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Program Release Form

Approved at July 07, 2021 EPAC
Link to Meeting Minutes

Date Prepared: 06/09/2021	**Project Title: [redacted] OCB Replacement Program Release**
Company: Eversource CT	**Facility Name: [redacted]**
Organization: Asset Management	**Project Number: CS00423**
Project Initiator: [redacted]	**Class(es) of Plant: D SS**
Project Manager: [redacted]	**Project Category: Stations - Circuit Breakers**
Project Sponsor: [redacted]	**Project Type: Program**
Program Level Title: CT OCB Replacement Program	**Capital Investment Part of Original Operating Plan? Yes**
Program Level Project Number: CS00411	**O&M Expenses Part of the Original Operating Plan? N/A**
Total Request: $688.5K – Full Funding	**Estimated in service date(s): December 2021**
	Facility Type (check all that apply): ☐ PTF ☐ non-PTF ☒ Distribution

Executive Summary

This Program Release is requesting $688.5K to [redacted] The engineering work started under the Program Level initial funding work order CS00411C. This release is to reallocate the minimal charges spent to date to this Release project under the CS00411 - CT OCB Replacement Program. The Program Level PAF had initial funding of $300K approved in PowerPlan on November 23, 2020, which was updated to $450K approved in PowerPlan on May 27, 2021. To date, the project scope, preliminary constructability walkdown and planning grade cost estimate has been completed. This work associated with this release is expected to be in service in December 2021.

This Program Release is requesting dollar authorization in accordance with the program level criteria specified in Program Level PAF CS00411 - CT OCB Replacement and Bus Rehabilitation Program (Attachment E) and this document for this specific location. The scope for this Program Release is defined in the Program Level PAF and in this document with modifications necessary that address this location. Location/site modification from the Program Level PAF shall be fully described herein for scope and unit cost.

Project Scope

The scope includes the following:

[redacted]



See Attachment B for the Nomenclature Diagram.

TABLE 1 Equipment To Be Replaced

Nomenclature	Age	Equip Type	Manufacturer	Model	Load	V Class

A constructability review was performed on 02/25/2021 (see Attachment C). Age marked with * indicates estimated age based appearance of equipment during constructability walkdown.

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Unitized Release Cost

Note: Dollar values are in thousands

Line item Category	Unitized Program Level PAF Cost	Release Cost	Delta
1. ROW / Easements / Land Acquisition	$0	$0	$0
2. Environmental Approvals / Permits	$0	$0	$0
3. Outreach	$1	$1	$0
4. Siting Approvals / Permits	$0	$0	$0
5. Engineering / Design	$7	$11	$4
6. Materials (Eversource purchased)	$89	$64	($26)
7. Construction (incl matl's by contractors)	$157	$211	$54
8. Testing / Commissioning	$86	$67	($19)
9. Project Mgmt Team	$3	$4	$1
10. Removals	$10	$12	$2
11. Other	$0	$0	$0
12. Risks **	$53	$52	($1)
SUBTOTAL DIRECTS W/ RISKS	**$406**	**$421**	**15**
13. Indirects/Overhead	$195	$217	$22
14. AFUDC	$36	$16	($20)
PROJECT TOTAL – BASELINE BUDGET	**$637**	**$654**	**$17**
15. Contingency	$33	$34	$1
TOTAL CAPITAL REQUEST	**$671**	**$688**	**$18**
16. Reimbursables/Customer Contribution	$0	$0	$0
PROJECT TOTAL (LESS REIMBURSABLES)	**$671**	**$688**	**$18**
O&M	$0	$0	$0
Total Request	**$671**	**$688**	**$18**

** See the Risks and Risk Mitigation Plans section below for the cost breakdown of the risks.

	Equipment	Unitized	This Release
1.	OCBs		
a.	Feeders	4 x 1200A	
b.	Ties & Transformers	1 x 2000A	1 x 1200A
2.	GOP Disc Switches		
a.	Feeders	4 x 1200A	
b.	Ties & Transformers	1 x 2000A	
c.	Reactors	4 x 1200A	
3.	Hook Disc Switches		
a.	Feeders	8 x 3 1200A	
b.	Ties & Transformers	1 x 3 2000A	2 x 3 1200A
4.	Surge Arrestors		
5.	Reactors	4 x 3	
6.	Grounding Switches	4 x 3	

Justification for Modification

1. **ROW / Easements / Land Acquisition: $0K -** No changes with respect to the program.
2. **Environmental Approvals / Permits: $0K -** No changes with respect to the program.
3. **Outreach: $0K -** No changes with respect to the program.
4. **Siting Approvals / Permits: $0K -** No changes with respect to the program.
5. **Engineering / Design: $4K -** Increase cost with respect to program as quantity of equipment is less than program reducing economies of scale.
6. **Materials (by Eversource: ($26K) -** This Release has no reactors; reactor switches or surge arrestors and tie and transformer circuit breakers do not have disconnect switches resulting in less materials by Eversource.
7. **Construction (including materials supplied by contractors): $54K -** Increase cost with respect to program as quantity of equipment is less than program reducing economies of scale.
8. **Testing / Commissioning: ($19K) -** Only one breaker to be tested with respect to the program.
9. **Project Management Team: $0K -** No changes with respect to the program.
10. **Removals: $2K -** No major changes with respect to the program.
11. **Other: $0K -** No changes with respect to the program.
12. **Risk: ($1K) -** No major changes with respect to the program.
13. **Indirects/Overhead: $22K -** Indirect charges are calculated using the direct charges as input, so the differences in direct charges for this release over the unitized program cost estimate results in different indirect costs.
14. **AFUDC: ($20K) -** The AFUDC is a direct result of the changes in direct charges for this release over the unitized program cost estimate.
15. **Contingency: $1K -** Minor changes with respect to the program. Contingency is a result of the changes in direct charges for this release over the unitized program cost estimate.
16. **Reimbursables/Customer Contribution: $0K -** No changes with respect to the program.
17. **O&M: $0K –** No changes with respect to the program.

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Project Costs Summary

Note: Dollar values are in thousands

Line item Category	Prior Authorized	Actuals to Date	2021 to Go	2022	Total
1. ROW / Easements / Land Acquisition					$0
2. Environmental Approvals / Permits					$0
3. Outreach			$1		$1
4. Siting Approvals / Permits					$0
5. Engineering / Design	$400	$4	$7	$1	$11
6. Materials (Eversource purchased)			$67		$67
7. Construction (incl matl's by contractors)			$211		$211
8. Testing / Commissioning			$67		$67
9. Project Mgmt Team	$50		$4		$4
10. Removals			$12		$12
11. Other					$0
12. Risks			$52		$52
SUBTOTAL DIRECTS W/ RISKS	**$450**	**$4**	**$417**	**$1**	**$421**
13. Indirects/Overhead			$215	$2	$217
14. AFUDC		$2	$14		$16
PROJECT TOTAL – BASELINE BUDGET	**$450**	**$6**	**$646**	**$2**	**$654**
15. Contingency			$34		$34
TOTAL CAPITAL REQUEST	**$450**	**$6**	**$681**	**$2**	**$688**
16. Reimbursables/Customer Contribution					
PROJECT TOTAL (LESS REIMBURSABLES)	**$450**	**$6**	**$681**	**$2**	**$688**
O&M					
TOTAL REQUEST	**$450**	**$6**	**$681**	**$2**	**$688**

Note: Explain unique payment provisions, if applicable: *Provide a detailed breakdown of Other costs here.*

Risk	Funded Amount
Control Breaker Cables Failures	$5K
Underground Conduit Damaged	$5K
Delays / outages related to breaker energization plans	$25K
Design development Risks	$6K
Severe Weather Delays	$6K
Existing foundations not suitable for re-use	$5K
Total	$52K

Breakout Costs

Note: Dollar values are in thousands

Line item Category	Prior Authorized	Actuals to Date	2021 to Go	2022	Total
ST Labor		$4	$13	$1	$18
OT Labor		$0	$0	$0	$0
Outside Services Labor		$0	$276	$0	$276
Materials*		$0	$64	$0	$64
Removals		$0	$12	$0	$12
Other		$0	$87	$0	$87
Indirects		$0	$215	$1	$217
AFUDC		$2	$14	$0	$16
TOTAL CAPITAL REQUEST - W/O REIMBURSABLES	**$450**	**$6**	**$681**	**$2**	**$688**

*All materials including Eversource purchased and outside service purchased. Note that outside service purchased material included in construction in project cost summary above

Future Financial Impacts:

Provide below the estimated future costs that will result from the project: **N/A**
Note: Dollar values are in thousands:

Future Costs	Year 20__	Year 20__	Year20__	Year 20__+	Total Future Project Costs
Capital	$ -	$ -	$ -	$ -	$ -
O&M	-	-	-	-	-
Other	-	-	-	-	-
TOTAL	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**

Describe the estimated future Capital, O&M and/or Other costs noted above:

What functional area(s) will these future costs be funded in? **N/A**
A representative from the respective functional area is required to be included as a project approver.

If this is other than a Reliability Project, please complete the section below; N/A

Provide below the estimated financial benefits that will result from the project:
Note: Dollar values are in thousands:

Future Benefits	Year 20__	Year 20__	Year20__	Year 20__+	Total Future Project Benefits
Capital	$ -	$ -	$ -	$ -	$ -
O&M	-	-	-	-	-
Other	-	-	-	-	-
TOTAL	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**

Describe the estimated future Capital, O&M and/or Other benefits noted above: **N/A**

What functional area(s) will these benefits be reflected in? **N/A**
A representative from the respective functional area is required to be included as a project approver.

Asset Retirement Obligation (ARO) and/ or Environmental Cleanup Costs (Environmental Liabilities):

Is there an ARO associated with this project? If yes, please provide details: **No**

Are there other environmental cleanup costs associated with this project? **Possibly**
If yes, please provide details:

No subsurface work resulting in environmental cleanup costs is expected. There is a risk that some underground conduit and/or some of the foundations will require replacing resulting in contaminated disposal costs.

Alternatives Considered with Cost Estimates

There are no changes from the Program Level PAF.

Regulatory Approvals

None. There are no changes from the Program Level PAF.

Risks and Risk Mitigation Plans

Risk	Mitigation
Control Breaker Cables Failures	Perform continuity and insulation integrity checks on control cables and install new control breaker cables if required.
Underground Conduit Damaged	Check for conduit damage and replace Underground Conduit if required.
Delays / outages related to breaker energization plans	Rescheduling and OT as required if outages cannot be performed during the scheduled times due to unforeseen circumstances.
Design development Risks	Re-Design Allowances
Severe Weather Delays	Rescheduling and OT as required
Existing foundations not suitable for re-use	Preliminary checks have indicated that the foundations can be reused. During construction, further checking is required and foundations to be replaced if required.

Contingency-

Contingency of $30K is included in the estimate for potential risks or project unknowns.

Project Schedule

Milestone/Phase Name	Estimated Date
Release Approval at EPAC	July 2021
Detailed Design Complete	July 2021
Construction Start	November 2021
In Service Date	December 2021
Release Close-Out	June 2022

See attachment D for the P6 Schedule.

Attachments

- Attachment A: CS00423-Estimate ES [redacted] OCB Rep - rev 0
- Attachment B: CS00423 [redacted] OCB Nomenclature Diagram
- Attachment C: SS Constructability Review Document [redacted] OCB
- Attachment D - CS00423 - [redacted] OCB Replacement Schedule
- Attachment E – CS00411 - CT OCB Replacement and Bus Rehabilitation Program Level PAF

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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] OCB Replacement Program Release				**Project Number: CS00423**	
Facility Type: ☐ BPS ☐ BES ☐ PTF ☐ non-PTF ☐ CIP ☒ Distribution					
PLANNING					
Is a NX-9 required?				No	
Is an ISO-NE PAC presentation required?				No	
ISO-NE Presentation Date (if completed):				N/A	
Cost in ISO-NE Presentation ($M) (if completed):				N/A	
Is a PPA required?				No	
Is a TCA Application Required?				No	
TCA Submittal Date (if submitted):				N/A	
Cost in TCA Submittal ($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?				No	
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	

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Project Checklist - Transmission & Substation Capital Project	
Project Name: [redacted] OCB Replacement Program Release	**Project Number: CS00423**
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
SITING & CONSTRUCTION SERVICES (OUTREACH)	
What is the level of outreach expected?	Low
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 Eversource Engineering
Name of the person who prepared the estimate:	[redacted]
Was the estimate reviewed by Eversource Estimating?	Yes - Partial Review

Cost Estimate Backup Details

See Attachment A for the cost estimate.

ESTIMATE SUMMARY

Project Title: [redacted] OCB Replacement and Bus Rehab Release
Project Mgr/Lead: [redacted]
Project Number:CS00423
WO & Task #: TBD
Est. Revision # 0
Estimate Type - Station work

Estimate By: [redacted]
Date of Estimate: 5/24/2021
ISD:12/31/2021
Estimate # C-21-427

Template Revision # 01.56

ESTIMATE SUMMARY

Estimate Type: Planning

WBS	Description	TOTAL	% of Directs	% of Total	Priors	2021	2022	2023	2024	2025	2026
1	ROW / Easements / Land purchases	$0	0.0%	0.0%	$0	$0	$0	$0	$0	$0	$0
2	Environmental Approvals / Permits	$0	0.0%	0.0%	$0	$0	$0	$0	$0	$0	$0
3	Outreach	$700	0.2%	0.1%	$0	$700	$0	$0	$0	$0	$0
4	Siting Approvals / Permits	$0	0.0%	0.0%	$0	$0	$0	$0	$0	$0	$0
5	Engineering / Design	$11,300	2.7%	1.6%	$4,000	$6,800	$500	$0	$0	$0	$0
6	Materials (Eversource purchased)	$63,600	15.1%	9.2%	$0	$63,600	$0	$0	$0	$0	$0
7	Construction (incl matl's by contractors)	$211,400	50.2%	30.7%	$0	$211,400	$0	$0	$0	$0	$0
8	Testing / Commissioning	$66,600	15.8%	9.7%	$0	$66,600	$0	$0	$0	$0	$0
9	PMT Project Mgmt Team	$3,800	0.9%	0.6%	$0	$3,800	$0	$0	$0	$0	$0
10	Removals	$11,900	2.8%	1.7%	$0	$11,900	$0	$0	$0	$0	$0
11	Other	$0	0.0%	0.0%	$0	$0	$0	$0	$0	$0	$0
12	Risks	$52,000	12.3%	7.6%	$0	$52,000	$0	$0	$0	$0	$0
	Project Directs Total w/Risks	**$421,300**	100.0%	61.2%	**$4,000**	**$416,800**	**$500**	**$0**	**$0**	**$0**	**$0**
13	Indirects/Overhead	$216,600		31.5%	$0	$215,300	$1,300	$0	$0	$0	$0
14	AFUDC	$16,200		2.4%	$2,000	$14,200	$0	$0	$0	$0	$0
	Project Total - Baseline Budget	**$654,100**		95.0%	**$6,000**	**$646,300**	**$1,800**	**$0**	**$0**	**$0**	**$0**
15	Contingency	$34,400		5.0%	$0	$34,400	$0	$0	$0	$0	$0
	Project Total - Funding Approval Level	**$688,500**		100.0%	**$6,000**	**$680,700**	**$1,800**	**$0**	**$0**	**$0**	**$0**
16	Reimbursables/Customer Contribution	$0			$0	$0	$0	$0	$0	$0	$0
	Project Total (less reimbursables)	**$688,500**			**$6,000**	**$680,700**	**$1,800**	**$0**	**$0**	**$0**	**$0**
	Amount of Escalation included above	$100			$0	$0	$100	$0	$0	$0	$0
6	Total materials - Eversource	$63,600			$0	$63,600	$0	$0	$0	$0	$0
	Total materials - Contractor	$0			$0	$0	$0	$0	$0	$0	$0
	Total materials	$63,600			$0	$63,600	$0	$0	$0	$0	$0

NOTE: Risk / Contingency is 14.3% of Project Total Costs (incl escal/indirects/AFUDC but excl reimb.)

