCS - None	AO								
Project Support Vendor - Legal	AO								
Project Support Vendor - Estimating	AO				$3,720				$3,720
Project Support Vendor - Siting - None	AO								
Project Support Vendor - Asset Management	AO				$2,480		$6,200		$8,680
Project Support Vendor - Other	AO								
Project Support Vendor - Other	AO								
Project Support Vendor - Other	AO								
Project Support Vendor - Other	AO								
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			$10,896		$15,367		$57,045		$91,308
Escalation									
PSMXX Total			$10,896		$15,367		$57,045		$91,308
REMXX-TG REMOVAL									
Engineering/Design	LT								
Internal Construction	LT						$5,312		$5,312
LT Total							$5,312		$5,312
Employee Expenses	AE						$797		$797
Outside Services	AO								
Contractor Labor	AO						-$14,400		-$14,400
Vehicles (now in Indirects section)	AV								
Rents and Leases	BR								
REMXX Subtotal							-$8,291		-$8,291
Escalation									
REMXX Total							-$8,291		-$8,291
TSTXX-TG TEST									
Test / Field Engr. Labor (In House)	LT						$2,048		$2,048
Lead Commissioning Engr. (LCE) (Internal)	LT						$1,024		$1,024
Employee Expense	AE						$307		$307
Test / Field Engr. Labor (contractor)	AO								
Lead Commissioning Engr. (LCE) (contractor)	AO								
Vehicles (now in Indirects section)	AV								
TSTXX Subtotal							$3,379		$3,379
Escalation									
TSTXX Total							$3,379		$3,379
SUBTOTAL PROJECT DIRECT COST		-	$27,782		$123,027		$109,191		$260,000
Risk									
Risk							$37,000		$37,000
				$ -		$ -			
Risk Total							$37,000		$37,000
TOTAL PROJECT DIRECT COST (w/risk)		-	$27,782		$123,027		$146,191		$297,000
INDIRECTS									
Non-Productive Time Allocation (2NP)	17.0%		$1,103		$1,990		$3,676		$6,769
Payroll Benefits Allocation (2PB) Incl NPT	44.0%						$6,331		$6,331
Gen SVC CO Overhead (2GS) Incl NPT	80.0%		$4,362		$10,956		$8,730		$24,056
E&S Allocations (2EB,2EL,2EB)	50.0%		$12,955		$39,967		$63,081		$116,033
AG&E Allocations (2A6)	1.3%		$477		$2,199		$2,358		$5,034
Stores Expense Allocation (2ST)	8.0%				$4,240				$4,240
Lobby Stock									
MDCC (2M)	6.0%		$1,667		$7,567		$4,872		$14,086
Vehicles (2VE)	28.0%		$111		$3,277		$6,055		$9,443
Indirects Subtotal			$20,695		$70,196		$95,133		$186,014
TOTAL PROJECT COST - Direct & Indirect (excl AFUDC)			$48,487		$193,223		$241,324		$483,014
AFUDC									
AFUDC (2X)			$719	0.50%	$9,477	0.50%	$8,248	1	$18,444
In Service Dollars									
Cumulative ISS				-		-			
AFUDC Subtotal			$719		$9,477		$8,248		$18,444
TOTAL PROJECT COST - Baseline Budget			$49,186		$202,700		$249,572		$501,458
Contingency									
Contingency					$5,115		$8,079		$16,197
Other			$ -		$ -		$ -		
Contingency SubTotal					$5,115		$8,079		$16,197
TOTAL PROJECT COST - Approved Funding			$49,186		$210,815		$257,651		$517,655
Reimbursables / Customer Contribution									
Reimbursables / Customer Contribution (enter as negative)			$ -		$ -		$ -		
TOTAL PROJECT COST			$49,186		$210,815		$257,651		$517,655

