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Operations Project Authorization Form

Approved at August 18, 2021 EPAC

Link to Meeting Minutes

Date Prepared: 06/15/2021	**Project Title: [redacted]-SS Recloser Automation**
Company: Eversource CT	**Project Number: CS00208**
Organization: Asset Management	**Class(es) of Plant: D SS**
Project Initiator: [redacted]	**Project Category: Stations - SCADA**
Project Manager: [redacted]	**Project Type: Specific**
Project Sponsor: [redacted]	**Project Purpose: Recloser Automation**
Estimated in service date: 12/13/2021	**Capital Investment part of original Oper. Plan: Yes**
Eng./Constr. Resources Budgeted? Yes	**O&M Expenses part of original Oper. Plan: No**
Authorization Type: Full Funding	**Facility Type** (check all that apply)**:**
Total Request: $930K	☐ PTF ☐ non-PTF ☒ Distribution

Financial Requirements:

Project Authorization

ERM: _____

FP&A: _____

Executive Summary

This project is requesting full funding approval of $930K for automation of [redacted]

[redacted]

[redacted]. Initial funding of $350K was approved in Powerplan on May 9, 2016. As of June 2021, $73K has been expended for engineering and project management.

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Project Costs Summary

Note: Dollar values are in thousands

Line item Category	Prior Authorized	Actuals to Date	2021	2022	Total
1. ROW / Easements / Land Acquisition	$	$0	$	$	$
2. Environmental Approvals / Permits	$	$0	$	$	$
3. Outreach	$	$0	$1	$	$1
4. Siting Approvals / Permits	$	$0	$2	$	$2
5. Engineering / Design	$10	$12	$1	$	$13
6. Materials (Eversource purchased)	$35	$	$36	$	$36
7. Construction (incl matl's by contractors)	$130	$6	$104	$	$110
8. Testing / Commissioning	$	$	$193	$	$193
9. Project Mgmt Team	$	$10	$29	$	$39
10. Removals	$	$12	$1	$	$13
11. Other	$	$0	$	$	$
12. Risks	$	$0	$43	$	$43
SUBTOTAL DIRECTS W/ RISKS	**$175**	**$40**	**$409**	**$**	**$449**
13. Indirects/Overhead	$	$30	$427	$	$457
14. AFUDC	$	$2	$6	$	$8
PROJECT TOTAL – BASELINE BUDGET	**$175**	**$73**	**$842**	**$**	**$915**
15. Contingency	$	$	$15	$	$15
TOTAL CAPITAL REQUEST	**$175**	**$73**	**$857**	**$**	**$930**
16. Reimbursables/Customer Contribution	$0	$	$	$	$
PROJECT TOTAL (LESS REIMBURSABLES)	**$175**	**$73**	**$857**	**$**	**$930**
O&M	$175	$	$	$	$
TOTAL REQUEST	**$350**	**$73**	**$857**	**$**	**$930**

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

Risks include the following:

Description	Amount
Outage Delays/ Switching Delays	$40K
Design Development	$3K
TOTAL	**$43K**

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Breakout Costs

Note: Dollar values are in thousands

Line item Category	Prior Authorized	Actuals to Date	2021	2022	Total
ST Labor	$	$28	$95	$	$123
OT Labor	$	$	$	$	$
Outside Services Labor	$	$	$230	$	$230
Materials*	$	$	$36	$	$36
Removals	$	$12	$1	$	$13
Other	$	$	$62	$	$62
Indirects	$	$30	$427	$	$457
AFUDC	$	$2	$6	$	$8
TOTAL CAPITAL REQUEST W/O REIMBURSABLES	**$350**	**$73**	**$857**	**$**	**$930**

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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__	Year 20__	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.

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

Future Benefits	Year 20__	Year 20__	Year 20__	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? If yes, please provide details: **None**, however this will be evaluated.

Technical Justification:

[redacted]

Project Need Statement

[redacted]

Project Objectives

[redacted]

Project Scope

[redacted]

[redacted]

Background / Justification

[redacted]

Business Process and / or Technical Improvements

[redacted]

[redacted]. Accordingly, shortening the response time to outages through automation will improve circuit system reliability and performance metrics, SAIDI and CAIDI.

Alternatives Considered with Cost Estimates

The Company has discussed using various [redacted]

Project Schedule

Milestone/Phase Name	Estimated Date
100% Engineering / DWG's/ Field Constructability	Complete
Procurement	09/01/2021
Relay settings package	Complete
EPAC Full Funding	08/18/2021
Construction Start	09/30/2021
In Service Date	12/13/2021
Project closeout	01/19/2022

Note: Due to reprioritization of other system needs, this project's schedule was extended

Regulatory Approvals

N/A

Risks and Risk Mitigation Plans

Risk allocation has been included for severe weather delays, over time and design/development.