Estimate Range

-25%	-	25%
$516,000	-	$861,000

COMMENTS:

[redacted]

The following equipment will be replaced & Removed:
[redacted]

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

- Engineering to be outsourced with in-house review, construction and testing to be out-sourced with external resources.
- This estimate was developed with the use of existing breaker control conduits with no digging in existing soil.
- This estimate was developed utilizing the existing foundation, no new foundations were included in this estimate.
- Material estimates based on previous work, and vendor quotes.
- All new equipment will be installed within the confines of the existing fenced yard.
- No additional allowances have been added for aggressive outage recall times.
- Estimate includes risk for all new control cables to be installed in the event of failure during megger testing. This estimate includes addition risk if the switches due to long lead times are not here in time to take advantage of the OCB outages.

RISKS

Control Breaker Cables Failures	$	5.000
Underground Conduit Damaged	$	5.000
Delays / outages related to breaker energization plans	$	25.000
Design development Risks	$	6.000
Severe Weather Delays	$	6.000
Existing foundations not suitable for re-use	$	5.000

Project Number:C800423

Project Title: [redacted] OCB Replacement and Bus Rehab Release

Escalated Line Item Dollars

Project Number:C800423
Date of Estimate: 5/24/2021
Est Revision # 0
Template Revision # 21.06

CSTXX-CONSTRUCTION	R		Prior actuals to date Mhrs	Prior actuals to date DOLLARS	2021 0 Mhrs	2021 0 DOLLARS	2022 1 Mhrs	2022 1 DOLLARS	2023 2 Mhrs	2023 2 DOLLARS	2024 3 Mhrs	2024 3 DOLLARS	2025 4 Mhrs	2025 4 DOLLARS	2026 5 Mhrs	2026 5 DOLLARS	TOTAL DOLLARS
Electrical Construction	LT	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
General Construction	LT	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
SCADA / Automation	LT	0%	0	$0	4	$212	0	$0	0	$0	0	$0	0	$0	0	$0	$212
Telecom - Field	LT	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Construction Reps (Internal)	LT	0%	0	$0	80	$4,240	0	$0	0	$0	0	$0	0	$0	0	$0	$4,240
Support Switch/Tag	LT	0%	0	$0	80	$4,240	0	$0	0	$0	0	$0	0	$0	0	$0	$4,240
Other (specify)	LT	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Other (specify)	LT	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Other (specify)	LT	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
LT Total		0%	0	$0	164	$8,692	0	$0	0	$0	0	$0	0	$0	0	$0	$8,692
Employee Expenses	AE	8%	0	$0		$435		$0		$0		$0		$0		$0	$435
Construction Purchased Material	AM	1%	0	$0		$2,023		$0		$0		$0		$0		$0	$2,023
Outside Construction Vendor	AQ		0	$0	1,442	$200,280	0	$0	0	$0	0	$0	0	$0	0	$0	$200,280
Sales tax on Constr. Vendor		0.0%	0	$0		$0		$0		$0		$0		$0		$0	$0
Vehicles (now in Indirects section)	AV	0%	0	$0		$0		$0		$0		$0		$0		$0	$0
Inspection services (Outside Vendor)	AQ		0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Construction Reps (Outside vendor)	AQ		0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Rents and Leases	BR		0	$0		$0		$0		$0		$0		$0		$0	$0
CSTXX Subtotal		0%		$0		$213,430		$0		$0		$0		$0		$0	$213,430
Escalation			0	$0		$ -		$0		$ -		$ -		$ -		$ -	$ -
0 PI		0%	0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
CSTXX Total		0%	0	$0	1,606	$213,430	0	$0	0	$0	0	$0	0	$0	0	$0	$213,430
ENRXX-TG ENGINEERING/DESIGN																	$0
Project Services/Drafting	LT	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
T- Line Engineering/Design	LT	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
D- Street Engineering/Design	LT	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Civil Engineering/Design	LT	0%	0	$0	3	$159	4	$218	0	$0	0	$0	0	$0	0	$0	$377
Substation (T) Engineering/Design	LT	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Substation (D) Engineering/Design	LT	0%	0	$4,000	5	$265	0	$0	0	$0	0	$0	0	$0	0	$0	$4,265
Protection & Controls Engineering	LT	0%	0	$0	5	$265	5	$273	0	$0	0	$0	0	$0	0	$0	$538
Survey Engineering	LT	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
SCADA / Automation Engineering	LT	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Telecom Engineering	LT	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Other - specify	LT	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Other - specify	LT	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
LT Total		0%	0	$4,000	13	$689	9	$491	0	$0	0	$0	0	$0	0	$0	$5,180
Employee Expenses	AE	6%	0	$0	0	$34	0	$25	0	$0	0	$0	0	$0	0	$0	$59
Contractor Engineering - T-Lines	AQ	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Contractor Engineering - D-Street	AQ	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Contractor Engineering - T-Station	AQ	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Contractor Engineering - D-Station	AQ	0%	0	$0	20	$3,040	0	$0	0	$0	0	$0	0	$0	0	$0	$3,040
Contractor Engineering - PSC	AQ	0%	0	$0	20	$3,060	0	$0	0	$0	0	$0	0	$0	0	$0	$3,060
Contractor Engineering - Survey	AQ	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Contractor Engineering - SCADA / Automation	AQ	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Contractor Engineering - Telecom	AQ	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Contractor Engineering - Specify	AQ	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Contractor Engineering - Specify	AQ	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Contractor Engineering - Specify	AQ	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Vehicles (now in Indirects section)	AV	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
ENRXX Subtotal		0%	-	$4,000	53	$6,823	9	$516	-	$0	-	$0	-	$0	-	$0	$11,339
Escalation			0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
0 PI		0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
ENRXX Total		0%	-	$4,000	53	$6,823	9	$516	-	$0	-	$0	-	$0	-	$0	$11,339
LNDXX-TG LAND		0%															0
Real Estate	LT	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Employee Expenses	AE	6%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Purchase Land	AM	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Vehicles (now in Indirects section)	AV	0%	0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Fees and Payments	RF	0%	0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
LNDXX Subtotal		0%	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0	$0
Escalation		0%	0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
0 PI		0%	0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
LNDXX Total		0%	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0	$0
MATXX-TG MATERIAL		0%															$0
Eversource	AM	0%	0	$0	0	$59,238	0	$0	0	$0	0	$0	0	$0	0	$0	$59,238
Outside Services	AM	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
	AM	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Freight		0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Sales Tax Eversource/outside services		0%	0	$0	0	$2,300	0	$0	0	$0	0	$0	0	$0	0	$0	$2,300
Other		0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
MATXX Subtotal		0%		$0		$61,538		$0		$0		$0		$0		$0	$61,538
Escalation			0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
0 PI		0%	0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
MATXX Total		0%		$0		$61,538		$0		$0		$0		$0		$0	$61,538
PSMXX-PROJECT MANAGER & SUPPORT		0%															$0
Project Management (PM)	LT	0%	0	$0	25	$1,325	0	$0	0	$0	0	$0	0	$0	0	$0	$1,325
Project Planning/Cost (I/P)	LT	0%	0	$0	32	$1,696	0	$0	0	$0	0	$0	0	$0	0	$0	$1,696
Contracts/Purchasing (C/P)	LT	0%	0	$0	4	$212	0	$0	0	$0	0	$0	0	$0	0	$0	$212
System Planning	LT	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Environmental	LT	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
SCS - Notification	LT	0%	0	$0	0	$36	0	$0	0	$0	0	$0	0	$0	0	$0	$36
Legal	LT	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Estimating	LT	0%	0	$0	2	$106	0	$0	0	$0	0	$0	0	$0	0	$0	$106
Siting - None	LT	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Asset Management	LT		0	$0	5	$265	0	$0	0	$0	0	$0	0	$0	0	$0	$265
Other -	LT		0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Other -	LT		0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Other -	LT		0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Other -		0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
LT Total		0%	0	$0	68	$3,640	0	$0	0	$0	0	$0	0	$0	0	$0	$3,640
Employee Expenses	AE	6%	0	$0		$182	0	$0	0	$0	0	$0	0	$0	0	$0	$182
Project Support Vendor - PM	AQ	0%	0	$0	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0	$0
Project Support Vendor - P	AQ	0%	0	$0	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0	$0
Project Support Vendor - C/P	AQ	0%	0	$0	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0	$0
Project Support Vendor - System Planning	AQ	0%	0	$0	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0	$0
Project Support Vendor - Environental	AQ	0%	0	$0	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0	$0
Project Support Vendor - SCS - Notification	AQ	0%	0	$0	-	$600	-	$0	-	$0	-	$0	-	$0	-	$0	$600
Project Support Vendor - Legal	AQ	0%	0	$0	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0	$0
Project Support Vendor - Estimating	AQ	0%	0	$0	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0	$0
Project Support Vendor - Siting - None	AQ	0%	0	$0	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0	$0
Project Support Vendor - Asset Management	AQ	0%	0	$0	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0	$0
Project Support Vendor - Other	AQ	0%	0	$0	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0	$0
Project Support Vendor - Other	AQ	0%	0	$0	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0	$0
Project Support Vendor - Other	AQ	0%	0	$0	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0	$0
Project Support Vendor - Other	AQ	0%	0	$0	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0	$0
Vehicles (now in Indirects section)	AV	0%	0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Property or CWIP tax true up/ allowance	BR	0%	0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
0 BR		0%	0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Fees and Payments - Environental	RF	0%	0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Fees and Payments - Siting	RF	0%	0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Fees and Payments - Other	RF	0%	0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
PSMXX Subtotal		0%	-	$0	68	$4,502	-	$0	-	$0	-	$0	-	$0	-	$0	$4,502
Escalation			0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
0 PI		0%	0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
PSMXX Total		0%	-	$0	68	$4,502	-	$0	-	$0	-	$0	-	$0	-	$0	$4,502
REMXX-TG REMOVAL		0%															$0
Engineering/Design	LT	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Internal Construction	LT	0%	0	$0	0	$500	0	$0	0	$0	0	$0	0	$0	0	$0	$500
LT Total		0%	0	$0	0	$500	0	$0	0	$0	0	$0	0	$0	0	$0	$500
Employee Expenses	AE	16%	0	$0		$75		$0		$0		$0		$0		$0	$75
Outside Services	AQ	0%	0	$0	-	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Contractor Labor	AQ	0%	0	$0		$11,300	0	$0	0	$0	0	$0	0	$0	0	$0	$11,300
Vehicles (now in Indirects section)	AV	0%	0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Rents and Leases	BR	0%	0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
REMXX Subtotal		0%	-	$0	-	$11,875	-	$0	-	$0	-	$0	-	$0	-	$0	$11,875
Escalation			0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
0 PI		0%	0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
REMXX Total		0%	-	$0	-	$11,875	-	$0	-	$0	-	$0	-	$0	-	$0	$11,875
TSTXX-TG TEST		0%															$0
Test / Field Engr. Labor (In House)	LT	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Lead Commissioning Engr. (LCE) (Internal)	AQ	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Employee Expenses	AE	16%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Test / Field Engr. Labor (contractor)	AQ	0%	0	$0	160	$33,280	0	$0	0	$0	0	$0	0	$0	0	$0	$33,280
Lead Commissioning Engr. (LCE) (contactor)	AQ	0%	0	$0	160	$33,280	0	$0	0	$0	0	$0	0	$0	0	$0	$33,280
Vehicles (now in Indirects section)	AV	0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
TSTXX Subtotal		0%	0	$0	0	$66,560	0	$0	0	$0	0	$0	0	$0	0	$0	$66,560
Escalation			0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
0 PI		0%	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
TSTXX Total		0%	0	$0	320	$66,560	0	$0	0	$0	0	$0	0	$0	0	$0	$66,560
SUBTOTAL PROJECT DIRECT COST		0%	-	$4,000	2,847	$364,728	9	$516	-	$0	-	$0	-	$0	-	$0	$369,244
Risk		0%															$0
Risk			0	$0		$52,000	0	$0	0	$0	0	$0	0	$0	0	$0	$52,000
0			0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
			0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Risk Total		0%		$0		$52,000		$0		$0		$0		$0		$0	$52,000
TOTAL PROJECT DIRECT COST		0%	-	$4,000	2,847	$416,728	9	$516	-	$0	-	$0	-	$0	-	$0	$421,244
INDIRECTS		0%															$0
Non-Productive Time Allocation (ZB)	58	16.1%	0	$0		$2,035	0	$74	0	$0	0	$0	0	$0	0	$0	$2,109
Payroll Save Rte Allocation (ZE) Incl NPT	59	44.0%	0	$0		$4,053	0	$0	0	$0	0	$0	0	$0	0	$0	$4,053
Gen SVC CO Overhead (ZY) Incl NPT	60	76.0%	0	$0		$3,735	0	$424	0	$0	0	$0	0	$0	0	$0	$4,159
E&S Allocations (ZI)	61	55.0%	0	$0		$170,975	0	$545	0	$0	0	$0	0	$0	0	$0	$171,520
ASMC Allocations (ZJ)	62	1.3%	0	$0		$8,827	0	$20	0	$0	0	$0	0	$0	0	$0	$8,847
Stores Expense Allocation (ZC)	62	8.0%	0	$0		$4,739	0	$0	0	$0	0	$0	0	$0	0	$0	$4,739
Lobby Stock		0.0%	0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
MDEC		0.0%	0	$0		$10,516	0	$382	0	$0	0	$0	0	$0	0	$0	$10,898
Vehicles		28.0%	0	$0		$3,786	0	$138	0	$0	0	$0	0	$0	0	$0	$3,924
0 63		0.0%		$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Indirects Subtotal		0%		$0		$215,366		$1,251		$0		$0		$0		$0	$216,617
TOTAL PROJECT COST - Direct & Indirect (excl AFUDC)				$4,000		$631,094		$1,767		$0		$0		$0		$0	$637,761
0			0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
AFUDC			0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
0			0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
AFUDC (ZK)			0	$2,000		$14,197	0	$0	0	$0	0	$0	0	$0	0	$0	$16,197
In Service Dollars																	
Cumulative ISS			0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	
0			0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
AFUDC Subtotal				$2,000		$14,197		$0		$0		$0		$0		$0	$16,197
TOTAL PROJECT COST - Baseline Budget				$6,000		$646,191		$1,767		$0		$0		$0		$0	$653,958
0			0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Continuacy			0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Contingency			0	$0		$34,443	0	$20	0	$0	0	$0	0	$0	0	$0	$34,463
Other			0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
0			0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Continuacy Sub/Total				$0		$34,443		$20		$0		$0		$0		$0	$34,463
0																	
TOTAL PROJECT COST - Approved Funding			0	$6,000		$680,634	0	$1,787	0	$0	0	$0	0	$0	0	$0	$688,421
0			0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Reimbursables / Customer Contribution			0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Reimbursables / Customer Contribution (enter as negative)			0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
0 59		0%	0	$0		$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
TOTAL PROJECT COST				$6,000		$680,634		$1,787		$0		$0		$0		$0	$688,421