Activity ID	Activity Name	Rem Dur	ES	Actual Start	EF	Actual Finish
80123547	**Neutral Reactor Replacement**					
	[redacted] Neutral Reactor Replacement					
	INITIALIZATION AND SCOPE DEVELOPEMENT					
	Project Initiation					
	EPAC Full Funding					
PAFF2110	EPAC Full Funding Meeting	0	29-Sep-22 08:00*			
FF1010	Full Funding PowerPlan Approval	10	30-Sep-22 08:00		14-Oct-22 16:00	
FF1000	Project Fully Funded	0			14-Oct-22 16:00	
	PROJECT MANAGEMENT					
A1170	Prepare CAN (Construction Authorization Notice)	10	26-Oct-22 08:00		08-Nov-22 16:00	
	T-Minus Milestones					
	T-Minus Milestones "A" Group					
AT1202	A-T-12.02 P/C DESCRIPTION / DRAFT OPERATING INSTRUCTIONS ISSUED	0			30-Sep-22 16:00*	
AT2404	A-T-24.04 DETERMINE / ASSIGN LCE (LEAD COMMISSIONING ENGINEER)	0			31-Oct-22 16:00*	
AT0203	A-T-02.03 CAN COMPLETE (CONSTRUCTION AUTHORIZATION NOTICE)	0			08-Nov-22 16:00*	
AT0409	A-T-04.09 ALL FIRM TOA APPLICATIONS DUE TO LCC (for DISTRIBUTION Non-transformer equipment)	0			09-Jan-23 16:00*	
AT1301	A-T-13.01 COMMISSIONING PLAN COMPLETE	0			10-Jan-23 16:00*	
AT00	T-00 START OF CONSTRUCTION - WO#	0	17-Apr-23 12:00*			
AT0401	A-T-04.01 ALL MATERIAL RECEIVED, STAGED, INVENTORIED, REVIEWED	0			20-Apr-23 16:00*	
	T-Minus Milestones "B" Group					
BT00	T-00 START OF CONSTRUCTION - WO#	0	17-Apr-23 12:00*			
	ENGINEERING & DESIGN					
	Electrical Engineering					
DSSE-920	Operating Instructions - SSED Review Draft Convex OI	5	26-Sep-22 08:00*		30-Sep-22 16:00	
DSSE-460	Operating Instructions - SSED Review Draft Distribution OI	5	26-Sep-22 08:00*		30-Sep-22 16:00	
	MATERIAL PROCUREMENT					
	MATERIAL FOR REACTORS					
REACT-530	REACTOR-MATERIAL - Reactor - Prepare & Issue DR	5	26-Sep-22 08:00*		30-Sep-22 16:00	
REACT-1180	REACTOR-Reactor Material Ordered	0			30-Sep-22 16:00	
REACT-1060	REACTOR-MATERIAL - Reactor - Procurement Issue PO	8	01-Oct-22 08:00		08-Oct-22 16:00	
REACT-1070	REACTOR-MATERIAL - Reactor - Material Vendor Delivery Leadtime	193	09-Oct-22 08:00		19-Apr-23 16:00	
REACT-1170	REACTOR-MATERIAL - Reactor - Prepare & Issue LNTP for Vendor Dwgs. & Schematics	8	17-Oct-22 08:00*		26-Oct-22 16:00	
REACT-570	REACTOR-MATERIAL - Reactor - Confirm Material Delivery to Site	1	20-Apr-23 08:00		20-Apr-23 16:00	
	CONSTRUCTION					
	CONSTRUCTION SERVICES SELECTION					
	CONSTRUCTION SERVICES - CONTRACTOR OF CHOICE					

TASK filter: Remove Completes.

(c) Primavera Systems, Inc.