Contingency

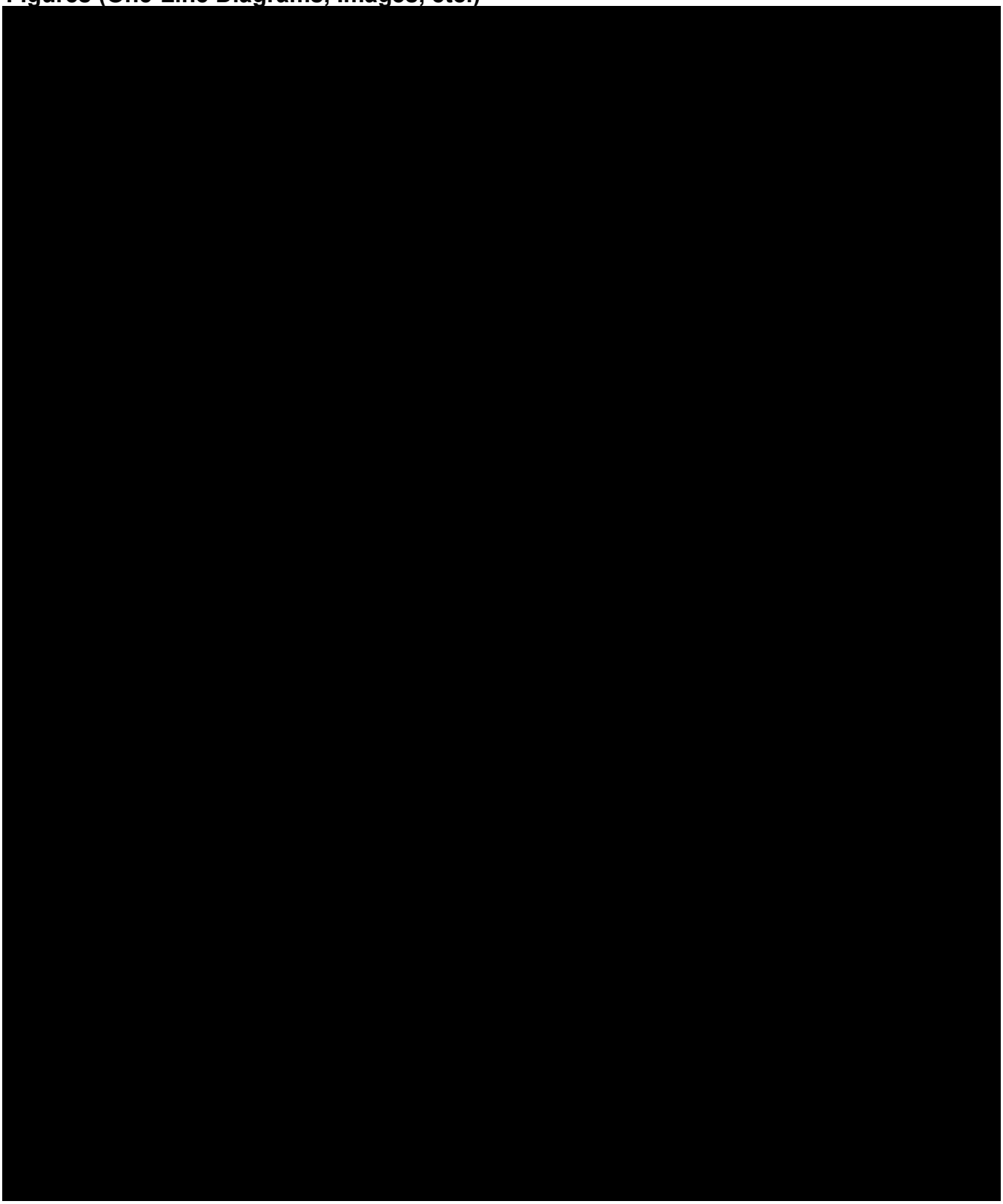
$15K - NOTE: Risk / Contingency is 6.6% of Project Total Costs (incl escal/indirects/AFUDC but excluding reimbursement)