[redacted]

[redacted]

EVERSOURCE

Constructability Review Form: **Substation**

Project Title: [redacted] OCB Replacement Project	☐	Prior Constructability Review Performed?
	☐	Program Related Site Specific Review?
Project Numbers(s): CS00423	**Project Constructability Phase:**	
Date(s) of Constructability Review: 02/25/2021	☐ Conceptual Engineering Design	
02/25/2021	☒ Preliminary Engineering Design	
	☐ Detailed Engineering Design	
Project Scope Statement: Replace [redacted] SPARE		

Department Review/Walkdown Attendees*:

Required [X]	Attended [X]	Department	Name	Required [X]	Attended [X]	Department	Name
☒	☒	Project Management	[redacted] (Representing PM)	☒	☒	S/S Engineering	[redacted]
☐	☐	Asset Management		☐	☐	P&C Engineering	
☐	☐	Constr. Management		☐	☐	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 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]___*02/25/2021*___[redacted]_____*Name / Signature*

EVERSOURCE

Constructability Review Form: **Substation**

Documents available for use on Constructability Review					
[X]	Deliverable	[X]	Deliverable	[X]	Deliverable
☒	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	☐	Previous Notes	☐	Identify Required Contractors
☒	Proposed Schedule	☐	Major Material List	☐	Replace / Reuse of equipment
☐	Construction Sequence/Timeline	☒	Major Equipment Items	☐	Pre-Walkdown Comments / Observations

Action Items and Resolutions:

Item No.	Const. Review Action Item/Concern	Design Resolution/Mitigation:
1	Civil engineers to verify structural integrity of existing foundations & structural steel supports. (Reference replaced [redacted] for typical design)	Civil Engineering
2	Verify need for aux. transformers required at breakers that do not have a neutral for the necessary 120 volts.	Electrical Engineering
3	Add extension plates & straight ground studs to breaker-sides of switches. Consider using insulated bucket (squirt boom) to install due to proximity. Or install brush guards when installing plates and studs.	Electrical Engineering
4	Communication/Annunciator cable(3c/#18) will probably need replacement since it may be too short to get to new j-box. (Based on the [redacted] replacement model)	Electrical Engineering
5		

	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
A	**General**		
1	**Any safety hazards specific to the facility? i.e. Low Bus, Deterioration, etc.**	☒	
2	**Prior known Site Specific Conditions - Common or Obvious station Issues**	☐	May be issues with control cables
3	**Scope Adequately Developed** Consider Physical Installation, P&C Scope, Civil Scope, Engineering studies, Design standard adherence	☐	See action items above.

EVERSOURCE

Constructability Review Form: **Substation**

	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
4	**Materials Identified/Ordered** Long Lead Equipment? Specialty material considerations? Review BOM lead times and project need dates Bids for Specialty Major Materials - Identify Specialty Equipment & Materials potentials - temporary/replacement Any Materials needed to facilitate construction access?	☐	Breakers not ordered, need project approval. Could be delayed at US/Mexico border. 21+ weeks lead-time for breakers.
5	**Any impacts that would drive T-Line Eng Scope?**	☒	
6	**Any other known projects that could overlap or impact outage work?**	☐	Asset management to identify.
B	**Construction**		
1	**Site Plan / Access:** -Confirm maintenance access for proposed new or replaced equipment -Review station expansion areas (if needed) for structures, old foundations, etc. -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) -Site Development Plan (grading and drainage) with Cut/Fill -Existing Rock Conditions? Potential Impacts (rock quantity)? -Any Sanitary Civil Requirements? (Septic tanks, etc) -Assess condition of existing yard equipment foundations and viability for reuse (if proposed)	☐	- - - - - - - - - - - - - - See action items above.
2	**Any Substation Access and site/yard access Limitations?** -Review turning radius for delivery trucks (if critical) -Identify Office Trailer / Container / Dumpster Space + source of utilities for construction trailer(s) if needed -Weather impacts to Site (Snow Placement) -Identify Material Laydown and Security -Construction permit for trailers outside substation fence?	☐	- Breaker removal mar require minimal steel brace removal and replacement. - Yard is tight but should have enough room for trailers/dumpsters outside station. - N/A - Space for material is sufficient. - N/A

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Constructability Review Form: **Substation**

	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
3	**Outage Planning & Construction Sequence** -Working Clearances - Review electrical clearances for equipment during construction – Approach Distances – Outage Requirements to maintain electrical clearances throughout proposed installation -As-Built drawing review (contacts and contributions) -Outage boundaries -Phased approach needs for additional mobilizations -Detail Design package align with schedule and outage sequence? -Lead Commissioning Engineer (LCE), Substation Operations, and Outage Planner - Review or give input to planned construction sequence to insure it is reasonable and scheduled outages associated with the sequence -Review or give input to planned construction sequence to insure it is reasonable -Verify outage sequence supports the planned construction sequence	☐	- - CR to utilize. - TBD - TBD - N/A - TBD -Further breaker control scheme investigation needed to complete outage requirements. -TBD
4	**Need for mobile generator and where connected (if needed)**	☒	
5	**Need for mobile battery and where connected (if needed)**	☒	
6	**Energization Plan** What outages are required, Detailed look at contributions to equipment, Detailed look at protection zone changes, Locked sequence or random outages, Outage durations minimized Mobile transformer, Additional outage requirements, Working clearance, Railroad Catenaries, Distribution overhead/underground/networks, Fiber outage, SCADA outage, Relay permissions	☐	To be established by CR/CM and reviewed by LCE once IFC drawings issued.
7	**Identify Required Oversite Needed - Estimated level of CR and LCE support needed**	☐	1 LCE and 1 CR required
8	**OT work required or Notable Permit Conditions (special hours)?**	☐	May need weekend work or extended days if schedule is delayed or system reliability dictates.
9	**Seasonal or weather conditions impacts?**	☐	Should not be an issue since this is a spare breaker and not loaded.
10	**Identify Required Depts for Construction? (who is constructor ?)**	☐	TBD
11	**Specialty Contractors Required?**	☒	
12	**Unique Equipment Considerations, Gas insulated substation, Gas insulated line, Gas insulated bus, Pass Breaker, Statcom, Sync Condenser**	☒	

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Constructability Review Form: **Substation**

	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
13	**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.)	☐	All conductors should be meggered and replaced if found compromised.
14	**Any other items missing in scope or could be underfunded?**	☐	See action items above.
15	Coordination of boundaries/seams (Identification of point of demarcation for connection to existing equipment and/or for coordination with other municipalities)	☒	
C	**Environmental**		
1	Soil Pre-Characterization or Grab Sampling Completed/Planned	☒	
2	Has Desktop investigation and EAD Review form been completed.	☒	
3	Dewatering requirements	☒	
4	Risk or presence of PCB's/Asbestos/Lead/SF6	☐	TBD. Potential PCB oil in existing breakers & possible asbestos wiring.
5	Permit requirements (Wetlands, Rare Species, etc)	☒	
6	Stormwater Considerations	☒	
7	Transformer Spill Containment Recommended?	☒	
8	Expanding Footprint / New Buildings or future Expansion Plans? (Enviro Impact)	☒	
D	**Siting, S&CS, and T&D Real Estate**		
1	Expanding Footprint / New Buildings or future Expansion Plans?	☒	
2	Installation is within Eversource Rights? - Rights and Restrictions Review	☒	
3	Proposed Equipment on same property? - Any Encroachments	☒	
4	Identify existing lighting and determine if additional lighting is needed?	☒	
5	Review for roadway, gate access, trailers, equip height, noise, weekend/night work, or any potential public disturbance related to work	☐	Residential neighborhood to access substation. Noise, weekend/night work, may cause public disturbance.
6	Visual mitigation screening considerations (feasibility or location)	☒	

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Constructability Review Form: **Substation**

	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
7	Neighbor/Abutter impacts (noise, visual, sensitive abutters)	☐	
E	**Engineering**		
1	**Scope of Work** Identify if high level scope sufficiently detailed? Any remote station impacts? Does title match the project deliverable/intent?	☐	Scope is not sufficiently detailed. (See Action Items and Resolutions)
2	**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	☒	
3	**Materials** Any concerns with BOM/Major Materials Review? Where will new vs removed equipment go? Review for OH and UG Items	☐	No material ordered. Sufficient room to store old and new.
4	**Control House** - Review: Unmapped equipment interferences, Control/Battery Enclosure Layout, HVAC System (if equipment added), space for new or modified equipment, AC / DC station service and loading, Panel Space, Expansion, one-line and/or riser type panelboard drawings, other..	☒	
5	Identification of Unique Requirements, i.e. (access bridges, station service, etc.)	☒	
6	**BPS Separation Requirements** Is this BPS Substation? Y/N (part of PAF) Changes to pre-existing BPS standards?	☒	
7	IEC 61850 Substation Automation and Communication Requirements - Any Impacts/Retrofit needed?	☒	
8	Any Upgrades to ES Standards - Is retrofit needed to bring up to ES standards? Can that be done?	☐	Addition of ground studs.
9	**Wall, Fence, Gate, and Foundation Considerations** -Any permanent / temporary alterations or relocations required? -Take measurements for Foundation quantities, dimensions and concrete volumes -CIP Review/Ballistic needs. Any Physical Security Requirement Consideration? -Any impacts to construction plan?	☐	Foundations need to be reviewed by civil engineers to verify suitable for re-use or need to be upgraded.

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Constructability Review Form: **Substation**

	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
10	**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?	☐	TBD - If foundations need alterations that warrant.
11	**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	☒	
12	Any Lighting Plan & Fixture Schedule Considerations?	☒	
13	Any Steel Structural Plan Considerations?	☐	Will need steel for new breakers
14	Sound Study Needed? Pre-Project Sound Measurements Needed? Sound Walls?	☒	
15	Engineering Estimates for Design and Technical Support? (EE and EOC) Total Project	☒	
16	Nomenclature / Switching One-Line Diagram -Any obvious deviations from diagrams provided?	☒	
17	Any design alterations or considerations to Eliminate SCLL Conditions, Reduce Recall Time, Reduce Outage durations, Special Conditions	☐	TBD
F	**Protection & Controls**		
1	Panel Graphic additions and/or Modifications	☒	
2	Space on existing panels for new equipment? (front & rear of panel fronts)	☒	
3	Panel fronts conform to drawings	☒	
4	Access to bring new panels into control enclosure	☒	
5	Nameplate list and location of nameplates	☒	
6	Verifies that relays and meters that will be an interconnected project work are as shown on the drawings.	☒	
7	Verify auxiliary panels have breaker available or space for new breakers (if needed)	☒	
G	**Telecom Engineering**		
1	Review telecom equipment in existing control enclosure	☒	
2	Review path to get telecom circuits into the station and determine whether new underground duct bank is needed.	☒	

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Constructability Review Form: **Substation**

	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info 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	Confirm whether correct interface equipment is available (i.e.) for fiber termination or multiplexor termination	☒	
6	Confirm whether existing communications cabinets are enough to support additional telecommunications equipment installed	☒	
7	Review space for any required additional communications cabinets which may be required to support additional telecommunications equipment installed	☒	
8	Review third party Telecommunications at substation and confirm whether additional capacity or Ground Potential Rise protection is required	☒	

Photos

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

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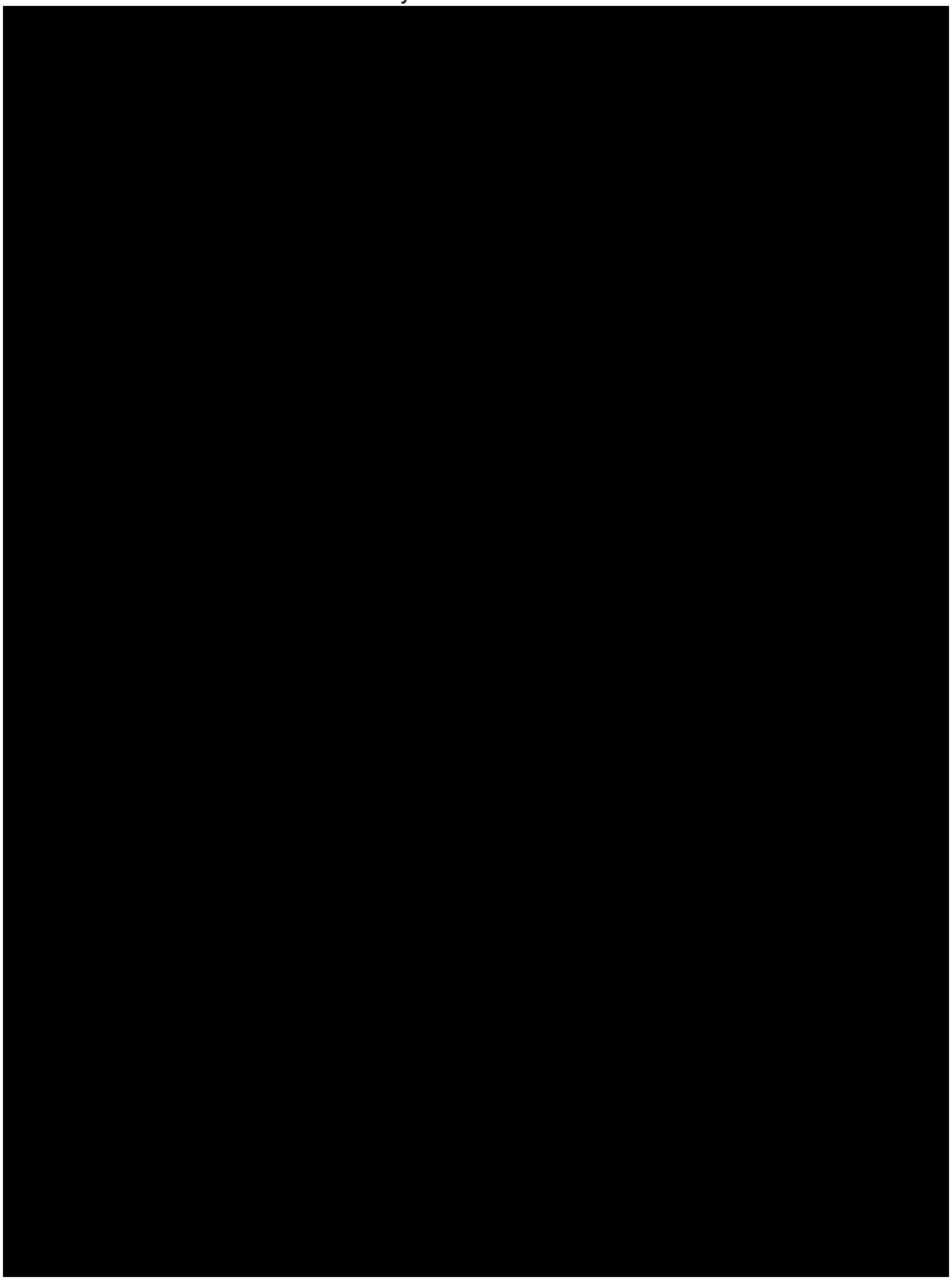
Constructability Review Form: **Substation**



