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Operations Project Authorization Form

Approved on September 14, 2023 EPAC

Link to Meeting Minutes

Project Title: [redacted] 6X Transformer Voltage Change	**Project Number: CS00577**
Date Prepared: 09/01/2023	**Company: Eversource CT**
Organization: Asset Management	**Class(es) of Plant: D SS**
Project Initiator: [redacted]	**Project Category: Stations - Transformer**
Managing Organization: Transmission / Major Projects	**Schedule ID#: 80240869**
Project Manager: [redacted]	**Project Type: Specific**
Project Sponsor: [redacted]	**Capital Investment part of original Op Plan: Yes**
Estimated in service date: April 2024	**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: $652K	**Authorization Type: Full Funding**

[1] Executive Summary

This project is seeking Full Funding of $652K to change the secondary voltage on the [redacted] transformer [redacted] from 27.6kV to 23kV. [redacted], CT. This project will [redacted] to 23kV being conducted under project CS00166. This will require the [redacted] See Attachment D for the Rockville Station One-Line Diagram.

The outage for this project will need to coordinate with the [redacted]-3X transformer replacement project and needs to be in service by December 2023 to support [redacted]-3X work. Additional work at [redacted] includes installing new 23kV rated equipment, relay setting modifications, and testing of the transformer. Due to the current recall of Hitachi bushings, an additional outage will be scheduled in April 2024 to replace the transformer bushings, making the final ISD April of 2024.

The project had $150K of initial funding approved in PowerPlan on April 18, 2022. As of August 2023, charges of $64K have accrued under CS00577. This initial funding supported the

completion of the following: preliminary engineering and design, site walkdown, a constructability review, planning grade estimates and full funding documentation.

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[2] PROJECT COSTS SUMMARY

Note: Dollar values are in thousands

Line item Category	Prior Authorized	Actuals to Date	2023 to Go	2024	2025	Total Request
1. ROW / Easements / Land Acquisition						
2. Environmental Approvals / Permits			$1	$0		$1
3. Outreach						
4. Siting Approvals / Permits						
5. Engineering / Design		$10	$5	$2		$17
6. Materials (Eversource purchased)			$45	$47		$92
7. Construction (incl materials by contractors)		$10	$32	$64		$106
8. Testing / Commissioning		$0	$21	$31		$52
9. Project Mgmt Team		$14	$12	$24		$51
10. Removals						
11. Other						
12. Risks			$41			$41
SUBTOTAL DIRECTS W/ RISKS	**$150**	**$34**	**$158**	**$168**		**$360**
13. Indirects/Overhead		$28	$86	$146		$259
14. AFUDC		$2	$13			$15
PROJECT TOTAL – BASELINE BUDGET	**$150**	**$64**	**$256**	**$314**		**$634**
15. Contingency			$8	$11		$18
TOTAL CAPITAL REQUEST	**$150**	**$64**	**$264**	**$324**		**$652**
16. Reimbursables/Customer Contribution						
PROJECT TOTAL (LESS REIMBURSABLES)	**$150**	**$64**	**$264**	**$324**		**$652**
O&M						
TOTAL REQUEST	**$150**	**$64**	**$264**	**$324**		**$652**

Detail other costs, project risk items and their allocations:

Risk	Allocation
1. Severe Weather, Delays, OT	$12,000
2. Outage Constraints which cause project delays	$11,000
3. Contamination handling/disposal	$8,000
4. Overtime due to Outage Durations	$10,000
Total	$41,000

Explain unique payment provisions, if applicable: N/A

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

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[3] TECHNICAL JUSTIFICATION

Project Need, Objective and Justification

The [redacted]

The project objective is to change the [redacted]. Transformer [redacted] is currently 67 years old and showed no major, concerning issues per a transformer health assessment completed in August 2023.

This project will [redacted] being conducted under project CS00166. The [redacted]

Project Scope

At the [redacted] under project CS00166.

The scope of work includes the following:

- Drain oil to the top of the transformer winding core (Estimated 3500 - 3800 Gal) and change of internal voltage connections, then refill the oil and test the transformer.
- Replacement of the three (3) existing 27.6kV [redacted] potential transformers for conversion to 23kV
- Replacement of the three (3) existing 27.6kV low side arresters to the 23kV rated arrestors. The three (3) 115kV high side transformer arrestors will be replaced due to age.
- Full apparatus testing of new taps, arrestors, coils, and potential transformers
- Addition of neutral cable to support the [redacted] circuit.
    - Internal tap reconfiguration of three (3) single phase regulators of the [redacted]
- Relay settings changes for voltage change to 23kV.
- Replace transformer bushings (April 2024).

A constructability review was completed on August 14, 2023, (See Attachment C). No noise impacts are anticipated as a result of the transformer voltage change.

Background

Transformer [redacted] is 67 years old; while transformers have a life expectancy of 40 years under normal operating conditions and with appropriate maintenance, this transformer does not have a history of overload and is not forecast to be overloaded in the future. Dissolved gas analysis shows the transformer insulation has not deteriorated. A health assessment of the transformer was done in August 2023 and did not meet the minimum requirement (two (2) high risk parameters) for immediate recommended replacement.

[redacted]

[4] ALTERNATIVES CONSIDERED

This project was presented to and approved at the Solution Design Committee meeting on February 2, 2023.

Alternative #1 – Replace 6X Transformer (This is not the preferred solution).

Replace the [redacted]-6X transformer with a new 23kV transformer. This is not the preferred alternative due to transformer lead time and cost. The transformer must be in service December 2023 to coincide with the [redacted] Area Voltage Conversion project (CS00166). The lead time of a new power transformer is currently 128 weeks. A future project will be initiated to replace the [redacted] as a long-term fix but, currently, the [redacted] has not yet been identified for replacement.

Advantages: The new transformer will potentially require lower maintenance and operational costs, as well provide a projected service life of 40+ years.

Disadvantages: This solution does not meet the project requirement for completion coinciding with the [redacted] project CS00166 in service date (December 2023) and is therefore not feasible.

Customer/Community impacts: This solution helps ensure customer reliability through the implementation of new, state of the art equipment.

Risks: This solution does not meet the operational needs of the system as reliability will be compromised from the time CS00166 is completed (December 2023) until completion of this project solution (December 2025).

Cost: The apparatus assembled & filled with oil will cost between $2.75M and $2.9M. Additionally, the associated substation modifications, installation and testing will bring the total project cost to approximately $3.5M (-25% / +50%), much higher than the preferred alternative cost.

Alternative #2 – Transformer Voltage Change and Refurbishment (This is not the preferred solution).

The internal connections of the existing [redacted] transformer will be modified to provide a secondary voltage of 23kV. In addition, the transformer will be refurbished. This is not the preferred alternative considering the limited benefit of the refurbishment.

Advantages: The in-service date of December 2023 coincides with the [redacted] Voltage Conversion Project. In doing so, system reliability is increased. The refurbishment will be done on site.

Disadvantages: This solution provides an expected 15+ year transformer service life -vs- 40+ for new transformer.