References
None

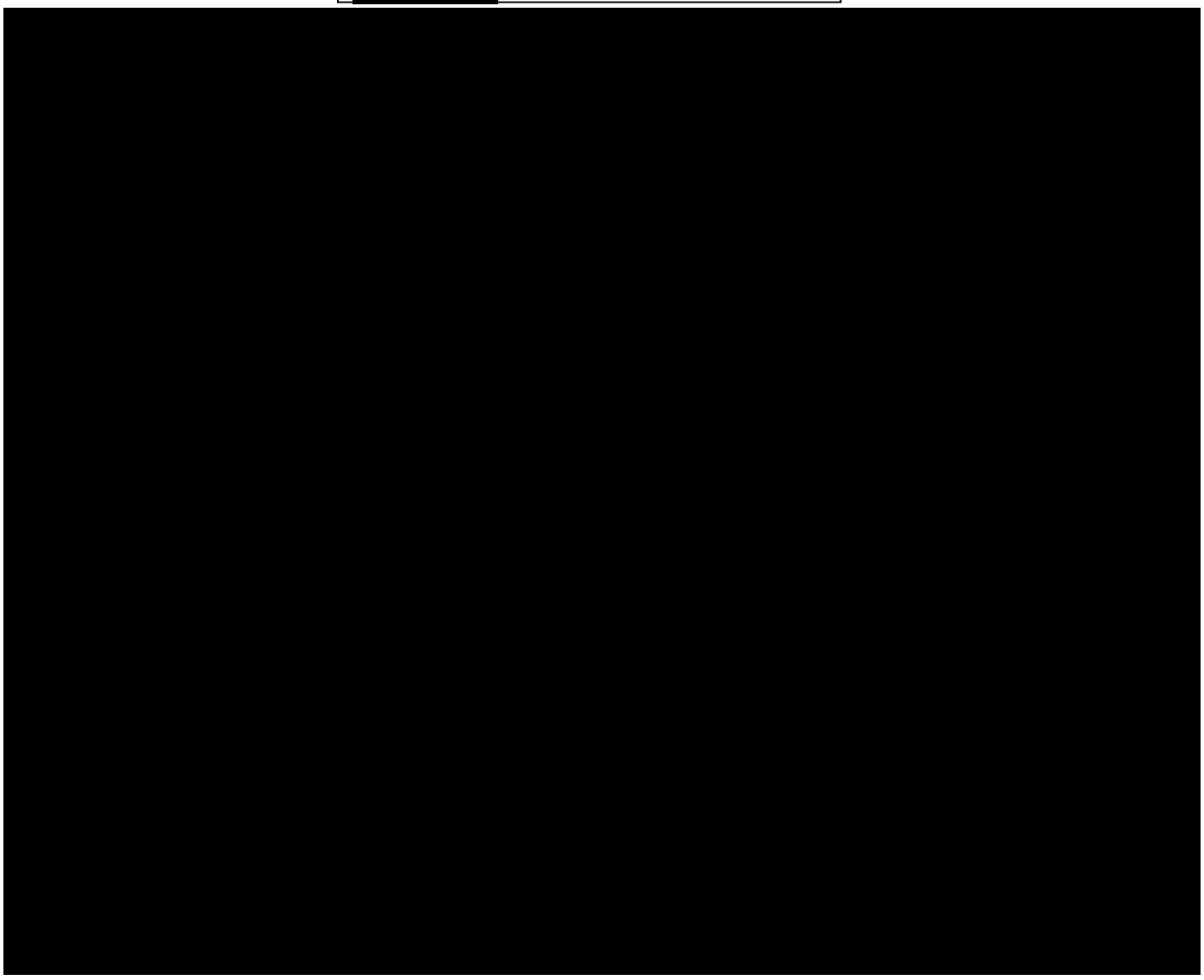
Attachments

- Attachment A – Cost Estimate
- Attachment B – Constructability Review Form
- Attachment C – P6 Schedule

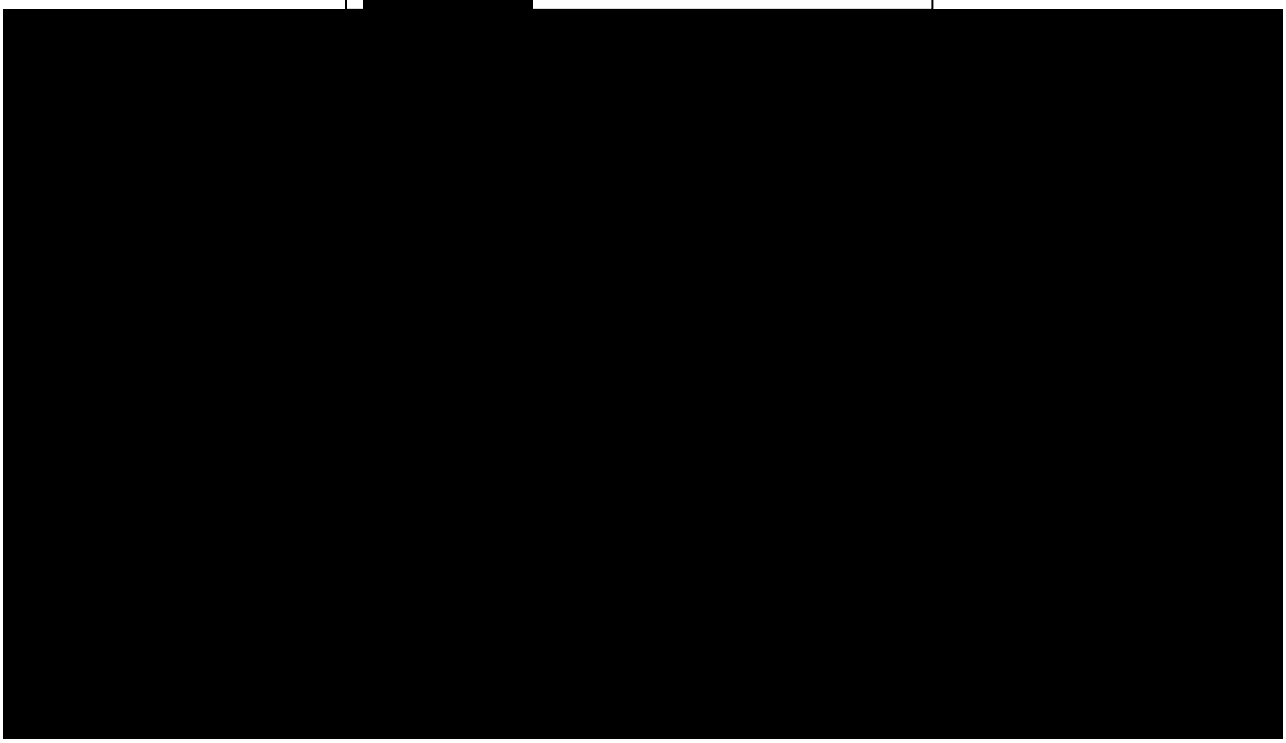
Figures (One-Line Diagrams, Images, etc.)



