EVERSOURCE

# Program Release Form

**Approved at September 29, 2021 EPAC**

**Link to Meeting Minutes**

| | |
|---|---|
| **Date Prepared: 09/17/2021** | **Project Title: [redacted] Phase 2 OCB Replacement Program Release** |
| **Company: Eversource CT** | **Facility Name: [redacted]** |
| **Organization: Asset Management** | **Project Number: CS00492** |
| **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: $1.906M** | **Estimated in service date(s): May 2022** |
| | **Facility Type** (check all that apply)**:** ☐ PTF ☐ non-PTF ☒ Distribution |

## Executive Summary

This Program Release is requesting full funding of $1.906M to [redacted] he engineering work started under the CT OCB Replacement and Bus Rehabilitation Program (CS00411) blanket capital work order 80099279 in 2021. This release will reallocate the minimal charges spend to date to this Phase 2 project CS00492. Two phases were set up for this substation due to the scheduling of the outsourced design resources allocated to this and other OCB program release substations.

To date, the project scope, preliminary constructability walkdown, and planning grade cost estimates have been completed. The work for the [redacted] is divided into two phases. For Phase 1 (CS00415), the project scope, preliminary constructability walkdown, planning grade cost estimate, and the design have been completed; the project is expected to be in service in November 2021. The scope for Phase 1 included the replacement of [redacted] For Phase 2 (CS00492), the project scope, preliminary constructability walkdown and planning grade cost estimate has been completed and the project is expected to be in service in May 2022.

This Program Release is requesting dollar authorization in accordance with the program level criteria specified in Program Level PAF CT OCB Replacement Program – CS00411 (approved at EPAC on May 26, 2021) (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:



- Provide civil, electrical, and P&C engineering design and construction documents.
- Test and commission the new equipment.
- Proper disposal of removed equipment.
-

See Attachment B for the Nomenclature Diagram. A constructability review was performed on 08/27/2021 (see Attachment C).

**Table 1 - Equipment List of Existing Equipment to be Replaced or Removed (Phase 2)**

| Nomenclature Location | Age | Equip Type | Manufacturer | Model | Short Cct Rating | Load Rating | V Class |
|---|---|---|---|---|---|---|---|
| [redacted] | | | | | | | |

**Table 2 – Phase 1 Equipment List of Existing Equipment Replaced (for reference)**

| Nomenclature Location | Age | Equip Type | Manufacturer | Model | Load Rating | V Class |
|---|---|---|---|---|---|---|
| [redacted] | | | | | | |

## 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 | $2 | $2 | $0 |
| 4. Siting Approvals / Permits | $0 | $0 | $0 |
| 5. Engineering / Design | $22 | $29 | $7 |
| 6. Materials (Eversource purchased) | $168 | $125 | ($43) |
| 7. Construction (incl matl's by contractors) | $572 | $565 | ($7) |
| 8. Testing / Commissioning | $259 | $267 | $8 |
| 9. Project Mgmt Team | $8 | $10 | $2 |
| 10. Removals | $29 | $31 | $2 |
| 11. Other | $0 | $0 | $0 |
| 12. Risks | $158 | $149 | ($9) |
| **SUBTOTAL DIRECTS W/ RISKS** | **$1,218** | **$1,178** | **($40)** |
| 13. Indirects/Overhead | $585 | $636 | $52 |
| 14. AFUDC | $109 | $21 | ($88) |
| **PROJECT TOTAL – BASELINE BUDGET** | **$1,912** | **$1,836** | **($76)** |
| 15. Contingency | $99 | $70 | ($29) |
| | | | |
| **TOTAL CAPITAL REQUEST** | **$2,012** | **$1,906** | **($106)** |
| 16. Reimbursables/Customer Contribution | $0 | $0 | $0 |
| | | | |
| **PROJECT TOTAL (LESS REIMBURSABLES)** | **$2,012** | **$1,906** | **($106)** |
| O&M | $0 | $0 | $0 |
| **Total Request** | **$2,012** | **$1,906** | **($106)** |

## 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: $7K** – Additional fee is needed due to minor changes with respect to the program, including removal of one (1) feeder breaker.
6. **Materials (by Eversource): ($43K)** – The cost savings is a result of this Release having no reactors; reactor switches or surge arrestors and tie and transformer circuit breakers do not have disconnect switches resulting in less materials to be purchased by Eversource.

7. **Construction (including materials supplied by contractors): ($7K) –** No major changes with respect to the program.
8. **Testing / Commissioning: $8K –** Minor changes with respect to the program.
9. **Project Management Team: $2K –** The additional fee is because the release spans two years while the program was based on one year.
10. **Removals: $2K** – The minor increased costs are due to the additional removal of one (1) circuit breaker.
11. **Other: $0K –** No changes with respect to the program.
12. **Risks: ($9K) –** This release is different than the program as it is based on replacing three circuit breakers and removal of one circuit breaker whereas the program was based on replacement of the three circuit breakers. The risks allocated for cable failures, conduit damage, outages and unsuitable foundations for the removal of the one circuit breaker are not required and reduces the overall average risk costs for this release.
13. **Indirects/Overhead: $52K –** Indirect charges are calculated using the direct charges as input, so the increase in direct charges for this release over the unitized program cost estimate results in higher indirect cost.
14. **AFUDC: ($88K) –** The AFUDC is a direct result of the changes in direct charges over the time from the release start to the in-service date.
15. **Contingency: ($29K) –** This release is different than the program as it is based on replacing three circuit breakers and removal of one circuit breaker whereas the program was based on replacement of the three circuit breakers. The contingency costs for cable failures, conduit damage, outages and unsuitable foundations for the removal of the one circuit breaker are not required and reduces the overall average contingency costs for this release.
16. **Reimbursables/Customer Contribution: $0K –** No changes with respect to the program.
17. **O&M: $0K –** No changes with respect to the program.

## 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 | $0 | $0 | $0 |
| 2. Environmental Approvals / Permits | | $0 | $0 | $0 | $0 |
| 3. Outreach | | $0 | $0 | $2 | $2 |
| 4. Siting Approvals / Permits | | $0 | $0 | $0 | $0 |
| 5. Engineering / Design | | $3 | $21 | $5 | $29 |
| 6. Materials (Eversource purchased) | | $0 | $120 | $5 | $125 |
| 7. Construction (incl matl's by contractors) | | $0 | $52 | $513 | $565 |
| 8. Testing / Commissioning | | $0 | $0 | $267 | $267 |
| 9. Project Mgmt Team | | $0 | $7 | $3 | $10 |
| 10. Removals | | $0 | $10 | $21 | $31 |
| 11. Other | | $0 | $0 | $0 | $0 |
| 12. Risks | | $0 | $0 | $149 | $149 |
| **SUBTOTAL DIRECTS W/ RISKS** | **$450** | **$3** | **$211** | **$965** | **$1,178** |
| 13. Indirects/Overhead | | $3 | $100 | $533 | $636 |
| 14. AFUDC | | $0 | $4 | $17 | $21 |
| **PROJECT TOTAL – BASELINE BUDGET** | **$450** | **$6** | **$315** | **$1,516** | **$1,836** |
| 15. Contingency | | $0 | $15 | $55 | $70 |
| | | $0 | $0 | $0 | $0 |
| **TOTAL CAPITAL REQUEST** | **$450** | **$6** | **$330** | **$1,570** | **$1,906** |
| 16. Reimbursables/Customer Contribution | | $0 | $0 | $0 | $0 |
| | | $0 | $0 | $0 | $0 |
| **PROJECT TOTAL (LESS REIMBURSABLES)** | **$450** | **$6** | **$330** | **$1,570** | **$1,906** |
| O&M | | **$0** | **$0** | **$0** | **$0** |
| **TOTAL REQUEST** | **$450** | **$6** | **$330** | **$1,570** | **$1,906** |

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

| Risk | Funded Amount |
|---|---|
| Breaker Control Cable Failures | $15K |
| Underground Conduit Damaged | $15K |
| Delays / outages related to breaker energization plans | $60K |
| Design development Risks | $20K |
| Severe Weather Delays | $24K |
| Existing foundations not suitable for re-use | $15K |
| **Total** | **$149K** |

## Breakout Costs

*Note: Dollar values are in thousands*

| Line item Category | Prior Authorized | Actuals to Date | 2021 to Go | 2022 | Total |
|---|---|---|---|---|---|
| ST Labor | | $3 | $11 | $37 | $51 |
| OT Labor | | $0 | $0 | $0 | $0 |
| Outside Services Labor | | $0 | $68 | $752 | $820 |
| Materials* | | $0 | $120 | $5 | $125 |
| Removals | | $0 | $10 | $21 | $31 |
| Other | | $0 | $16 | $206 | $221 |
| Indirects | | $3 | $100 | $533 | $636 |
| AFUDC | | $0 | $4 | $17 | $21 |
| **TOTAL CAPITAL REQUEST - W/O REIMBURSABLES** | **$450** | **$6** | **$330** | **$1,570** | **$1,906** |

*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: N/A
*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 small 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 checks and insulation integrity test (Megger/Hipot) 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 evaluation has indicated that the foundations can be reused. During construction, further evaluation is required and foundations to be replaced if required. |

Risk allocation is included in the estimate to address the risks identified above.

## Contingency

Contingency of $70K is included in the estimate for potential risks or project unknowns that do not have a mitigation plan.

## Project Schedule

| Milestone/Phase Name | Estimated Date |
|---|---|
| Program (CS00411) Approval at EPAC | May 2021 |
| EPAC Presentation & Approval | September 2021 |
| Detailed Design Complete | September 2021 |
| Release Full Funding Approval | October 2021 |
| Construction Start | January 2022 |
| In Service Date | May 2022 |
| Release Close-Out | August 2022 |

*See attachment D for the P6 Schedule.*

## Attachments

- Attachment A: CS00492 - [redacted] Phase 2 OCB Estimate C-21-254A R0
- Attachment B: CS00492 - [redacted] Phase 2 OCB Nomenclature Diagram
- Attachment C: CS00492 - [redacted] Phase 2 OCB Constructability Review Document
- Attachment D: CS00492 - [redacted] Phase 2 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] **Phase 2 OCB Replacement Program Release** | | | | **Project Number: CS00492** | |
| **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] Phase 2 OCB Replacement Program Release** | **Project Number: CS00492** |
| **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: Greenhill 30R Phase 2 OCB Replacement Release
Project Mgr/Lead: [redacted]
Project Number:CS00492
WO & Task #: TBD
Est. Revision # 0
Estimate Type - Station work

Estimate By: [redacted]
Date of Estimate: 08/16/2021
ISD:05/31/2022
Estimate #: C-21-634

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 | $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 | $2,000 | 0.2% | 0.1% | $0 | $400 | $1,600 | $0 | $0 | $0 | $0 |
| 4 | Siting Approvals / Permits | $0 | 0.0% | 0.0% | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 5 | Engineering / Design | $29,200 | 2.5% | 1.5% | $2,700 | $21,000 | $5,500 | $0 | $0 | $0 | $0 |
| 6 | Materials ( Eversource purchased) | $124,900 | 10.6% | 6.6% | $0 | $120,100 | $4,800 | $0 | $0 | $0 | $0 |
| 7 | Construction ( incl matl's by | $565,100 | 48.0% | 29.7% | $0 | $51,700 | $513,400 | $0 | $0 | $0 | $0 |
| 8 | Testing / Commissioning | $267,100 | 22.7% | 14.0% | $0 | $0 | $267,100 | $0 | $0 | $0 | $0 |
| 9 | PMT Project Mgmt Team | $10,000 | 0.8% | 0.5% | $0 | $7,100 | $2,900 | $0 | $0 | $0 | $0 |
| 10 | Removals | $31,000 | 2.6% | 1.6% | $0 | $10,300 | $20,700 | $0 | $0 | $0 | $0 |
| 11 | Other | $0 | 0.0% | 0.0% | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 12 | Risks | $149,000 | 12.6% | 7.8% | $0 | $0 | $149,000 | $0 | $0 | $0 | $0 |
| | **Project Directs Total w/Risks** | **$1,178,300** | 100.0% | 61.8% | **$2,700** | **$210,600** | **$965,000** | **$0** | **$0** | **$0** | **$0** |
| 13 | Indirects/Overhead | $636,500 | | 33.4% | $2,900 | $100,100 | $533,500 | $0 | $0 | $0 | $0 |
| 14 | AFUDC | $21,000 | | 1.1% | $0 | $3,900 | $17,100 | $0 | $0 | $0 | $0 |
| | **Project Total - Baseline Budget** | **$1,835,800** | | 96.3% | **$5,600** | **$314,600** | **$1,515,600** | **$0** | **$0** | **$0** | **$0** |
| 15 | Contingency | $70,000 | | 3.7% | $0 | $15,300 | $54,700 | $0 | $0 | $0 | $0 |
| | **Project Total - Funding Approval Level** | **$1,905,800** | | 100.0% | **$5,600** | **$329,900** | **$1,570,300** | **$0** | **$0** | **$0** | **$0** |
| 16 | Reimbursables/Customer Contribution | $0 | | | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| | **Project Total (less reimbursables)** | **$1,905,800** | | | **$5,600** | **$329,900** | **$1,570,300** | **$0** | **$0** | **$0** | **$0** |
| | | - | | | | | | | | | |
| | Amount of Escalation included above | $39,300 | | | $0 | $0 | $39,300 | $0 | $0 | $0 | $0 |
| 6 | Total materials - Eversource | $124,900 | | | $0 | $120,100 | $4,800 | $0 | $0 | $0 | $0 |
| | Total materials - Contractor | $0 | | | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| | Total materials | $124,900 | | | $0 | $120,100 | $4,800 | $0 | $0 | $0 | $0 |

NOTE: Risk / Contingency is 13% of Project Total Costs (incl escal/indirects/AFUDC but excl reimb.)

| Estimate Range | -25% | - | 25% |
|---|---|---|---|
| | $1,429,000 | - | $2,382,000 |

**COMMENTS:**

[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 | $ | 15.000 |
| Underground Conduit Damaged | $ | 15.000 |
| Delays / outages related to breaker energization plans | $ | 60.000 |
| Design development Risks | $ | 20.000 |
| Severe Weather Delays | $ | 24.000 |
| Existing foundations not suitable for re-use | $ | 15.000 |

