EVERSOURCE
Project Authorization Form

# Operations Project Authorization Form

| | |
|---|---|
| **Project Title:** [redacted] 2020 TDRP | **Project Number: CD01770** |
| **Date Prepared:** 04/07/2023 | **Company:** Eversource CT |
| **Organization:** Distribution Engineering | **Class(es) of Plant:** D Line |
| **Project Initiator:** [redacted] | **Project Category:** TRMSN DISTR RELIABILTY PERFRM |
| **Project Manager:** [redacted] | **Project Type:** Specific |
| **Project Sponsor:** [redacted] | **Capital Investment part of original Operating Plan:** No |
| **Estimated in service date:** 12/31/2023 | **Emergency Related Request?** No |
| **Eng./Constr. Resources Budgeted?** Yes | **Facility Type** (check all that apply):<br>☐ PTF ☐ non-PTF **X** Distribution |
| **Total Gross Capital Request:** $2,682,835 | **Authorization Type:** Full Funding |

## Executive Summary

**The project was previously presented for initial funding as follows:**

Transmission-Distribution Reliability Performance (TDRP) projects address reliability issues associated with the top Worst 100 circuits in Connecticut. In doing so, Eversource-CT maintains compliance with Docket 86-12-03. Eversource-CT is required to report the status of actions taken to improve performance for each circuit topping the "Worst 100" list. Updates are required each year for the four years following a circuit's appearance on the list.

The [redacted] was studied under the 2020 TDRP program. The [redacted]. It is ranked number 87 on the 2020 Transmission and Distribution Reliability Program list.

The project will perform 'spot' reconductoring based upon the tree fault location history, fix fuse coordination issues and installing more sectionalizing fuses to reduce the number of customers in an outage event. Also [redacted] was last trimmed in 2019.

This project will also focus on reducing the contingency overloads on [redacted]

## Initial Funding PAF vs ACT

This project received preliminary funding on August 5, 2021, for $1,333,278. Construction for this project is currently in progress. The risk and contingency included with TDRP projects caused higher than expected bids and direct capital costs for this project. The requested amount for the project is now $2,682,835 or 201% of the initial funding request. Cost overages are mainly due to the contractor bid of $937,000. Costs for contractors were not included in the initial estimate, which would have increased the estimate by $266,655. Additionally, the

estimate did not include adequate risk and contingency associated with more labor-intensive voltage conversion work. Other overages include extensive tree trimming exceeding ENG estimate, rock drilling for new poles and anchors, and ten additional poles were also required that were not called for in the original ENG estimate. Although the funding request increased significantly, we anticipate a similar percent increase on the alternative options. The preferred option remains the most cost-effective option. This project remains needed to increase the resilience of the [redacted]

## Project Costs Summary

*Note: Dollar values are in thousands*

| Direct Capital Costs | 2023 | 2024 | Total |
|---|---|---|---|
| Internal Labor and Construction Equipment | 115.5 | 0 | 115.5 |
| Outside Services | 842.6 | 0 | 842.6 |
| Materials | 318.5 | 0 | 318.5 |
| Removals | 170.8 | 0 | 170.8 |
| Risk and Contingency | 243.9 | 0 | 243.9 |
| Other | 0.0 | 0 | 0.0 |
| Subtotal – Direct Costs | **1,691.3** | **0** | **1,691.3** |
| | | | |
| **Indirect Capital Costs** | **2023** | **2024** | **Total** |
| Indirect/Overheads (including benefits) | 991.5 | 0 | 991.5 |
| Capitalized interest or AFUDC, if any | 0.0 | 0 | 0.0 |
| Subtotal – Indirect Costs | **991.5** | **0** | **991.5** |
| **Total Gross Capital Costs** | **2,682.8** | **0** | **2,682.8** |
| Less Total Customer Contribution | 0.0 | 0 | 0.0 |
| Total O&M Project Costs | 0.0 | 0 | 0.0 |
| **Total Net Capital Project Costs** | **2,682.8** | **0** | **2,682.8** |

# Technical Justification

[redacted] RSAM 2019 Circuit Performance Ranking is 87, its 2016 ranking was 83 and in 2015 it was 78; making the Top 100 Worst List for over four years. Its four (4) year Circuit SAIDI is 7.5, its four (4) year System SAIDI is 7.75 and the four (4) year SAIFI is 8.75.