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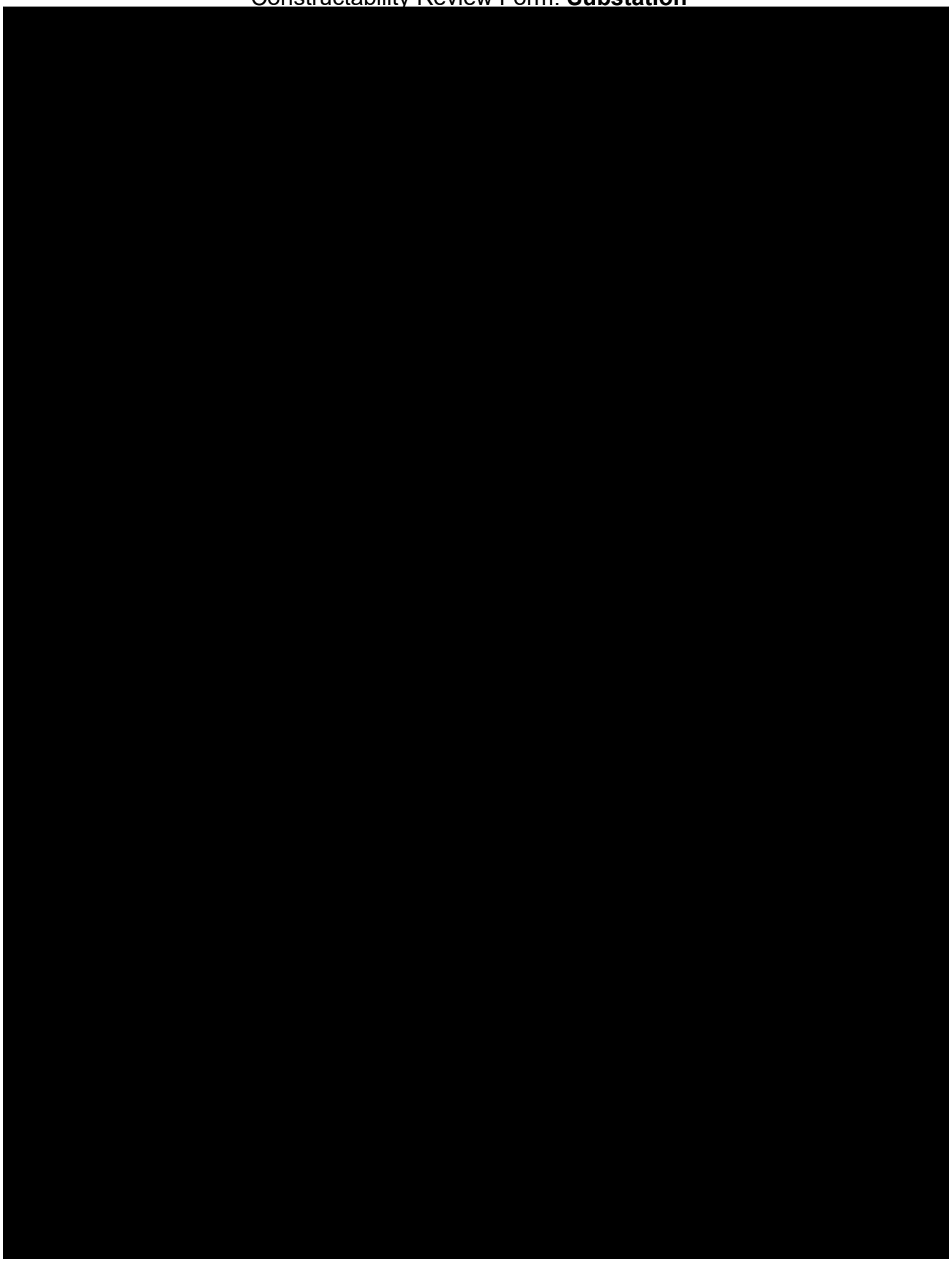
Constructability Review Form: **Substation**



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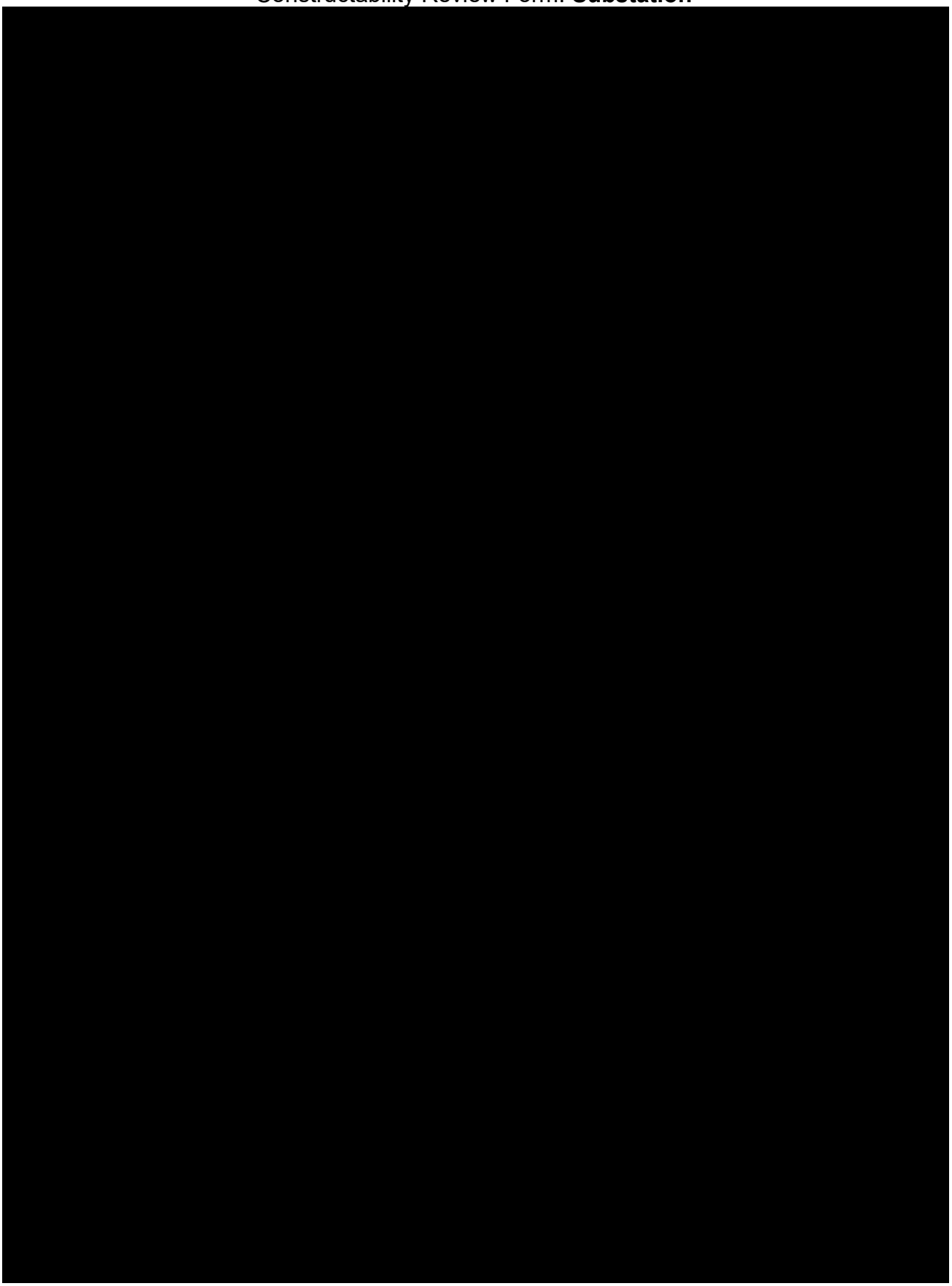
Constructability Review Form: **Substation**



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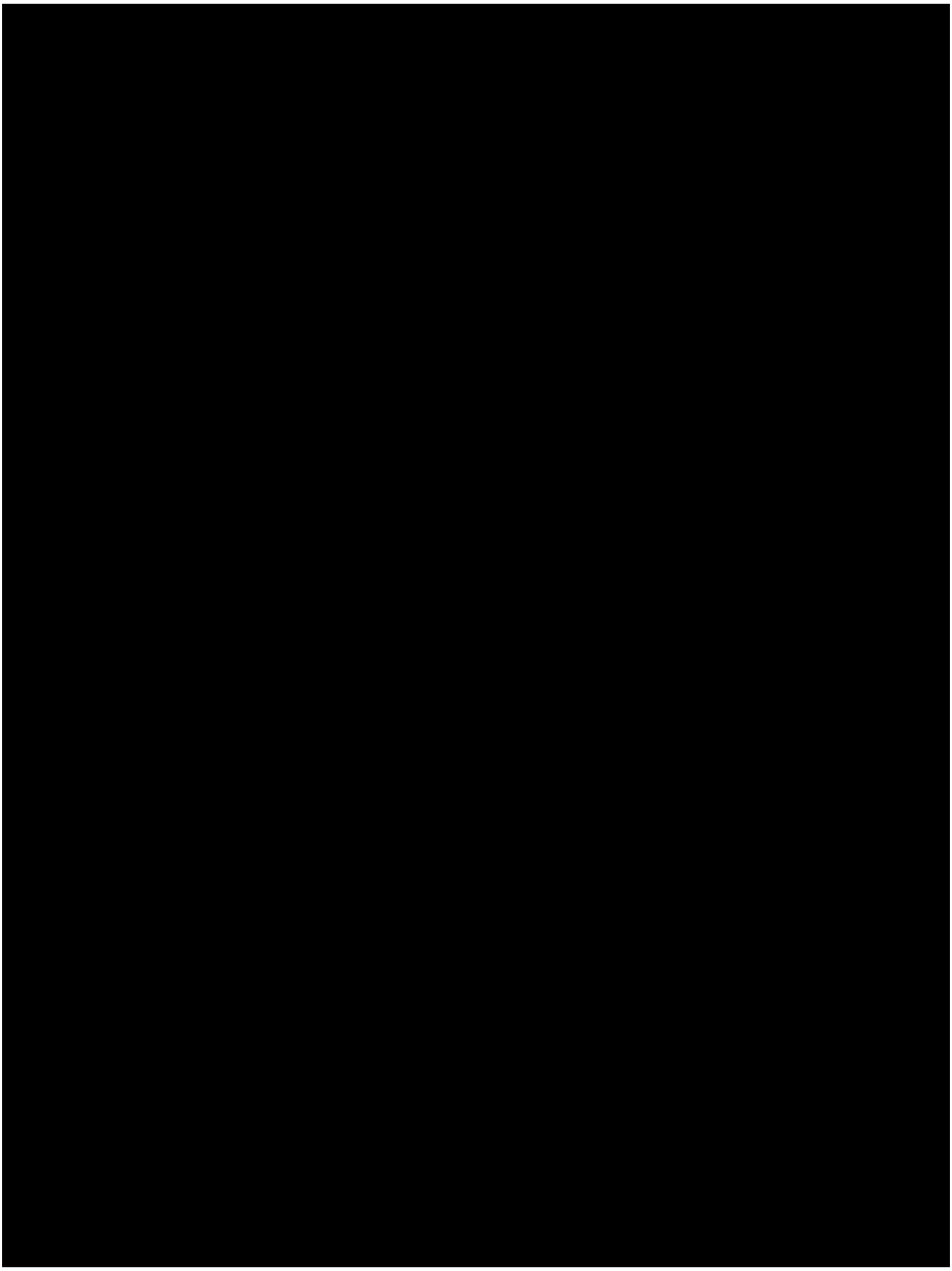
Constructability Review Form: **Substation**



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Constructability Review Form: **Substation**



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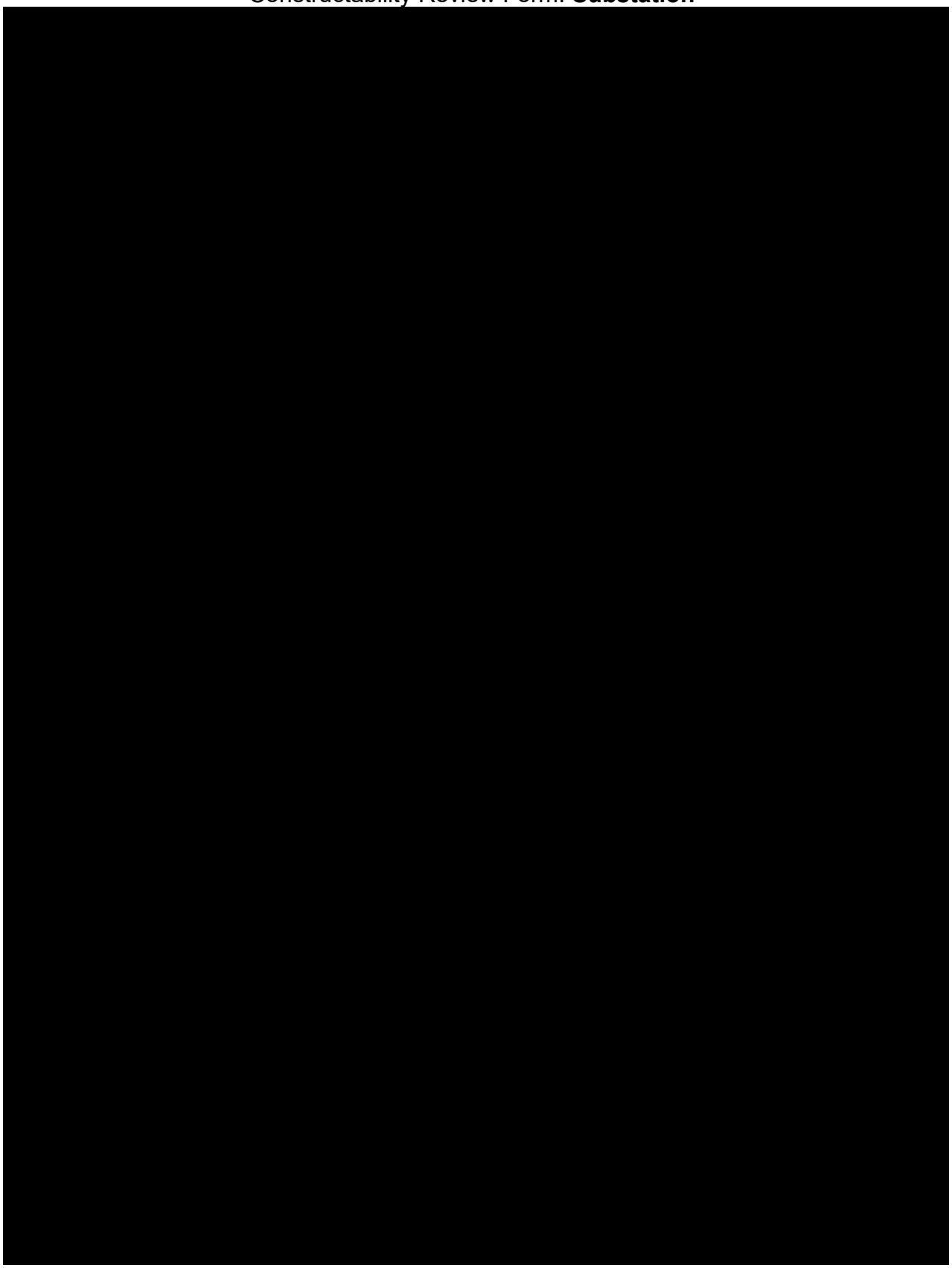
Constructability Review Form: **Substation**