Activity ID	Activity Name	Rem Dur	ES	Actual Start	EF	Actual Finish
A3390	CONST.SERVICES - COC - Eversource Provides Spec / RFQ to COC	5	17-Oct-22 08:00		21-Oct-22 16:00	
A3400	CONST.SERVICES - COC - COC Evaluates Spec and Provides Quote	10	24-Oct-22 08:00		04-Nov-22 16:00	
A3410	CONST.SERVICES - COC - Eversource Reviews Quote from COC	10	07-Nov-22 08:00		21-Nov-22 16:00	
A3420	CONST.SERVICES - COC - Eversource Awards Contract - PO Issued	10	22-Nov-22 08:00		06-Dec-22 16:00	
CONSTRUCTION SERVICES - BID PROCESS						
A3430	CONST.SERVICES - BID - Eversource provide Spec / RFP	2	17-Oct-22 08:00		18-Oct-22 16:00	
A3440	CONST.SERVICES - BID - Contractors Evaluate RFP and Provide Proposal	7	19-Oct-22 08:00		27-Oct-22 16:00	
A3450	CONST.SERVICES - BID - Eversource reviews contractor proposals	15	28-Oct-22 08:00		18-Nov-22 16:00	
A3460	CONST.SERVICES - BID - Contract is Awarded - PO Issued	20	21-Nov-22 08:00		19-Dec-22 16:00	
CONSTRUCTION - CIVIL						
A1120	Construction - Civil	2	17-Apr-23 12:00		19-Apr-23 12:00	
CONSTRUCTION - ELECTRICAL						
A1130	Construction - Electrical	2	17-Apr-23 12:00		19-Apr-23 12:00	
CONSTRUCTION - COMMUNICATIONS						
A1150	Construction - Field Communications	2	17-Apr-23 12:00		19-Apr-23 12:00	
CONSTRUCTION - CONST.REP TASKS						
A1250	Construction Rep SUBMIT OUTAGE REQUESTS for NON-transformer equipment (4 weeks before outage)	5	03-Jan-23 08:00*		09-Jan-23 16:00	
A1260	Construction Rep Finalize CASCADE Forms (within 14 days folloiwng ISD)	10	19-Apr-23 12:00		03-May-23 12:00	
CONSTRUCTION RESOURCE TRACKING						
ConRep-S	RESOURCE ONLY ACTIVITY - CONSTRUCTION - CONSTRUCTION REP	2	17-Apr-23 12:00		19-Apr-23 12:00	
A1080	RESOURCE ONLY ACTIVITY - CONSTRUCTION - SWITCH IN	2	17-Apr-23 12:00		19-Apr-23 12:00	
A1070	RESOURCE ONLY ACTIVITY - CONSTRUCTION - SWITCH OUT	2	17-Apr-23 12:00		19-Apr-23 12:00	
CONSTelec	RESOURCE ONLY ACTIVITY - CONSTRUCTION - ELECTRICIAN	2	17-Apr-23 12:00		19-Apr-23 12:00	
CONSTRUCTION OUTAGES						
TOA-Const	OUTAGE / General Construction Work	2	17-Apr-23 12:00		19-Apr-23 12:00	
CSM	Construction Start Milestone	0	17-Apr-23 12:00			
TOA-Const20	Replace Neutral Grounding Reactor (Phase 1)	1	17-Apr-23 12:00		18-Apr-23 12:00	
TOA-Const50	Replace Neutral Grounding Reactor (Phase 2)	1	18-Apr-23 12:00		19-Apr-23 12:00	
CFM	Construction Finish Milestone	0			19-Apr-23 12:00	
ISD	EQUIPMENT IN SERVICE DATE (requires FOOB constraint)	0			19-Apr-23 12:00*	
TEST AND COMMISSION						
TEST - SERVICES STAFFING DECISION						
A1010	STAFFING DECISION: EVERSOURCE OR OUTSOURCE BID/COC	11	11-Oct-22 08:00*		25-Oct-22 16:00	
TEST SERVICES - CONTRACTOR OF CHOICE						
A3470	TEST SERVICES - COC - Eversource Provides Spec / RFQ to COC	1	26-Oct-22 08:00		26-Oct-22 16:00	
A3480	TEST SERVICES - COC - COC Evaluates Spec and Provides Quote	10	27-Oct-22 08:00		09-Nov-22 16:00	

TASK filter: Remove Completes.