Customer/Community impacts: This solution helps ensure customer reliability through the increased system stability associated with the interconnection to the [redacted].

Risks: Refurbishing of the [redacted] carries the risk of damage to the transformer during execution of the work. Additionally, there may be unforeseen conditions identified upon inspection of the transformer internals. A mobile transformer will be deployed on site should these conditions be realized.

Cost: The estimated cost for this solution is $984K (-25%/+50%).

Alternative #3 – Transformer Voltage Change (This is the preferred solution)

The internal connections of the existing [redacted] transformer will be modified to provide a secondary voltage of 23kV. Minimum oil will be drained to the top of the windings and the internal voltage connections will be modified, followed by the refilling of oil and full apparatus testing. This is the preferred solution as it meets system stability requirements and is the lowest-cost option. This is a short-term solution for the current transformer needs and aims to be completed in December 2023 in support of the December 2023 [redacted] Conversion Project in-service-date. This solution will manage the oil leaks until the long-term solution is established which will replace the transformer as part of the capital plan.

Advantages: The in-service date of December 2023 coincides with the [redacted] Voltage Conversion Project. In doing so, system reliability is increased.

Disadvantages: This solution does not provide an increased service lifespan.

Customer/Community Impacts: This solution helps ensure customer reliability through the increase system stability associated with the interconnection to the [redacted]

Risks: [redacted]

Cost: The estimated cost for this solution is $652K (-25% / +25%) See Attachment A for Planning Grade estimate.

[5] PROJECT SCHEDULE

Milestone	Scheduled Completion Date
IFR Approval	April 2022
SDC Approval (for applicable projects)	February 2023
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)	August 2023
EPAC Full Funding Approval	September 2023
Siting Approval (for applicable projects)	N/A
Start of Construction	November 2023
Project In-Service Date (ISD)*	April 2024
Project Need Date (for applicable projects)	November 2023
ISO Related Milestones: (for applicable projects)	N/A
• ISO Preferred Alternative Selected	N/A
• PAC Presentation	N/A
• TCA Submittal	N/A

*Phase 1 construction (transformer voltage change) ISD is November 2023; Phase 2 construction (bushing replacement) ISD is April 2024.

See Attachment B for the P6 schedule.

[6] Regulatory Approvals

N/A

[7] Risk and Risk Mitigation Plans

Contingency: Contingency of $18K is in included in this estimate for project unknowns.

Risk Mitigation:

Risk	Mitigation
1. Severe Weather, Delays, OT	Risk allocation is included for possible delays in the event of severe weather. Unanticipated weather events and/or lack of available field personnel due to storm duty may restrict the ability to perform construction, testing, and commissioning activities. To mitigate this risk, the project team is holding bi-weekly status meetings and will remain in contact with substation operations as the construction kick-off date is approached.
2. Outage Constraints which cause project delays	The project team will continue to communicate with substation operations and the SCLL team as we get closer to the scheduled work to ensure no additional scope of work is going on in the area that will impact the reliability of the system. Risk allocation has also been included in the budget.
3. Contamination handling/disposal	Risk allocation is included for a Spill Prevention Control and Countermeasures Plan when handling oil following Eversource guidelines.
4. Overtime due to Outage Durations	Risk allocation is included for possible delays that may require overtime for schedule recovery. To mitigate this risk, the project team is holding bi-weekly status meetings and will remain in contact with substation operations as the construction kick-off date is approached.
5. Single Contingency Load Loss	The project team determined there is minimal risk of SCLL conditions during this work. The team will continue to communicate with Ops and the SCLL team as the scheduled outages get closer to ensure no additional impact to system reliability.

[8] REFERENCES

References
1. 404932, CS00166 – [redacted] Expansion PAF, approved 05/06/2021
2. [redacted] 6X Transformer Health Assessment, 2023
3.
4.
5.

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

Attachment	Included in Submittal?
A. Cost Estimate	*YES*
B. P6 Schedule	*YES*
C. Constructability Review	*YES*
D. Station One-Lines	*YES*

Project Checklist - Transmission & Substation Capital Project			
Project Name: [redacted] 6X Transformer Voltage Change		**Project Number: CS00577**	
Facility Type: ☐BPS ☐BES ☐PTF ☐PTF non-regional ☐non-PTF ☐CIP ☒Distribution ☐General Plant			
PLANNING			
Is a NX-9 required?	Yes		
Is an ISO-NE PAC presentation required?	No		
ISO-NE Presentation Date (if completed):	N/A		
Cost in ISO-NE Presentation ($M) (if completed):	N/A		
Is a PPA required?	No		
ISO-NE Approval Date (if completed):	N/A		
Is a TCA Application Required?	No		
TCA Submittal Date (if submitted):	N/A		
Cost in TCA Submittal ($M) (if submitted):	N/A		
Enter ISO-NE RSP / Asset Condition ID, if assigned:	N/A		
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?	No		
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] 6X Transformer Voltage Change	**Project Number: CS00577**

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	
Has Siting reviewed this project?	No
Name of Siting contact:	N/A
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	
Has Project Services reviewed this project?	No Choose an item
Name of Project Services contact:	N/A
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?	Yes
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: Rockville 14W 6X Transformer Voltage Change
Project Mgr/Lead [redacted]
Project Number: CS00577
WO & Task #: 80240869
Estimate revision #: 01
Estimate Type - Station work

Estimate #: C-23-360
Date of Estimate 08/31/2023
Estimate done by [redacted]
In Service date (ISD) 12/2024

Template Revision # 01.92a

Alt Estimate Summary for PP4 Calc (escalation separate)

Estimate #: C-23-360
Date of Estimate:08/31/2023

Project Number: CS00577
WO & Task #: 80240869

ESTIMATE SUMMARY

Estimate Type: Planning

WBS	Description	TOTAL	% of Directs	% of Total	Priors	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	TOTAL w/ escal broken out
1	ROW / Easements / Land purchases															
2	Environmental Approvals / Permits	$900	0.3%	0.1%		$900										
3	Outreach															
4	Siting Approvals / Permits															
5	Engineering / Design	$16 700	4.6%	2 6%	$9 900	$4 900	$1 900									
6	Materials (Eversource purchased)	$92.100	25.6%	14.1%		$45.300	$46.800									
7	Construction (incl materials by contractors)	$105,700	29.4%	16 2%	$9,700	$32,200	$63,800									
8	Testing / Commissioning	$52,200	14.5%	8 0%	$100	$21,100	$31,000									
9	PMT Project Mgmt Team	$50,900	14.2%	7 8%	$14,400	$12,200	$24,300									
10	Removals															
11	Other (property taxes and BAR)															
12	Risks	$41 000	11.4%	6 3%		$41 000										
125																
	Project Directs Total w/Risks	**$359,500**	100.0%	55.1%	**$34,100**	**$157,600**	**$167,800**									**$352,700**
13	Indirects/Overhead	$259,400		39 8%	$28,100	$85,700	$145,600									
14	AFUDC	$14,700		2 3%	$1,700	$13,000										
125																
	Project Total - Baseline Budget	**$633,600**		97 2%	**$63,900**	**$256,300**	**$313,400**									**$619,800**
15	Contingency	$18,400		2 8%		$7,800	$10,600									
	Project Total - Funding Approval Level	**$652,000**		100 0%	**$63,900**	**$264,100**	**$324,000**									**$638,200**
16	Reimbursables/Customer Contribution															

	Project Total (less reimbursables)	**$652,000**			**$63,900**	**$264,100**	**$324,000**									**$638,200**
	Cost per key qty (if appl)	652,000	$'s / EA Voltage Tap change from 27.6kV to 23 kV													
	Amount of Escalation included above	$14 100					$14 100									
6	Total materials - Eversource	$92 100				$45 300	$46 800									
	Total materials - Contractor	$515			$415		$100									
	Total materials	$92 615			$415	$45 300	$46 900									

NOTE: Risk / Contingency is 10% of Project Total Costs (incl escal/Indirects/AFUDC but excl reimb.)