[redacted] Substation Oblique View



[redacted] Substation Street View™



Project Checklist - Transmission & Substation Capital Project					
Project Name: [redacted] - DSCADA Recloser Automation				**Project Number: CS00208**	
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):				Enter Date	
Cost in ISO-NE Presentation ($M) (if completed):				Enter Cost ($M)	
Is a PPA required?				No	
Is a TCA Application Required?				No	
TCA Submittal Date (if submitted):				Enter Date	
Cost in TCA Submittal ($M) (if submitted):				Enter Cost ($M)	
Enter ISO-NE RSP / Asset Condition ID, if assigned:				Enter ISO-NE ID	
PLANNING/PROTECTION & CONTROLS					
Are RAS/SPS/UVLs affected?				No	
OPERATIONS					
Outage Required?	☐ Primary Equipment (Power Transfer)	☐ Secondary Equipment (P&C only)	☒ Outage Not Required		
Do SCLL Conditions Exist?				No	
Has an outage schedule been approved?				No	
Are Operations & Maintenance procedures/training required?				No	
STANDARDS					
Does the project include standard equipment and designs?				Yes	
SUBSTATION ENGINEERING					
Does this impact Revenue Metering				No	
Is preliminary short circuit/ breaker duty analysis required?				No	
Are there any changes to the baseline audible noise?				No	
Is there an impact to the existing ground grid?				No	
Is a Transient Over Voltage (TOV) analysis required?				No	

Project Checklist - Transmission & Substation Capital Project	
Project Name: [redacted] - DSCADA Recloser Automation	**Project Number: CS00208**

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?	None
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?	No

Please see Attachment A for Cost Estimate Backup Details

ESTIMATE SUMMARY

Project Title:Recloser Automation
Project Mgr/Lead [redacted]
Project Number:CS00208
WO & Task #:CS002081
Est. Revision #
Estimate Type - Lines work

Estimate By [redacted]
Date of Estimate:7/26/21
ISD:12/31/2021
Estimate #

Template Revision # 01.65c

ESTIMATE SUMMARY

Estimate Type: Planning

WBS	Description	TOTAL	% of Directs	% of Total	Priors	2021	2022	2023	2024	2025	2026
1	ROW / Easements / Land purchases										
2	Environmental Approvals / Permits										
3	Outreach	$700	0.2%	0.1%		$700					
4	Siting Approvals / Permits	$1,800	0.4%	0.2%		$1,800					
5	Engineering / Design	$12,700	2.8%	1.4%	$12,100	$600					
6	Materials (Eversource purchased)	$35,900	8.0%	3.9%		$35,900					
7	Construction (incl matl's by	$110,200	24.5%	11.9%	$6,000	$104,200					
8	Testing / Commissioning	$192,600	42.9%	20.7%		$192,600					
9	PMT Project Mgmt Team	$39,300	8.8%	4.2%	$10,000	$29,300					
10	Removals	$13,300	3.0%	1.4%	$12,100	$1,200					
11	Other										
12	Risks	$42,500	9.5%	4.6%		$42,500					
	Project Directs Total w/Risks	**$449,000**	100.0%	48.3%	**$40,200**	**$408,800**					
13	Indirects/Overhead	$457,400		49.2%	$30,100	$427,300					
14	AFUDC	$8,200		0.9%	$2,300	$5,900					
	Project Total - Baseline Budget	**$914,600**		98.4%	**$72,600**	**$842,000**					
15	Contingency	$15,200		1.6%		$15,200					
	Project Total - Funding Approval Level	**$929,800**		100.0%	**$72,600**	**$857,200**					
16	Reimbursables/Customer Contribution										
	Project Total (less reimbursables)	**$929,800**			**$72,600**	**$857,200**					
		-									
	Amount of Escalation included above										
6	Total materials - Eversource	$35,900				$35,900					
	Total materials - Contractor										
	Total materials	$35,900				$35,900					

NOTE: Risk / Contingency is 6.6% of Project Total Costs (incl escal/indirects/AFUDC but excl reimb.)

Estimate Range	**-25%**	-	**25%**
	$697,000	-	**$1,162,000**

COMMENTS:

[redacted]

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

Engineering to be utilized by in-house resources, test & construction to be outsourced.
Material estimates based on acutal cost in MAXIMO and test & electrical constrution 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.

RISKS

Severe Weather. Delays. OT	$ 40.000
Design development	$ 2.500

Project Number:C800208
Date of Estimate:7/28/21
Est. Revision #
Template Revision # 01.65c