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Activity ID	Activity Name	Rem Dur	ES	Actual Start	EF	Actual Finish
A3490	TEST SERVICES - COC - Eversource Reviews Quote from COC	10	10-Nov-22 08:00		25-Nov-22 16:00	
A3500	TEST SERVICES - COC - Eversource Awards Contract - PO Issued	10	28-Nov-22 08:00		09-Dec-22 16:00	
TEST SERVICES - BID PROCESS						
A3510	TEST SERVICES - BID - Eversource provide Spec / RFP	1	26-Oct-22 08:00		26-Oct-22 16:00	
A3520	TEST SERVICES - BID - Contractors Evaluate RFP and Provide Proposal	10	27-Oct-22 08:00		09-Nov-22 16:00	
A3530	TEST SERVICES - BID - Eversource reviews contractor proposals	10	10-Nov-22 08:00		25-Nov-22 16:00	
A3540	TEST SERVICES - BID - Eversource awards contract - PO Issued	10	28-Nov-22 08:00		09-Dec-22 16:00	
LCE PLANNING						
LCE100	PM to Request Lead Commissioning Engineer GO/NO-GO {Preliminary or Detail design is often the predeces	2	26-Oct-22 08:00		27-Oct-22 16:00	
LCE200	Assign Lead Commissioning Engineer	2	28-Oct-22 08:00		31-Oct-22 16:00	
LCE400	Develop Test and Commissioning Plan	10	12-Dec-22 08:00		23-Dec-22 16:00	
LCE500	LCE Review and Approve Vendor's Test and Commissioning Plan	10	27-Dec-22 08:00		10-Jan-23 16:00	
TEST ACTIVITIES						
LCE310	Mobilize LCE Prior to Construction	2	10-Dec-22 08:00		11-Dec-22 16:00	
LCE320	Mobilize Testing Vendor Prior to Construction	2	10-Dec-22 08:00		11-Dec-22 16:00	
LCE610	LCE Oversee Execution of Test and Commissioning Plan	30	11-Jan-23 08:00		23-Feb-23 16:00	
LCE620	Execute Test and Commissioning Plan	30	11-Jan-23 08:00		23-Feb-23 16:00	
LCE700	LCE Ensure Test Group Prepare Electrical Field Mark Ups	1	24-Feb-23 08:00		24-Feb-23 16:00	
PROJECT CLOSE OUT						
DSSE-1100	Complete TD-707 Turnover Document / Forward to SOC & Mailing List	5	19-Apr-23 12:00		26-Apr-23 12:00	
A3620	Prepare & Submit Civil Field Mark Ups (Tie after Last Civil Construction Activity)	21	19-Apr-23 12:00		18-May-23 12:00	
A3640	Test Prepare & Submit Electrical Field Mark Ups	21	03-May-23 12:00		02-Jun-23 12:00	
A3650	Prepare & Submit P&C Field Mark Ups	21	03-May-23 12:00		02-Jun-23 12:00	
A3660	PM to Document Civil As-Built Drawings Complete	1	14-Aug-23 12:00		15-Aug-23 12:00	
A3670	FE Files Civil Design Drawings at Station	30	15-Aug-23 12:00		27-Sep-23 12:00	
A3680	PM to Document Electrical As-Built Drawings Complete (Electrical, P&C)	1	28-Aug-23 12:00		29-Aug-23 12:00	
A3690	FE Files Substation Design Drawings at Station	30	29-Aug-23 12:00		12-Oct-23 12:00	
A3710	FE Files P&C Design Drawings at Station	30	29-Aug-23 12:00		12-Oct-23 12:00	
Civil As-Builts						
A3730	Eversource Engineering Verifies Civil Mark Ups and Updates As-Built Drawing Package	55	18-May-23 12:00		07-Aug-23 12:00	
A3740	ES Create Civil Transmittal, Approve Final As-Built Package, and EDC Files and Issue Drawings to Field	5	07-Aug-23 12:00		14-Aug-23 12:00	
Electrical As-Builts						
A3750	Eversource Engineering Verifies Electrical Mark Ups and Updates As-Built Drawing Package	55	02-Jun-23 12:00		21-Aug-23 12:00	
A3760	Electrical Transmittal, Approve Final As-Built Package, and EDC Files and Issue Drawings to Field	5	21-Aug-23 12:00		28-Aug-23 12:00	
P&C As-Builts						
A3770	Eversource Engineering Verifies P&C Mark Ups and Updates As-Built Drawing Package	55	02-Jun-23 12:00		21-Aug-23 12:00	