Estimate Range	**-25%**	**25%**	
	$489,000	**$815,000**	

	TOTAL w/ escal broken out
ROW / Easements / Land purchas	$ -
Environmental Approvals / Permi	$ 900
Outreach	$ -
Siting Approvals / Permits	$ -
Engineering / Design	$ 16 700
Materials (Eversource purchased	$ 91,215
Construction (incl materials by c	$ 102,285
Testing / Commissioning	$ 50,800
PMT Project Mgmt Team	$ 49,800
Removals	$ -
Other (property taxes and BAR)	$ -
Risks	$ 41 000
	$352,700
Indirects/Overhead	$ 252,400
AFUDC	$ 14,700
	$ -
	$619,800
	$ -
Contingency	$ 18,400
	$638,200
	$ -
	$ -
	$638,200
	$ 14 100
Escal total	**$652,300**
Check total	$300

COMMENTS:

Project Scope:

Key qty's and UOM (tie to inputs on est sheets): 1 EA Voltage Tap change from 27 6k\ 7.08 Factor (total $/Eversource Mat'l $'s)

[redacted]

Indirect rates based on: 11 - CT - Station work

Engineering will be Internal
Construction will be Internal
P6 Schedule provided was recieved on7/24/2023
Existing cables will be reused
Prior Costs WBS are entered as of 7/26/2023
Project does not require a Mobile Switcher & Mobile Transformer per SOW.
Hours in the estimate are revised to comply with an email from the PM dated 5/30/2023
rev.01
Entered Revisde Schedule with new ISD Date. per AM emails dated 8/30/23

RISKS

Severe Wea her. Delays. OT	$ 12 000
Outage Constraints which cause project delays	$ 11 000
Contamina ion handling/disposal	$ 8 000
Overtime due to Outage Durations	$ 10 000