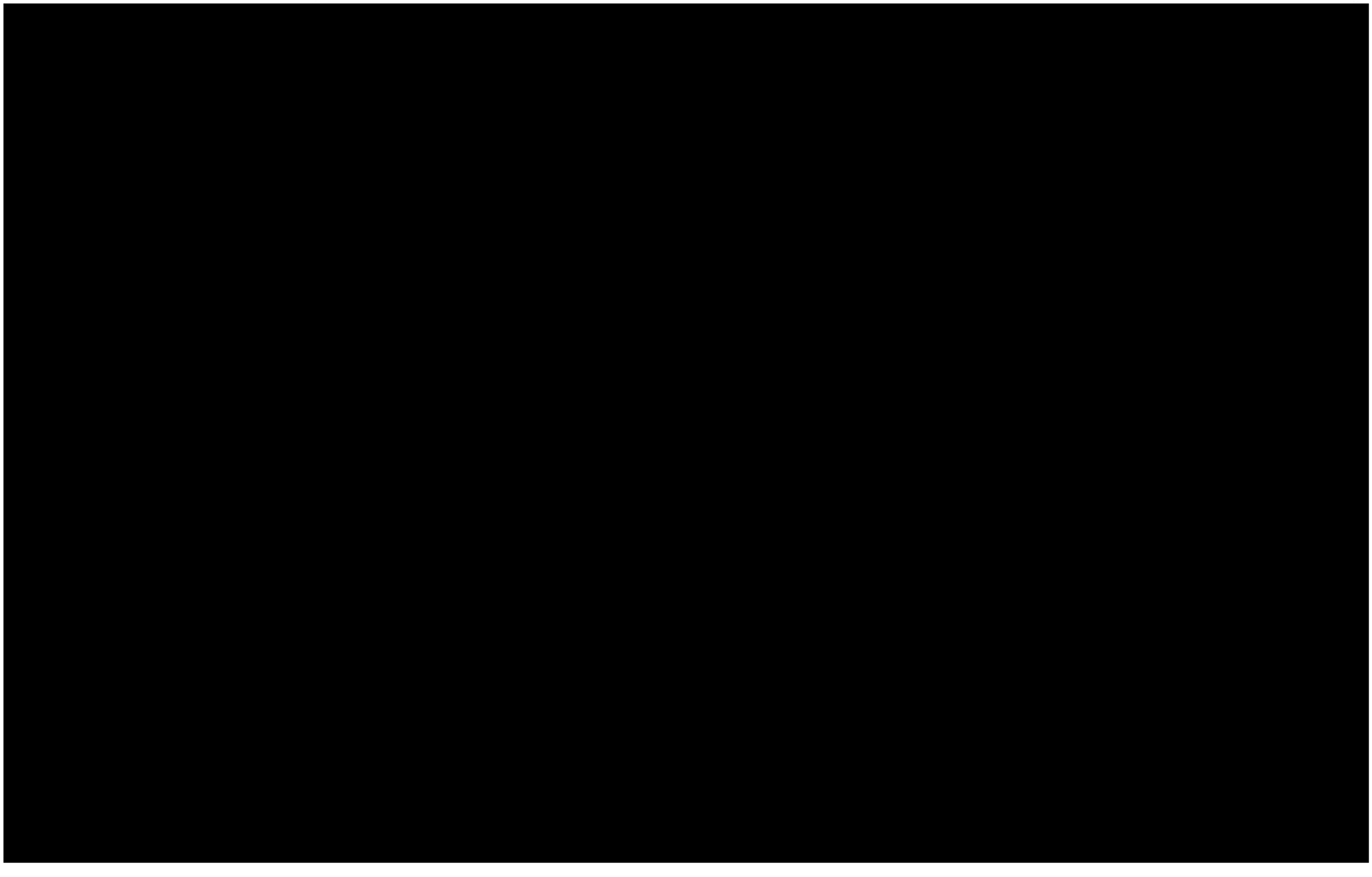
**Project Number:C800482**

**Project Title: Greenhill 30R Phase 2 OCB Replacement Release**

# Es[redacted] Line I[redacted]ars

**Project Number:C800482**
**Date of Estimate: 08/18/2021**
**Est. Revision # 0**
Template Revision # 01.05c

| 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 |
| General Construction | LT | 0% | 0 | $0 | | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $0 |
| SCADA / Automation | LT | 0% | 0 | $0 | | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $0 |
| Telecom - Field | LT | 0% | 0 | $0 | | $0 | | $1,965 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $1,965 |
| Construction Reps ( Internal) | LT | 0% | 0 | $0 | | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $0 |
| Support Switch/Tag | LT | 0% | 0 | $0 | | $0 | | $24,020 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $24,020 |
| Other ( specify) | LT | 0% | 0 | $0 | | $0 | | $6,551 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $6,551 |
| Other ( specify) | LT | 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 |
| **LT Total** | | 0% | 0 | $0 | | $0 | | $32,536 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $32,536 |
| Employee Expenses | AE | 5% | 0 | $0 | | $0 | | $1,626 | | $0 | | $0 | | $0 | | $0 | $1,626 |
| Construction Purchased Material | AM | 1% | 0 | $0 | | $517 | | $4,793 | | $0 | | $0 | | $0 | | $0 | $5,310 |
| Outside Construction Vendor | AQ | | 0 | $0 | | $51,701 | | $479,267 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $530,968 |
| 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 |
| Construction Rep (Outside vendor) | AQ | | 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 | | $52,218 | | $518,222 | | $0 | | $0 | | $0 | | $0 | $570,440 |
| Escalation | | | 0 | $0 | | $ - | | $ - | | $ - | | $ - | | $ - | | $ - | $ - |
| 0 | P1 | 0% | 0 | $0 | | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $0 |
| **CSTXX Total** | | | 0 | $0 | | $52,218 | | $518,222 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $570,440 |
| **ENRXX-TG ENGINEERING/DESIGN** | | | | | | | | | | | | | | | | | $0 |
| Project Services/Drafting | LT | 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 |
| D- Street Engineering/Design | LT | 0% | 0 | $0 | | $954 | | $218 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $1,172 |
| Civil Engineering/Design | LT | 0% | 0 | $0 | | $954 | | $328 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $1,282 |
| Substation (T) Engineering/Design | LT | 0% | 0 | $0 | | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $0 |
| Substation (D) Engineering/Design | LT | 0% | 0 | $916 | | $1,060 | | $437 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $2,413 |
| Protection & Controls Engineering | LT | 0% | 0 | $1,832 | | $1,696 | | $655 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $4,183 |
| Survey Engineering | LT | 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 |
| Telecom Engineering | LT | 0% | 0 | $0 | | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $0 |
| Other - Prior Actuals (Power Plan) | LT | 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 |
| **LT Total** | | 0% | 0 | $2,748 | | $4,664 | | $1,638 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $9,050 |
| Employee Expenses | AE | 5% | 0 | $0 | | $233 | | $82 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $315 |
| Contractor Engineering - T-Lines | AQ | 0% | 0 | $0 | | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $0 |
| Contractor Engineering - D-Street | AQ | 0% | 0 | $0 | | $3,926 | | $622 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $4,548 |
| Contractor Engineering - T -Station | AQ | 0% | 0 | $0 | | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $0 |
| Contractor Engineering - D-Station | AQ | 0% | 0 | $0 | | $4,256 | | $1,252 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $5,508 |
| Contractor Engineering - P&C | AQ | 0% | 0 | $0 | | $7,956 | | $1,891 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $9,847 |
| Contractor Engineering - Survey | AQ | 0% | 0 | $0 | | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $0 |
| Contractor Engineering - SCADA / Automatio | AQ | 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 |
| Contractor Engineering - Specify | AQ | 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 |
| Contractor Engineering - Specify | AQ | 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 |
| **ENRXX Subtotal** | | 0% | - | $2,748 | | $21,035 | | $5,485 | - | $0 | - | $0 | - | $0 | - | $0 | $29,268 |
| Escalation | | 0% | 0 | $0 | | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $0 |
| 0 | P1 | 0% | 0 | $0 | | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $0 |
| **ENRXX Total** | | 0% | - | $2,748 | | $21,035 | | $5,485 | - | $0 | - | $0 | - | $0 | - | $0 | $29,268 |
| **LNDXX-TG LAND** | | 0% | | | | | | | | | | | | | | | 0 |
| Real Estate | LT | 0% | 0 | $0 | | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $0 |
| Employee Expenses | AE | 5% | 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 |
| Vehicles ( now in indirects section) | AV | 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 |
| **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 | P1 | 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 | | $115,107 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $115,107 |
| Outside Services | AM | 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 |
| Freight | | 0% | 0 | $0 | | $1 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $1 |
| Sales Tax Eversource/outside services | | 4% | 0 | $0 | | $4,500 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $4,500 |
| Other | | 0% | 0 | $0 | | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $0 |
| **MATXX Subtotal** | | 0% | | $0 | | $119,608 | | $0 | | $0 | | $0 | | $0 | | $0 | $119,608 |
| Escalation | | 0% | 0 | $0 | | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $0 |
| 0 | P1 | 0% | 0 | $0 | | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $0 |
| **MATXX Total** | | 0% | | $0 | | $119,608 | | $0 | | $0 | | $0 | | $0 | | $0 | $119,608 |
| **PSMXX-PROJECT MANAGER & SUPPORT** | | 0% | | | | | | | | | | | | | | | |
| Project Management (PM) | LT | 0% | 0 | $0 | | $4,028 | | $1,310 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $5,338 |
| Project Planning/Cost (/P) | LT | 0% | 0 | $0 | | $1,060 | | $437 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $1,497 |
| Contracts/Purchasing (C/P) | LT | 0% | 0 | $0 | | $636 | | $218 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $854 |
| System Planning | LT | 0% | 0 | $0 | | $318 | | $109 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $427 |
| Environmental | LT | 0% | 0 | $0 | | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $0 |
| SCS - Notification | LT | 0% | 0 | $0 | | $20 | | $81 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $101 |
| Legal | LT | 0% | 0 | $0 | | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $0 |
| Estimating | LT | 0% | 0 | $0 | | $53 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $53 |
| Siting - None | LT | 0% | 0 | $0 | | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $0 |
| Asset Management | LT | | 0 | $0 | | $636 | | $655 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $1,291 |
| Other - | LT | | 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 |
| Other - | LT | | 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 |
| **LT Total** | | 0% | | $0 | | $6,751 | | $2,810 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $9,561 |
| Employee Expenses | AE | 5% | 0 | $0 | | $338 | | $140 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $478 |
| Project Support Vendor - PM | AQ | 0% | 0 | $0 | | $0 | | $0 | - | $0 | - | $0 | - | $0 | - | $0 | $0 |
| Project Support Vendor - IP | AQ | 0% | 0 | $0 | | $0 | | $0 | - | $0 | - | $0 | - | $0 | - | $0 | $0 |
| Project Support Vendor - CIP | 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 - Environmental | AQ | 0% | 0 | $0 | | $0 | | $0 | - | $0 | - | $0 | - | $0 | - | $0 | $0 |
| Project Support Vendor - SCS - Notification | AQ | 0% | 0 | $0 | | $390 | | $1,545 | - | $0 | - | $0 | - | $0 | - | $0 | $1,935 |
| 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 |
| Property or CW P tax large proj. allowance | BR | 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 |
| Fees and Payments - Environmental | RF | 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 |
| Fees and Payments - Other | RF | 0% | 0 | $0 | | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $0 |
| **PSMXX Subtotal** | | 0% | - | $0 | | $7,479 | | $4,495 | - | $0 | - | $0 | - | $0 | - | $0 | $11,974 |
| Escalation | | 0% | 0 | $0 | | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $0 |
| 0 | P1 | 0% | 0 | $0 | | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $0 |
| **PSMXX Total** | | 0% | - | $0 | | $7,479 | | $4,495 | - | $0 | - | $0 | - | $0 | - | $0 | $11,974 |
| **REMXX-TG REMOVAL** | | 0% | | | | | | | | | | | | | | | $0 |
| Engineering/Design | LT | 0% | 0 | $0 | 0 | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $0 |
| Internal Construction | LT | 0% | 0 | $0 | | $8,999 | | $17,993 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $26,992 |
| **LT Total** | | 0% | 0 | $0 | | $8,999 | | $17,993 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $26,992 |
| Employee Expenses | AE | 18% | 0 | $0 | | $1,350 | | $2,699 | | $0 | | $0 | | $0 | | $0 | $4,049 |
| Outside Services | AQ | 0% | 0 | $0 | | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $0 |
| Contractor Labor | AQ | 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 |
| Rents and Leases | BR | 0% | 0 | $0 | | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $0 |
| **REMXX Subtotal** | | 0% | - | $0 | | $10,349 | | $20,692 | - | $0 | - | $0 | - | $0 | - | $0 | $31,041 |
| Escalation | | 0% | 0 | $0 | | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $0 |
| 0 | P1 | 0% | 0 | $0 | | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $0 |
| **REMXX Total** | | 0% | - | $0 | | $10,349 | | $20,692 | - | $0 | - | $0 | - | $0 | - | $0 | $31,041 |
| **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 |
| Lead Commissioning Engr. (LCE) ( Internal) | AQ | 0% | 0 | $0 | 0 | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $0 |
| Employee Expense | AE | 0% | 0 | $0 | 0 | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $0 |
| Test / Field Engr. Labor (contractor) | AQ | 0% | 0 | $0 | 0 | $0 | | $155,736 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $155,736 |
| Lead Commissioning Engr. (LCE) (contractor) | AQ | 0% | 0 | $0 | 0 | $0 | | $111,405 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $111,405 |
| Vehicles ( now in indirects section) | AV | 0% | 0 | $0 | 0 | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $0 |
| **TSTXX Subtotal** | | 0% | 0 | $0 | 0 | $0 | | $267,141 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $267,141 |
| Escalation | | 0% | 0 | $0 | 0 | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $0 |
| 0 | P1 | 0% | 0 | $0 | 0 | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $0 |
| **TSTXX Total** | | 0% | 0 | $0 | 0 | $0 | | $267,141 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $267,141 |
| **SUBTOTAL PROJECT DIRECT COST** | | 0% | - | $2,748 | | $210,689 | | $816,035 | - | $0 | - | $0 | - | $0 | - | $0 | $1,029,473 |
| **Risk** | | 0% | | | | | | | | | | | | | | | $0 |
| Risk | | | 0 | $0 | | $0 | | $149,000 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $149,000 |
| 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 |
| **Risk Total** | | 0% | | $0 | | $0 | | $149,000 | | $0 | | $0 | | $0 | | $0 | $149,000 |
| **TOTAL PROJECT DIRECT COST** | | 0% | - | $2,748 | | $210,689 | | $965,035 | - | $0 | - | $0 | - | $0 | - | $0 | $1,178,473 |
| **INDIRECTS** | | 0% | | | | | | | | | | | | | | | $0 |
| Non-Productive Time Allocation (ZNP) | 58 | 16.1% | 0 | $234 | | $3,072 | 0 | $8,274 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $11,580 |
| Payroll Benefits Allocation (ZPB) incl NPT | 59 | 44.0% | 0 | $0 | | $4,556 | 0 | $25,579 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $30,135 |
| Gen SVC CO Overhead (ZGS) incl NPT | 60 | 75.0% | 0 | $1,223 | | $9,850 | 0 | $3,839 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $14,912 |
| S&S Allocations (Z59, ZEI, ZES) | 61 | 50.0% | 0 | $1,199 | | $53,061 | 0 | $422,194 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $476,454 |
| AS&E Allocations (ZAS) | 62 | 1.3% | 0 | $44 | | $3,515 | 0 | $15,949 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $19,508 |
| Stores Expense Allocation (ZST) | 63 | 8.0% | 0 | $0 | | $9,209 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $9,209 |
| Lobby Stock | | 0.0% | 0 | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $0 |
| MD&C (ZMX) | | 5.0% | 0 | $180 | | $11,060 | 0 | $42,230 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $53,500 |
| Vehicles (ZVE) | | 28.0% | 0 | $24 | | $5,718 | 0 | $15,393 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $21,133 |
| 0 | 63 | 0.0% | 0 | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | $0 |
| **Indirects Subtotal** | | 0% | | $2,903 | | $100,069 | | $533,458 | | $0 | | $0 | | $0 | | $0 | $636,430 |
| **TOTAL PROJECT COST - Direct & Indirect ( excl AFUDC )** | | | | $5,651 | | $310,758 | | $1,498,493 | | $0 | | $0 | | $0 | | $0 | $1,814,902 |
| 0 | | | 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 | 0 | $0 |
| AFUDC (ZK) | | | 0 | $0 | | $3,873 | 0 | $17,079 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $20,952 |
| 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 | $0 |
| **AFUDC Subtotal** | | | | $0 | | $3,873 | | $17,079 | | $0 | | $0 | | $0 | | $0 | | $20,952 |
| **TOTAL PROJECT COST - Baseline Budget** | | | | $5,651 | | $314,631 | | $1,515,572 | | $0 | | $0 | | $0 | | $0 | | $1,835,854 |
| 0 | | | 0 | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 |
| **Contingency** | | | 0 | $0 | | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 |
| Contingency | | | 0 | $0 | | $15,335 | 0 | $54,667 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $70,002 |
| 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 | 0 | $0 |
| **Contingency SubTotal** | | | | $0 | | $15,335 | | $54,667 | | $0 | | $0 | | $0 | | $0 | | $70,002 |
| 0 | | | | | | | | | | | | | | | | | | |
| **TOTAL PROJECT COST - Approved Funding** | | | 0 | $5,651 | | $329,966 | 0 | $1,570,239 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $0 | 0 | $1,906,857 |
| 0 | | | 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 | $0 |
| Reimbursables / Customer Contribution ( enter as negative) | | | 0 | $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 | $0 |