CSTXX-CONSTRUCTION	R		Prior actuals to date Mhrs	DOLLARS	21 DOLLARS	1 2022 Mhrs	DOLLARS	2 2023 Mhrs	DOLLARS	3 2024 Mhrs	DOLLARS	4 2025 Mhrs	DOLLARS	5 2026 Mhrs	DOLLARS	TAL DOLLARS
Electrical Construction	LT			$5 985												$5 985
General Construction	LT															
SCADA / Automation	LT				$4 240											$4 240
Telecom - Field	LT				$1 060											$1 060
Construction Reps (Internal)	LT				$23 850											$23 850
Support Switch/Tag	LT															
Electrical Contractor	LT				$45 050											$45 050
Other (specify)	LT															
Other (specify)	LT															
LT Total				$5 985	$74 200											$80 185
Employee Expenses	AE	5%			$3 710											$3 710
Construction Purchased Material	AM	1%			$263											$263
Outside Construction Vendor	AQ				$26 295											$26 295
Sales tax on Constr. Vendor																
Vehicles (now in indirects section)	AV															
Inspection services (Outside Vendor)	AQ															
Construction Rep (Outside vendor)	AQ															
Rents and Leases	BR															
CSTXX Subtotal				$5 985	$104 468											$110 453
Escalation					-	$ -		$ -		$ -		$ -		$ -		$ -
	P1															
CSTXX Total				$5 985	$104 468											$110 453
ENRXX-TG ENGINEERING/DESIGN																
Project Services/Drafting	LT															
T- Line Engineering/Design	LT															
D- Street Engineering/Design	LT															
Civil Engineering/Design	LT															
Substation (T) Engineering/Design	LT															
Substation (D) Engineering/Design	LT			$12 143												$12 143
Protection & Controls Engineering	LT				$530											$530
Survey Engineering	LT															
SCADA / Automation Engineering	LT															
Telecom Engineering	LT															
Other - specify	LT															
Other - specify	LT															
LT Total				$12 143	$530											$12 673
Employee Expenses	AE	5%			$27											$27
Contractor Engineering - T-Lines	AQ															
Contractor Engineering - D-Street	AQ															
Contractor Engineering - T -Station	AQ															
Contractor Engineering - D-Station	AQ															
Contractor Engineering - P&C	AQ															
Contractor Engineering - Survey	AQ															
Contractor Engineering - SCADA / Automatio	AQ															
Contractor Engineering - Telecom	AQ															
Contractor Engineering - Specify	AQ															
Contractor Engineering - Specify	AQ															
Contractor Engineering - Specify	AQ															
Vehicles (now in indirects section)	AV															
ENRXX Subtotal			-	$12 143	$557	-		-		-		-		-		$12 700
Escalation																
	P1															
ENRXX Total			-	$12 143	$557	-		-		-		-		-		$12 700
LNDXX-TG LAND																
Real Estate	LT															
Employee Expenses	AE	5%														
Purchase Land	AM															
Vehicles (now in indirects section)	AV															
Fees and Payments	BF															
LNDXX Subtotal			-		-	-		-		-		-		-		
Escalation																
	P1															
LNDXX Total			-		-	-		-		-		-		-		
MATXX-TG MATERIAL																
Eversource	AM				$34 322											$34 322
Outside Services	AM															
	AM															
Freight																
Sales Tax Eversource/outside services		4%			$1 300											$1 300
Other																
MATXX Subtotal					$35 622											$35 622
Escalation																
	P1															
MATXX Total					$35 622											$35 622
PSMXX-PROJECT MANAGER & SUPPORT																
Project Management (PM)	LT			$10 032	$18 550											$28 582
Project Planning/Cost (IP)	LT															
Contracts/Purchasing (C/P)	LT				$265											$265
System Planning	LT															
Environmental	LT															
SCS - Notification	LT				$33											$33
Legal	LT															
Estimating	LT				$530											$530
Siting - Local Zoning	LT				$100											$100
Asset Management	LT				$530											$530
Other -	LT															
Other -	LT															
Other -	LT															
Other -	LT															
LT Total				$10 032	$20 008											$30 040
Employee Expenses	AE	5%			$1 000											$1 000
Project Support Vendor - PM	AQ				$8 400	-		-		-		-		-		$8 400
Project Support Vendor - P	AQ					-		-		-		-		-		
Project Support Vendor - C/P	AQ					-		-		-		-		-		
Project Support Vendor - System Planning	AQ					-		-		-		-		-		
Project Support Vendor - Environmental	AQ					-		-		-		-		-		
Project Support Vendor - SCS - Notification	AQ				$640	-		-		-		-		-		$640
Project Support Vendor - Legal	AQ					-		-		-		-		-		
Project Support Vendor - Estimating	AQ					-		-		-		-		-		
Project Support Vendor - Siting - Local Zoning	AQ			-	$1 700	-		-		-		-		-		$1 700
Project Support Vendor - Asset Management	AQ			-		-		-		-		-		-		
Project Support Vendor - Other	AQ			-		-		-		-		-		-		
Project Support Vendor - Other	AQ			-		-		-		-		-		-		
Project Support Vendor - Other	AQ			-		-		-		-		-		-		
Project Support Vendor - Other	AQ			-		-		-		-		-		-		
Vehicles (now in indirects section)	AV															
Property or CW P tax large proj. allowance	BR															
	BR															
Fees and Payments - Environental	BF															
Fees and Payments - Siting	BF															
Fees and Payments - Other	BF															
PSMXX Subtotal			-	$10 032	$31 748	-		-		-		-		-		$41 780
Escalation																
	P1															
PSMXX Total			-	$10 032	$31 748	-		-		-		-		-		$41 780
REMXX-TG REMOVAL																
Engineering/Design	LT			$12 143	$1 060											$13 203
Internal Construction	LT															
LT Total				$12 143	$1 060											$13 203
Employee Expenses	AE	15%			$159											$159
Outside Services	AQ															
Contractor Labor	AQ															
Vehicles (now in indirects section)	AV															
Rents and Leases	BR															
REMXX Subtotal			-	$12 143	$1 219	-		-		-		-		-		$13 362
Escalation																
	P1															
REMXX Total			-	$12 143	$1 219	-		-		-		-		-		$13 362
TSTXX-TG TEST																
Test / Field Engr. Labor (In House)	LT															
Lead Commissioning Engr. (LCE) (Internal)	AQ															
Employee Expense	AE	10%														
Test / Field Engr. Labor (contractor)	AQ				$99 000											$99 000
Lead Commissioning Engr. (LCE) (contactor)	AQ				$93 600											$93 600
Vehicles (now in indirects section)	AV															
TSTXX Subtotal					$192 600											$192 600
Escalation																
	P1															
TSTXX Total					$192 600											$192 600
SUBTOTAL PROJECT DIRECT COST			-	$40.303	$366.214	-		-		-		-		-		$406.517
Risk																
Risk					$42 500											$42 500
Risk Total					$42 500											$42 500
TOTAL PROJECT DIRECT COST			-	$40,303	$408,714	-		-		-		-		-		$449,017
INDIRECTS																
Non-Productive Time Allocation (ZNP)	58	15.1%		$2 215	$14 418											$16 633
Payroll Benefits Allocation (ZPB) incl NPT	59	44.0%		$5 320	$38 098											$43 418
Gen SVC CO Overhead (ZOS) incl NPT	60	75.0%		$6 521	$17 722											$24 043
E&S Allocations (ZEB ZEL ZES)	61	75.0%		$4 532	$296 753											$301 285
A&GE Allocations (ZAS)	62	1.3%		$1 563	$9 165											$10 728
Stores Expense Allocation (ZST)	62	8.0%		$5 230	$2 746											$7 976
Lobby Stock																
MDEC (ZMI)		5.0%		$3 523	$21 551											$25 074
Vehicles (ZVE)		26.0%		$1 410	$26 823											$28 233
	63															
Indirects Subtotal				$30 114	$427 278											$457 390
TOTAL PROJECT COST - Direct & Indirect (excl AFUDC)				$70.417	$835.990											$906.407
AFUDC																
AFUDC (ZK)				$2 326	$5 901	0		0		0		0		0		$8 227
In Service Dollars																
Cumulative ISS																
AFUDC Subtotal				$2 326	$5 901											$8 227
TOTAL PROJECT COST - Baseline Budget				$72.743	$841.891											$914.634
Contingency																
Contingency					$15 171											$15 171
Other																
Contingency SubTotal					$15.171											$15.171
TOTAL PROJECT COST - Approved Funding				$72.743	$857.062											$929.805
Reimbursables / Customer Contribution																
Reimbursables / Customer Contribution (enter as negative)																