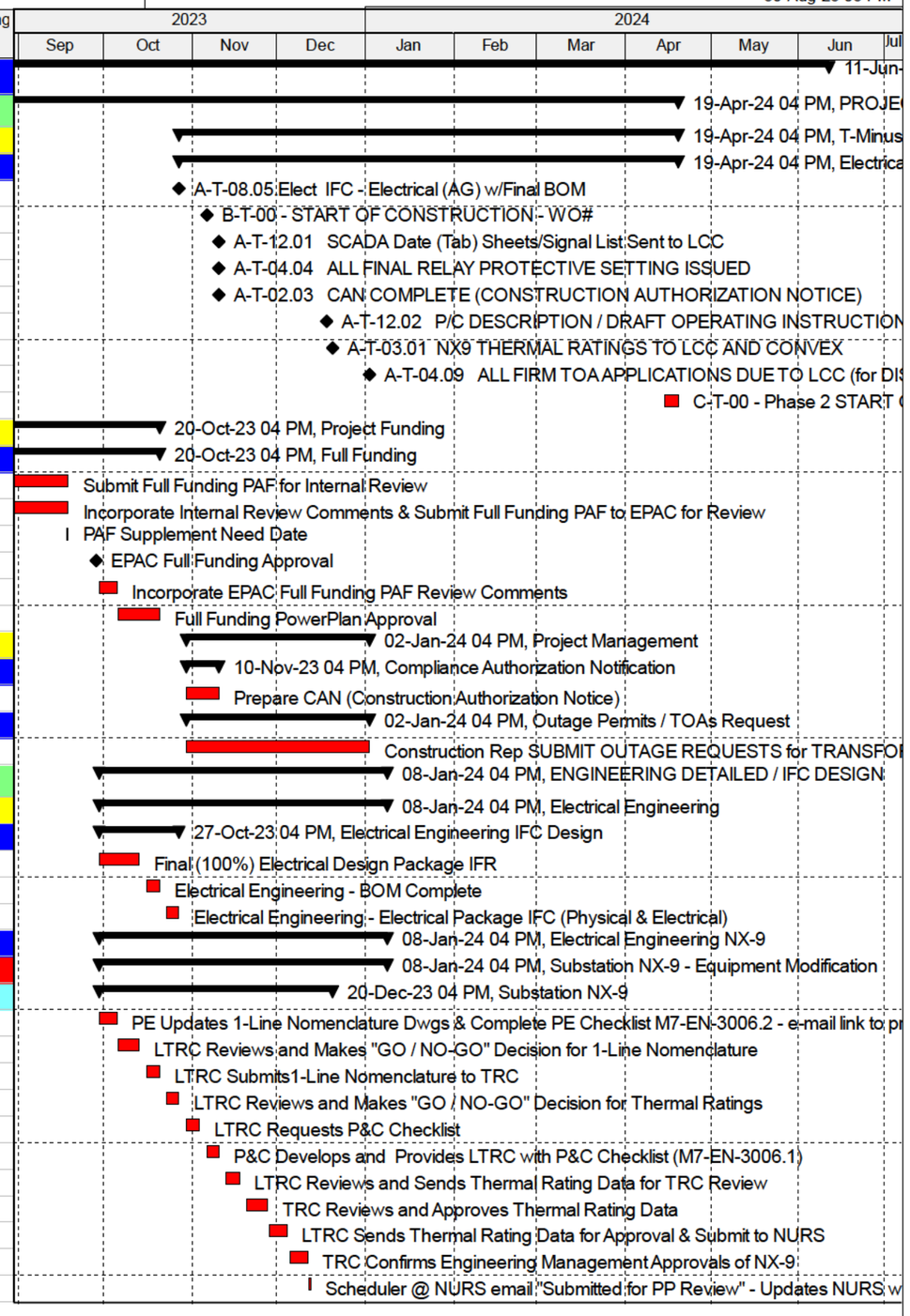
UNESCALATED LINE ITEM DOLLARS

Project Number C800577
Date of Estimate 09/21/2022
Estimate revision # 01

Escalation Rate — E Rate $ 57 — 1

CSTXX-CONSTRUCTION	R	Prior Mhrs	Prior DOLLARS	2023 Mhrs	2023 DOLLARS	2024 Mhrs	2024 DOLLARS	TOTAL Mhrs	TOTAL DOLLARS
Electrical Construction	LT				$17,645		$32,768		$50,413
General Construction	LT		$7,727						$7,727
SCADA / Automation	LT								
Other Miscellaneous	LT								
Construction Reps (Internal)	LT				$4,969		$7,033		$11,902
Support Switch/Tap	LT				$1,391		$2,521		$3,782
Other (specify)	LT								
Other (specify)	LT								
Other (specify)	LT								
LT Total			$7,727		$23,775		$42,322		$73,824
Employee Expenses	AE				$1,189		$2,116		$3,305
Constr. Purchased Matl (Eversource)	AM				$176		$328		$504
Constr. Purchased Matl (contracted)	AM				$36		$81		$117
Outside Construction Vendor	AO		$1,517		$7,233		$16,350		$23,483
Sales tax on Constr. Vendor									
Vehicles (now in Indirects section)	AV								
Inspection services (Outside Vendor)	AO								
Construction fee (Outside vendor)	AO								
Rents and Leases	SR								
CSTXX Subtotal			$9,244		$32,409		$61,097		$101,233
Escalation									
CSTXX Total			$9,244		$32,409		$61,097		$101,233
ENRXX-TG ENGINEERING/DESIGN									
Project Services/Drafting	LT				$1,597		$399		$1,996
T- Line Engineering/Design	LT								
D- Street Engineering/Design	LT								
Cbd Engineering/Design	LT								
Substation (T) Engineering/Design	LT								
Substation (D) Engineering/Design	LT		$9,947		$2,164		$866		$3,030
Protection & Controls Engineering	LT				$834		$467		$1,401
Survey Engineering	LT								
SCADA / Automation Engineering	LT								
Telecom Engineering	LT								
Other - specify	LT								
Other - specify	LT								
LT Total			$9,947		$4,595		$1,732		$6,427
Employee Expenses	AE				$235		$87		$322
Contractor Engineering - T-Lines	AQ								
Contractor Engineering - D-Street	AQ								
Contractor Engineering - T -Station	AQ								
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			$9,947		$4,830		$1,819		$6,749
Escalation									
ENRXX Total			$9,947		$4,830		$1,819		$6,749
LNDXX-TG LAND									
Real Estate	LT								
Employee Expenses	AE								
Purchase Land	AM								
Easements	AM								
Vehicles (now in Indirects section)	AV								
Fees and Payments	SF								
LNDXX Subtotal									
Escalation									
LNDXX Total									
MATXX-TG MATERIAL									
Eversource	AM				$43,428		$43,428		$86,856
Outside Services	AM		$415						$415
Freight	AM								
Sales Tax (Eversource)	3.9%				$1,700		$1,700		$3,400
Sales Tax (outside services)	3.9%								
Other									
MATXX Subtotal			$415		$45,128		$45,128		$90,671
Escalation									
MATXX Total			$415		$45,128		$45,128		$90,671
PSMXX-PROJECT MANAGER & SUPPORT									
Project Management (PM)	LT		$6,606		-$1,665		$5,170		$9,891
Project Planning/Cost (IP)	LT				$407		$407		$814
Contracts/Purchasing (C/P)	LT				$442				$442
System Planning	LT								
Environmental	LT				$694		$18		$912
SCS - None	LT								
Legal	LT								
Estimating	LT								
Siting - None	LT								
Asset Management	LT								
Veg. Mgmt	LT								
Other -	LT	$ -							
Other -	LT	$ -							
Other -	LT	$ -							
LT Total			$6,606		-$142		$5,595		$12,059
Employee Expenses	AE				-$7		$280		$273
Project Support Vendor - PM	AQ		$7,843		$5,597		$14,720		$28,160
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								
Project Support Vendor - Legal	AQ								
Project Support Vendor - Estimating	AQ				$5,120				$5,120
Project Support Vendor - Siting - None	AQ								
Project Support Vendor - Asset Management	AQ				$2,560		$2,560		$5,120
Project Support Vendor - Veg. Mgmt.	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	SR								
Builder All-risk Insurance excluding deductibles(if project is over $5Cm)	SR								
Fees and Payments - Environmental	SF								
Fees and Payments - Siting	SF								
Fees and Payments - Other	SF								
PSMXX Subtotal			$14,449		$13,128		$23,155		$50,732
Escalation									
PSMXX Total			$14,449		$13,128		$23,155		$50,732
REMXX-TG REMOVAL									
Engineering/Design	LT								
Internal Construction	LT								
LT Total									
Employee Expenses	AE								
Outside Services	AO								
Contractor Labor	AQ								
Vehicles (now in Indirects section)	AV								
Rents and Leases	SR								
REMXX Subtotal									
Escalation									
REMXX Total									
TSTXX-TG TEST									
Test / Field Engr. Labor (In House)	LT		$128		$12,800		$17,920		$30,720
Test / Comm. Engr. Labor (In House)	LT								
Lead Commissioning Engr. (LCE) (Internal)	LT				$6,400		$8,960		$15,360
Employee Expense	AE				$1,920		$2,688		$4,608
Test / Field Engr. Labor (contractor)	AQ								
Test / Comm. Engr. Labor (contractor)	AQ								
Lead Commissioning Engr. (LCE) (contactor)	AQ								
Vehicles (now in Indirects section)	AV								
TSTXX Subtotal			$128		$21,120		$29,568		$50,688
Escalation									
TSTXX Total			$128		$21,120		$29,568		$50,688
SUBTOTAL PROJECT DIRECT COST		-	$94,183		$116,715		$160,767		$300,673
Risk									
Risk					$41,000				$41,000
					$ -		$ -		
					$ -		$ -		
Risk Total					$41,000				$41,000
TOTAL PROJECT DIRECT COST (w risk)		-	$94,183		$157,715		$160,767		$341,673
INDIRECTS									
Non-Productive Time Allocation (ZNP)	17.0%		$3,446		$8,080		$13,010		$24,536
Payroll Benefits Allocation (ZPB) incl NPT	44.0%		$1,382		$24,540		$36,517		$62,319
Gen SVC OD Overhead (ZGS) incl NPT	80.0%		$11,174		-$133		$5,237		$16,278
E&S Allocations (ZES,ZEL,ZES)	28.0%		$6,955		$26,147		$46,151		$83,253
AS&E Allocations (ZAS)	1.2%		$475		$2,217		$3,271		$5,964
Stores Expense Allocation (ZST)	8.0%				$3,474		$3,474		$6,948
Lobby Stock									
MOEC (ZME)	6.0%		$1,696		$6,039		$9,575		$17,510
Vehicles (ZME)	28.0%		$955		$13,308		$21,428		$35,691
Indirects Subtotal			$26,064		$85,672		$138,663		$252,399
TOTAL PROJECT COST - Direct & Indirect (excl AFUDC)			$62,247		$243,387		$299,430		$695,472
AFUDC									
AFUDC (ZK)			$1,679	7.00%	$12,960	7.00%			$14,672
In Service Dollars / Land costs									
Cumulative ISS & Land Costs				-		-			
AFUDC Subtotal			$1,679		$12,960				$14,672
TOTAL PROJECT COST - Baseline Budget			$63,926		$256,380		$299,430		$808,144
Contingency									
Contingency					$7,705		$10,645		$18,430
Other			$ -		$ -		$ -		
Contingency SubTotal					$7,705		$10,645		$18,430
TOTAL PROJECT COST - Approved Funding			$63,926		$264,165		$310,075		$826,573