EVERSOURCE

Constructability Review Form: **Substation**

| | | |
|---|---|---|
| **Project Title:** [redacted] OCB Replacement Release | ☐ | Prior Constructability Review Performed? |
| | ☐ | Program Related Site Specific Review? |
| **Project Numbers(s):** CS00415 | **Project Constructability Phase:** | |
| **Date(s) of Constructability Review:** **08/27/2021** 08/27/2021 | ☐ Conceptual Engineering Design<br>☒ Preliminary Engineering Design<br>☐ Detailed Engineering Design | |

**Project Scope Statement:**
The project scope includes replacement of the oil circuit breakers, switches and lighting arrestor. The nomenclatures for the equipment to be replaced are: 30R15-2, 30R15-5, 30R-2X3-2, 30R-2X3-4, 30R-3X3-2, 30R-3X3-4, 30R16-2

## 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 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]___*08/27/2021*_____*Name / Signature*

EVERSOURCE

Constructability Review Form: **Substation**

| Documents available for use on Constructability Review | | | | | |
|---|---|---|---|---|---|
| [X] | Deliverable | [X] | Deliverable | [X] | Deliverable |
| ☐ | Initial Scope<br>-Birdseye site plan<br>-General Arrangement | ☐ | Preliminary Drawings<br>-Civil Site Drawing<br>-Electrical Drawing<br>-Section Drawings | ☐ | Prints in hand for marking up<br>-Panel Front/Read View<br>-Control Enclosure Layout<br>-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 | Animal protection requirements should be confirmed prior to financial approval and scope confirmation. | Asset Management and design team to review. |
| 2 | Design considerations for the underslung switches to include in review. | Asset Management to confirm requirements. |
| 3 | The steel reinforcements for the breakers to confirmed. | Design team to review and confirm material in BOM. |
| 4 | Dog bone requirements to confirmed in final design. | Engineering team and Asset Management to confirm requirements. |
| 5 | NEMA 4 holes pad material to be confirmed in BOM. | Design team to confirm. |

| | 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**<br>Consider Physical Installation, P&C Scope, Civil Scope, Engineering studies, Design standard adherence | ☐ | |

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**<br>Long Lead Equipment?<br>Specialty material considerations?<br>Review BOM lead times and project need dates<br>Bids for Specialty Major Materials - Identify Specialty Equipment & Materials potentials - temporary/replacement<br>Any Materials needed to facilitate construction access? | ☐ | |
| 5 | **Any impacts that would drive T-Line Eng Scope?** | ☐ | |
| 6 | **Any other known projects that could overlap or impact outage work?** | ☐ | |
| B | **Construction** | | |
| 1 | **Site Plan / Access:**<br>-Confirm maintenance access for proposed new or replaced equipment<br>-Review station expansion areas (if needed) for structures, old foundations, etc.<br>-Verify clear footprint for yard equipment / Property Plan<br>-General access to site, can areas outside substation be utilized?<br>-Substation Entry Plan (driveway and drive path modifications)<br>-Site Development Plan (grading and drainage) with Cut/Fill<br>-Existing Rock Conditions? Potential Impacts (rock quantity)?<br>-Any Sanitary Civil Requirements? (Septic tanks, etc)<br>-Assess condition of existing yard equipment foundations and viability for reuse (if proposed) | ☐ | |
| 2 | **Any Substation Access and site/yard access Limitations?**<br>-Review turning radius for delivery trucks (if critical)<br>-Identify Office Trailer / Container / Dumpster Space + source of utilities for construction trailer(s) if needed<br>-Weather impacts to Site (Snow Placement)<br>-Identify Material Laydown and Security<br>-Construction permit for trailers outside substation fence? | ☐ | |

EVERSOURCE

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**<br>-Working Clearances - Review electrical clearances for equipment during construction – Approach Distances – Outage Requirements to maintain electrical clearances throughout proposed installation<br>-As-Built drawing review (contacts and contributions)<br>-Outage boundaries<br>-Phased approach needs for additional mobilizations<br>-Detail Design package align with schedule and outage sequence?<br>-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<br>-Review or give input to planned construction sequence to insure it is reasonable<br>-Verify outage sequence supports the planned construction sequence | ☐ | |
| 4 | **Need for mobile generator and where connected (if needed)** | ☐ | |
| 5 | **Need for mobile battery and where connected (if needed)** | ☐ | |
| 6 | **Energization Plan**<br>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 | ☐ | |
| 7 | **Identify Required Oversite Needed - Estimated level of CR and LCE support needed** | ☐ | LCE review needed |
| 8 | **OT work required or Notable Permit Conditions (special hours)?** | ☐ | |
| 9 | **Seasonal or weather conditions impacts?** | ☐ | |
| 10 | **Identify Required Depts for Construction? (who is constructor ?)** | ☐ | |
| 11 | **Specialty Contractors Required?** | ☐ | |
| 12 | **Unique Equipment Considerations, Gas insulated substation, Gas insulated line, Gas insulated bus, Pass Breaker, Statcom, Sync Condenser** | ☐ | |

EVERSOURCE

Constructability Review Form: **Substation**

| | Key Review Item Description | N/A or No Concern | Review Notes, Concerns, or Additional Info Needed |
|---|---|---|---|
| 13 | **Underground Obstructions**<br>-Drawing review concerns?<br>-Is preconstruction or test excavation needed?<br>-Is reuse of underground control cables / Conduits /replace Non-Shielded Cable feasible (if applicable)<br>-Are spare conduits available? Are they useable?<br>-Review if any areas will need to be plated for increased load bearing for equipment access (i.e. large Xfmr, etc.) | ☐ | |
| 14 | **Any other items missing in scope or could be underfunded?** | ☐ | |
| 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 | ☐ | |
| 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 | ☐ | |
| 6 | Visual mitigation screening considerations (feasibility or location) | ☐ | |
| 7 | Neighbor/Abutter impacts (noise, visual, sensitive abutters) | ☐ | |

EVERSOURCE

Constructability Review Form: **Substation**

| | Key Review Item Description | N/A or No Concern | Review Notes, Concerns, or Additional Info Needed |
|---|---|---|---|
| E | **Engineering** | | |
| 1 | **Scope of Work**<br>Identify if high level scope sufficiently detailed?<br>Any remote station impacts?<br>Does title match the project deliverable/intent? | ☐ | Scope of work document was available. |
| 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**<br>Any concerns with BOM/Major Materials Review?<br>Where will new vs removed equipment go?<br>Review for OH and UG Items | ☐ | Material on order to be completed shortly. Material delivery to be coordinated. |
| 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**<br>Is this BPS Substation? Y/N (part of PAF)<br>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? | ☐ | |
| 9 | **Wall, Fence, Gate, and Foundation Considerations**<br>-Any permanent / temporary alterations or relocations required?<br>-Take measurements for Foundation quantities, dimensions and concrete volumes<br>-CIP Review/Ballistic needs. Any Physical Security Requirement Consideration?<br>-Any impacts to construction plan? | ☐ | |

EVERSOURCE

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? | ☐ | |
| 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<br>-Any obvious deviations from diagrams provided? | ☐ | |
| 17 | Any design alterations or considerations to Eliminate SCLL Conditions, Reduce Recall Time, Reduce Outage durations, Special Conditions | ☐ | |
| F | **Protection & Controls** | | |
| 1 | Panel Graphic additions and/or Modifications | ☐ | |
| 2 | Space on existing panels for new equipment?<br>(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. | ☐ | |

EVERSOURCE

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)