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Constructability Review Form: **Substation**



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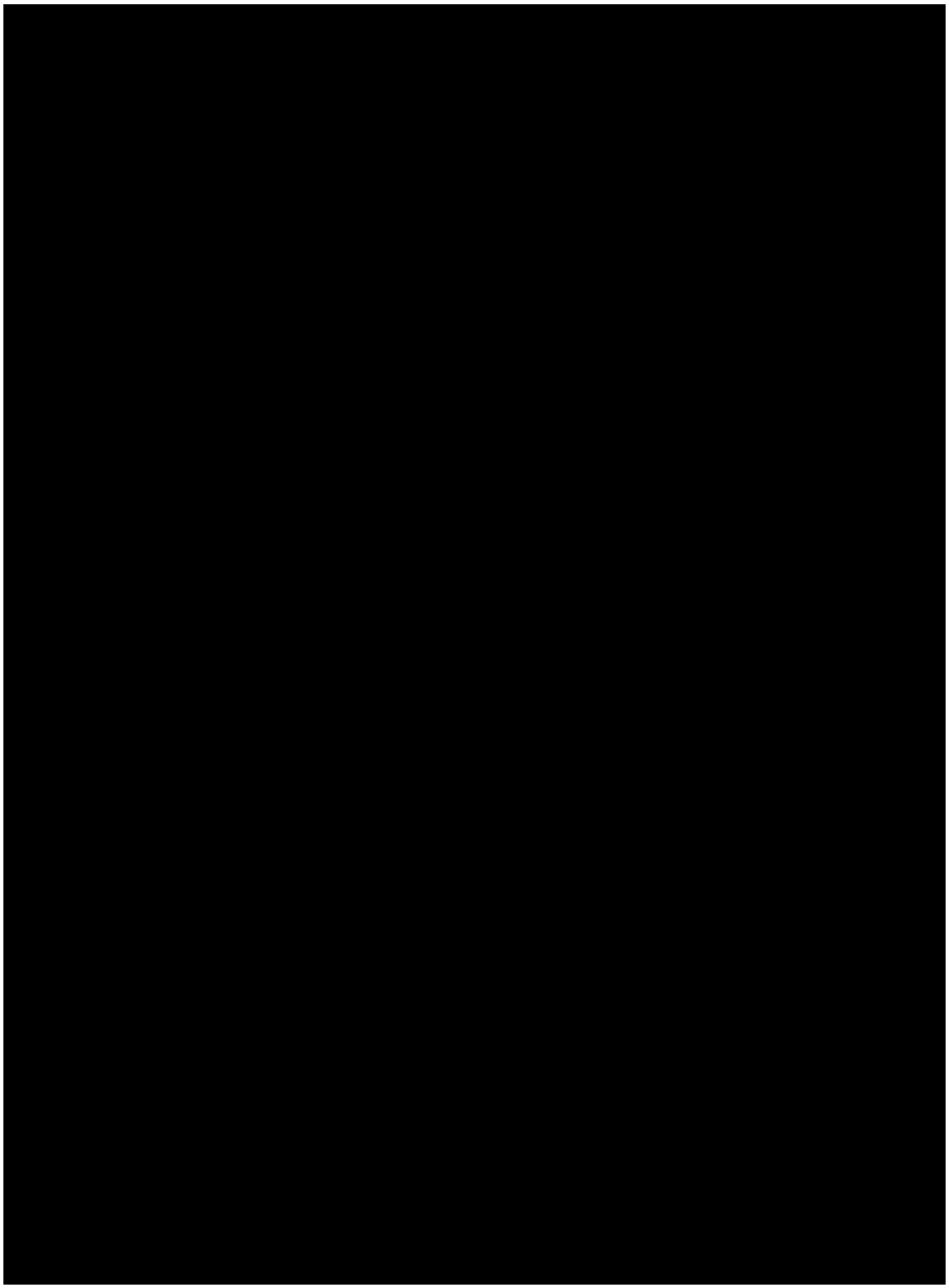
Constructability Review Form: **Substation**



Activity ID	Activity Name	Original Duration	Start	Finish	Resources	Predecessors	Successors
[redacted]	(1) OCB Replacement (TRC)	335	11/03/2020 00 A	06/07/2022 16			
[redacted]	(1) OCB Replacement (TRC)	0					
Initialization And Scope Development		194	02/08/2021 08 A	11/15/2021 08			
Initialization And Scope Development		0	02/08/2021 08 A	02/08/2021 08 A			
START	SCHEDULE START MILESTONE	0	02/08/2021 08 A				DE2350, FFR2315, A1010, PE1000, PE1400, PE110
Engineering Scope Development		3	03/05/2021 08 A	03/05/2021 16 A			
PE1000	N/R Develop Civil Substation Conceptual Engineering Scope Design in Accordance with	3	03/05/2021 08 A	03/05/2021 16 A		START	CE2310
PE1400	N/R Develop P&C Conceptual Engineering Scope Design in Accordance with Deliverab	3	03/05/2021 08 A	03/05/2021 16 A		START	
PE1100	N/R Develop Electrical Substation Conceptual Engineering Scope Design in Accordanc	3	03/05/2021 08 A	03/05/2021 16 A		START	DE2310
Civil Engineering Preliminary Design		19	04/12/2021 08 A	05/24/2021 16 A			
DE2010	Vendor Engineer Develop Civil Substation Preliminary Design	4	04/12/2021 08 A	05/06/2021 00 A		TMP1220, TMP1230	DE2330, DE2322, DE2020
DE2020	ES Engineering Review Civil Substation Preliminary Design	10	05/07/2021 00 A	05/24/2021 16 A		DE2010	CE2310, DE2350, AT2605, DSSE-500, CE1200
Electrical Engineering Preliminary Design		29	04/12/2021 08 A	05/24/2021 16 A			
DE2030	Vendor Engineer Develop Electrical Substation Preliminary Design	4	04/12/2021 08 A	05/06/2021 00 A		TMP1220, TMP1230	DE2330, DE2322, DE2040, DE2324, DE2340
DE2040	ES Engineering Review Electrical Substation Preliminary Design	10	05/07/2021 00 A	05/24/2021 16 A		DE2030	CE2310, BT2605, DSSE-1150, DSSE-520, DE2350,
P&C Engineering Preliminary Design		29	04/12/2021 08 A	05/24/2021 16 A			
DE2090	Vendor Engineer Develop P&C Preliminary Design	4	04/12/2021 08 A	05/06/2021 00 A		TMP1220, TMP1230	DE2330, DE2100
DE2100	ES Engineering Review P&C Preliminary Design	10	05/07/2021 00 A	05/24/2021 16 A		DE2090	CE2310, DE2350, BT2605, DSSE-510, PC1100, NX
Project Release Partial Funding PAF		56	03/01/2021 08 A	03/22/2021 16 A			
CE2321	N/R - Schedule Preliminary Constructability Walk Down	5	03/01/2021 08 A	03/05/2021 16 A		CE2310	CE2322
CE2330	N/R - Review Siting & Permitting (If Required)	5	03/01/2021 08 A	03/05/2021 16 A			
CE2340	N/R - Preliminary ISD Date Locked Down	5	03/01/2021 08 A	03/05/2021 16 A		CE2310	ATCGE1010
CE2322	N/R - Conduct Preliminary Constructability Walk Down	5	03/05/2021 08 A	03/11/2021 16 A		CE2321	CE2324
CE2310	N/R - Develop Electrical Substation Preliminary Scope	5	03/22/2021 08 A	03/22/2021 16 A		PE1000, DE2100, DE2040, DE2020	AT3001, A3370, CE2362, ATCGE1010, CE2340, CE
CE2324	N/R - Release Constructability Form Review Complete	5	03/22/2021 08 A	03/22/2021 16 A		CE2322	CE2351, ATCGE1010
CE2351	N/R - Estimating Request Initiated	3	03/22/2021 08 A	03/22/2021 16 A		CE2362, CE2324, ATCGE1010	CE2352
CE2352	N/R - Review Preliminary Grade Estimate (-25%+50%)	5	03/22/2021 08 A	03/22/2021 16 A		ATCGE1010, CE2351	PAPF2310, CE2341
CE2341	N/R - Develop P6 Schedule for Release EPAC Submittal	5	03/22/2021 08 A	03/22/2021 16 A		CE2352	PAPF2310
PAPF2310	N/R - Submit Partial Funding PAF for Internal Review	3	03/22/2021 08 A	03/22/2021 16 A		CE2341, CE2352	PAPF2311
PAPF2311	N/R - Incorporate Internal Review Comments & Submit Partial Funding PAF to EPAC f	3	03/22/2021 08 A	03/22/2021 16 A		PAPF2310	PAPF2312
PAPF2312	N/R - Present Partial Funding PAF at EPAC Meeting	1	03/22/2021 08 A	03/22/2021 16 A		PAPF2311	PAPF2313
PAPF2313	N/R - Incorporate EPAC Partial Funding PAF Review Comments	3	03/22/2021 08 A	03/22/2021 16 A		PAPF2312	PAPF2314
PAPF2314	N/R - EPAC Partial Funding Approval -Release	10	03/22/2021 08 A	03/22/2021 16 A		PAPF2313	FPR2315
ATCGE1010	N/R - Develop Preliminary Grade Estimate (-25%+50%)	6	03/22/2021 08 A	03/22/2021 16 A		CE2362, CE2340, CE2310, CE2324	CE2352, CE2351
CE2362	N/R - Develop Unitized Cost Estimate	5	03/22/2021 08 A	03/22/2021 16 A		CE2310	ATCGE1010, CE2351
FPR2315	N/R - Partial Funding Release Complete Power Plan Approval (Release SCHEDULE T	0		03/22/2021 16 A		PAPF2314	CE1200
EPAC Full Funding		93	02/25/2021 08 A	07/23/2021 16			
DE2324	Project Constructability Review Complete	2	02/25/2021 08 A	02/25/2021 16 A		DE2322, DE2030	PAFF2310, DE2350
DE2310	Develop Electrical Substation Concept Scope	5	03/15/2021 08 A	03/15/2021 16 A		PE1100	DE2340, DE2321, DE2350, DE2330
DE2321	Schedule Planning Constructability Walk Down	5	03/15/2021 08 A	03/15/2021 16 A		DE2310	DE2322
DE2340	Preliminary ISD Date Locked Down	2	03/15/2021 08 A	03/15/2021 16 A		DE2310, DE2030	DE2350
DE2330	N/R (per S.A. 3/22/21) Review Detail Siting & Permitting (If Required)	1	03/22/2021 00 A	03/22/2021 00 A		DE2310, DE2030, DE2010, DE2090	DE2322
DE2322	Conduct Planning Constructability Walk Down	1	03/22/2021 08 A	03/22/2021 16 A		DE2321, DE2030, DE2010, DE2330	LCE100, DE2324
DE2350	Develop Planning Grade Estimate (+/-25% Full Funding)	5	06/01/2021 08 A	06/03/2021 16 A		DE2340, DE2310, DE2020, DE2100, STAR	DE2351, PAFF2310
DE2351	Estimating Request Initiated	1	06/07/2021 08	06/07/2021 16		DE2350	DE2352
DE2352	Review Planning Grade Estimate (-25%+25%)	5	06/14/2021 08	06/18/2021 16*		DE2351	DE2341