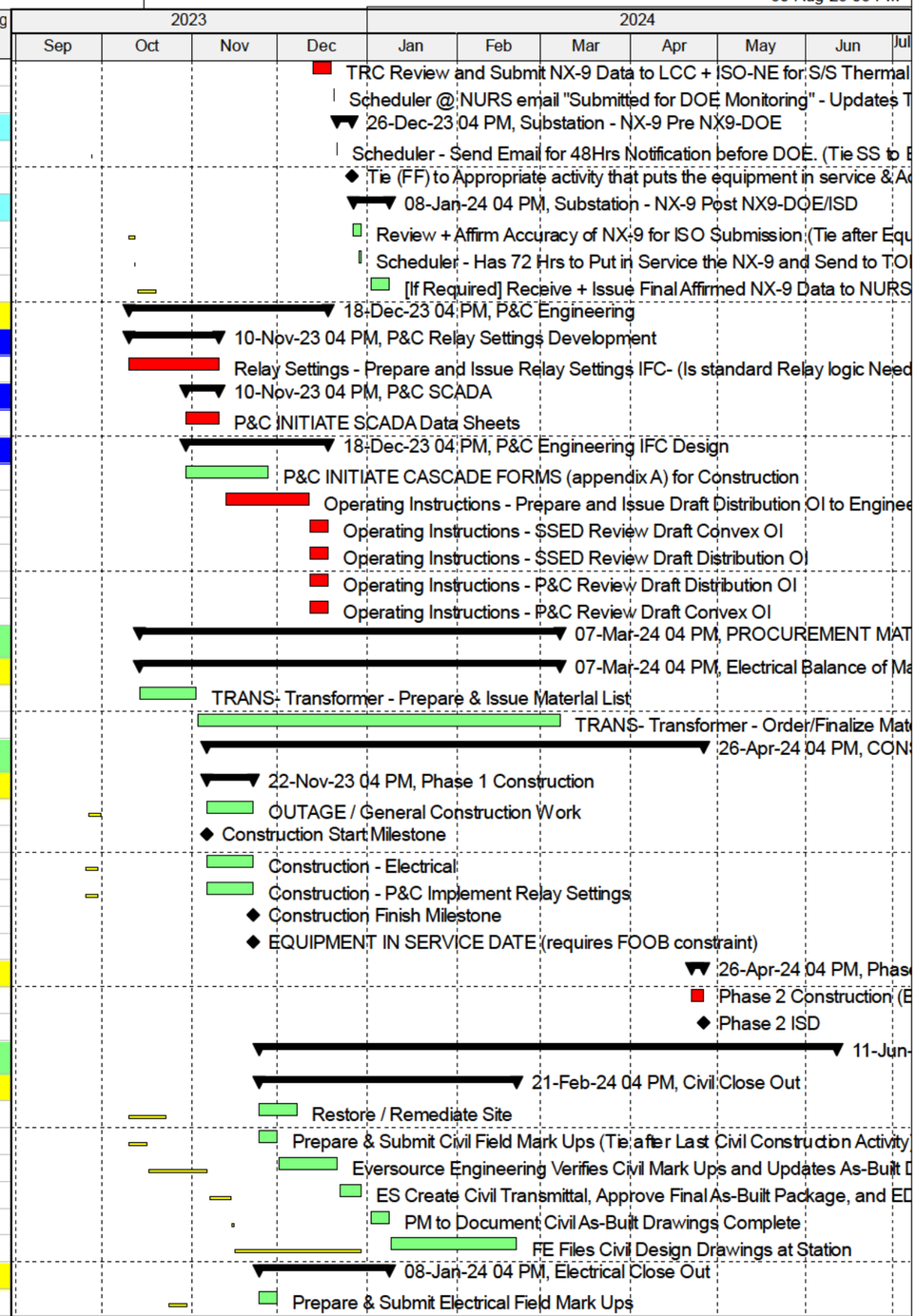
Activity ID	Activity Name	Original Duration	Start	Finish	Remaining Duration
[redacted]	Transformer Refurbishment	215	04-Aug-23 08 AM A	11-Jun-24 04 PM	
	PROJECT PLANNING & FUNDING	179	04-Aug-23 08 AM A	19-Apr-24 04 PM	
	T-Minus Milestones	120	27-Oct-23 04 PM	19-Apr-24 04 PM	
	Electrical T-Milestones	120	27-Oct-23 04 PM	19-Apr-24 04 PM	
BT0805E	A-T-08.05.Elect IFC - Electrical (AG) w/Final BOM	0		27-Oct-23 04 PM	
BT00	B-T-00 - START OF CONSTRUCTION - WO#	0	06-Nov-23 08 AM*		
BT1201	A-T-12.01 SCADA Date (Tab) Sheets/Signal List Sent to LCC	0		10-Nov-23 04 PM	
BT0404	A-T-04.04 ALL FINAL RELAY PROTECTIVE SETTING ISSUED	0		10-Nov-23 04 PM	
BT0203	A-T-02.03 CAN COMPLETE (CONSTRUCTION AUTHORIZATION NOTICE	0		10-Nov-23 04 PM	
BT1202	A-T-12.02 P/C DESCRIPTION / DRAFT OPERATING INSTRUCTIONS ISSU	0		18-Dec-23 04 PM	
BT0301	A-T-03.01 NX9 THERMAL RATINGS TO LCC AND CONVEX	0		20-Dec-23 04 PM*	
BT0409	A-T-04.09 ALL FIRM TOA APPLICATIONS DUE TO LCC (for DISTRIBUTION	0		02-Jan-24 04 PM*	
A3810	C-T-00 - Phase 2 START OF CONSTRUCTION	5	15-Apr-24 08 AM*	19-Apr-24 04 PM	
	Project Funding	54	04-Aug-23 08 AM A	20-Oct-23 04 PM	
	Full Funding	54	04-Aug-23 08 AM A	20-Oct-23 04 PM	
PAFF2000	Submit Full Funding PAF for Internal Review	10	04-Aug-23 08 AM A	18-Sep-23 04 PM	
PAFF2100	Incorporate Internal Review Comments & Submit Full Funding PAF to EPAC for	10	08-Aug-23 08 AM A	18-Sep-23 04 PM	
PAFF2110	PAF Supplement Need Date	1	18-Sep-23 08 AM	18-Sep-23 04 PM	
FF1000	EPAC Full Funding Approval	0		28-Sep-23 04 PM	
PAFF2200	Incorporate EPAC Full Funding PAF Review Comments	5	29-Sep-23 08 AM	05-Oct-23 04 PM	
FF1010	Full Funding PowerPlan Approval	10	06-Oct-23 08 AM	20-Oct-23 04 PM	
	Project Management	44	30-Oct-23 08 AM	02-Jan-24 04 PM	
	Compliance Authorization Notification	10	30-Oct-23 08 AM	10-Nov-23 04 PM	
A1170	Prepare CAN (Construction Authorization Notice)	10	30-Oct-23 08 AM	10-Nov-23 04 PM	
	Outage Permits / TOAs Request	44	30-Oct-23 08 AM	02-Jan-24 04 PM	
A1280	Construction Rep SUBMIT OUTAGE REQUESTS for TRANSFORMER REFU	44	30-Oct-23 08 AM	02-Jan-24 04 PM	
	ENGINEERING DETAILED / IFC DESIGN	68	29-Sep-23 08 AM	08-Jan-24 04 PM	
	Electrical Engineering	68	29-Sep-23 08 AM	08-Jan-24 04 PM	
	Electrical Engineering IFC Design	20	29-Sep-23 08 AM	27-Oct-23 04 PM	
DSSE-210	Final (100%) Electrical Design Package IFR	10	29-Sep-23 08 AM	13-Oct-23 04 PM	
DSSE-230	Electrical Engineering - BOM Complete	5	16-Oct-23 08 AM	20-Oct-23 04 PM	
DSSE-240	Electrical Engineering - Electrical Package IFC (Physical & Electrical)	5	23-Oct-23 08 AM	27-Oct-23 04 PM	
	Electrical Engineering NX-9	68	29-Sep-23 08 AM	08-Jan-24 04 PM	
	Substation NX-9 - Equipment Modification	68	29-Sep-23 08 AM	08-Jan-24 04 PM	
	Substation NX-9	57	29-Sep-23 08 AM	20-Dec-23 04 PM	
NX9A-EM01	PE Updates 1-Line Nomenclature Dwgs & Complete PE Checklist M7-EN-300	5	29-Sep-23 08 AM	05-Oct-23 04 PM	
NX9A-EM04	LTRC Reviews and Makes "GO / NO-GO" Decision for 1-Line Nomenclature	5	06-Oct-23 08 AM	13-Oct-23 04 PM	
NX9A-EM07	LTRC Submits1-Line Nomenclature to TRC	5	16-Oct-23 08 AM	20-Oct-23 04 PM	
NX9A-EM10	LTRC Reviews and Makes "GO / NO-GO" Decision for Thermal Ratings	5	23-Oct-23 08 AM	27-Oct-23 04 PM	
NX9A-EM13	LTRC Requests P&C Checklist	5	30-Oct-23 08 AM	03-Nov-23 04 PM	
NX9A-EM16	P&C Develops and Provides LTRC with P&C Checklist (M7-EN-3006.1)	5	06-Nov-23 08 AM	10-Nov-23 04 PM	
NX9A-EM19	LTRC Reviews and Sends Thermal Rating Data for TRC Review	5	13-Nov-23 08 AM	17-Nov-23 04 PM	
NX9A-EM22	TRC Reviews and Approves Thermal Rating Data	5	20-Nov-23 08 AM	27-Nov-23 04 PM	
NX9A-EM25	LTRC Sends Thermal Rating Data for Approval & Submit to NURS	5	28-Nov-23 08 AM	04-Dec-23 04 PM	
NX9A-EM26	TRC Confirms Engineering Management Approvals of NX-9	5	05-Dec-23 08 AM	11-Dec-23 04 PM	
NX9A-EM28	Scheduler @ NURS email "Submitted for PP Review" - Updates NURS with DC	1	12-Dec-23 08 AM	12-Dec-23 04 PM	