**Figure 1 Breaker 30R-2X3-2**

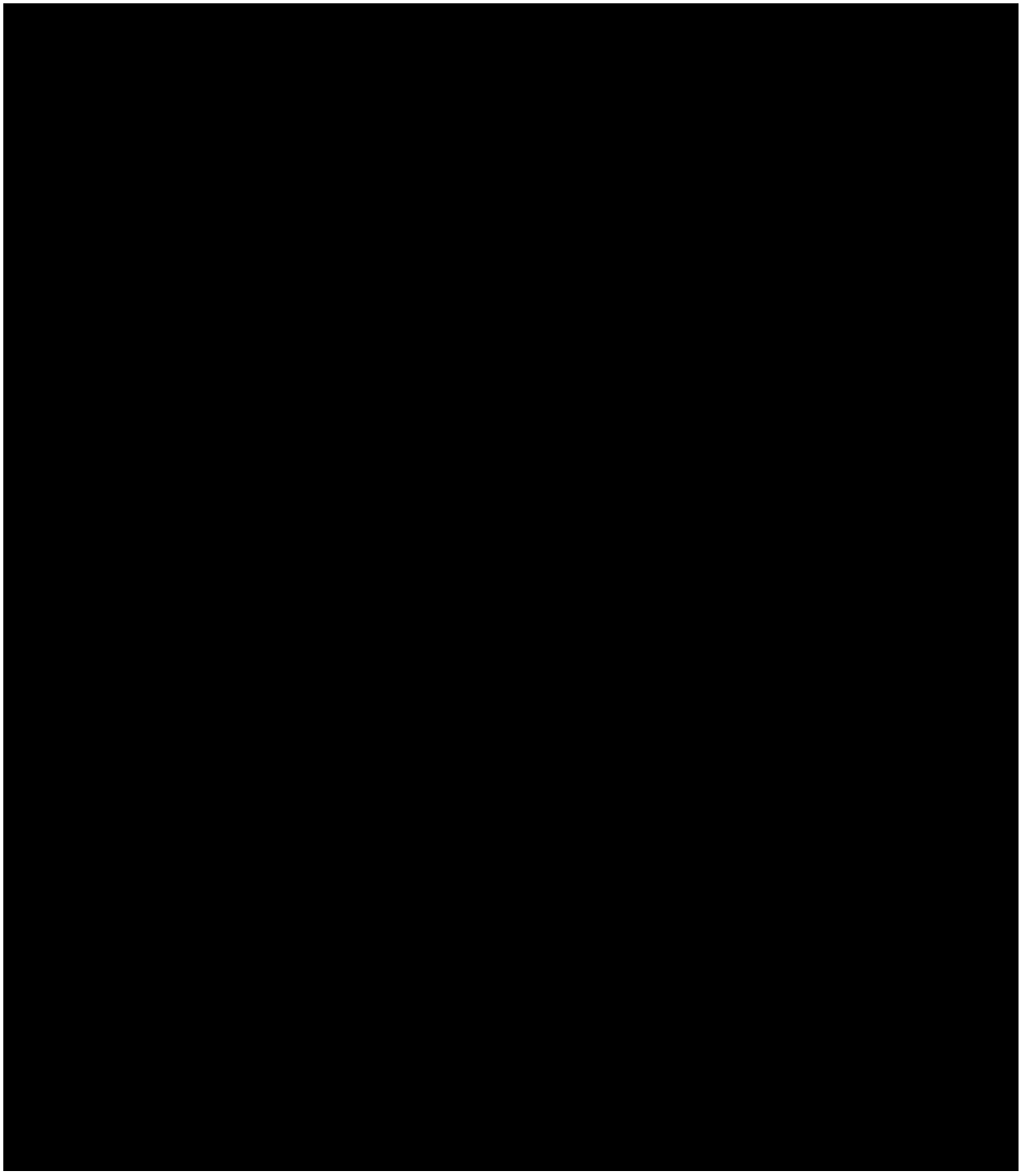


Figure 2 Breaker 30R-2X3-2 Cabinet

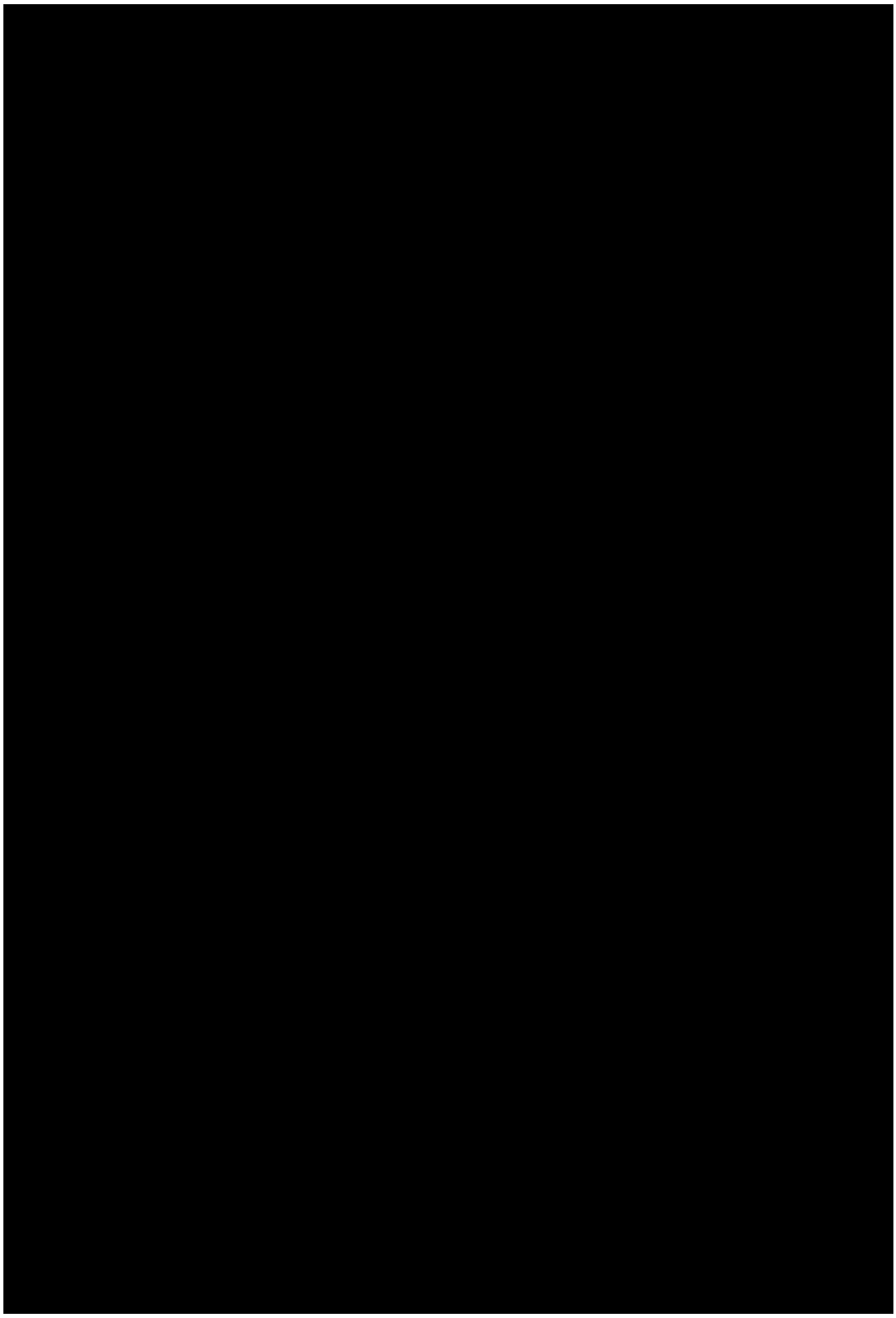


**Figure 3 Breaker 30R-2X3-2 Nameplate**



**Figure 4 Switch 30R-2X3-4**



Figure 5 Breaker 30R-3X3-2

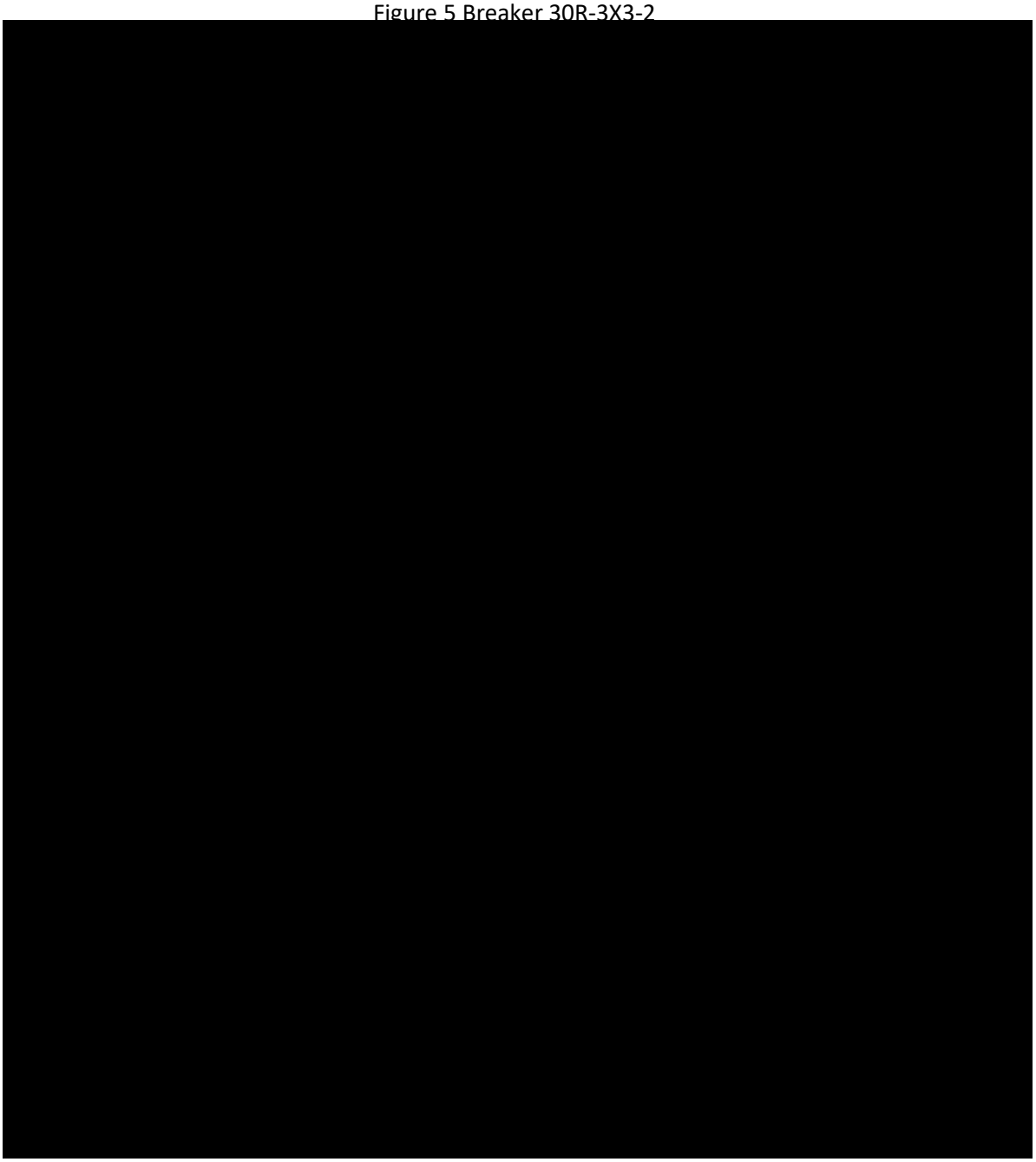


**Figure 6 Breaker 30R-3X3-2 Cabinet**

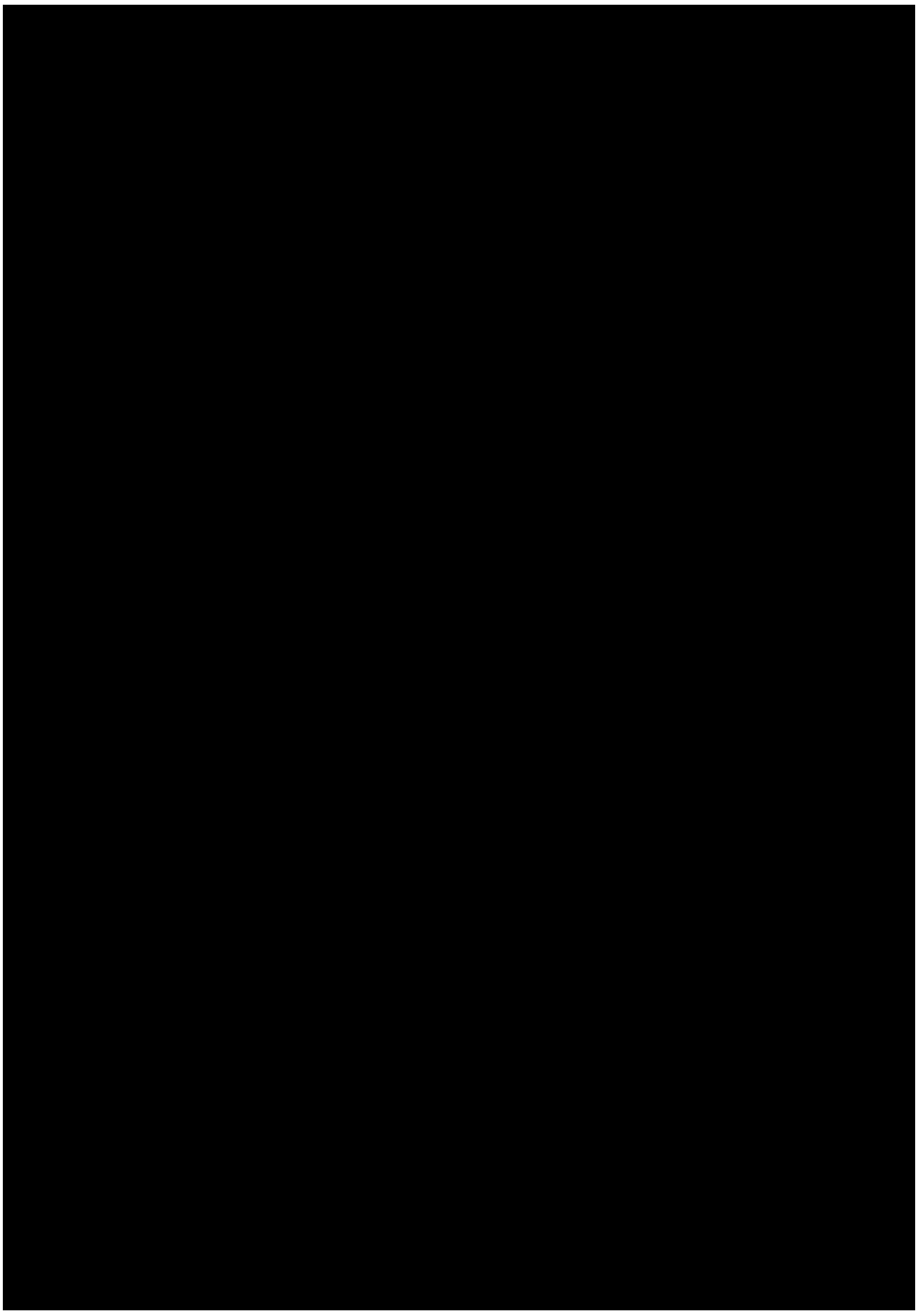
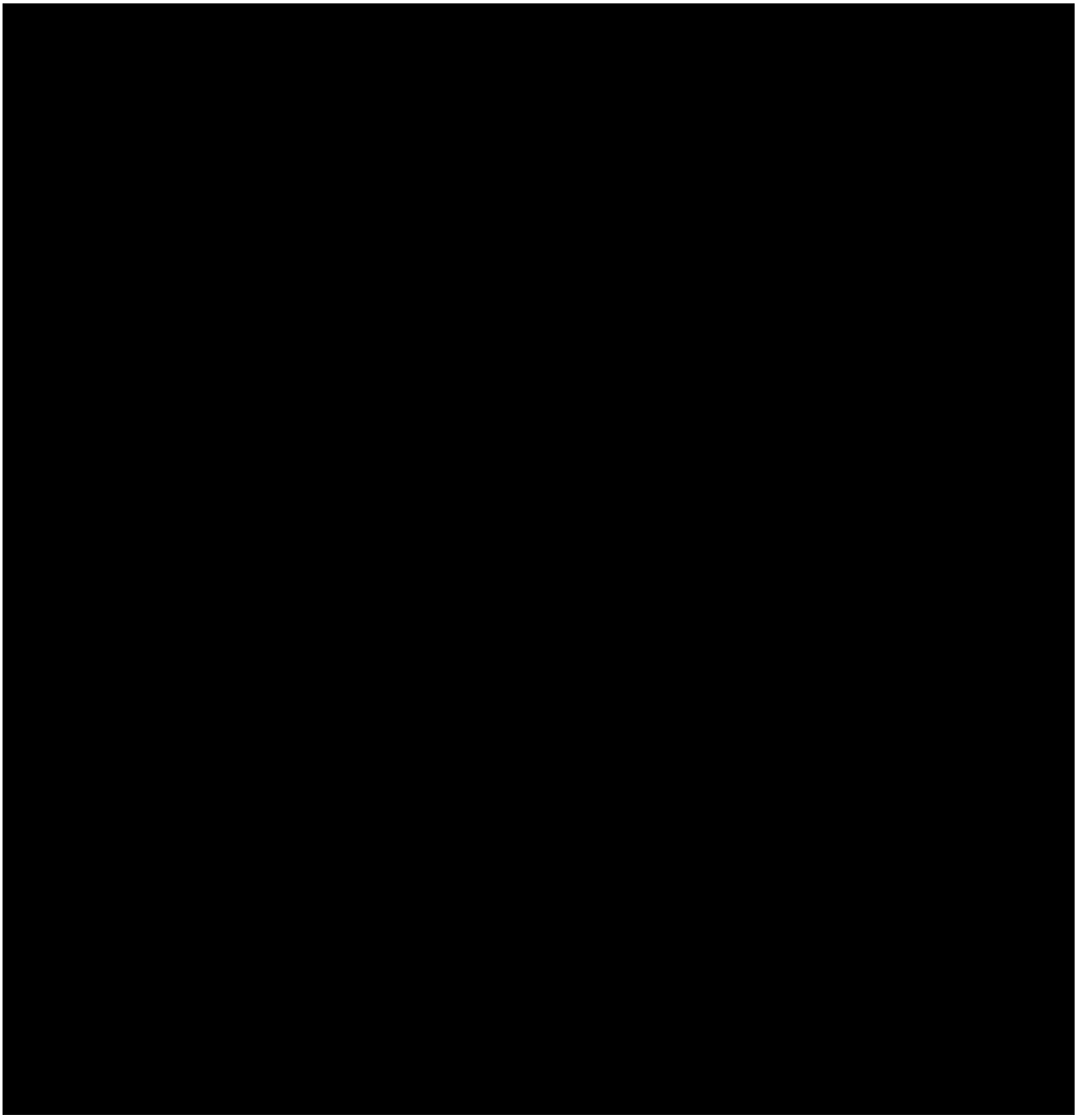