10/6/2021 2:23 PM

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Constructability Review Form: **Substation**

Project Title:Center st DSCADA Automation Project	☐	Prior Constructability Review Performed?
	☐	Program Related Site Specific Review?
Project Numbers(s): CS00208	**Project Constructability Phase:**	
Date(s) of Constructability Review: **06/15/2021**	☐ Conceptual Engineering Design	
Click to enter a date	☐ Preliminary Engineering Design	
	☒ Detailed Engineering Design	
Project Scope Statement: **Add DSCADA operation to the 8 reclosers for this substation**		

Department Review/Walkdown Attendees*:

Required [X]	Attended [X]	Department	Name	Required [X]	Attended [X]	Department	Name
☐	☒	Project Management	[redacted]	☐	☐	S/S Engineering	[redacted]
☐	☐	Asset Management		☐	☐	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 the review even if external construction resources are planned

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

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Constructability Review Form: **Substation**

[redacted] 6/15/21 *Name / Signature*

Date

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

Action Items and Resolutions:

Item No.	Const. Review Action Item/Concern	Design Resolution/Mitigation:
1		
2		
3		
4		
5		

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

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Constructability Review Form: **Substation**

	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
	- Engineering Estimates for Design and Technical Support? (EE and EOC) Total Project		
2	**Materials Identified/Ordered** -Any concerns with BOM/Major Materials? Review BOM lead times and project need dates -Specialty Major Materials: Identify Specialty Equipment & Materials potentials - temporary/replacement - long lead items? -Any Materials needed to facilitate construction access?	N/A	Materials ordered
3	**Control House** - Review Unmapped equipment interferences, Control/Battery Enclosure Layout, HVAC System (if equipment added), space for new or modified equipment, AC / DC station breaker availability and service loading, Panel Space, Expansion, one-line and/or riser type panelboard drawings, other..	N/A	OK
4	**Ratings & Dimensions** for Major Equipment. Any concerns upon field review? Equipment Rating One Line (and/or equipment thermal ratings tables) - Review for any errors in field	N/A	

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	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
5	**Wall, Fence, Gate, and Foundation Considerations** -Any permanent / temporary alterations or relocations required? -Pre-Project Sound Measurements Needed? Sound Walls? -Take measurements for Foundation quantities, dimensions and concrete volumes -CIP Review/Ballistic needs. Any Physical Security Requirement Consideration? -Assess condition of existing yard equipment foundations and viability for reuse (if proposed) -Review station expansion areas (if needed) for structures, old foundations, etc. -Any Steel Structural Plan Considerations? -Any impacts to construction plan?	☐	No Issues
6	**Below Grade / Enclosure Raceway** - If possible, evaluate existing raceway and review spacing requirements. Review for any subsurface investigation needs or potential below grade obstructions. GPR/test pits needed? Geotechnical Investigation - is soil boring or resistivity investigation needed?	☐	N/A
7	**Underground Obstructions** -Drawing review concerns? -Is preconstruction or test excavation needed? -Is reuse of underground control cables / Conduits /replace Non-Shielded Cable feasible (if applicable) -Are spare conduits available? Are they useable? -Review if any areas will need to be plated for increased load bearing for equipment access (i.e. large Xfmr, etc.)	☐	N/A
8	**Grounding Plan (Ground Grid)** - Will footprint impact layout or other equipment? Identify locations to improve grounding. Impacts to foundations and ground grid plans. Observations on wetlands or ability to perform tests	☐	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
9	Nomenclature / Switching One-Line Diagram -Any obvious deviations from diagrams provided?	☐	No Concern
10	BPS Separation Requirements - Is this BPS Substation? Y/N (part of PAF) - Changes to pre-existing BPS standards?	☐	N/A
11	IEC 61850 Substation Automation and Communication Requirements - Any Impacts/Retrofit needed?	☐	N/A
12	Any Upgrades to ES Standards - Is retrofit needed to bring up to ES standards? Can that be done?	☐	N/A
B	**Construction**		
1	**Any safety hazards specific to the facility? i.e. Low Bus, Deterioration, etc.**	☐	N/A
2	**Prior known Site Specific Conditions** -Common or Obvious station Issues -Missing scope items that could impact costs?	☐	N/A
3	**Identify/Consider Required Depts for Construction?** -Who is constructor: Internal vs External Resources -S/S Ops, GO, Test, Field Engineering, etc -Specialty Contractors Required? -Required Oversite Needed - Estimated level of CR and LCE support needed	☐	External resources