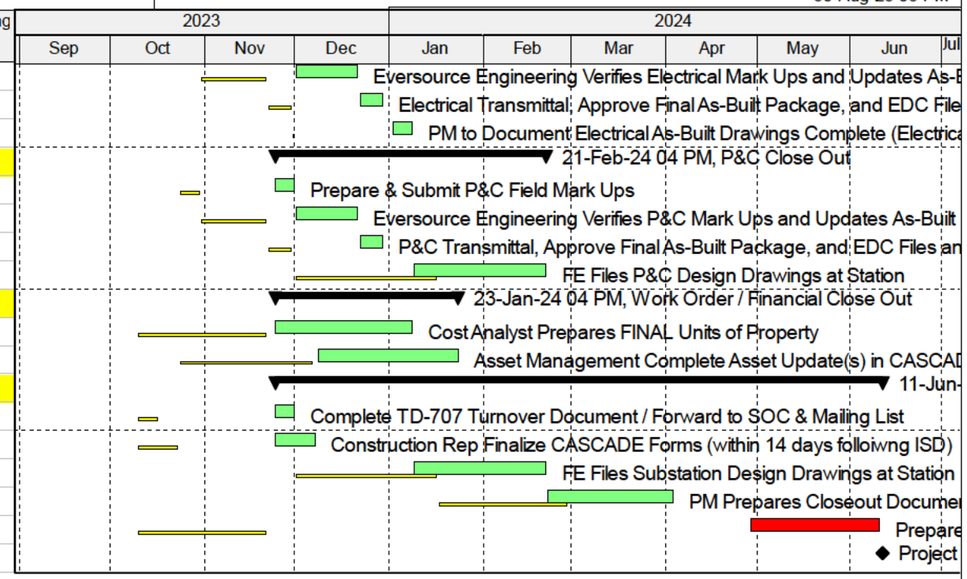
Remaining Level of Effort | Project Baseline Bar | Remaining Work
Actual Level of Effort | Actual Work | Critical Remaining ...

TASK filters: Not Completed, Not Complete_1, Remove Completes, Remove Completes, Remove LOE and WBS Summary, WBS - RB - <100%.