**Figure 7 Breaker 30R-3X3-2 Nameplate**



## Figure 8 Switch 30R-3X3-4



## Figure 9 Breaker 30R15-2

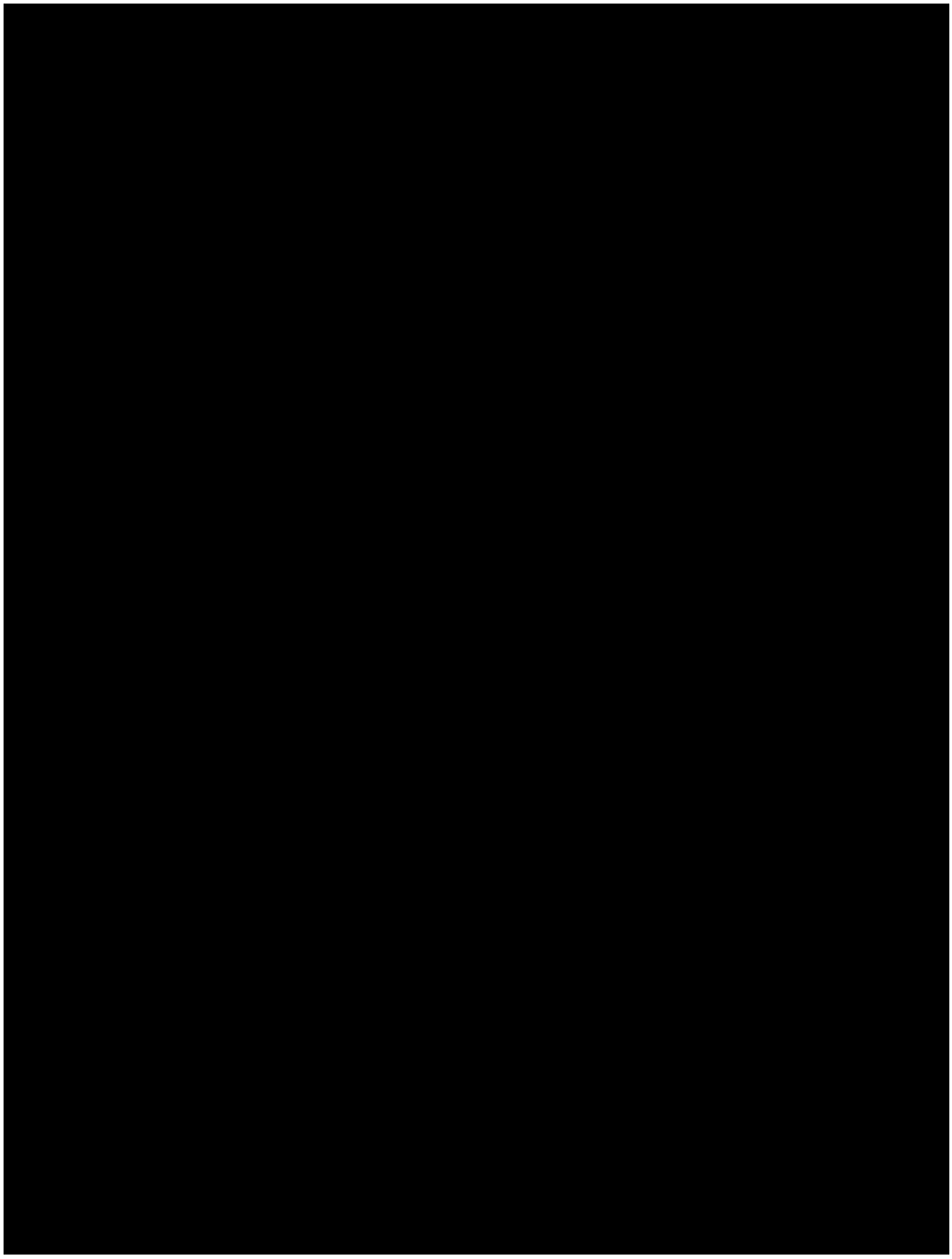


**Figure 10 Breaker 30R-30R15-2 Cabinet**

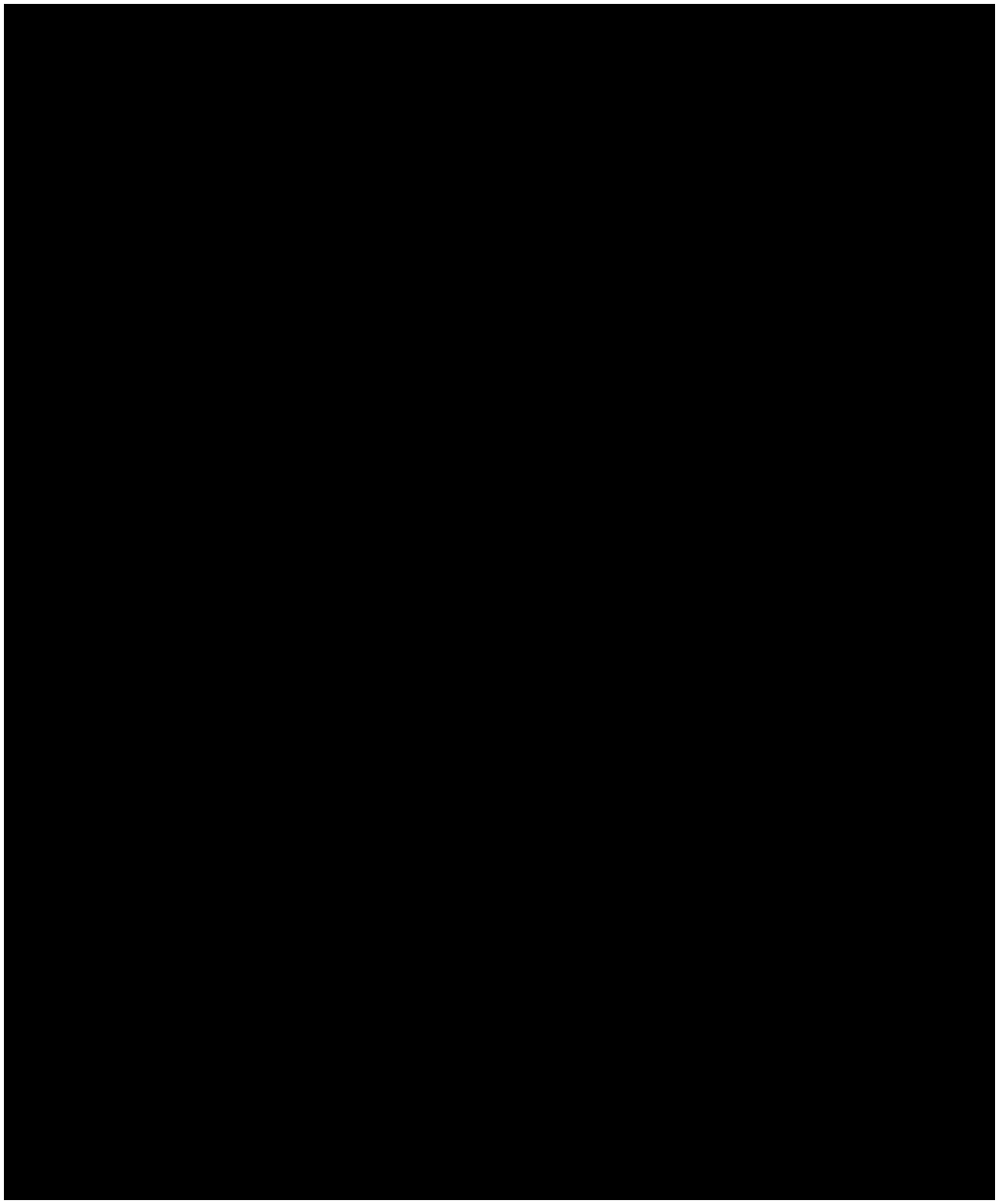


**Figure 11 Breaker 30R15-2 Nameplate**



## Figure 12 Switch 30R15-5



| Activity ID | Activity Name | Original Duration | Start | Finish | Resources | Predecessors | Successors |
|---|---|---|---|---|---|---|---|
| [redacted] | Phase 2 OCB Replacement Program Release (RLC) | 378 | 11/03/2020 08 A | 08/08/2022 16 | | | |
| [redacted] | Phase 2 OCB Replacement Program Release (RLC) | 0 | | | | | |
| INITIALIZATION AND SCOPE DEVELOPEMENT | | 348 | 02/08/2021 08 A | 04/19/2022 16 | | | |
| INITIALIZATION AND SCOPE DEVELOPEMENT | | 0 | 02/08/2021 08 A | 02/08/2021 08 A | | | |
| START | SCHEDULE START MILESTONE | 0 | 02/08/2021 08 A | | | | PE1100, PE1400, PE1000, A1010 |
| 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 | |
| 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 | DE1510 |
| Civil Engineering Preliminary Design | | 29 | 07/13/2021 08 A | 08/13/2021 16 A | | | |
| DE2010 | Vendor Engineer Develop Civil Substation Preliminary Design | 10 | 07/13/2021 08 A | 07/26/2021 16 A | | TMP1220 | DE2020, DE1524, DE1500, DE1540 |
| DE2020 | ES Engineering Review Civil Substation Preliminary Design | 10 | 08/02/2021 08 A | 08/13/2021 16 A | | DE2010 | AT2605, CE1510, CE1200, DSSE-500, DE1550 |
| Electrical Engineering Preliminary Design | | 20 | 07/08/2021 08 A | 08/13/2021 16 A | | | |
| DE2030 | Vendor Engineer Develop Electrical Substation Preliminary Design | 10 | 07/08/2021 08 A | 07/26/2021 16 A | | TMP1220 | DE2040, DE1524, DE1500, DE1540 |
| DE2040 | ES Engineering Review Electrical Substation Preliminary Design | 10 | 08/09/2021 08 A | 08/13/2021 16 A | | DE2030 | BT2605, CE1510, EE1200, DSSE-520, DSSE-1150, |
| P&C Engineering Preliminary Design | | 15 | 07/13/2021 08 A | 08/13/2021 16 A | | | |
| DE2090 | Vendor Engineer Develop P&C Preliminary Design | 10 | 07/13/2021 08 A | 07/26/2021 16 A | | TMP1220 | DE2100, DE1524, DE1500, DE1540 |
| DE2100 | ES Engineering Review P&C Preliminary Design | 10 | 08/09/2021 08 A | 08/13/2021 16 A | | DE2090 | BT2605, CE1510, NX9A-NC01, PC1100, DSSE-510, |
| EPAC Partial Funding PAF[redacted] | | 66 | 03/01/2021 08 A | 04/07/2021 16 A | | | |
| CE1521 | Schedule Preliminary Constructability Walk Down | 5 | 03/01/2021 08 A | 03/05/2021 16 A | | CE1510 | CE1522 |
| CE1530 | N/R - Review Siting & Permitting (If Required) | 5 | 03/01/2021 08 A | 03/05/2021 16 A | | | |
| CE1540 | Preliminary ISD Date Locked Down | 5 | 03/01/2021 08 A | 03/05/2021 16 A | | CE1510 | CE1550 |
| CE1522 | Conduct Preliminary Constructability Walk Down | 5 | 03/05/2021 08 A | 03/11/2021 16 A | | CE1521 | CE1524 |
| CE1524 | Release Constructability Form Review Complete | 5 | 03/22/2021 08 A | 03/24/2021 00 A | | CE1522 | CE1551, CE1550 |
| CE1550 | Develop Preliminary Grade Estimate (-25%+50%) | 6 | 03/22/2021 08 A | 04/07/2021 16 A | | CE1562, CE1540, CE1510, CE1524 | A3590, A3620, A3370, CE1552, CE1551 |
| CE1510 | Develop Electrical Substation Preliminary Scope | 5 | 03/24/2021 08 A | 03/24/2021 16 A | | DE2020, DE2040, DE2100 | CE1562, CE1550, CE1540, CE1521 |
| CE1551 | N/R - Estimating Request Initiated | 3 | 04/07/2021 08 A | 04/07/2021 16 A | | CE1562, CE1524, CE1550 | CE1552 |
| CE1552 | N/R - Review Preliminary Grade Estimate (-25%+50%) | 5 | 04/07/2021 08 A | 04/07/2021 16 A | | CE1550, CE1551 | PAPF1510, CE1541 |
| CE1541 | N/R - Develop P6 Schedule for Release EPAC Submittal | 5 | 04/07/2021 08 A | 04/07/2021 16 A | | CE1552 | PAPF1510 |
| PAPF1510 | N/R - Submit Partial Funding PAF for Internal Review | 3 | 04/07/2021 08 A | 04/07/2021 16 A | | CE1541, CE1552 | PAPF1511 |
| PAPF1511 | N/R - Incorporate Internal Review Comments & Submit Partial Funding PAF to EPAC f | 3 | 04/07/2021 08 A | 04/07/2021 16 A | | PAPF1510 | PAPF1512 |
| PAPF1512 | N/R - Present Partial Funding PAF at EPAC Meeting | 1 | 04/07/2021 08 A | 04/07/2021 16 A | | PAPF1511 | PAPF1513 |
| PAPF1513 | N/R - Incorporate EPAC Partial Funding PAF Review Comments | 3 | 04/07/2021 08 A | 04/07/2021 16 A | | PAPF1512 | PAPF1514 |
| PAPF1514 | N/R - EPAC Partial Funding Approval -Release | 10 | 04/07/2021 08 A | 04/07/2021 16 A | | PAPF1513 | PC1100, FPR1515 |
| CE1562 | N/R - Develop Unitized Cost Estimate | 5 | 04/07/2021 08 A | 04/07/2021 16 A | | CE1510 | CE1550, CE1551 |
| FPR1515 | N/R - Partial Funding Release Complete Power Plan Approval (Release SCHEDULE T. | 0 | | 04/07/2021 16 A | | PAPF1514 | TMP1250, DSSE-1150, DSSE-500, DSSE-520, DSS |
| EPAC Full Funding PAF[redacted] | | 147 | 03/03/2021 08 A | 10/08/2021 16 | | | |
| DE1521 | Schedule Planning Constructability Walk Down | 5 | 03/03/2021 08 A | 03/04/2021 16 A | | EE1210, PC1110, CE1210, DE1510 | DE1522 |
| DE1522 | Conduct Planning Constructability Walk Down | 1 | 03/05/2021 08 A | 03/11/2021 16 A | | DE1521 | DE1500, DE1524 |
| DE1530 | N/R - Review Siting & Permitting (If Required) | 5 | 03/15/2021 08 A | 03/15/2021 16 A | | EE1210, PC1110, CE1210, DE1510 | PAFF1510 |
| DE1510 | Develop Electrical Substation Concept Scope | 5 | 03/18/2021 08 A | 03/19/2021 16 A | | PE1100 | DE1550, DE1540, DE1530, DE1521 |
| DE1550 | Develop Planning Grade Estimate (-25%+25%) | 10 | 08/09/2021 08 A | 08/17/2021 16 A | | DE1500, DE1540, DE1524, DE1510, DE21( | DE1551 |
| DE1551 | Estimating Request Initiated | 1 | 08/18/2021 08 A | 08/18/2021 16 A | | DE1550 | DE1552 |
| DE1524 | Release Constructability Form Review Complete | 4 | 08/25/2021 08 A | 08/27/2021 16 A | | DE1522, DE2010, DE2030, DE2090 | DE1550 |
| DE1552 | Review Planning Grade Estimate (-25%+25%) | 10 | 08/30/2021 08 | 09/13/2021 16* | | DE1551 | PAFF1510, DE1541 |
| DE1540 | Preliminary ISD Date Locked Down | 15 | 08/30/2021 08 | 09/20/2021 16 | | DE1510, DE2090, DE2030, DE2010 | DE1550 |