TASK filter: All Activities

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Activity ID	Activity Name	Original Duration	Start	Finish	Resources	Predecessors	Successors
DE2341	Develop P6 Schedule for Release EPAC Submittal	4	06/14/2021 08	06/17/2021 16	[redacted]	DE2352	PAFF2310
PAFF2310	Submit Full Funding PAF for Internal Review	1	06/18/2021 08	06/18/2021 16		DE2341, DE2324, DE2040, DE2350	PAFF2311
PAFF2311	Incorporate Internal Review Comments & Submit Full Funding PAF to EPAC for Revie	1	06/28/2021 08	06/28/2021 16*		PAFF2310	PAFF2312
PAFF2312	EPAC Full Funding Meeting	0		07/07/2021 16*		PAFF2311	PAFF2313, LCE100
PAFF2313	Incorporate EPAC Full Funding PAF Review Comments	2	07/08/2021 08	07/09/2021 16		PAFF2312	PAFF2314
PAFF2314	EPAC Full Funding Approval - Release	0		07/09/2021 16		PAFF2313	DSSE-520, DSSE-500, FFR2315
FFR2315	Full Funding PowerPlan Approval (Release Complete)	10	07/12/2021 08	07/23/2021 16		START, PAFF2314	A3550, A3430, A3390, A3420, A3460, A3500, A3540
T-Minus Milestones Civil		186	02/16/2021 16 A	11/12/2021 08			
AT3001	A-T-30.01 Engr Project Scoping Document Issued (Scope Lockdown) ** Re	0		02/16/2021 16 A		CE2310	AT00
AT2605	Preliminary Design / Engineering Completed - Civil	0		05/24/2021 16 A		DE2020	AT00
AT0814	Construction Contracts / PSA in Place	0		06/07/2021 08		A3420, A3460	AT00
AT1811	Detailed Design / Engineering Completed - Civil	0		06/29/2021 16		CE1210	AT00
AT0805C	Civil IFC - Civil (BG) w/BOM	0		07/29/2021 16		CE1320	AT00
AT2003	Go / No-Go [CAN] Construction Authorization Notice Form Complete	0		08/02/2021 16		A1170	AT00
AT0401	Final Civil Material Delivered to Site	0		08/30/2021 16		DSSE-560	AT00
AT00	A-T-00 Start Construction Civil	0	11/12/2021 08*			AT0814, AT3001, AT2003, AT2605, AT1811,	A1120
T-Minus Milestones Electrical		130	03/09/2021 16 A	11/15/2021 08			
BT1805	N/R A-T-18.05 NX-9 Rating to LCC + ISO for New 'T' Equipment (NC=Per Procedure/	0		03/09/2021 16 A			BT00
BT0814	Construction Contracts / PSA In Place (Internal Resources)	0		03/31/2021 16 A		A3460, A3420	BT00
BT1003	N/R - PPA (I.3.9) Approval Received	0		03/31/2021 16 A			BT00
BT0901	N/R - T-09 Protection System Data - OP-24 Requirement (Tie to First Start of Constru	0		03/31/2021 16 A			BT00
BT0404	All Final Relay Protective Settings Issued	0		04/12/2021 16 A		PC1400	BT00
BT2605	Preliminary Design / Engineering Completed	0		05/24/2021 08 A		DE2100, DE2040	BT00
BT1202	P/C Description / Draft OI Issued To LCC	0		06/07/2021 08			BT00
BT1811	Detailed Design / Engineering Completed	0		06/22/2021 16		EE1210, PC1110	BT00
BT0409	T-04 ALL FIRM TOA APPLICATIONS DUE TO LCC	0		06/29/2021 16		OPERM1000, A1250	BT00
BT2404	Determine / Assign Commissioning Engineer	0		07/16/2021 16		LCE200	BT00
BT0805P	IFC - P&C w/BOM	0		07/21/2021 16		PC1330	BT00
BT0805E	IFC - Electrical (AG) w/BOM	0		07/22/2021 16		EE1310	BT00
BT1201	SCADA Data (Tab) Sheets Sent to LCC	0		07/22/2021 16		CSD1030, CSD1000	BT00
BT2003	Go / No-Go [CAN] Construction Authorization Notice Form Complete	0		08/02/2021 16		B1170	BT00
BT1301	Commissioning Plan Complete	0		08/16/2021 16		LCE400	BT00
BT0401	Final Material Receipt Review Completed *ES Purchased*	0		09/07/2021 16		DSSE-1130, DSSE-560, DSSE-550, DSSE	BT00
BT0301	T-03 NX-9 Ratings to LCC & ISO for Existing Equipment (EM=Per Procedure/15 busin	0		09/30/2021 16*		NX9A-NC23	BT00
BT00	T-00 Start of Construction (Work Description, INCLUDE the WO#)	0	11/15/2021 08*			BT0404, BT2404, BT0409, BT1301, BT081	A1130, CSM
Overhead / Indirects		10	07/20/2021 08	08/02/2021 16			
PROJECT MANAGEMENT		10	07/20/2021 08	08/02/2021 16			
A1170	Prepare Civil CAN (Construction Authorization Notice)	10	07/20/2021 08	08/02/2021 16	[redacted]	OPERM1010, A3420, A3460	AT2003
B1170	Prepare Electrical CAN (Construction Authorization Notice)	10	07/20/2021 08	08/02/2021 16		OPERM1010, A3420, A3460	BT2003
ROW AND EASEMENTS		0					
ENVIRONMENTAL APPROVALS AND PERMITS		0					
SITING APPROVALS AND PERMITS		50	03/09/2021 08 A	03/09/2021 16 A			
PERMITTING - Local - Short Form		45	03/09/2021 08 A	03/09/2021 16 A			
A3590	N/R - Permitting - PM Send Scope to Siting Team	5	03/09/2021 08 A	03/09/2021 16 A			A3600
A3600	N/R -Permitting - Siting Team Review Scope to Determine Siting Requirements (e.g. zc	10	03/09/2021 08 A	03/09/2021 16 A		A3590	A3610
A3610	N/R -Permitting - If Requirements Exist, Pursue Appropriate Actions, Permits, etc.	30	03/09/2021 08 A	03/09/2021 16 A		A3600	

TASK filter: All Activities

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Activity ID	Activity Name	Original Duration	Start	Finish	Resources	Predecessors	Successors
PERMITTING - Local - Long Form		50	03/09/2021 08 A	03/09/2021 16 A			
A3620	N/R -Permitting - PM Send Scope to Siting Team	5	03/09/2021 08 A	03/09/2021 16 A			A3630
A3630	N/R -Permitting - Siting Team Review Scope to Determine Siting Requirements (e.g. zc	10	03/09/2021 08 A	03/09/2021 16 A		A3620	A3640
A3640	N/R -Permitting - If transformer changes substation footprint, conduct zoning review	5	03/09/2021 08 A	03/09/2021 16 A		A3630	A3650
A3650	N/R -Permitting - Meet with Building Inspector	10	03/09/2021 08 A	03/09/2021 16 A		A3640	A3660
A3660	N/R -Permitting - Obtain Special Use Permit	20	03/09/2021 08 A	03/09/2021 16 A		A3650	
Engineering & Design		213	11/03/2020 00 A	12/23/2021 16			
Engineering Services Staffing		1	03/22/2021 08 A	03/22/2021 16 A			
A3370	Decision Required Regarding Engineering Staffing (ES, COC, BID)	1	03/22/2021 08 A	03/22/2021 16 A		CE2310	TMP1140
EOC - Engineer of Choice Process		65	11/03/2020 00 A	04/12/2021 16 A			
TMP1140	EOC- Provide RFP to Single Vendor	2	11/03/2020 00 A	11/04/2020 00 A		A3370	TMP1150
TMP1150	EOC- Vendor Responds with Proposal	5	11/05/2020 00 A	11/17/2020 00 A		TMP1140	TMP1180
TMP1180	EOC- EOC Committee Reviews at Bi-Weekly Meeting & Approves	1	01/26/2021 00 A	01/26/2021 00 A		TMP1150	TMP1200
TMP1200	EOC- DR Prepared by Project Engineer & Project Controls #	3	01/29/2021 00 A	02/03/2021 00 A		TMP1180	TMP1220, TMP1230
TMP1220	EOC- PO Issued for Vendor -Preliminary Design Effort #	10	02/01/2021 00 A	02/03/2021 00 A		TMP1200	DE2010, DE2030, DE2090, TMP1230
TMP1230	Vendor Receives NTP to start 70%	30	04/12/2021 08 A	04/12/2021 16 A		TMP1200, TMP1220	DE2010, DE2030, DE2090
Civil Engineering Detail Design		22	05/25/2021 08 A	06/29/2021 16			
CE1200	Vendor Engineer Develop Civil Substation Detail Design	18	05/25/2021 08 A	06/15/2021 16		FPR2315, DE2020	OPERM1000, CE1210
CE1210	ES Engineering Review Civil Substation Detail Design	10	06/16/2021 08	06/29/2021 16		CE1200	AT1811, CE1300
Civil Engineering IFC Design		21	06/30/2021 08	07/29/2021 16			
CE1300	Vendor Engineer Develop Civil Substation IFC	10	06/30/2021 08	07/14/2021 16		CE1210	CE1310
CE1310	ES Engineering Review Civil Substation IFC	10	07/15/2021 08	07/28/2021 16		CE1300	CE1320
CE1320	ES Engineering Issue Civil Substation IFC	1	07/29/2021 08	07/29/2021 16		CE1310	AT0805C
Electrical Engineering		5	07/16/2021 08	07/22/2021 16			
CSD1000	PE Initiate CASCADE Forms (Appendix A) for Construction Package	5	07/16/2021 08	07/22/2021 16		EE1310	BT1201
Electrical Engineering Detail Design		20	05/25/2021 08 A	06/22/2021 16			
EE1200	Vendor Engineer Develop Electrical Substation Detail Design	18	05/25/2021 08 A	06/08/2021 16*		DE2040	OPERM1000, EE1210
EE1210	ES Engineering Review Electrical Substation Detail Design	10	06/09/2021 08	06/22/2021 16		EE1200	A1250, BT1811, EE1300
Electrical Engineering IFC Design		21	06/23/2021 08	07/22/2021 16			
EE1300	Vendor Engineer Develop Electrical Substation IFC	11	06/23/2021 08	07/08/2021 16		EE1210	EE1310
EE1310	ES Engineering Review Electrical Substation IFC	10	07/09/2021 08	07/22/2021 16		EE1300	BT0805E, CSD1000
Substation - Preliminary Thermal Data		116	03/25/2021 00 A	09/30/2021 16			
NX9A-NC01	N/R (per G.B. 3/25/21) PE Updates 1-Line Nomenclature Dwgs & Complete PE Check	5	03/25/2021 00 A	03/25/2021 00 A		DE2100	NX9A-NC03
NX9A-NC03	LTRC Reviews and Makes "GO / NO-GO" Decision for 1-Line Nomenclature - GO!	5	05/10/2021 08 A	05/14/2021 16 A		NX9A-NC01	NX9A-NC05
NX9A-NC05	LTRC Submits 1-Line Nomenclature to TRC	5	06/21/2021 08*	06/25/2021 16		NX9A-NC03	NX9A-NC07
NX9A-NC07	LTRC Reviews and Makes "GO / NO-GO" Decision for Thermal Ratings	5	08/10/2021 08	08/16/2021 16		NX9A-NC05	NX9A-NC09
NX9A-NC09	LTRC Requests P&C Checklist	5	08/17/2021 08	08/23/2021 16		NX9A-NC07	NX9A-NC11
NX9A-NC11	P&C Develops and Provides LTRC with P&C Checklist (M7-EN-3006.1)	5	08/24/2021 08	08/30/2021 16		NX9A-NC09	NX9A-NC13
NX9A-NC13	LTRC Reviews and Sends Thermal Rating Data for TRC Review	5	08/31/2021 08	09/07/2021 16		NX9A-NC11	NX9A-NC15
NX9A-NC15	TRC Reviews and Approves Thermal Rating Data	5	09/08/2021 08	09/14/2021 16		NX9A-NC13	NX9A-NC17
NX9A-NC17	LTRC Sends Thermal Rating Data for Approval & Submit to NURS	5	09/15/2021 08	09/21/2021 16		NX9A-NC15	NX9A-NC19
NX9A-NC19	Scheduler @ NURS email "Submitted for PP Review" - Updates NURS with DOE	1	09/22/2021 08	09/22/2021 16		NX9A-NC17	NX9A-NC21
NX9A-NC21	TRC Review and Submit NX-9 Data to LCC + ISO-NE for S/S Thermal Rating	5	09/23/2021 08	09/29/2021 16		NX9A-NC19	NX9A-NC23
NX9A-NC23	Scheduler @ NURS email "Submitted for DOE Monitoring" - Updates T-3, EquipDOE,	1	09/30/2021 08	09/30/2021 16		NX9A-NC21	BT0301
Substation - NX-9 Pre NX9-DOE		1	12/13/2021 08	12/13/2021 16			
NX9500	Scheduler - Send Email for 48Hrs Notification before DOE.	1	12/13/2021 08	12/13/2021 16		CFM	NX9FINAL50

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Substation - NX-9 Post NX9-DOE/ISD		8	12/14/2021 08	12/23/2021 16			
NX9FINAL5i	Review + Affirm Accuracy of NX-9 for ISO Submission (Tie after Equip DOE or ISD)	3	12/14/2021 08	12/16/2021 16		NX9500	NX9FINAL60
NX9FINAL6i	[If Required] Receive + Issue Final Affirmed NX-9 Data to NURS	5	12/17/2021 08	12/23/2021 16		NX9FINAL50	FINISH
P&C Engineering		5	07/15/2021 08	07/21/2021 16			
CSD1030	PE Initiate CASCADE Forms (Appendix A) for Construction Package	5	07/15/2021 08	07/21/2021 16		PC1330	BT1201
P&C Engineering Detail Design		18	05/25/2021 08 A	06/22/2021 16			
PC1100	Vendor Engineer Develop P&C Detail Design	18	05/25/2021 08 A	06/08/2021 16		DE2100	OPERM1000, PC1110
PC1110	ES Engineering Review P&C Detail Design	10	06/09/2021 08	06/22/2021 16		PC1100	BT1811, PC1320, A7550
P&C Design Package		32	06/07/2021 08	07/21/2021 16			
OPERM100	Submit Outage Permit / TOA Request - (18 weeks)	10	06/07/2021 08	06/18/2021 16		PC1100, EE1200, CE1200	BT0409, OPERM1010
OPERM101	Outage Permit / TOA Request - Review/ Approve (18 weeks)	20	06/21/2021 08	07/19/2021 16		OPERM1000	B1170, A1170, CSM
PC1320	Vendor Engineer Develop P&C IFC	10	06/23/2021 08	07/07/2021 16		PC1110	PC1330
PC1330	ES Engineering Review P&C IFC	10	07/08/2021 08	07/21/2021 16		PC1320	BT0805P, CSD1030
Relay Settings		1	04/12/2021 08 A	04/12/2021 16 A			
A7420	N/R (per TP 4/12/21)P&C Review Relay Settings Basis Document and Provides Comn	1	04/12/2021 08 A	04/12/2021 16 A		A7540	A7500
A7540	N/R (per TP 4/12/21)Vendor Prepares Relay Settngs Basis Document (IFR)	1	04/12/2021 08 A	04/12/2021 16 A		A7551	A7420
A7500	N/R (per TP 4/12/21)Vendor Incorporate Relay Settings Comments & IFC	1	04/12/2021 08 A	04/12/2021 16 A		A7420	A7440
A7440	N/R (per TP 4/12/21)P&C Prepare and Send Relay Settings to Field	1	04/12/2021 08 A	04/12/2021 16 A		A7500	PC1400
A7550	N/R (per TP 4/12/21)Provide Relay Setting Information to Vendor (ASPEN Model, As-E	1	04/12/2021 08 A	04/12/2021 16 A		PC1110	A7551
A7551	N/R (per TP 4/12/21)Vendor Makes Go/No-Go Decision on Relay Settings	1	04/12/2021 08 A	04/12/2021 16 A		A7550	A7540
PC1400	N/R (per TP 4/12/21)Complete P&C Relay Settings	0		04/12/2021 16 A		A7440	BT0404
Material Procurement		94	04/19/2021 08 A	09/07/2021 16			
Material - P&C		65	05/14/2021 08 A	09/07/2021 16			
DSSE-510	N/R (per DB 14-5-21) MATERIAL - P&C- Prepare & Issue DR	5	05/14/2021 08 A	05/14/2021 16 A		DE2100	DSSE-980
DSSE-980	MATERIAL - P&C - Procurement Issue PO	10	06/07/2021 08	06/18/2021 16		DSSE-510	DSSE-1000
DSSE-1000	MATERIAL - P&C - Material Vendor Delivery Leadtime	80	06/19/2021 08	09/06/2021 16		DSSE-980	DSSE-1010
DSSE-1010	MATERIAL - P&C - Confirm Material Delivery to Site	1	09/07/2021 08	09/07/2021 16		DSSE-1000	BT0401
Material - Electrical		36	07/12/2021 08	08/30/2021 16			
DSSE-520	MATERIAL - Electrical - Prepare & Issue DR	5	07/12/2021 08	07/16/2021 16		DE2040, PAFF2314	DSSE-530, DSSE-1020
DSSE-530	Electrical (AG) Material Ordered	0		07/16/2021 16		DSSE-520	DSSE-1020
DSSE-1020	MATERIAL - ELectrical - Procurement Issue PO	10	07/19/2021 08	07/30/2021 16		DSSE-530, DSSE-520	DSSE-1030
DSSE-1030	MATERIAL - ELectrical - Material Vendor Delivery Leadtime	30	07/31/2021 08	08/29/2021 16		DSSE-1020	DSSE-550
DSSE-550	MATERIAL - Electrical - Confirm Material Delivery to Site	1	08/30/2021 08	08/30/2021 16		DSSE-1030	BT0401
Material - Civil		36	07/12/2021 08	08/30/2021 16			
DSSE-500	MATERIAL - CIVIL - Prepare & Issue DR	5	07/12/2021 08	07/16/2021 16		DE2020, PAFF2314	DSSE-540, DSSE-1040
DSSE-540	Civil (BG) Material Ordered	0		07/16/2021 16		DSSE-500	DSSE-1040
DSSE-1040	MATERIAL - CIVIL - Procurement Issue PO	10	07/19/2021 08	07/30/2021 16		DSSE-540, DSSE-500	DSSE-1050
DSSE-1050	MATERIAL - CIVIL - Material Vendor Delivery Leadtime	30	07/31/2021 08	08/29/2021 16		DSSE-1040	DSSE-560
DSSE-560	MATERIAL - CIVIL - Confirm Material Delivery to Site	1	08/30/2021 08	08/30/2021 16		DSSE-1050	AT0401, BT0401
Material - Breakers		89	04/19/2021 08 A	08/18/2021 16			
DSSE-1160	MATERIAL - BREAKER - Procurement Issue PO	10	04/19/2021 08 A	04/23/2021 16 A		DSSE-1180, DSSE-1150	DSSE-1140
DSSE-1140	MATERIAL - BREAKER - Material Vendor Delivery Leadtime	127	04/26/2021 08 A	08/17/2021 16		DSSE-1160	DSSE-1130
DSSE-1150	MATERIAL - BREAKER - Prepare & Issue DR (breakers)DR# 514169	5	06/21/2021 08*	06/25/2021 16		DE2040	DSSE-1180, DSSE-1160
DSSE-1180	Breaker (AG) Material Ordered	0		06/25/2021 16		DSSE-1150	DSSE-1160
DSSE-1130	MATERIAL - BREAKER - Confirm Material Delivery to Site	1	08/18/2021 08	08/18/2021 16		DSSE-1140	BT0401
Material - Switch		64	06/07/2021 08	09/04/2021 16			