Activity ID	Activity Name	Original Duration	Start	Finish	Remaining Duration
NX9A-EM31	TRC Review and Submit NX-9 Data to LCC + ISO-NE for S/S Thermal Rating	5	13-Dec-23 08 AM	19-Dec-23 04 PM	
NX9A-EM34	Scheduler @ NURS email "Submitted for DOE Monitoring" - Updates T-3, Equi	1	20-Dec-23 08 AM	20-Dec-23 04 PM	
Substation - NX-9 Pre NX9-DOE		3	21-Dec-23 08 AM	26-Dec-23 04 PM	
NX9A100	Scheduler - Send Email for 48Hrs Notification before DOE. (Tie SS to Beginnin	1	21-Dec-23 08 AM	21-Dec-23 04 PM	
TIE_2	Tie (FF) to Appropriate activity that puts the equipment in service & Add NX9-D(	0		26-Dec-23 04 PM	
Substation - NX-9 Post NX9-DOE/ISD		8	27-Dec-23 08 AM	08-Jan-24 04 PM	
NX9FINAL1	Review + Affirm Accuracy of NX-9 for ISO Submission (Tie after Equip DOE or I	3	27-Dec-23 08 AM	29-Dec-23 04 PM	
NX9A200	Scheduler - Has 72 Hrs to Put in Service the NX-9 and Send to TOP Director ir	1	29-Dec-23 08 AM	29-Dec-23 04 PM	
NX9FINAL2	[If Required] Receive + Issue Final Affirmed NX-9 Data to NURS	5	02-Jan-24 08 AM	08-Jan-24 04 PM	
P&C Engineering		49	10-Oct-23 08 AM	18-Dec-23 04 PM	
P&C Relay Settings Development		24	10-Oct-23 08 AM	10-Nov-23 04 PM	
DSSE-440	Relay Settings - Prepare and Issue Relay Settings IFC- (Is standard Relay logic	24	10-Oct-23 08 AM*	10-Nov-23 04 PM	
P&C SCADA		10	30-Oct-23 08 AM	10-Nov-23 04 PM	
DSSE-990	P&C INITIATE SCADA Data Sheets	10	30-Oct-23 08 AM	10-Nov-23 04 PM	
P&C Engineering IFC Design		35	30-Oct-23 08 AM	18-Dec-23 04 PM	
DSSE-480	P&C INITIATE CASCADE FORMS (appendix A) for Construction	20	30-Oct-23 08 AM	27-Nov-23 04 PM	
DSSE-450	Operating Instructions - Prepare and Issue Draft Distribution OI to Engineering	20	13-Nov-23 08 AM	11-Dec-23 04 PM	
DSSE-920	Operating Instructions - SSED Review Draft Convex OI	5	12-Dec-23 08 AM	18-Dec-23 04 PM	
DSSE-460	Operating Instructions - SSED Review Draft Distribution OI	5	12-Dec-23 08 AM	18-Dec-23 04 PM	
DSSE-470	Operating Instructions - P&C Review Draft Distribution OI	5	12-Dec-23 08 AM	18-Dec-23 04 PM	
DSSE-930	Operating Instructions - P&C Review Draft Convex OI	5	12-Dec-23 08 AM	18-Dec-23 04 PM	
PROCUREMENT MATERIAL - BALANCE OF MATERIAL		146	14-Oct-23 08 AM	07-Mar-24 04 PM	
Electrical Balance of Material		146	14-Oct-23 08 AM	07-Mar-24 04 PM	
TRANS-1170	TRANS- Transformer - Prepare & Issue Material List	20	14-Oct-23 08 AM	02-Nov-23 04 PM	
TRANS-1190	TRANS- Transformer - Order/Finalize Material List	126	03-Nov-23 08 AM	07-Mar-24 04 PM	
CONSTRUCTION		120	06-Nov-23 08 AM	26-Apr-24 04 PM	
Phase 1 Construction		13	06-Nov-23 08 AM	22-Nov-23 04 PM	
TOA-Const	OUTAGE / General Construction Work	15	06-Nov-23 08 AM	22-Nov-23 04 PM	
CSM	Construction Start Milestone	0	06-Nov-23 08 AM		
A1130	Construction - Electrical	13	06-Nov-23 08 AM	22-Nov-23 04 PM	
A1140	Construction - P&C Implement Relay Settings	13	06-Nov-23 08 AM	22-Nov-23 04 PM	
CFM	Construction Finish Milestone	0		22-Nov-23 04 PM	
ISD	EQUIPMENT IN SERVICE DATE (requires FOOB constraint)	0		22-Nov-23 04 PM*	
Phase 2 Construction		5	22-Apr-24 08 AM	26-Apr-24 04 PM	
A3790	Phase 2 Construction (Bushings)	5	22-Apr-24 08 AM	26-Apr-24 04 PM	
A3800	Phase 2 ISD	0		26-Apr-24 04 PM	
PROJECT CLOSE OUT		138	24-Nov-23 08 AM	11-Jun-24 04 PM	
Civil Close Out		60	24-Nov-23 08 AM	21-Feb-24 04 PM	
A1110	Restore / Remediate Site	10	24-Nov-23 08 AM	07-Dec-23 04 PM	
A3620	Prepare & Submit Civil Field Mark Ups (Tie after Last Civil Construction Activity)	5	24-Nov-23 08 AM	30-Nov-23 04 PM	
A3730	Eversource Engineering Verifies Civil Mark Ups and Updates As-Built Drawing	15	01-Dec-23 08 AM	21-Dec-23 04 PM	
A3740	ES Create Civil Transmittal, Approve Final As-Built Package, and EDC Files anc	5	22-Dec-23 08 AM	29-Dec-23 04 PM	
A3660	PM to Document Civil As-Built Drawings Complete	5	02-Jan-24 08 AM	08-Jan-24 04 PM	
A3670	FE Files Civil Design Drawings at Station	30	09-Jan-24 08 AM	21-Feb-24 04 PM	
Electrical Close Out		30	24-Nov-23 08 AM	08-Jan-24 04 PM	
A3640	Prepare & Submit Electrical Field Mark Ups	5	24-Nov-23 08 AM	30-Nov-23 04 PM	



Activity ID	Activity Name	Original Duration	Start	Finish	Remaining Duration
A3750	Eversource Engineering Verifies Electrical Mark Ups and Updates As-Built Drav	15	01-Dec-23 08 AM	21-Dec-23 04 PM	
A3760	Electrical Transmittal, Approve Final As-Built Package, and EDC Files and Issue	5	22-Dec-23 08 AM	29-Dec-23 04 PM	
A3680	PM to Document Electrical As-Built Drawings Complete (Electrical, P&C)	5	02-Jan-24 08 AM	08-Jan-24 04 PM	
P&C Close Out		60	24-Nov-23 08 AM	21-Feb-24 04 PM	
A3650	Prepare & Submit P&C Field Mark Ups	5	24-Nov-23 08 AM	30-Nov-23 04 PM	
A3770	Eversource Engineering Verifies P&C Mark Ups and Updates As-Built Drawing	15	01-Dec-23 08 AM	21-Dec-23 04 PM	
A3780	P&C Transmittal, Approve Final As-Built Package, and EDC Files and Issue Dra	5	22-Dec-23 08 AM	29-Dec-23 04 PM	
A3710	FE Files P&C Design Drawings at Station	30	09-Jan-24 08 AM	21-Feb-24 04 PM	
Work Order / Financial Close Out		40	24-Nov-23 08 AM	23-Jan-24 04 PM	
A1020	Cost Analyst Prepares FINAL Units of Property	30	24-Nov-23 08 AM	08-Jan-24 04 PM	
A1030	Asset Management Complete Asset Update(s) in CASCADE	30	08-Dec-23 08 AM	23-Jan-24 04 PM	
Project Management Close Out		138	24-Nov-23 08 AM	11-Jun-24 04 PM	
DSSE-1100	Complete TD-707 Turnover Document / Forward to SOC & Mailing List	5	24-Nov-23 08 AM	30-Nov-23 04 PM	
A1260	Construction Rep Finalize CASCADE Forms (within 14 days folloiwng ISD)	10	24-Nov-23 08 AM	07-Dec-23 04 PM	
A3690	FE Files Substation Design Drawings at Station	30	09-Jan-24 08 AM	21-Feb-24 04 PM	
A1040	PM Prepares Closeout Documentation, Lessons Learned Meeting, etc.	30	22-Feb-24 08 AM	03-Apr-24 04 PM	
A1270	Prepare TD-707 Document	30	29-Apr-24 08 AM	10-Jun-24 04 PM	
FINISH	Project / Work Order Complete (FINAL SCHEDULE TASK/MILESTONE)	0		11-Jun-24 04 PM	