## Project Need Statement

The work in this project will help Eversource Energy meet its reliability goals of SAIDI, CAIDI, SAIFI by improving the electrical system with cover wire, sectionalizing switches, and updating poles.

## Project Objectives

The recommendations in this project will improve the reliability of the [redacted] by hardening the electrical distribution system with covered wire, stronger poles, and more isolation devices.

## Project Scope

This is the preferred solution, a cost of the following proposals are listed in the order of performance as referenced by Table 3.

- [redacted]
  Desc: [redacted]

| | | | | |
|---|---|---|---|---|
| Cost: $192,500 | CIS: 42 | $/CIS: 4,603.05 | CMS: 27,930 | $/CMS: 6.89 |

- [redacted]
  Desc: [redacted]

| | | | | |
|---|---|---|---|---|
| Cost: $135,487 | CIS: 17 | $/CIS: 8,211.36 | CMS: 19,226 | $/CMS: 7.05 |

- [redacted]
  Desc: [redacted]

| | | | | |
|---|---|---|---|---|
| Cost: $110,591 | CIS: 34 | $/CIS: 3,268.05 | CMS: 25,549 | $/CMS: 4.33 |

- #7: Keeler Road (12)
  Desc: [redacted]

| | | | | |
|---|---|---|---|---|
| Cost: $328,156 | CIS: 42 | $/CIS: 7,767.03 | CMS: 39,3983 | $/CMS: 8.33 |

- #13: [redacted]
  Desc: [redacted]

| | | | | |
|---|---|---|---|---|
| Cost: $162,040 | CIS: 0 | $/CIS: 0.0 | CMS: 185,167 | $/CMS: 0.88 |

- #14: [redacted]

| | | | | |
|---|---|---|---|---|
| Cost: $470,679 | CIS: 0 | $/CIS: 2,744.13 | CMS: 56,077 | $/CMS: 7.19 |

- #15: [redacted]

| | | | | |
|---|---|---|---|---|
| Cost: $12,800 | CIS: - | $/CIS: - | CMS: - | $/CMS: - |

## Major Material

(1) 8 X Cooper Nova Form 6 Recloser's with various settings
(2) 22,500' 1/0 175mil tree wire

## Background / Justification

[redacted] circuit was last trimmed in 2019 and in scheduled to be trimmed in 2023.

Storms and Trees are the largest contributing cause to outages. In the last four years storms contributed to forty-one (41%) percent of the outages; years 2014 and 2015 are the exception when storms played no role at all.

[redacted] top 15 (32) worst performing devices were studied, Table 1 shows the device listing. The number of splices, location of splices and trees, and four (4) year tree outage history determined the sections to be reconductored or where "spot reconductoring" is to be performed.

[redacted]

Below is the table that was used to review the devices that were the major contributors to the reliability of the circuit.

| Device location | Street | Customer Count | Prior Four Years All Customer Min. Interrupted | % CMI | Prior Four Years All Number of Events | Prior Four Years All Customer Affected Count | % Cus |
|---|---|---|---|---|---|---|---|
| [redacted] | [redacted] | [redacted] | 276814 | 1.99% | 15 | 373 | 1.91% |
| | | | 107502 | 0.77% | 14 | 157 | 0.80% |
| | | | 176999 | 1.27% | 13 | 140 | 0.72% |
| | | | 128980 | 0.93% | 11 | 218 | 1.12% |
| | | | 206052 | 1.48% | 8 | 264 | 1.35% |
| | | | 102439 | 0.74% | 8 | 405 | 2.07% |
| | | | 227686 | 1.64% | 7 | 281 | 1.44% |
| | | | 211836 | 1.52% | 7 | 185 | 0.95% |
| | | | 120623 | 0.87% | 7 | 120 | 0.61% |
| | | | 29404 | 0.21% | 7 | 360 | 1.84% |
| | | | 17233 | 0.12% | 7 | 104 | 0.53% |
| | | | 414679 | 2.98% | 6 | 363 | 1.86% |
| | | | 308037 | 2.21% | 6 | 2375 | 12.15% |
| | | | 272583 | 1.96% | 6 | 375 | 1.92% |
| | | | 211897 | 1.52% | 6 | 859 | 4.39% |
| | | | 180423 | 1.30% | 6 | 194 | 0.99% |
| | | | 85219 | 0.61% | 6 | 324 | 1.66% |
| | | | 37021 | 0.27% | 6 | 77 | 0.39% |
| | | | 15588 | 0.11% | 6 | 18 | 0.09% |
| | | | 11411 | 0.08% | 6 | 13 | 0.07% |
| | | | 2465325 | 17.71% | 5 | 4759 | 24.34% |
| | | | 695164 | 4.99% | 5 | 735 | 3.76% |
| | | | 126504 | 0.91% | 5 | 90 | 0.46% |
| | | | 28783 | 0.21% | 5 | 19 | 0.10% |
| | | | 5547 | 0.04% | 5 | 73 | 0.37% |
| | | | 143271 | 1.03% | 4 | 1330 | 6.80% |
| | | | 354086 | 2.54% | 3 | 216 | 1.10% |
| | | | 875559 | 6.29% | 2 | 933 | 4.77% |