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DSSE-1210	MATERIAL - Switch - Prepare & Issue DR (breakers)DR# 514169	5	06/07/2021 08	06/11/2021 16		DE2040	DSSE-1230, DSSE-1220
DSSE-1230	Switch (AG) Material Ordered	0		06/11/2021 16		DSSE-1210	DSSE-1220
DSSE-1220	MATERIAL - Switch - Procurement Issue PO	10	06/14/2021 08	06/25/2021 16		DSSE-1230, DSSE-1210	DSSE-1200
DSSE-1200	MATERIAL - Switch - Material Vendor Delivery Leadtime	70	06/26/2021 08	09/03/2021 16		DSSE-1220	DSSE-1190
DSSE-1190	MATERIAL - Switch - Confirm Material Delivery to Site	1	09/04/2021 08	09/04/2021 16		DSSE-1200	BT0401
Construction		147	03/22/2021 08 A	12/27/2021 16			
Construction Services Selection		1	03/31/2021 08 A	03/31/2021 16 A			
A3550	STAFFING DECISION: EVERSOURCE OR OUTSOURCE BID/COC CONSTRUCT	1	03/31/2021 08 A	03/31/2021 16 A		FFR2315	A3430, A3390
Contractor Of Choice Group		35	03/31/2021 08 A	03/31/2021 16 A			
A3390	N/R - CONST.SERVICES - COC - Eversource Provides Spec / RFQ to COC	5	03/31/2021 08 A	03/31/2021 16 A		FFR2315, A3550	A3470, A3400
A3400	N/R - CONST.SERVICES - COC - COC Evaluates Spec and Provides Quote	10	03/31/2021 08 A	03/31/2021 16 A		A3390	A3410
A3410	N/R - CONST.SERVICES - COC - Eversource Reviews Quote from COC	10	03/31/2021 08 A	03/31/2021 16 A		A3400	A3420
A3420	N/R - CONST.SERVICES - COC - Eversource Awards Contract - PO Issued	10	03/31/2021 08 A	03/31/2021 16 A		FFR2315, A3410	B1170, AT0814, BT0814, A1170
BID Process Group		65	03/22/2021 08 A	03/22/2021 16 A			
A3430	N/R - CONST.SERVICES - BID - Eversource provide Spec / RFP	15	03/22/2021 08 A	03/22/2021 16 A		FFR2315, A3550	A3510, A3440
A3440	N/R - CONST.SERVICES - BID - Contractors Evaluate RFP and Provide Proposal	15	03/22/2021 08 A	03/22/2021 16 A		A3430	A3450
A3450	N/R - CONST.SERVICES - BID - Eversource reviews contractor proposals	15	03/22/2021 08 A	03/22/2021 16 A		A3440	A3460
A3460	N/R - CONST.SERVICES - BID - Contract is Awarded - PO Issued	20	03/22/2021 08 A	03/22/2021 16 A		FFR2315, A3450	B1170, AT0814, BT0814, A1170
Construction - Civil		5	11/12/2021 08	11/18/2021 16			
A1120	Construction - Civil	5	11/12/2021 08	11/18/2021 16		AT00	A1130, CV1000
Construction - Electrical		14	11/19/2021 08	12/02/2021 16			
A1130	Construction - Electrical	14	11/19/2021 08	12/02/2021 16		BT00, A1120	CFM
Construction - Const. Rep Tasks		128	06/23/2021 08	12/27/2021 16			
A1250	Construction Rep SUBMIT OUTAGE REQUESTS for NON-transformer equipment (4	5	06/23/2021 08	06/29/2021 16		EE1210	BT0409
A1260	Construction Rep Finalize CASCADE Forms (within 14 days folloiwng ISD) - Group 1	10	12/13/2021 08	12/27/2021 16		CFM	A1030
Construction Resource Tracking		19	11/15/2021 08	12/10/2021 16			
ConRep-S	CONSTRUCTION REP	19	11/15/2021 08	12/10/2021 16		CSM	CFM
CONSTelec	ELECTRICIAN	19	11/15/2021 08	12/10/2021 16		CSM	CFM
Construction Outages		19	11/15/2021 08	12/10/2021 16			
TOA-Const	OUTAGE / General Construction Work (14S-3X3-2)	23	11/15/2021 08	12/10/2021 16		CSM	SWINP1B, SWOUP1B, CFM
CSM	Construction Start Milestone	0	11/15/2021 08			OPERM1010, BT00	SWINP1B, ConRep-S, CONSTelec, TOA-Const
SWOUP1B	RESOURCE ONLY ACTIVITY - Construction - Switch Out (14S-3X3-2)	1	11/15/2021 08	11/15/2021 16		TOA-Const	CFM
SWINP1B	RESOURCE ONLY ACTIVITY - Construction - Switch In (14S-3X3-2)	1	12/10/2021 08	12/10/2021 16		TOA-Const, CSM	CFM
CFM	Construction Finish Milestone	0		12/10/2021 16		A1130, CONSTelec, ConRep-S, SWOUP1E	NX9500, A1260, DSSE-1100, A1020, A1030, ISD, A1
ISD	Equipment in Service Date (requires FOOB constraint)	0		12/10/2021 16		CFM, LCE700	LCE800
Test And Commissioning		156	03/22/2021 08 A	10/29/2021 16			
Test Services - Staffing Decision		5	03/22/2021 08 A	03/22/2021 16 A			
A1010	STAFFING DECISION: EVERSOURCE OR OUTSOURCE BID/COC TESTING	5	03/22/2021 08 A	03/22/2021 16 A		START	A3510, A3470
LCE Planning		49	07/08/2021 08	09/15/2021 16			
LCE100	PM to Request Lead Commissioning Engineer GO/NO-GO	2	07/08/2021 08	07/09/2021 16		DE2322, PAFF2312	LCE200
LCE200	Assign Lead Commissioning Engineer	5	07/12/2021 08	07/16/2021 16		LCE100	BT2404, LCE310, LCE320
LCE400	Develop Test and Commissioning Plan	21	07/19/2021 08	08/16/2021 16		LCE310, LCE320	BT1301, LCE500
LCE500	LCE Review and Approve Vendor's Test and Commissioning Plan	21	08/17/2021 08	09/15/2021 16		LCE400	LCE610, LCE620
Test Services - Contractor Of Choice		62	03/22/2021 08 A	03/22/2021 16 A			
A3470	N/R - TEST SERVICES - COC - Eversource Provides Spec / RFQ to COC	5	03/22/2021 08 A	03/22/2021 16 A		A3390, A1010	A3480
A3480	N/R - TEST SERVICES - COC - COC Evaluates Spec and Provides Quote	10	03/22/2021 08 A	03/22/2021 16 A		A3470	A3490

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Activity ID	Activity Name	Original Duration	Start	Finish	Resources	Predecessors	Successors
A3490	N/R - TEST SERVICES - COC - Eversource Reviews Quote from COC	10	03/22/2021 08 A	03/22/2021 16 A		A3480	A3500
A3500	N/R - TEST SERVICES - COC - Eversource Awards Contract - PO Issued	10	03/22/2021 08 A	03/22/2021 16 A		FFR2315, A3490	LCE310, LCE320
Test Services - BID Process		65	03/22/2021 08 A	03/22/2021 16 A			
A3510	N/R - TEST SERVICES - BID - Eversource provide spec / RFP	15	03/22/2021 08 A	03/22/2021 16 A		A3430, A1010	A3520
A3520	N/R - TEST SERVICES - BID - Contractors Evaluate RFP and Provide Proposal	15	03/22/2021 08 A	03/22/2021 16 A		A3510	A3530
A3530	N/R - TEST SERVICES - BID - Eversource reviews contractor proposals	15	03/22/2021 08 A	03/22/2021 16 A		A3520	A3540
A3540	N/R - TEST SERVICES - BID - Eversource awards contract - PO Issued	20	03/22/2021 08 A	03/22/2021 16 A		FFR2315, A3530	
Test Activities		73	07/17/2021 08	10/29/2021 16			
LCE310	Mobilize Commissioning Engineer Prior to Construction	2	07/17/2021 08	07/18/2021 16		LCE200, A3500	LCE400
LCE320	Mobilize Testing Vendor Prior to Construction	2	07/17/2021 08	07/18/2021 16		A3500, LCE200	LCE400
LCE620	Execute Test and Commissioning Plan	30	09/16/2021 08	10/28/2021 16		LCE500	LCE700
LCE610	LCE Oversee Execution of Test and Commissioning Plan	30	09/16/2021 08	10/28/2021 16		LCE500	CFM
LCE700	LCE Ensure Test Group Prepare Electrical Field Mark Ups	1	10/29/2021 08	10/29/2021 16		LCE620	ISD
Project Close-Out		137	11/19/2021 08	06/07/2022 16			
Project Close-Out		137	11/19/2021 08	06/07/2022 16			
CV1000	Prepare Civil Field Mark Ups (Tie after Last Civil Construction Activity)	21	11/19/2021 08	12/20/2021 16		A1120	CV1100
EV1000	Prepare Electrical Field Mark Ups	21	12/28/2021 08	01/27/2022 16		LCE900	EV1100
CV1500	FE Files Civil Design Drawings at Station	30	03/22/2022 08	05/02/2022 16		PM1000	FINISH
PM1100	PM to Document Electrical As-Built Drawings Complete (Electrical & P&C)	1	04/25/2022 08	04/25/2022 16		EV1400, PC1310	EV1500, PC1500
EV1500	FE Files Substation Design Drawings at Station	30	04/26/2022 08	06/07/2022 16		PM1100	FINISH
PC1500	FE Files P&C Design Drawings at Station	30	04/26/2022 08	06/07/2022 16		PM1100	FINISH
Civil As-Builts		61	12/21/2021 08	03/21/2022 16			
CV1100	Eversource Engineering Prepares & Sends Civil Field Mark Up Packge to Vendor	5	12/21/2021 08	12/28/2021 16		CV1000	CV1200
CV1200	Vendor Engineering Verifies Civil Mark Ups and Updates As-Built Drawing Package. Su	30	12/29/2021 08	02/10/2022 16		CV1100	CV1300
CV1300	Eversource Engineering Verifies Quality of Submitted Civil Drawings	20	02/11/2022 08	03/11/2022 16		CV1200	CV1400
CV1400	ES Create Civil Transmittal, Approve Final As-Built Package, and EDC Files and Issue	5	03/14/2022 08	03/18/2022 16		CV1300	PM1000
PM1000	PM to Document Civil As-Built Drawings Complete	1	03/21/2022 08	03/21/2022 16		CV1400	CV1500
Electrical As-Builts		81	12/28/2021 08	04/22/2022 16			
PC1000	Prepare P&C Field Mark Ups	21	12/28/2021 08	01/27/2022 16		LCE900	PC1340
EV1100	Eversource Engineering Prepares & Sends Electrical Field Mark Up Packge to Vendor	5	01/28/2022 08	02/03/2022 16		EV1000	EV1200
EV1200	Vendor Eng Verifies Electrical Mark Ups and Updates As-Built Drawing Package Subn	30	02/04/2022 08	03/18/2022 16		EV1100	EV1300
EV1300	Eversource Engineering Verifies Quality of Submitted Electrical Drawings	20	03/21/2022 08	04/15/2022 16		EV1200	EV1400
EV1400	Electrical Transmittal, Approve Final As-Built Package, and EDC Files and Issue Drawi	5	04/18/2022 08	04/22/2022 16		EV1300	PM1100
P&C As-Builts		60	01/28/2022 08	04/22/2022 16			
PC1340	Eversource Engineering Prepares & Sends Electrical Field Mark Up Packge to Vendor	5	01/28/2022 08	02/03/2022 16		PC1000	PC1200
PC1200	Vendor Engineering Verifies P&C Mark Ups and Updates As-Built Drawing Package. S	30	02/04/2022 08	03/18/2022 16		PC1340	PC1300
PC1300	Eversource Engineering Verifies Quality of Submitted P&C Drawings	20	03/21/2022 08	04/15/2022 16		PC1200	PC1310
PC1310	P&C Transmittal, Approve Final As-Built Package, and EDC Files and Issue Drawings	5	04/18/2022 08	04/22/2022 16		PC1300	PM1100
Test Close-Out		10	12/13/2021 08	12/27/2021 16			
LCE800	LCE Ensures Marked up Prints Ready for Pick-up	5	12/13/2021 08	12/17/2021 16		ISD	LCE900
LCE900	LCE Review Test Data and Issue Commissioning Report	5	12/20/2021 08	12/27/2021 16		LCE800	EV1000, PC1000
Site Restoration Close-Out		10	12/13/2021 08	12/27/2021 16			
A1110	Restore / Remediate Site	10	12/13/2021 08	12/27/2021 16		CFM	FINISH
Material, Equipment, Cost And Asset Management Close-Out		40	12/13/2021 08	02/09/2022 16			
A1020	Cost Analyst Prepares FINAL Units of Property	30	12/13/2021 08	01/26/2022 16		CFM	FINISH
A1030	Asset Management Complete Asset Update(s) in CASCADE	30	12/28/2021 08	02/09/2022 16		CFM, A1260	FINISH