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| Activity ID | Activity Name | Original Duration | Start | Finish | Resources | Predecessors | Successors |
|---|---|---|---|---|---|---|---|
| DE1500 | Conduct Initial Risk Management & SCLL Review (Project Initiator & PM) | 3 | 08/30/2021 08 | 09/01/2021 16 | [redacted] | DE1522, DE2090, DE2030, DE2010 | DE1550 |
| DE1541 | Develop P6 Schedule for Release EPAC Submittal | 5 | 09/07/2021 08 | 09/13/2021 16 | | DE1552 | PAFF1510 |
| PAFF1510 | Submit Full Funding PAF for Internal Review | 5 | 09/14/2021 08 | 09/20/2021 16 | | DE1541, DE1530, DE1552 | PAFF1511 |
| PAFF1511 | Incorporate Internal Review Comments & Submit Full Funding PAF to EPAC for Revie | 4 | 09/15/2021 08 | 09/20/2021 16* | | PAFF1510 | PAFF1512 |
| PAFF1512 | Present Full Funding PAF at EPAC Meeting | 0 | | 09/29/2021 16* | | PAFF1511 | PAFF1513 |
| PAFF1513 | Incorporate EPAC Full Funding PAF Review Comments | 2 | 09/30/2021 08 | 10/01/2021 16 | | PAFF1512 | PAFF1514 |
| PAFF1514 | EPAC Full Funding Approval - Release | 5 | 10/04/2021 08 | 10/08/2021 16 | | PAFF1513 | A1010, FFR1515, DSSE-520, DSSE-500, DSSE-115 |
| FFR1515 | Full Funding PowerPlan Approval | 0 | | 10/08/2021 16 | | PAFF1514 | A3540, A3500, A3460, A3430, A3420, A3390, A3510 |
| **T-Minus Milestones Civil** | | 238 | 02/16/2021 16 A | 01/03/2022 08 | | | |
| AT3001 | A-T-30.01 Engr Project Scoping Document Issued (Scope Lockdown) ** Re | 0 | | 02/16/2021 16 A | | | AT00 |
| AT0814 | Construction Contracts / PSA in Place | 0 | | 03/31/2021 16 A | | A3460, A3420 | AT00 |
| AT2605 | Preliminary Design / Engineering Completed - Civil | 0 | | 08/13/2021 16 A | | DE2020 | AT00 |
| AT1811 | Detailed Design / Engineering Completed - Civil Civil | 0 | | 09/17/2021 16* | | CE1210 | AT00 |
| AT0805C | Civil IFC - Civil (BG) w/BOM | 0 | | 11/18/2021 16 | | CE1320 | AT00 |
| AT0203 | Go / No-Go [CAN] Construction Authorization Notice Form Complete | 0 | | 12/19/2021 16 | | A1170 | AT00 |
| AT0401 | Final Civil Material Delivered to Site | 0 | | 12/30/2021 16 | | DSSE-560 | AT00 |
| AT00 | A-T-00 Start Construction Civil | 0 | 01/03/2022 08* | | | AT0203, AT0814, AT3001, AT2605, AT1811, | A1120 |
| **T-Minus Milestones Electrical** | | 284 | 03/09/2021 16 A | 04/19/2022 16 | | | |
| 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 |
| BT1003 | N/R - PPA (I.3.9) Approval Received | 0 | | 03/29/2021 16 A | | | BT00 |
| BT0901 | N/R - T-09 Protection System Data - OP-24 Requirement (Tie to First Start of Construc | 0 | | 03/29/2021 16 A | | | BT00 |
| BT0814 | Construction Contracts / PSA In Place (Internal Resources) | 0 | | 03/31/2021 16 A | | A3460, A3420 | BT00 |
| BT1202 | N/R - P/C Description / Draft OI Issued To LCC | 0 | | 03/31/2021 16 A | | | BT00 |
| BT0301 | T-03 NX-9 Ratings to LCC & ISO for Existing Equipment (EM=Per Procedure/15 busin | 0 | | 07/28/2021 16 A | | NX9A-NC23 | BT00 |
| BT2605 | Preliminary Design / Engineering Completed | 0 | | 08/13/2021 16 A | | DE2040, DE2100 | A3550, BT00 |
| BT1811 | Detailed Design / Engineering Completed | 0 | | 09/17/2021 16* | | EE1210, PC1110 | BT00 |
| BT0805P | IFC - P&C w/BOM | 0 | | 11/17/2021 16 | | PC1330 | BT00 |
| BT0805E | IFC - Electrical (AG) w/BOM | 0 | | 11/17/2021 16 | | EE1310 | BT00 |
| BT1201 | SCADA Data (Tab) Sheets Sent to LCC | 0 | | 11/27/2021 16 | | CSD1030, CSD1000 | BT00 |
| BT0409 | T-04 ALL FIRM TOA APPLICATIONS DUE TO LCC | 0 | | 12/05/2021 16 | | A1250 | BT00 |
| BT0404 | All Final Relay Protective Settings Issued | 0 | | 12/05/2021 16 | | PC1400 | BT00 |
| BT0203 | Go / No-Go [CAN] Construction Authorization Notice Form Complete | 0 | | 12/19/2021 16 | | B1170 | BT00 |
| BT00 | T-00 Start of Construction | 0 | 01/03/2022 08* | | | BT0404, BT2404, BT0409, BT1301, BT081 | CSM |
| BT2404 | Determine / Assign Commissioning Engineer | 0 | | 02/01/2022 16 | | LCE200 | BT00 |
| BT1301 | Commissioning Plan Complete | 0 | | 03/14/2022 16 | | LCE400 | BT00 |
| BT0401 | Final Material Receipt Review Completed *ES Purchased* | 0 | | 04/19/2022 16 | | DSSE-1130, DSSE-1010, DSSE-550, DSS | BT00 |
| **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 | [redacted] | CE1550 | 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 | |
| **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 | | CE1550 | 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 |



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| Activity ID | Activity Name | Original Duration | Start | Finish | Resources | Predecessors | Successors |
|---|---|---|---|---|---|---|---|
| A3660 | N/R -Permitting - Obtain Special Use Permit | 20 | 03/09/2021 08 A | 03/09/2021 16 A | | A3650 | |
| **Engineering & Design** | | 324 | 11/03/2020 08 A | 06/03/2022 16 | | | |
| **Engineering Services Staffing** | | 1 | 01/26/2021 08 A | 01/26/2021 16 A | | | |
| A3370 | Decision Required Regarding Engineering Staffing (ES, COC, BID) | 1 | 01/26/2021 08 A | 01/26/2021 16 A | | CE1550 | TMP1140 |
| **EOC - Engineer of Choice Process** | | 70 | 11/03/2020 08 A | 02/03/2021 16 A | | | |
| TMP1140 | EOC- Provide RFP to Vendors | 2 | 11/03/2020 08 A | 11/04/2020 16 A | | A3370 | TMP1150 |
| TMP1150 | EOC- Vendors Responds with Proposal | 5 | 11/05/2020 08 A | 11/17/2020 16 A | | TMP1140 | TMP1180 |
| TMP1180 | EOC- EOC Committee Reviews at Bi-Weekly Meeting & Approves | 1 | 01/26/2021 08 A | 01/26/2021 16 A | | TMP1150 | TMP1200 |
| TMP1200 | EOC- DR Prepared by Project Engineer & Project Controls #500065 | 3 | 01/29/2021 08 A | 02/03/2021 16 A | | TMP1180 | TMP1220 |
| TMP1220 | EOC- PO Issued for Vendor -Preliminary Design Effort | 10 | 02/01/2021 00 A | 02/03/2021 00 A | | TMP1200 | DE2090, DE2030, DE2010 |
| TMP1240 | EOC- CO Issued for Vendor - Design Effort | 10 | 02/01/2021 00 A | 02/03/2021 00 A | | | |
| TMP1250 | EOC- NTP Issued for Vendor -Preliminary Design Effort | 4 | 02/01/2021 08 A | 02/03/2021 16 A | | FPR1515 | PC1100, EE1200, CE1200 |
| **Civil Engineering Detail Design** | | 27 | 08/16/2021 08 A | 09/17/2021 16 | | | |
| CE1200 | Vendor Engineer Develop Civil Substation Detail Design | 15 | 08/16/2021 08 A | 09/02/2021 16 | | TMP1250, DE2020 | CE1210, OPERM1000 |
| CE1210 | ES Engineering Review Civil Substation Detail Design | 10 | 09/03/2021 08 | 09/17/2021 16* | | CE1200 | AT1811, DE1530, DE1521, CE1300 |
| **Civil Engineering IFC Design** | | 31 | 10/05/2021 08 | 11/18/2021 16 | | | |
| CE1300 | Vendor Engineer Develop Civil Substation IFC | 20 | 10/05/2021 08 | 11/02/2021 16* | | CE1210 | CE1310 |
| CE1310 | ES Engineering Review Civil Substation IFC | 10 | 11/03/2021 08 | 11/17/2021 16 | | CE1300 | CE1320, DSSE-500 |
| CE1320 | ES Engineering Issue Civil Substation IFC | 1 | 11/18/2021 08 | 11/18/2021 16 | | CE1310 | AT0805C |
| **SS Electrical Engineering** | | 5 | 11/10/2021 08 | 11/17/2021 16 | | | |
| CSD1000 | PE Initiate CASCADE Forms (Appendix A) for Construction Package - | 5 | 11/10/2021 08 | 11/17/2021 16 | | EE1310 | BT1201 |
| **Electrical Engineering Detail Design** | | 27 | 08/16/2021 08 A | 09/17/2021 16 | | | |
| EE1200 | Vendor Engineer Develop Electrical Substation Detail Design | 15 | 08/16/2021 08 A | 09/02/2021 16 | | TMP1250, DE2040 | EE1210, OPERM1000 |
| EE1210 | ES Engineering Review Electrical Substation Detail Design | 10 | 09/03/2021 08 | 09/17/2021 16* | | EE1200 | A1250, BT1811, DE1530, DE1521, EE1300 |
| **Electrical Engineering IFC Design** | | 30 | 10/05/2021 08 | 11/17/2021 16 | | | |
| EE1300 | Vendor Engineer Develop Electrical Substation IFC | 20 | 10/05/2021 08 | 11/02/2021 16* | | EE1210 | EE1310, A3510 |
| EE1310 | ES Engineering Review Electrical Substation IFC | 10 | 11/03/2021 08 | 11/17/2021 16 | | EE1300 | BT0805E, CSD1000, DSSE-520, DSSE-1150, DSSE |
| **Substation - Preliminary Thermal Data** | | 4 | 07/28/2021 08 A | 07/28/2021 16 A | | | |
| NX9A-NC07 | N/R (per M.L. 7/28/21) LTRC Reviews and Makes "GO / NO-GO" Decision for Thermal | 1 | 07/28/2021 08 A | 07/28/2021 16 A | | NX9A-NC05 | NX9A-NC09 |
| NX9A-NC01 | N/R (per M.L. 7/28/21) PE Updates 1-Line Nomenclature Dwgs & Complete PE Check | 1 | 07/28/2021 08 A | 07/28/2021 08 A | | DE2100 | NX9A-NC03 |
| NX9A-NC11 | N/R (per M.L. 7/28/21) P&C Develops and Provides LTRC with P&C Checklist (M7-EN | 1 | 07/28/2021 08 A | 07/28/2021 16 A | | NX9A-NC09 | NX9A-NC13 |
| NX9A-NC21 | N/R (per M.L. 7/28/21) TRC Review and Submit NX-9 Data to LCC + ISO-NE for S/S T | 1 | 07/28/2021 08 A | 07/28/2021 16 A | | NX9A-NC19 | NX9A-NC23 |
| NX9A-NC09 | N/R (per M.L. 7/28/21) LTRC Requests P&C Checklist | 1 | 07/28/2021 08 A | 07/28/2021 16 A | | NX9A-NC07 | NX9A-NC11 |
| NX9A-NC19 | N/R - Scheduler @ NURS email "Submitted for PP Review" - Updates NURS with DOI | 1 | 07/28/2021 08 A | 07/28/2021 16 A | | NX9A-NC17 | NX9A-NC21 |
| NX9A-NC17 | N/R (per M.L. 7/28/21) LTRC Sends Thermal Rating Data for Approval & Submit to NUI | 1 | 07/28/2021 08 A | 07/28/2021 16 A | | NX9A-NC15 | NX9A-NC19 |
| NX9A-NC15 | N/R (per M.L. 7/28/21) TRC Reviews and Approves Thermal Rating Data | 1 | 07/28/2021 08 A | 07/28/2021 16 A | | NX9A-NC13 | NX9A-NC17 |
| NX9A-NC13 | N/R (per M.L. 7/28/21) LTRC Reviews and Sends Thermal Rating Data for TRC Review | 1 | 07/28/2021 08 A | 07/28/2021 16 A | | NX9A-NC11 | NX9A-NC15 |
| NX9A-NC23 | N/R - Scheduler @ NURS email "Submitted for DOE Monitoring" - Updates T-3, Equipl | 1 | 07/28/2021 08 A | 07/28/2021 16 A | | NX9A-NC21 | BT0301 |
| NX9A-NC03 | N/R (per M.L. 7/28/21) LTRC Reviews and Makes "GO / NO-GO" Decision for 1-Line N | 1 | 07/28/2021 08 A | 07/28/2021 16 A | | NX9A-NC01 | NX9A-NC05 |
| NX9A-NC05 | N/R (per M.L. 7/28/21) LTRC Submits 1-Line Nomenclature to TRC | 1 | 07/28/2021 08 A | 07/28/2021 16 A | | NX9A-NC03 | NX9A-NC07 |
| **Substation - NX-9 Pre NX9-DOE** | | 1 | 06/01/2022 08 | 06/01/2022 16 | | | |
| NX9500 | Scheduler - Send Email for 48Hrs Notification before DOE. | 1 | 06/01/2022 08 | 06/01/2022 16 | | ISD | FINISH |
| **Substation - NX-9 Post NX9-DOE/ISD** | | 214 | 07/28/2021 08 A | 06/03/2022 16 | | | |
| NX9FINAL6( | N/R (per M.L. 7/28/21) Receive + Issue Final Affirmed NX-9 Data to NURS | 1 | 07/28/2021 08 A | 07/28/2021 16 A | | NX9FINAL50 | FINISH |
| NX9FINAL5( | Review + Affirm Accuracy of NX-9 for ISO Submission (Tie after Equip DOE or ISD) | 3 | 06/01/2022 08 | 06/03/2022 16 | | ISD | NX9FINAL60 |
| **P&C Engineering** | | 5 | 11/10/2021 08 | 11/17/2021 16 | | | |