## Table 1 – 12Y8's Worst Performing Devices

| Device location | Street | Customer Count | Prior Four Years All Customer Min. Interrupted | % CMI | Prior Four Years All Number of Events | Prior Four Years All Customer Affected Count | % Cus | Solution |
|---|---|---|---|---|---|---|---|---|
| [redacted] | [redacted] | [redacted] | 276814 | 1.99% | 15 | 373 | 1.91% | [redacted] |
| | | | 176999 | 1.27% | 13 | 140 | 0.72% | [redacted] |
| | | | 128980 | 0.93% | 11 | 218 | 1.12% | [redacted] |
| | | | 227686 | 1.64% | 7 | 281 | 1.44% | [redacted] |
| | | | 120623 | 0.87% | 7 | 120 | 0.61% | [redacted] |
| | | | 17233 | 0.12% | 7 | 104 | 0.53% | [redacted] |
| | | | 414679 | 2.98% | 6 | 363 | 1.86% | [redacted] |
| | | | 180423 | 1.30% | 6 | 194 | 0.99% | [redacted] |
| | | | 2465325 | 17.71 % | 5 | 4759 | 24.34 % | [redacted] |

## Table:2 The following segments were not considered economical:

| Device location | Street | Customer Count | Prior Four Years All Customer Min. Interrupted | % CMI | Prior Four Years All Number of Events | Prior Four Years All Customer Affected Count | % Cus | Solution |
|---|---|---|---|---|---|---|---|---|
| [redacted] | [redacted] | [redacted] | 206052 | 1.48% | 8 | 264 | 1.35% | Only one outage since trimming in 2019 |
| | | | 102439 | 0.74% | 8 | 405 | 2.07% | [redacted] |
| | | | 211836 | 1.52% | 7 | 185 | 0.95% | No outage since 2019 trimming |
| | | | 29404 | 0.21% | 7 | 360 | 1.84% | No Work required ETT trimming 2019 only 1 outage since 2019 |
| | | | 17233 | 0.12% | 7 | 104 | 0.53% | Only 2 trimming since 2019 no work needed for now |
| | | | 308037 | 2.21% | 6 | 2375 | 12.15% | Breaker outages |
| | | | 85219 | 0.61% | 6 | 324 | 1.66% | No Work needed for now |
| | | | 37021 | 0.27% | 6 | 77 | 0.39% | No Work needed for now |
| | | | 15588 | 0.11% | 6 | 18 | 0.09% | No Work needed for now |
| | | | 272583 | 1.96% | 6 | 375 | 1.92% | Two outages after trimming no work required |
| | | | 211897 | 1.52% | 6 | 859 | 4.39% | No work required only 3 outage since trimming |
| | | | | | | | | |
| | | | 11411 | 0.08% | 6 | 13 | 0.07% | ETT Trimming completed in 2019 no outage since |
| | | | 695164 | 4.99% | 5 | 735 | 3.76% | No work required two outages since 2019 storm no trimming done in 2019 |
| | | | 126504 | 0.91% | 5 | 90 | 0.46% | NO work required only two outages since trimming |
| | | | 5547 | 0.04% | 5 | 73 | 0.37% | Only 1 outage since 2019 no work needed as of now |
| | | | 143271 | 1.03% | 4 | 1330 | 6.80% | No work required for now three outages since 2017, 1 in 2017, 1, 2019 and 1 in 2020 2 storm related |
| | | | 354086 | 2.54% | 3 | 216 | 1.10% | No work required for now one outage since 2019 |
| | | | 875559 | 6.29% | 2 | 933 | 4.77% | No work required for now |
| | | | 622880 | 4.47% | 2 | 168 | 0.86% | No work needed only one outage since 2019 ETT Blue sky performed 2019 |
| | | | 588960 | 4.23% | 1 | 144 | 0.74% | No work required for now |
| | | | 431452 | 3.10% | 1 | 76 | 0.39% | No Work required ETT trimming 2019 only 1 outage since 2019 |