EVERSOURCE

Constructability Review Form: **M6-PM-2012 - Eversource**

Substation Constructability Review

Project Title: [redacted] 6X Voltage Change	☐	Prior Constructability Review Performed?
	☐	Program Related Site-Specific Review?
Project Numbers(s): CS00577	**Project Constructability Phase:**	
Date(s) of Constructability Review: 08/14/2023 Click to enter a date	☐ Conceptual Engineering Design ☒ Preliminary Engineering Design ☐ Detailed Engineering Design	
Project Scope Statement: Change [redacted] transformer voltage to match the changes being made at [redacted]		

Department Review/Walkdown Attendees*:

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

[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:

[redacted] _____ [redacted] _____

Name / Signature *Date*

EVERSOURCE

Constructability Review Form: **M6-PM-2012 - Eversource**

Substation Constructability Review

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		
2		
3		
4		
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	☐	The preliminary scope of work for the refurbishment and voltage change of the 6X transformer has been developed and detailed. This project is to support the ongoing projects at [redacted] and the project team is in close communication with the distribution engineer team to align schedules.

EVERSOURCE

Constructability Review Form: **M6-PM-2012 - Eversource**

Substation Constructability Review

	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?	☐	All major materials have been ordered. As of 8/23, we are in communication with Siemens as we may need to order 3 bushings due to 3 ABB/Hitachi bushings being recalled.
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...	X	
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	X	
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?	X	
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?	X	

EVERSOURCE

Constructability Review Form: **M6-PM-2012 - Eversource**

Substation Constructability Review

	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.)	X	
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	X	
9	Nomenclature / Switching One-Line Diagram -Any obvious deviations from diagrams provided?	☐	The drawings will convey the voltage change of the 6X transformer along with the downstream bus and distribution circuit.
10	BPS Separation Requirements - Is this BPS Substation? Y/N (part of PAF) - Changes to pre-existing BPS standards?	X	
11	IEC 61850 Substation Automation and Communication Requirements - Any Impacts/Retrofit needed?	X	
12	Any Upgrades to ES Standards - Is retrofit needed to bring up to ES standards? Can that be done?	X	
B	**Construction**		
1	**Any safety hazards specific to the facility? i.e., Low Bus, Deterioration, etc.**	X	
2	**Prior known Site-Specific Conditions** -Common or Obvious station Issues -Missing scope items that could impact costs?	X	
3	**Identify/Consider Required Depts for Construction?** -Who is constructor: Internal vs External Resources -S/S Ops, GO, Test, Field Engineering, etc.	X	

EVERSOURCE

Constructability Review Form: **M6-PM-2012 - Eversource**

Substation Constructability Review

	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
	-Specialty Contractors Required? -Required Oversite Needed - Estimated level of CR and LCE support 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 Dept. will need an office trailer for their print's layouts and scripts.
5	Unique Equipment Considerations: Gas insulated substation, Gas insulated line, Gas insulated bus, Pass Breaker, Statcom, Sync Condenser		

EVERSOURCE

Constructability Review Form: **M6-PM-2012 - Eversource**

Substation Constructability Review

	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	x	
7	**Equipment Testing & Acceptance** -Grounding plans / Resources? Will we need grounds hung? -Hi-pot testing and where will the equipment be set up?	x	
8	Need for mobile generator and where connected (if needed)	x	
9	Need for mobile battery and where connected (if needed)	x	
10	OT work required or Notable Permit Conditions (special hours)?	x	
11	Coordination of boundaries/seams (Identification of point of demarcation for connection to existing equipment and/or for coordination with other municipalities)	x	

EVERSOURCE

Constructability Review Form: **M6-PM-2012 - Eversource**

Substation Constructability Review

	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	X	
2	**Desktop investigation and EAD Review** -Required Permits -Stormwater Considerations -Dewatering requirements -Wetland and buffer review	X	
3	Risk or presence of PCB's/Asbestos/Lead/SF6	X	
4	Transformer Spill Containment Recommended?	X	
5	Expanding Footprint / New Buildings or future Expansion Plans? (Enviro Impact)	X	
6	Environmental oversight considerations? (Inspection type/Interval)	X	
7	Environmental mitigations - Any matting or seasonal needs? Review D&M Plan with CR.	X	
D	**Siting, Project Services, and ROW T&D Rights & Survey**		
1	**Any regulatory concerns or approvals needed?** - Any concerns noted that could be mitigated by scope/design alterations? - Likely to require visual screening? What considerations (feasibility or location)? -Zoning Relief and Permits required?	X	
2	Other siting considerations?	X	
3	**Neighbor/Abutter impacts:** - Any noise, visual impacts, or sensitive abutters - Any changes to lighting or additional lighting needed?	X	
4	Review for roadway, gate access, trailers, equip height, noise, weekend/night work, or any potential public disturbance related to work	X	
5	Installation within Eversource Rights - Is Rights and Restrictions Review required?	X	

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Substation Constructability Review

	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
6	Expanding Footprint / New Buildings / Fence line or future Expansion Plans?	X	
7	Proposed Equipment on same property? - Any Encroachments	X	
F	**Protection & Controls**		
1	Panel Graphic additions and/or Modifications	X	
2	Space on existing panels for new equipment? (front & rear of panel fronts)	X	
3	Panel fronts conform to drawings	X	
4	Access to bring new panels into control enclosure	X	
5	Nameplate list and location of nameplates	X	
6	Verifies that relays and meters that will be an interconnected project work are as shown on the drawings.	X	
7	Temporary protection, relays, control cable needed? How long will they be required?	X	
8	Will relay setting changes be needed? Any additional outage requirements for changes?		New relay settings will be needed
G	**Telecom Engineering**		
1	Review telecom equipment in existing control enclosure	X	
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.	X	
3	Review current or proposed Telecom equipment power connections and validate with P&C any need for system 1 and system 2 separation.	X	
4	Review current Telecom fiber diversity and validate with P&C any fiber diversity requirements.	X	
5	Review and list any remote station impacts/updates	X	
6	Confirm whether correct interface equipment is available (i.e.) for fiber termination or multiplexor termination	X	

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Substation Constructability Review

	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
7	Confirm whether existing communications cabinets are enough to support additional telecommunications equipment installed	X	
8	Review space for any required additional communications cabinets which may be required to support additional telecommunications equipment installed	X	
9	Review third party Telecommunications at substation and confirm whether additional capacity or Ground Potential Rise protection is required	X	

Photos

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

ES VER: 05/2015

6/16/2023 7:42 AM – SMYRSMJ – 24601-91001.DWG – As Built

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