TASK filter: All Activities

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| Activity ID | Activity Name | Original Duration | Start | Finish | Resources | Predecessors | Successors |
|---|---|---|---|---|---|---|---|
| CSD1030 | PE Initiate CASCADE Forms (Appendix A) for Construction Package - | 5 | 11/10/2021 08 | 11/17/2021 16 | | PC1330 | BT1201 |
| **P&C Engineering Detail Design** | | 27 | 08/16/2021 08 A | 09/17/2021 16 | | | |
| PC1100 | Vendor Engineer Develop P&C Detail Design | 15 | 08/16/2021 08 A | 09/02/2021 16 | | PAPF1514, TMP1250, DE2100 | PC1110, OPERM1000 |
| PC1110 | ES Engineering Review P&C Detail Design | 10 | 09/03/2021 08 | 09/17/2021 16* | | PC1100 | BT1811, DE1530, DE1521, A7550, PC1320 |
| **P&C Engineering IFC Design** | | 30 | 10/05/2021 08 | 11/17/2021 16 | | | |
| PC1320 | Vendor Engineer Develop P&C IFC | 20 | 10/05/2021 08 | 11/02/2021 16* | | PC1110 | PC1330 |
| PC1330 | ES Engineering Review P&C IFC | 10 | 11/03/2021 08 | 11/17/2021 16 | | PC1320 | BT0805P, CSD1030, LCE100 |
| **P&C Design Package** | | 30 | 08/30/2021 08 | 10/12/2021 16 | | | |
| OPERM100 | Submit Outage Permit / TOA Request - (18 weeks) | 10 | 08/30/2021 08 | 09/13/2021 16 | | CE1200, EE1200, PC1100 | OPERM1010 |
| OPERM101 | Outage Permit / TOA Request - Review/ Approve (18 weeks) | 20 | 09/14/2021 08 | 10/12/2021 16 | | OPERM1000 | B1170, A1170 |
| **Relay Settings** | | 1 | 04/12/2021 08 A | 04/12/2021 16 A | | | |
| A7420 | N/R(per Tim P 4/12/21)P&C Review Relay Settings Basis Document and Provides Cor | 1 | 04/12/2021 08 A | 04/12/2021 16 A | | A7540 | A7500 |
| A7540 | N/R(per Tim P 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 Tim P 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 Tim P 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 Tim P 4/12/21)Provide Relay Setting Information to Vendor (ASPEN Model, As | 1 | 04/12/2021 08 A | 04/12/2021 16 A | | PC1110 | A7551 |
| A7551 | N/R(per Tim P 4/12/21)Vendor Makes Go/No-Go Decision on Relay Settings | 1 | 04/12/2021 08 A | 04/12/2021 16 A | | A7550 | LCE100, A7540 |
| PC1400 | N/R(per Tim P 4/12/21) SA Complete P&C Relay Settings | 0 | | 04/12/2021 16 A | | A7440 | BT0404 |
| **Material Procurement** | | 257 | 04/09/2021 08 A | 04/19/2022 16 | | | |
| **Material - P&C** | | 131 | 04/09/2021 08 A | 04/19/2021 16 A | | | |
| DSSE-510 | N/R (per DB 9-4-21) MATERIAL - P&C - Prepare & Issue DR | 5 | 04/09/2021 08 A | 04/09/2021 16 A | | FPR1515, DE2100 | DSSE-980 |
| DSSE-1010 | N/R - MATERIAL - P&C - Confirm Material Delivery to Site | 1 | 04/19/2021 08 A | 04/19/2021 16 A | | DSSE-1000 | BT0401 |
| DSSE-1000 | N/R - MATERIAL - P&C - Material Vendor Delivery Leadtime | 70 | 04/19/2021 08 A | 04/19/2021 16 A | | DSSE-980 | DSSE-1010 |
| DSSE-980 | N/R - MATERIAL - P&C - Procurement Issue PO | 10 | 04/19/2021 08 A | 04/19/2021 16 A | | DSSE-510 | DSSE-1000 |
| **Material - Electrical** | | 30 | 11/18/2021 08 | 01/03/2022 16 | | | |
| DSSE-520 | MATERIAL - Electrical - Prepare & Issue DR | 1 | 11/18/2021 08 | 11/18/2021 16 | | FPR1515, DE2040, PAFF1514, EE1310 | DSSE-1020, DSSE-530 |
| DSSE-530 | Electrical (AG) Material Ordered | 0 | | 11/18/2021 16 | | DSSE-520 | DSSE-1020 |
| DSSE-1020 | MATERIAL - Electrical - Procurement Issue PO | 10 | 11/19/2021 08 | 12/03/2021 16 | | DSSE-520, DSSE-530 | DSSE-1030 |
| DSSE-1030 | MATERIAL - Electrical - Material Vendor Delivery Leadtime | 30 | 12/04/2021 08 | 01/02/2022 16 | | DSSE-1020 | DSSE-550 |
| DSSE-550 | MATERIAL - Electrical - Confirm Material Delivery to Site | 1 | 01/03/2022 08 | 01/03/2022 16 | | DSSE-1030 | BT0401 |
| **Material - Civil** | | 29 | 11/18/2021 08 | 12/30/2021 16 | | | |
| DSSE-500 | MATERIAL - CIVIL - Prepare & Issue DR | 5 | 11/18/2021 08 | 11/24/2021 16 | | FPR1515, DE2020, PAFF1514, CE1310 | DSSE-1040, DSSE-540 |
| DSSE-540 | Civil (BG) Material Ordered | 0 | | 11/24/2021 16 | | DSSE-500 | DSSE-1040 |
| DSSE-1040 | MATERIAL - CIVIL - Procurement Issue PO | 10 | 11/26/2021 08 | 12/09/2021 16 | | DSSE-500, DSSE-540 | DSSE-1050 |
| DSSE-1050 | MATERIAL - CIVIL - Material Vendor Delivery Leadtime | 20 | 12/10/2021 08 | 12/29/2021 16 | | DSSE-1040 | DSSE-560 |
| DSSE-560 | MATERIAL - CIVIL - Confirm Material Delivery to Site | 1 | 12/30/2021 08 | 12/30/2021 16 | | DSSE-1050 | AT0401 |
| **Material - Breakers** | | 104 | 11/18/2021 08 | 04/19/2022 16 | | | |
| DSSE-1150 | MATERIAL - BREAKER - Prepare & Issue DR (breakers)DR # | 5 | 11/18/2021 08 | 11/24/2021 16 | | FPR1515, DE2040, PAFF1514, EE1310 | DSSE-1160, DSSE-1180 |
| DSSE-1180 | Breaker (AG) Material Ordered | 0 | | 11/24/2021 16 | | DSSE-1150 | DSSE-1160 |
| DSSE-1160 | MATERIAL - BREAKER - Procurement Issue PO# 11086619 | 10 | 11/26/2021 08 | 12/09/2021 16 | | DSSE-1180, DSSE-1150 | DSSE-1140 |
| DSSE-1140 | MATERIAL - BREAKER - Material Vendor Delivery Leadtime | 130 | 12/10/2021 08 | 04/18/2022 16 | | DSSE-1160 | DSSE-1130 |
| DSSE-1130 | MATERIAL - BREAKER - Confirm Material Delivery to Site | 1 | 04/19/2022 08 | 04/19/2022 16 | | DSSE-1140 | BT0401 |
| **Material - Switch** | | 97 | 11/18/2021 08 | 04/09/2022 16 | | | |
| DSSE-1210 | MATERIAL - SWITCH - Prepare & Issue DR (breakers) DR | 5 | 11/18/2021 08 | 11/24/2021 16 | | FPR1515, DE2040, PAFF1514, EE1310 | DSSE-1220, DSSE-1230 |
| DSSE-1230 | Switch (AG) Material Ordered | 0 | | 11/24/2021 16 | | DSSE-1210 | DSSE-1220 |
| DSSE-1220 | MATERIAL - SWITCH - Procurement Issue PO | 10 | 11/26/2021 08 | 12/09/2021 16 | | DSSE-1230, DSSE-1210 | DSSE-1200 |





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| Activity ID | Activity Name | Original Duration | Start | Finish | Resources | Predecessors | Successors |
|---|---|---|---|---|---|---|---|
| DSSE-1200 | MATERIAL - SWITCH - Material Vendor Delivery Leadtime | 120 | 12/10/2021 08 | 04/08/2022 16 | [redacted] | DSSE-1220 | DSSE-1190 |
| DSSE-1190 | MATERIAL - SWITCH - Confirm Material Delivery to Site | 1 | 04/09/2022 08 | 04/09/2022 16 | | DSSE-1200 | BT0401 |
| **Construction** | | 306 | 03/31/2021 08 A | 06/14/2022 16 | | | |
| **Construction Services Selection** | | 5 | 03/31/2021 08 A | 03/31/2021 16 A | | | |
| A3550 | STAFFING DECISION: EVERSOURCE OR OUTSOURCE BID/COC CONSTRUCT | 5 | 03/31/2021 08 A | 03/31/2021 16 A | | BT2605 | A3390, A3430 |
| **Contractor Of Choice** | | 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 | | FFR1515, A3550 | 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 | | FFR1515, A3410 | B1170, AT0814, BT0814, A1170 |
| **BID Process** | | 65 | 03/31/2021 08 A | 03/31/2021 16 A | | | |
| A3430 | N/R - CONST.SERVICES - BID - Eversource provide Spec / RFP | 15 | 03/31/2021 08 A | 03/31/2021 16 A | | FFR1515, A3550 | A3440 |
| A3440 | N/R - CONST.SERVICES - BID - Contractors Evaluate RFP and Provide Proposal | 15 | 03/31/2021 08 A | 03/31/2021 16 A | | A3430 | A3450 |
| A3450 | N/R - CONST.SERVICES - BID - Eversource reviews contractor proposals | 15 | 03/31/2021 08 A | 03/31/2021 16 A | | A3440 | A3460 |
| A3460 | N/R - CONST.SERVICES - BID - Contract is Awarded - PO Issued | 20 | 03/31/2021 08 A | 03/31/2021 16 A | | FFR1515, A3450 | B1170, AT0814, BT0814, A1170 |
| **Construction - Civil** | | 5 | 01/03/2022 08 | 01/07/2022 16 | | | |
| A1120 | Construction - Civil | 5 | 01/03/2022 08 | 01/07/2022 16 | | AT00 | CV1000, A1130 |
| **Construction - Electrical** | | 14 | 01/08/2022 08 | 01/21/2022 16 | | | |
| A1130 | Construction - Electrical | 14 | 01/08/2022 08 | 01/21/2022 16 | | A1120 | CFM |
| **Construction - Const. Rep Tasks** | | 184 | 09/20/2021 08 | 06/14/2022 16 | | | |
| A1250 | Construction Rep SUBMIT OUTAGE REQUESTS for NON-transformer equipment (4 | 5 | 09/20/2021 08 | 09/24/2021 16 | | EE1210 | BT0409 |
| A1260 | Construction Rep Finalize CASCADE Forms (within 14 days folloiwng ISD) | 10 | 06/01/2022 08 | 06/14/2022 16 | | CFM | A1030 |
| **Construction Resource Tracking** | | 104 | 01/03/2022 08 | 05/31/2022 16 | | | |
| ConRep-S | CONSTRUCTION REP | 104 | 01/03/2022 08 | 05/31/2022 16 | | CSM | CFM |
| CONSTelec | CONSTRUCTION - ELECTRICIAN | 104 | 01/03/2022 08 | 05/31/2022 16 | | CSM | CFM |
| **Construction Outages** | | 104 | 01/03/2022 08 | 05/31/2022 16 | | | |
| CSM | Construction Start Milestone | 0 | 01/03/2022 08 | | | BT00 | TOA-Const11, CONSTelec, ConRep-S |
| TOA-Const' | OUTAGE / General Construction Work (OCB-1) | 31 | 01/03/2022 08 | 02/07/2022 16 | | CSM | TOA-Const2, SWINP1B1, SWOUP1B1 |
| SWOUP1B1 | Construction - Switch Out (OCB-1) | 1 | 01/03/2022 08 | 01/03/2022 16 | | TOA-Const11 | |
| SWINP1B1 | Construction - Switch In (OCB-1) | 1 | 02/07/2022 08 | 02/07/2022 16 | | TOA-Const11 | |
| TOA-Const2 | OUTAGE / General Construction Work (OCB-2) | 31 | 02/10/2022 08 | 03/17/2022 16 | | TOA-Const11 | CFM, TOA-Const3, SWOUP1B3, SWINP1B3, SWC |
| SWOUP1B2 | Construction - Switch Out (OCB-2) | 1 | 02/10/2022 08 | 02/10/2022 16 | | TOA-Const2 | CFM |
| SWINP1B2 | Construction - Switch In (OCB-2) | 1 | 03/17/2022 08 | 03/17/2022 16 | | TOA-Const2 | CFM |
| TOA-Const3 | OUTAGE / General Construction Work (OCB-3) | 31 | 03/21/2022 08 | 04/25/2022 16 | | TOA-Const2 | CFM, SWOUP1B3, SWINP1B3, TOA-Const4 |
| SWOUP1B3 | Construction - Switch Out (OCB-3) | 1 | 03/21/2022 08 | 03/21/2022 16 | | TOA-Const3, TOA-Const2 | CFM |
| SWINP1B3 | Construction - Switch In (OCB-3) | 1 | 04/25/2022 08 | 04/25/2022 16 | | TOA-Const3, TOA-Const2 | CFM |
| TOA-Const4 | OUTAGE / General Construction Work (OCB-4) | 31 | 04/26/2022 08 | 05/31/2022 16 | | TOA-Const2, TOA-Const3 | CFM, SWOUP1B4, SWINP1B4 |
| SWOUP1B4 | Construction - Switch Out (OCB-4) | 1 | 04/26/2022 08 | 04/26/2022 16 | | TOA-Const4, TOA-Const2 | CFM |
| SWINP1B4 | Construction - Switch In (OCB-4) | 1 | 05/31/2022 08 | 05/31/2022 16 | | TOA-Const4, TOA-Const2 | CFM |
| CFM | Construction Finish Milestone | 0 | | 05/31/2022 16 | | LCE610, SWINP1B3, SWOUP1B3, TOA-( | A1110, A1040, ISD, A1030, A1260, A1020, DSSE-11( |
| ISD | EQUIPMENT IN SERVICE DATE (requires FOOB constraint) | 0 | | 05/31/2022 16* | | LCE700, CFM | NX9500, LCE800, NX9FINAL50 |
| **Test And Commission** | | 245 | 03/31/2021 08 A | 05/27/2022 16 | | | |
| **TEST - SERVICES STAFFING DECISION** | | 5 | 03/31/2021 08 A | 03/31/2021 16 A | | | |
| A1010 | STAFFING DECISION: EVERSOURCE OR OUTSOURCE BID/COC TESTING | 5 | 03/31/2021 08 A | 03/31/2021 16 A | | PAFF1514, START | A3470, A3510 |
| **LCE Planning** | | 99 | 11/18/2021 08 | 04/12/2022 16 | | | |
| LCE100 | PM to Request Lead Commissioning Engineer GO/NO-GO | 2 | 11/18/2021 08 | 11/19/2021 16 | | A7551, PC1330, EE1310 | LCE200 |