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	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
4	**Site Plan, Access, and Temporary Construction Facilities:** -Confirm maintenance access for proposed new or replaced equipment -Verify clear footprint for yard equipment / Property Plan -General access to site, can areas outside substation be utilized? -Substation Entry Plan (driveway and drive path modifications) - Identification of Unique Requirements, i.e. (access bridges, station service, etc.) -Site Development Plan (grading and drainage) with Cut/Fill -Existing Rock Conditions? Potential Impacts (rock quantity)? -Any police details needed for deliveries, restricted hours, and/or need for extended hour approvals -Any Sanitary Civil Requirements? (Septic tanks, etc) -Review turning radius for delivery trucks (if critical) -Any Substation Access and site/yard access Limitations? -Office Trailer Needs: Facilities, Utilities, Restroom, Container, Dumpster Space -Weather impacts to Site (Snow Placement) -Identify Material Laydown and Security -Where will new vs removed equipment go? -Construction permit for trailers outside substation fence?	☐	No Concern
5	Unique Equipment Considerations: Gas insulated substation, Gas insulated line, Gas insulated bus, Pass Breaker, Statcom, Sync Condenser		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
6	**Outage & Energization Plan and Construction Sequence:** *Review electrical working clearances for equipment during construction, Detailed look at protection zone changes, Locked sequence or random outages, Outage durations minimized.* ***Considerations:*** -Approach Distances – Outage Requirements to maintain electrical clearances throughout proposed installation -Distribution Clearances -Clearance Holder Assignments -Drawings vs Field Conditions -Outage boundaries and interconnections -Phased approach needs for additional mobilizations -Verify outage sequence supports the planned construction sequence and timeline. (Lead Commissioning Engineer "LCE", Substation Operations, and Outage Planner input) -Any design alterations or considerations to Eliminate SCLL Conditions, Reduce Recall Time, Reduce Outage durations, Special Conditions -Additional outage requirements: Railroad Catenaries, Fiber outage, SCADA outage, Relay permissions -Seasonal or weather conditions impacts	☐	No Concerns
7	**Equipment Testing & Acceptance** -Grounding plans / Resources? Will we need grounds hung? -Hi-pot testing and where will the equipment be set up?	☐	No Concerns
8	Need for mobile generator and where connected (if needed)	☐	N/A
9	Need for mobile battery and where connected (if needed)	☐	N/A
10	OT work required or Notable Permit Conditions (special hours)?	☐	N/A
11	Coordination of boundaries/seams (Identification of point of demarcation for connection to existing equipment and/or for coordination with other municipalities)	☐	No concerns

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Constructability Review Form: **Substation**

	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
C	**Environmental**		
1	Soil Pre-Characterization or Grab Sampling Completed/Planned	☐	N/A
2	**Desktop investigation and EAD Review** -Required Permits -Stormwater Considerations -Dewatering requirements -Wetland and buffer review	☐	N/A
3	Risk or presence of PCB's/Asbestos/Lead/SF6	☐	N/A
4	Transformer Spill Containment Recommended?	☐	N/A
5	Expanding Footprint / New Buildings or future Expansion Plans? (Enviro Impact)	☐	N/A
6	Environmental oversight considerations? (Inspection type/Interval)	☐	N/A
7	Environmental mitigations - Any matting or seasonal needs? Review D&M Plan with CR.	☐	N/A
D	**Siting, S&CS, and T&D Real Estate**		
1	**Any regulatory concerns or approvals needed?** - Consider scope/design alterations to mitigate concerns - Consider Visual screening considerations (feasibility or location) -Zoning Relief and Permits required	☐	N/A
2	**Neighbor/Abutter impacts:** - Any noise, visual impacts, or sensitive abutters - Any changes to lighting or additional lighting needed?	☐	N/A
3	Review for roadway, gate access, trailers, equip height, noise, weekend/night work, or any potential public disturbance related to work	☐	N/A
4	Installation within Eversource Rights - Is Rights and Restrictions Review required?	☐	N/A
5	Expanding Footprint / New Buildings or future Expansion Plans?	☐	N/A
6	Proposed Equipment on same property? - Any Encroachments	☐	N/A