TASK filter: All Activities

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Activity ID	Activity Name	Original Duration	Start	Finish	Resources	Predecessors	Successors
Project Management Close-Out		122	12/13/2021 08	06/07/2022 16			
A1040	PM Prepares Closeout Documentation, Lessons Learned Meeting, etc.	30	12/13/2021 08	01/26/2022 16	[redacted]	CFM	FINISH
DSSE-1100	Complete TD-707 Turnover Document / Forward to SOC & Mailing List	5	12/13/2021 08	12/17/2021 16		CFM	
FINISH	Project / Work Order Complete (FINAL SCHEDULE TASK/MILESTONE)	0		06/07/2022 16		A1040, A1020, A1110, A1030, EV1500, CV1	

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Operations Program Level Project Authorization Form

Approved at May 26, 2021 EPAC

Link to Meeting Minutes

Date Prepared: 05/11/2021	**Program Title: CT OCB Replacement and Bus Rehabilitation Program**
Company: Eversource CT	**Project Number (by state): CS00411 (CT)**
Organization: Asset Management	**Class(es) of Plant:** D SS
Project Initiator: [redacted]	**Project Category:** Stations - Circuit Breakers
Project Manager: [redacted]	**Project Type:** Program
Project Sponsor: [redacted]	**Project Purpose:** Replace Contaminated Circuit Breakers and Bus Rehab
Estimated in service date: Q4 2024	**If Transmission Project: PTF/Non-PTF?** See associated Program Release Forms
Eng. / Constr. Resources Budgeted? See associated Program Release Forms	**Capital Investment Part of Original Operating Plan?** See associated Program Release Forms
Authorization Type: Program Approval	**O&M Expenses Part of the Original Operating Plan?** See associated Program Release Forms
Initial Funding Request: N/A	**Estimated Program Value (by State): CT $32.185M** **CT Projected unit cost: $670.5K Unit cost/breaker**

Financial Requirements:

Project Authorization

ERM: _____

FP&A: _____

Executive Summary

This program is requesting program approval of the CT Oil Circuit Breaker (OCB) Replacement and Bus Rehabilitation Program and identifies for information only, projected unit costs. This program proposes to replace up to 48 OCBs at 11 substations in CT now through 2024. Dollar authorization for these costs shall be through submission of individual program releases. Program Release Form submissions shall occur in accordance with the locations and phases identified in this document. "Project Checklist – Transmission & Substation" will be submitted with each Program Release Form.

An initial funding request for the OCB Replacement and Bus Rehabilitation Program for Connecticut was approved on November 23, 2020 for $300K. The initial funding was requested to allow engineering to complete an analysis, design, and estimate of what will be required for the replacement of OCBs and bus rehabilitation. An additional funding request was sent on April 1, 2021 to increase the total initial funding to $450K to allow additional engineering to be included in the program activities. As of May 20, 2021, $256.6K has been spent in development of this program and has completed ten constructability walkdowns and scope definitions and has completed three estimates.

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Financial Unit Cost Evaluation (by State)

Note: Dollar values are in thousands and are unit level costs for Program PAFs

Line item Category	Year 1	Year 2	Year 3+	Total
1. ROW / Easements / Land Acquisition				
2. Environmental Approvals / Permits				
3. Outreach	$1			$1
4. Siting Approvals / Permits				
5. Engineering / Design	$7			$7
6. Materials (Eversource purchased)	$89			$89
7. Construction (incl matl's by contractors)	$157			$157
8. Testing / Commissioning	$86			$86
9. Project Mgmt Team	$3			$3
10. Removals	$10			$10
11. Other				
12. Risks *	$53			$53
SUBTOTAL DIRECTS W/ RISKS	**$406**			**$406**
13. Indirects/Overhead	$195			$195
14. AFUDC	$36			$36
PROJECT TOTAL – BASELINE BUDGET	**$637**			**$637**
15. Contingency	$33			$33
TOTAL CAPITAL REQUEST	**$671**			**$671**
16. Reimbursables/Customer Contribution				
PROJECT TOTAL (LESS REIMBURSABLES)	**$671**			**$671**
O&M				
Total Request	**$671**			**$671**

* *See the* Risks and Risk Mitigation Plans section below for the cost breakdown of the risks.

Unit Breakout Costs (by state)

Note: Dollar values are in thousands

Line item Category	Year 1	Year 2	Year 3+	Total
ST Labor	$10			$10
OT Labor				
Outside Services Labor	$244			$244
Materials*	$89			$89
Removals	$10			$10
Other	$86			$86
Indirects	$195			$195
AFUDC	$36			$36
TOTAL REQUEST	**$671**			**$671**

*All materials including Eversource purchased and outside service purchased. Note that outside service purchased material included in construction in unit cost evaluation above.

Future Financial Impacts:

Provide below the estimated future costs that will result from the project: N/A
Note: Dollar values are in thousands:

Future Costs	Year 20__	Year 20__	Year20__	Year 20__+	Total Future Project Costs
Capital	$ -	$ -	$ -	$ -	$ -
O&M	-	-	-	-	-
Other	-	-	-	-	-
TOTAL	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**

Describe the estimated future Capital, O&M and/or Other costs noted above:

What functional area(s) will these future costs be funded in?_____N/A_____
A representative from the respective functional area is required to be included as a project approver.

If this is other than a Reliability Project, please complete the section below;

Provide below the estimated financial benefits that will result from the project:
Note: Dollar values are in thousands:

Future Benefits	Year 20__	Year 20__	Year20__	Year 20__+	Total Future Project Benefits
Capital	$ -	$ -	$ -	$ -	$ -
O&M	-	-	-	-	-
Other	-	-	-	-	-
TOTAL	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**

Describe the estimated future Capital, O&M and/or Other benefits noted above:

What functional area(s) will these benefits be reflected in?_____N/A_____
A representative from the respective functional area is required to be included as a project approver.

Asset Retirement Obligation (ARO) and/ or Environmental Cleanup Costs (Environmental Liabilities):

Is there an ARO associated with this project? If yes, please provide details: No

Are there other environmental cleanup costs associated with this project? If yes, please provide details: No

Technical Justification:

Project Need Statement

This program is required to replace all remaining Connecticut distribution substation oil circuit breakers (OCBs) and to perform bus rehabilitation to replace aging reactors, switches and surge arrestors.

Manufacturer support and replacement parts are difficult to obtain for the OCBs. Many of the required repair parts for these aging breakers are unavailable. Eversource CT previously submitted a Public Utilities Regulatory Authority (PURA) initiative within docket number 14-05-06 (initiated 2014) to replace all OCBs at distribution substations to minimize environmental impacts from possible leaking and failed equipment.

Most of the reactors and switches on the busses for this program were installed when the substations were originally built and are at least 40 years old.

The identified switches proposed for replacement play a critical role in isolating major pieces of equipment. Isolation of equipment is required during emergencies and scheduled maintenance/work to be performed on any given piece of equipment. In the past, during isolating switching operations of equipment, the isolating device has failed to operate correctly resulting in expanded work zones. These failures typically result in additional customer load being redirected to other sources placing the system at additional risks.

Project Objectives

The program objectives are to replace OCBs and associated isolation switches, reactors and bus attached devices that are inoperative or present a risk to either employees or of an outage in the Connecticut distribution substations. The replacement of OCBs in other states are not included in this program as they are being done through other programs such Grid Mod Program in WMA to take advantage of outage synergies. Manufacturer support and replacement parts are difficult to obtain for the circuit breakers and many of the required repair parts for these aging breakers are unavailable. The program also seeks to prevent animal-caused interruptions by improving/adding animal protection on electrical equipment where previous poor performance has been exhibited.

Initial funding allows engineering to complete an analysis, design, and estimate of what will be required for the replacement of OCBs and bus rehabilitation for Connecticut projects starting in 2021. Based on the initial walkdowns and subsequent analysis, Substation Technical Engineering, Substation Engineering and Design, Protection and Controls Engineering, Asset Management, and Project Management will develop a scope for each site.

Program Scope

This program proposes to replace up to 48 OCBs at 11 substations in CT now through 2024 as identified in Table 1 below. The program deliverables will be an engineering and design summary report of the substation walkdowns, a refined project scope summary and a "unitized" cost estimate to be used in the updated program PAF. A ± 25% planning grade estimate for each release will be provided upon completion of the initial walkdowns and preliminary engineering. When the planning grade estimates are complete for a release, the release's project authorization form will be presented for full funding. A preliminary summary of the equipment for each release is shown in Table 1. Marked up nomenclature drawings identifying the release equipment is provided in the Attachment 1.

Table 1 Release Equipment Summary:

Substation	Release Number	OCB	Hook Stick	Reactor	Manual Sw	Surge arrestors	emove Grd Switch
[redacted]	CS00412	[redacted]					
	CS00413						
	CS00414						
	CS00415						
	CS00492						
	CS00416						
	CS00493						
	CS00417						
	CS00418						
	CS00418xxx						
	CS00419						
	CS00420						
	CS00421						
	CS00423						

Background / Justification

The equipment replacements are needed to enhance the reliability and availability of the Connecticut substations.

The overall Eversource initiative to eliminate oil filled circuit breakers was presented to PURA within docket number 14-05-06. This initiative was created to decrease Eversource's environmental exposure to oil spills and leaks as well as replace a vital component of aging substation infrastructure. The initiative started by targeting OCBs with polychlorinated biphenyl (PCB) bushings. In 2012, the initiative increased in scope to include all substation OCBs. The initial justification was based on the anticipated risk of potential environmental damage in case of a PCB bushing/breaker catastrophic failure.

During past projects, isolation switches have failed while being operated to create safe work zones. This has caused safety issues, disrupted planned work, led to emergent projects to replace the failed switches and caused equipment to be out of service for extended periods of time. This program is a proactive approach to replacing the identified devices prior to failures that can result in multiple customers being out for lengthy time periods. The proposed switches will conform to Substation standards SUB 018. Many of the devices being replaced are identified as problematic by the substation electricians. Other switches were chosen for their location on the bus and ability to isolate work zones without compromising the remaining live busses.

The practice of grounding equipment to perform work has changed over the years. The existing grounding switches located in the substations were used for this purpose at one time. It was noted that personnel would not rely on the grounding switch to providing solid grounding to equipment. The operation group's current practice is to use dedicated grounding cables and clamps to provide grounding to equipment being worked on. Asset management has been including the removal of all grounding switches encountered as part of bus rehab projects.

Business Process and / or Technical Improvements:

The equipment improvements to the substation yards will look to minimize future exposure to prolonged customer outages during emergency and routine switching operations and reduced environmental risk. This program will increase system reliability by replacing the obsolete equipment.

The environmental benefit will be realized by replacing aging oil filled equipment, which presents an environmental concern.

Alternatives Considered with Cost Estimates

Alternative 1. Replace OCBs and bus equipment (chosen alternative).

This alternative is to replace the substation OCBs and bus equipment with new vacuum breakers and bus equipment. See Attachment A for the alternative 1 Cost Estimate.

Alternative 2. Replace OCB PCB bushings and leave breakers in place

An alternative was considered to address only the PCBs in the OCB bushings and keep the oil filled breakers in place. The cost for this alternative could be as high as $40 to $50K per breaker. No true conceptual cost estimate for this alternative was done as this alternative does not address the PURA initiative nor the aging bus equipment and was not chosen.

Alternative 3. Replace OCB PCB bushings and leave breakers in place

An alternative to replace the OCBs and bus equipment with switchgear may be a viable alternative for individual substations and will be determined when reviewing the scope for each release. No cost estimate has been provided for this alternative.

Alternative 4. Do Nothing

An alternative to the identified project scope is to do nothing. The identified devices are operational and could go on in service until they fail. At that point an emergent failure project could be created to replace only the failed device(s). This is not recommended because of the failures that have occurred during switching and the subsequent disruptions that this has caused. No true conceptual cost estimate for this alternative was done as this alternative does not address the PURA initiative nor the aging bus equipment and was not chosen.

Project Schedule

Program Schedule Milestone/Phase Name	Estimated Completion Date
Begin Program Execution	Q1 2021
Preliminary scope developed	Q2 2021
Program Level PAF and first Project Releases presented to EPAC	Q2 2021
Complete Program	Q4 2024

Release Schedule Milestone/Phase Name			
Substation	Release Number	Full Funding EPAC Mtg Target	Scheduled Construction Target
[redacted]	CS00412	[redacted]	
	CS00413		
	CS00414		
	CS00415		
	CS00492		
	CS00416		
	CS00493		
	CS00417		
	CS00418		
	CS00418xxx		
	CS00419		
	CS00420		
	CS00421		
	CS00423		
Totals			

Regulatory Approvals

Not applicable

Risks and Risk Mitigation Plans

The risks associated with the work identified in the release to replace equipment will be identified and evaluated in the individual release documentation.

	Risk	Funded Amount	Assessment and Mitigation
1.	Breaker control cables are found to be damaged.	$5K	Perform continuity checks on control cables and install new control breaker cables if required.
2.	Underground conduit damaged.	$5K	Check for conduit damage and replace Underground Conduit if required.
3.	Delays / outages related to breaker energization plans.	$25K	Reschedule and provide overtime as required.
4.	Design development Risks.	$6.4K	Add Allowances for Re-Design
5.	Severe Weather, Delays, OT.	$6.4K	Reschedule and provide overtime as required.
6.	Existing foundations not suitable for re-use.	$5K	Replace foundations as required

Contingency

Contingency is included in the estimates to cover possible cost deviations for unknown conditions that may arise during the project. See Individual Program releases.

References

CL&P 2014 Operating Initiatives - Docket No.14-05-06 PURA-03 Dated 06/20/2014

Attachments (One-Line Diagrams, Images, etc.)

Attachment A: Unitized Cost Estimate Backup Details
Attachment B: OCB Releases Nomenclature Diagrams

Cost Estimate Backup Details

Attachment A: Unitized Cost Estimate Backup Details