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| Activity ID | Activity Name | Original Duration | Start | Finish | Resources | Predecessors | Successors |
|---|---|---|---|---|---|---|---|
| LCE200 | Assign Lead Commissioning Engineer | 2 | 01/31/2022 08* | 02/01/2022 16 | [redacted] | LCE100 | LCE310, BT2404 |
| LCE400 | Develop Test and Commissioning Plan | 21 | 02/11/2022 08 | 03/14/2022 16 | | LCE320, LCE310 | BT1301, LCE500 |
| LCE500 | LCE Review and Approve Vendor's Test and Commissioning Plan | 21 | 03/15/2022 08 | 04/12/2022 16 | | LCE400 | LCE610, LCE620 |
| **TEST SERVICES - CONTRACTOR OF CHOICE** | | 35 | 04/19/2021 08 A | 04/19/2021 16 A | | | |
| A3470 | N/R - TEST SERVICES - COC - Eversource Provides Spec / RFQ to COC | 5 | 04/19/2021 08 A | 04/19/2021 16 A | | A1010 | A3480 |
| A3480 | N/R - TEST SERVICES - COC - COC Evaluates Spec and Provides Quote | 10 | 04/19/2021 08 A | 04/19/2021 16 A | | A3470 | A3490 |
| A3490 | N/R - TEST SERVICES - COC - Eversource Reviews Quote from COC | 10 | 04/19/2021 08 A | 04/19/2021 16 A | | A3480 | A3500 |
| A3500 | N/R - TEST SERVICES - COC - Eversource Awards Contract - PO Issued | 10 | 04/19/2021 08 A | 04/19/2021 16 A | | FFR1515, A3490 | LCE320, LCE310 |
| **Test Services - BID Process** | | 65 | 11/03/2021 08 | 02/08/2022 16 | | | |
| A3510 | TEST SERVICES - BID - Eversource provide spec / RFP | 15 | 11/03/2021 08 | 11/24/2021 16 | | A1010, PAFF1514, FFR1515, EE1300 | A3520 |
| A3520 | TEST SERVICES - BID - Contractors Evaluate RFP and Provide Proposal | 15 | 11/26/2021 08 | 12/16/2021 16 | | A3510 | A3530 |
| A3530 | TEST SERVICES - BID - Eversource reviews contractor proposals | 15 | 12/17/2021 08 | 01/10/2022 16 | | A3520 | A3540 |
| A3540 | TEST SERVICES - BID - Eversource awards contract - PO Issued | 20 | 01/11/2022 08 | 02/08/2022 16 | | FFR1515, A3530 | LCE320, LCE310 |
| **Test Activities** | | 77 | 02/09/2022 08 | 05/27/2022 16 | | | |
| LCE310 | Mobilize Commissioning Engineer Prior to Construction | 2 | 02/09/2022 08 | 02/10/2022 16 | | LCE200, A3500, A3540 | LCE400 |
| LCE320 | Mobilize Testing Vendor Prior to Construction | 2 | 02/09/2022 08 | 02/10/2022 16 | | A3500, A3540 | LCE400 |
| LCE620 | Execute Test and Commissioning Plan | 32 | 04/13/2022 08 | 05/26/2022 16 | | LCE500 | LCE700 |
| LCE610 | LCE Oversee Execution of Test and Commissioning Plan | 32 | 04/13/2022 08 | 05/26/2022 16 | | LCE500 | CFM |
| LCE700 | LCE Ensure Test Group Prepare Electrical Field Mark Ups | 1 | 05/27/2022 08 | 05/27/2022 16 | | LCE620 | ISD |
| **Project Close - Out** | | 147 | 01/10/2022 08 | 08/08/2022 16 | | | |
| **Project Close-Out** | | 147 | 01/10/2022 08 | 08/08/2022 16 | | | |
| CV1000 | FE Prepares Civil Field Mark Ups (Tie after Last Civil Construction Activity) | 7 | 01/10/2022 08 | 01/19/2022 16 | | A1120 | CV1100 |
| CV1500 | FE Files Civil Design Drawings at Station | 5 | 02/25/2022 08 | 03/03/2022 16 | | PM1000 | FINISH |
| EV1000 | FE Prepare Electrical Field Mark Ups | 7 | 06/16/2022 08 | 06/24/2022 16 | | LCE900 | EV1100, PC1340 |
| EV1500 | FE Files Substation Design Drawings at Station | 5 | 08/02/2022 08 | 08/08/2022 16 | | PM1100 | FINISH |
| PC1500 | FE Files P&C Design Drawings at Station | 5 | 08/02/2022 08 | 08/08/2022 16 | | PM1100 | FINISH |
| **Civil As-Builts** | | 25 | 01/20/2022 08 | 02/24/2022 16 | | | |
| CV1100 | Eversource Engineering Prepares & Sends Civil Field Mark Up Packge to Vendor | 5 | 01/20/2022 08 | 01/26/2022 16 | | CV1000 | CV1200 |
| CV1200 | Vendor Engineering Verifies Civil Mark Ups and Updates As-Built Drawing Package. Su | 7 | 01/27/2022 08 | 02/04/2022 16 | | CV1100 | CV1300 |
| CV1300 | Eversource Engineering Verifies Quality of Submitted Civil Drawings | 7 | 02/07/2022 08 | 02/15/2022 16 | | CV1200 | CV1400 |
| CV1400 | ES Create Civil Transmittal, Approve Final As-Built Package, and EDC Files and Issue | 5 | 02/16/2022 08 | 02/23/2022 16 | | CV1300 | PM1000 |
| PM1000 | PM to Document Civil As-Built Drawings Complete | 1 | 02/24/2022 08 | 02/24/2022 16 | | CV1400 | CV1500 |
| **Electrical As-Builts** | | 25 | 06/27/2022 08 | 08/01/2022 16 | | | |
| EV1100 | Eversource Engineering Prepares & Sends Electrical Field Mark Up Packge to Vendor | 5 | 06/27/2022 08 | 07/01/2022 16 | | EV1000 | EV1200 |
| EV1200 | Vendor Eng Verifies Electrical Mark Ups and Updates As-Built Drawing Package. Subr | 7 | 07/05/2022 08 | 07/13/2022 16 | | EV1100 | EV1300 |
| EV1300 | Eversource Engineering Verifies Quality of Submitted Electrical Drawings | 7 | 07/14/2022 08 | 07/22/2022 16 | | EV1200 | EV1400 |
| EV1400 | Electrical Transmittal, Approve Final As-Built Package, and EDC Files and Issue Drawi | 5 | 07/25/2022 08 | 07/29/2022 16 | | EV1300 | PM1100 |
| PM1100 | PM to Document Electrical As-Built Drawings Complete (Electrical & P&C) | 1 | 08/01/2022 08 | 08/01/2022 16 | | PC1310, EV1400 | PC1500, EV1500 |
| **P&C As-Builts** | | 24 | 06/27/2022 08 | 07/29/2022 16 | | | |
| PC1340 | Eversource Engineering Prepares & Sends Electrical Field Mark Up Packge to Vendor | 5 | 06/27/2022 08 | 07/01/2022 16 | | EV1000 | PC1200 |
| PC1200 | Vendor Engineering Verifies P&C Mark Ups and Updates As-Built Drawing Package. S | 7 | 07/05/2022 08 | 07/13/2022 16 | | PC1340 | PC1300 |
| PC1300 | Eversource Engineering Verifies Quality of Submitted P&C Drawings | 7 | 07/14/2022 08 | 07/22/2022 16 | | PC1200 | PC1310 |
| PC1310 | P&C Transmittal, Approve Final As-Built Package, and EDC Files and Issue Drawings | 5 | 07/25/2022 08 | 07/29/2022 16 | | PC1300 | PM1100 |
| **Test Close-Out** | | 11 | 06/01/2022 08 | 06/15/2022 16 | | | |
| LCE800 | LCE Ensures Marked up Prints Ready for Pick-up | 1 | 06/01/2022 08 | 06/01/2022 16 | | ISD | LCE900 |
| LCE900 | LCE Review Test Data and Issue Commissioning Report | 10 | 06/02/2022 08 | 06/15/2022 16 | | LCE800 | EV1000 |



TASK filter: All Activities

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| Activity ID | Activity Name | Original Duration | Start | Finish | Resources | Predecessors | Successors |
|---|---|---|---|---|---|---|---|
| **Site Restoration Close-Out** | | 10 | 06/01/2022 08 | 06/14/2022 16 | [redacted] | | |
| A1110 | Restore / Remediate Site | 10 | 06/01/2022 08 | 06/14/2022 16 | | CFM | FINISH |
| **Material, Equipment, Cost And Asset Management Close-Out** | | 35 | 06/01/2022 08 | 07/20/2022 16 | | | |
| A1020 | Cost Analyst Prepares FINAL Units of Property | 21 | 06/01/2022 08 | 06/29/2022 16 | | CFM | FINISH |
| A1030 | Asset Management Complete Asset Update(s) in CASCADE | 25 | 06/15/2022 08 | 07/20/2022 16 | | A1260, CFM | FINISH |
| **Project Management Close-Out** | | 48 | 06/01/2022 08 | 08/08/2022 16 | | | |
| A1040 | PM Prepares Closeout Documentation, Lessons Learned Meeting, etc. | 30 | 06/01/2022 08 | 07/13/2022 16 | | CFM | FINISH |
| DSSE-1100 | Complete TD-707 Turnover Document / Forward to SOC & Mailing List | 5 | 06/01/2022 08 | 06/07/2022 16 | | CFM | FINISH |
| FINISH | Project / Work Order Complete (FINAL SCHEDULE TASK/MILESTONE) | 0 | | 08/08/2022 16 | | DSSE-1100, NX9500, NX9FINAL60, PC150 | |
| **Overhead / Indirects** | | 10 | 10/13/2021 08 | 10/26/2021 16 | | | |
| **PROJECT MANAGEMENT** | | 10 | 10/13/2021 08 | 10/26/2021 16 | | | |
| A1170 | Prepare Civil CAN (Construction Authorization Notice) | 10 | 10/13/2021 08 | 10/26/2021 16 | | OPERM1010, A3460, A3420 | AT0203 |
| B1170 | Prepare Electrical CAN (Construction Authorization Notice) | 10 | 10/13/2021 08 | 10/26/2021 16 | | OPERM1010, A3460, A3420 | BT0203 |



TASK filter: All Activities

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EVERSOURCE

# 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 | Remove Grd Switch |
|---|---|---|---|---|---|---|---|
| [redacted] | CS00412 | [redacted] | | | | | |
| | CS00413 | | | | | | |
| | CS00414 | | | | | | |
| | CS00415 | | | | | | |
| | CS00492 | | | | | | |
| | CS00416 | | | | | | |
| | CS00493 | | | | | | |
| | CS00417 | | | | | | |
| | CS00418 | | | | | | |
| | CS00418xxx | | | | | | |
| | CS00419 | | | | | | |
| | CS00420 | | | | | | |
| | CS00421 | | | | | | |
| | CS00423 | | | | | | |
| **Totals** | | | | | | | |

**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