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	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
F	**Protection & Controls**		
1	Panel Graphic additions and/or Modifications	☐	N/A
2	Space on existing panels for new equipment? (front & rear of panel fronts)	☐	N/A
3	Panel fronts conform to drawings	☐	N/A
4	Access to bring new panels into control enclosure	☐	N/A
5	Nameplate list and location of nameplates	☐	N/A
6	Verifies that relays and meters that will be an interconnected project work are as shown on the drawings.	☐	N/A
7	Temporary protection, relays, control cable needed? How long will they be required?	☐	N/A
8	Will relay setting changes be needed? Any additional outage requirements for changes?		N/A
G	**Telecom Engineering**		
1	Review telecom equipment in existing control enclosure	☐	No Concerns
2	Review path to get telecom circuits into the station and paths within the control house. Determine whether new underground duct or overhead tray work is needed.	☐	No Concerns
3	Review current or proposed Telecom equipment power connections and validate with P&C any need for system 1 and system 2 separation.	☐	No Concerns
4	Review current Telecom fiber diversity and validate with P&C any fiber diversity requirements.	☐	No Concerns
5	Review and list any remote station impacts/updates	☐	N/A
6	Confirm whether correct interface equipment is available (i.e.) for fiber termination or multiplexor termination	☐	No Concerns
7	Confirm whether existing communications cabinets are enough to support additional telecommunications equipment installed	☐	No Concerns

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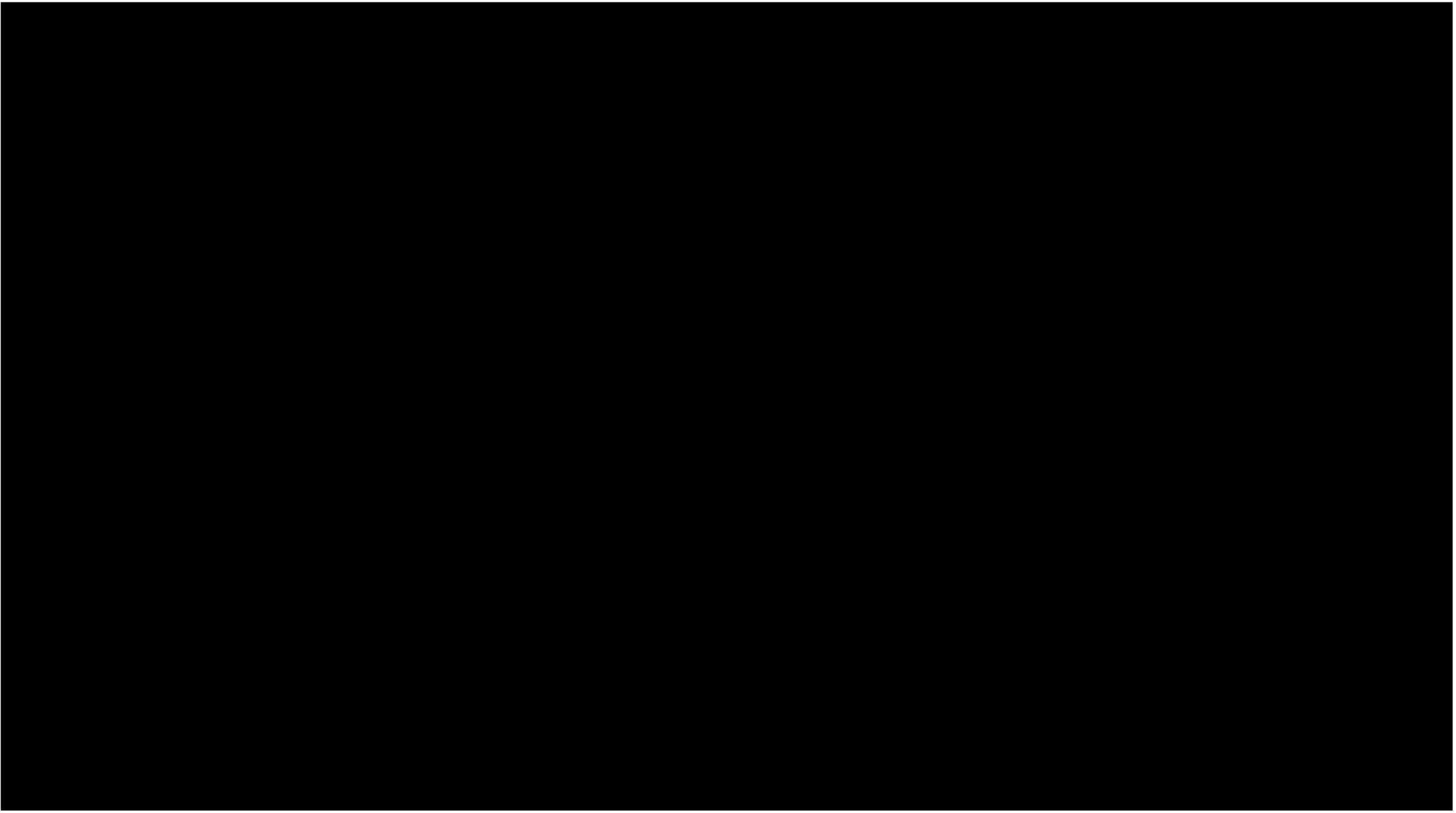
	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
8	Review space for any required additional communications cabinets which may be required to support additional telecommunications equipment installed	☐	No Concerns
9	Review third party Telecommunications at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

Photos

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



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