TASK filter: Remove Completes.

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Activity ID	Activity Name	Rem Dur	ES	Actual Start	EF	Actual Finish
A3780	P&C Transmittal, Approve Final As-Built Package, and EDC Files and Issue Drawings to Field	5	21-Aug-23 12:00		28-Aug-23 12:00	
Test Closout						
LCE900	LCE Review Test Data and Issue Commissioning Report	10	19-Apr-23 12:00		03-May-23 12:00	
LCE800	LCE Ensures Marked up Prints Ready for Pick-up	1	19-Apr-23 12:00		20-Apr-23 12:00	
SITE RESTORATION CLOSEOUT						
A1110	Restore / Remediate Site	10	19-Apr-23 12:00		03-May-23 12:00	
MATERIAL, EQUIPMENT, COST, AND ASSET MANAGEMENT CLOSEOUT						
A1020	Cost Analyst Prepares FINAL Units of Property	30	19-Apr-23 12:00		01-Jun-23 12:00	
A1030	Asset Management Complete Asset Update(s) in CASCADE	30	03-May-23 12:00		15-Jun-23 12:00	
PROJECT MANAGEMENT CLOSEOUT						
A1270	Prepare TD-707 Document	30	19-Apr-23 12:00		01-Jun-23 12:00	
A1040	PM Prepares Closeout Documentation, Lessons Learned Meeting, etc.	30	12-Oct-23 12:00		27-Nov-23 12:00	
FINISH	Project / Work Order Complete (FINAL SCHEDULE TASK/MILESTONE)	0			28-Nov-23 12:00	

TASK filter: Remove Completes.

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EVERSOURCE

Constructability Review Form: **M6-PM-2012 - Eversource Substation and Transmission Overhead Line Constructability Review**

Project Information

Project Title: [redacted] **Neutral Reactor Replacements**	☐	Prior Constructability Review
	☐	Program Project (Check if yes)
Project Numbers(s): Project # CS00531 --- Work Order# -- 80123547	☐	
Date(s) of Constructability Review (including any prior dates): **03/03/2022** Click to enter a date	**Project Funding/Phase:** ☐ Conceptual Engineering Design ☐ Preliminary Engineering Design ☐ Detailed Engineering Design	

Project Scope:

This project will replace the neutral reactors for the 7L-1X and 7L-2X transformers at [redacted] substation.

The project scope includes:

☐ Civil and electrical engineering needed to specify and purchase the replacement reactors

☐ Perform Constructability Walkdown/Review

☐ Prepare cost estimate

☐ Design of foundation and structural support modifications(if needed).

☐ Removal and disposal of existing reactors

☒ Purchase and installation of replacement reactors and related material.