## Business Process and / or Technical Improvements

The expectation is to lessen the vulnerability of the system to outages, mostly caused by trees, while strengthening the infrastructure to become more resilient.

## Alternatives Considered with Cost Estimates

**X : Available - N/A not available**

**Project Option Comparison**

| Design Criteria | [redacted] | | |
|---|---|---|---|
| Customer Interruption saved | 98 | 98 | 38 |
| Cost / CIS Saved | $19,394.97 | $24,112.38 | $34,607.97 |
| Cust Minute saved | 107,913 | 123,001 | 99,940 |
| Cost / CM Saved | $17.69 | $19.30 | $13.34 |
| Cost | $1,909,417.98 | $2,3737,842.94 | $1,333,277.7 |
| Preferred option | | | X |

## Project Schedule

| Milestone/Phase Name | Estimated Completion Date |
|---|---|
| Preliminary Approval | 07/2021 |
| Detailed Design | 01/2022 |
| Construction Approval | 04/2022 |
| Settings Requested | 07/2022 |
| Construction Start Date | 09/2022 |
| Construction End Date | 12/2023 |

## Risks and Risk Mitigation Plans

| Risk Event | Risk Horizon | Likelihood of Occurrence | Risk Mitigation |
|---|---|---|---|
| Actual cost higher than estimated due to scope changes. | 2022 | Low | Included contingency costs in the funding request. Perform detailed Field Analysis and walk down in project development to avoid potential issues. |
| Customer Permission / Siting Council / Municipal approvals | 2022 | Low | Design to minimize customer impact. Project Preplanning and customer/community outreach. |
| Internal construction resources not available to perform the work. | 2022 | Medium | Plan internal resources to perform the work. Use competitive bidding to ensure lowest outside labor cost. |
| Internal engineering resources not available to perform the work. | 2022 | Low | Plan internal resources to perform the work. Use competitive bidding to ensure lowest outside labor cost. |
| Materials Shortage or long lead times | 2022 | Low | Pre-order long lead time material; minimize the use of non-standard and non-stocked material. |
| Storm delays | 2022 | Medium | If storm activity delays work, we may be forced to use external resources. |
| System abnormal configuration | 2022 | Low | Schedule work to minimize system abnormal time. Install temporary bypasses/equipment if system will be abnormal for extended periods. |
| Technological risks involving integration of new technology | 2022 | Low | Before use of new technology ensure support of standards and manufacturer. Schedule project to accommodate for extra time or ensure new technology is not on the critical path. |
| Wetlands / Environmentally sensitive area | 2022 | Low | Use of mats and specialty equipment, only work during certain times of the year. |

## References

DSEM10.20 – Recloser Guide
DSEM 10.22 – Recloser Three Phase Selection
DSEM 03.301 – Reliability Cost Effectiveness
DSEM 02.411 – Circuit Performance Ranking
DSEM 02.423 – Multiple Interruptions
DSEM 02.501 – System Resiliency Guideline

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

### Need Statement

CD01770_project_needs_statement.pdf

### Load Sheet

CD01770 Loadsheet.pdf

### One-Line Map

CD01770 Oneline.pdf

### Detail Map

CD01770[redacted]TDRP Existing Map.pdf

CD01770[redacted] TDRP After Map.pdf

CD01770[redacted] Sectionalizing Map.

### Outage Information

CD01770 Outage.pdf