Walkdown Attendees:

Required [X]*	Attended [X]	Department	Name**	Required [X]*	Attended [X]	Department	Name**
☒	☒	Project Management	[redacted]	☒	☒	S/S Engineering	[redacted]
☒	☒	Constr. Management		☒	☒	P&C Engineering	
☐	☐	S/S Technical / LCE		☐	☐	Civil Engineering	

EVERSOURCE

Constructability Review Form: **M6-PM-2012 - Eversource Substation and Transmission Overhead Line Constructability Review**

☐	☐	S/S Operations	N/A	☐	☐	Telecom	NA
☐	☐	Field Engineering	N/A	☐	☐	Environmental	[redacted]
☐	☐	Line Engineering	N/A	☐	☐	Asset Management	
☐	☐	Vegetation Management	N/A	☐	☐	ROW T&D Rights & Survey	
☐	☐	Siting	N/A	☐	☐	Survey Engineering	
☐	☐	Safety	N/A	☐	☐	Cost Estimating	
☐	☐	SCADA	N/A	☐	☐	Project Services (Outreach)	

*Not every resource may be required to attend walkdown of every project

**** 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**

[Project Manager] 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:

PM / [redacted] / *6/2/2022*

Title / Name / Signature *Date*

Key Documents:

Documents for Use on Constructability Review

In Hand [X]	Document	In Hand [X]	Document	In Hand [X]	Document
☐	Detailed Scope of Work	☒	Project Milestones/Schedule	☒	Old Photos
☐	Conceptual Engineering Design	☐	Marked up Plan & Profile (Preliminary Design)	☐	Rights and Restrictions Spreadsheet
☒	Preliminary Engineering Design	☐	Preliminary Mapping and/or Mapping from Prior Project	☐	Potential Encroachment List
☐	Detailed Engineering Design	☐		☐	

Summary of Action Items and Resolutions:

Item No.	Const. Review Action Item/Concern	Design Resolution/Mitigation:
1	Ensure buying mounting channels for reactors	Civil will need to order new mounting channels
2		
3		
4		

5		
6		
7		
8		
9		
10		
11		
12		
13		

Design Review:

Review feasibility and implementation of design

	Key Review Item Description	No Concerns with Proposed Design [X]	Concerns with Current Proposed Design	Follow Up Items and Additional Notes*
A	**General**			
1	Detailed Scope of Work	☒		Scope of work is available based on initial IFR
2	Vegetation Scope of Work (limits of tree removal/clearing per standards)	☒	N/A	
3	Right-of-Way (ROW) Coordination (projects within same corridor)	☒	N/A	
B	**Engineering**			
1	Survey (Structure and ROW Boundary Stakeouts, Approximate Easement Lines)	☒	N/A	
2	Proposed Structure Placement Relative to Underground (UG) Facilities (sewer, septic, gas, etc.)	☒	N/A	

EVERSOURCE

Constructability Review Form: **M6-PM-2012 - Eversource Substation and Transmission Overhead Line Constructability Review**

	Key Review Item Description	No Concerns with Proposed Design [X]	Concerns with Current Proposed Design	Follow Up Items and Additional Notes*
3	Splice Can Locations	☒	N/A	
4	Federal Aviation Administration (FAA) Requirements	☒	N/A	
5	Utility Crossings	☒	N/A	
6	Soil Borings (for engineered structure, UG)	☒	N/A	
C	**Environmental**			
1	Preliminary Mapping (with proposed work pads, pull pads, access) Confirm mapping from past projects	☒	N/A	
2	River Crossings (Navigable waterway crossing)/State Waterbodies (NH)	☒	N/A	
3	Delineated Wetlands	☒	N/A	
4	Temporary Matting Needs	☒	N/A	
5	Permitting & Health and Safety: Massachusetts Department of Agricultural Resources (MDAR)/Area Use Limitation (AUL)	☒	N/A	
6	National Parks Services (NPS)/State or Federal Trail and Park Crossings	☒	N/A	
7	Archeological/Cultural Areas	☒	N/A	
8	Presence of Invasive Species	☒	N/A	
D	**Siting**			
1	Adherence to Siting requirements	☒		
E	**Project Services (Outreach)**			
1	Proposed construction and restoration plan(s) for manicured lawns/areas	☒	N/A	
2	Evaluation of Vegetation Clearing Impacts/Identification of Homes with Potential Visual Impacts (and Mitigation plans)	☒	N/A	
3	Pre-Construction Photos	☒	N/A	

EVERSOURCE

Constructability Review Form: **M6-PM-2012 - Eversource Substation and Transmission Overhead Line Constructability Review**

	Key Review Item Description	No Concerns with Proposed Design [X]	Concerns with Current Proposed Design	Follow Up Items and Additional Notes*
F	**Permitting (other)*** *Note that input for CT and WMA is from Siting. New Hampshire and EMA is from Environmental and/or ROW T&D Rights & Survey, as applicable.			
1	State Road/Highway	☒	N/A	
2	Railroad Crossings	☒	N/A	
3	Additional Permitting Needs	☒	**N/A**	
G	**ROW T&D Rights & Survey**			
1	Within Eversource Rights/ROW (blowout, pole, foundation, guys)	☒	N/A	
2	In-ROW and Off-ROW Access Needs, including Joint Use Agreement JULs)	☒	N/A	
3	Proposed Structure Placement on Same Property	☒	N/A	
4	Abutters List	☒	N/A	
5	Rights and Restrictions Matrix Review (may not be available until preliminary engineering)	☒	N/A	
6	Encroachments	☒	N/A	
H	**Construction**			
1	Pull Pad Locations: Proposed size and material type (gravel vs matting)	☒	N/A	
2	Constructability of Workpads/Pull Pads/Access Roads (including size optimization)	☒	N/A	
3	Cultivated Fields/Hay Fields/Lawn Areas	☒	N/A	
4	Review of iTOA for scheduled work on lines/potential conflicts	☒	No known Conflicts for April 2023	
5	Outage/Reclosing Needs – activity specific (crew compliment, work areas) (structure replacement, drilling, reconductor, OPGW)	☒		
6	Identification of work activities to be completed under outage (DNO) and/or Non-Reclosing Assurance (NRA)	☒	Replace 7L-1X & 7L-2X Neutral Bushing Reactors using a Clearance Tag Zone of Protection	

EVERSOURCE

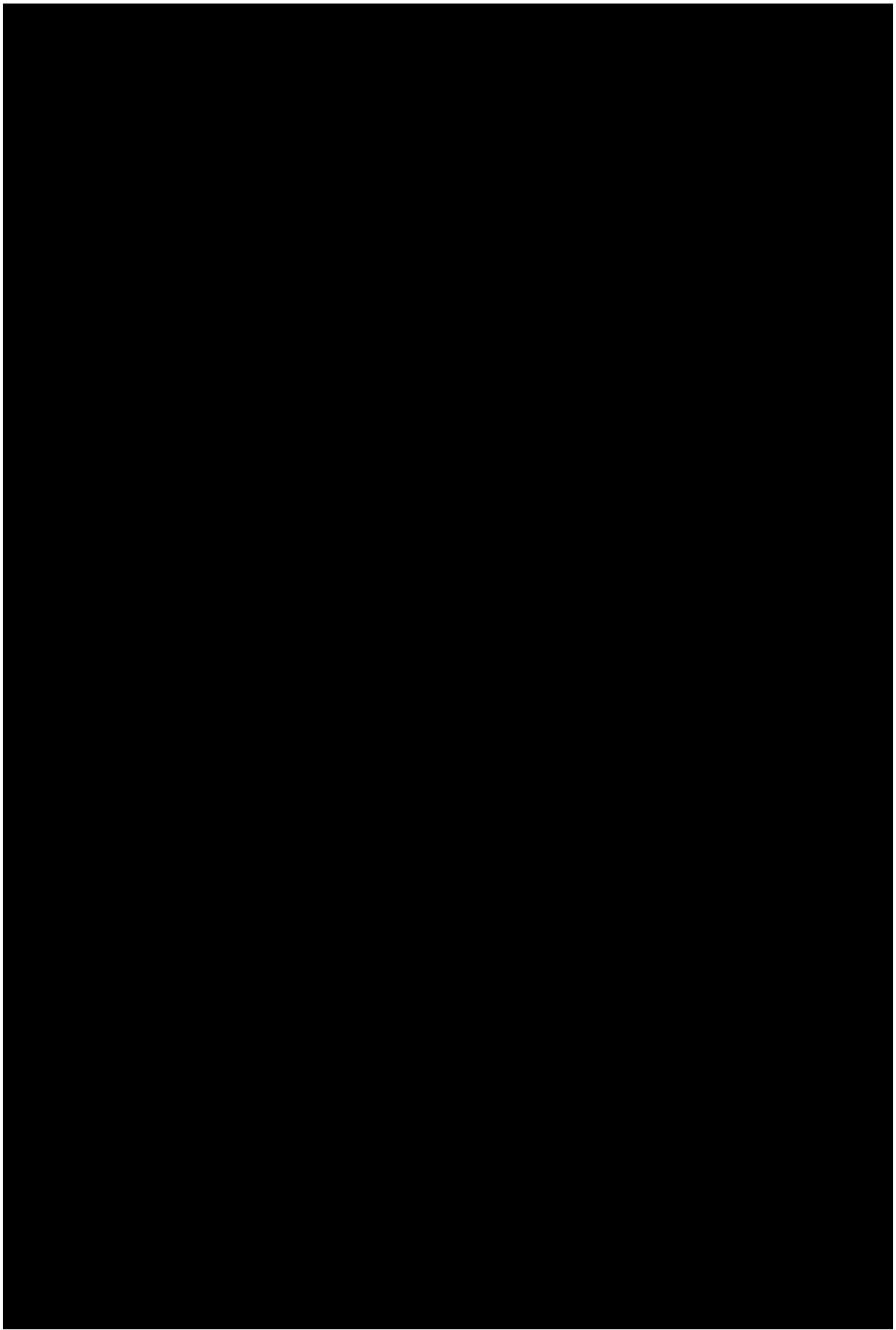
Constructability Review Form: **M6-PM-2012 - Eversource Substation and Transmission Overhead Line Constructability Review**

	Key Review Item Description	No Concerns with Proposed Design [X]	Concerns with Current Proposed Design	Follow Up Items and Additional Notes*
7	Construction Means (helicopter use, potential landing zones, etc.)	☒	N/A	
8	Potential locations/need for Congested Area Plan (CAP) for Helicopter Use (Identification of locations where helicopter is infeasible)	☒	N/A	
9	Single Contingency Load Loss (SCLL), Circuit Contingencies, Recall Times	☒		
10	Laydown Yard/Temporary Workspace – optimize previously secured locations/agreements, confirm size needs	☒	No concerns – plenty of room inside the S/S yard for materials and equipment	
11	Construction Sequence/Timeline	☒	Timeline should be no more than 1 day per transformer without the installation of a Mobile Transformer	
12	Safety, Line Clearance and Visibility Concerns for Vehicles	☒	No concerns - Spotters will be used when vehicles are in motion	
13	Constructability of Access Roads to meet OTRM standards	☒	N/A	
14	Coordination of boundaries/seams (Identification of point of demarcation for connection to existing equipment and/or for coordination with other municipalities)	☒	N/A	
15	Identification of existing Personal Communication System (PCS) locations	☒	N/A	
16	Parking Lots or any Potential Impact to Pavement	☒	No concerns – trap rock and dirt are in the driveway & parking areas	
17	Internal versus External Construction Support	☒	External Construction Support would keep the Outage duration short. Internal Construction Support may back out at the last minute due to staffing needs	

*Additional space provided for Photos and Notes

Photos and Additional Notes

[redacted]



[redacted]