EVERSOURCE

# Project Approval Form

| | |
|---|---|
| **Project Title:** New Canaan Network Conversion | **Project Number:** CD01915 |
| **Date Prepared:** 10/10/2023 | **Company:** Eversource CT |
| **Organization:** Distribution Engineering | **Project Category:** NTWRK 500KCMIL CBL RPL PRG |
| **Project Initiator:** [redacted] | **Project Type:** Specific |
| **Initiating Organization:** Distribution | **Capital Investment part of original Op Plan:** Yes |
| **Project Manager:** [redacted] | **Emergency Related Request?** No |
| **Project Sponsor:** [redacted] | **Facility Type** (check all that apply): ☐ PTF ☐ non-PTF ☒ Distribution ☐ N/A (General Plant) |
| **Required in service date:** 12/31/2024 | |
| **Total Capital Request: $4,319.9K** | **Authorization Type:** Full Funding |

## 1. Executive Summary

This project is being constructed as part of a PURA commitment to remove type B (500cu) secondaries from networks by converting the system to a conventional UG system or reconductoring the secondaries with type A (4/0 7CT). [redacted]

This project proposes to [redacted]

The project is expected to be completed over 2 years with civil work, line extensions and recloser work scheduled for 2023 and UG transformer and cable work scheduled for 2024.

*10/11/2023 – Full Funding Request*

Full funding is being sought for this project at a cost of $4,319.9K which is 115% of the Partial funding estimate of $3,753K. The variance was due to a slight scope change with 2 vaults being relocated. [redacted] At this location the curb was being bumped out and would've ended up going through the existing vault grating. These issues require new vaults and new duct bank between the existing vaults and new vault locations – the existing vaults were converted to manholes.

## 2. Project Cost Summary

Note: Dollar values are in thousands.

| Capital Costs | 2023 | 2024 | 2025+ | Total |
|---|---|---|---|---|
| Internal Labor and Construction Equipment | 140.5 | 135.1 | 0.0 | 275.6 |
| Outside Services | 650.9 | 625.6 | 0.0 | 1,276.4 |
| Materials | 211.7 | 203.4 | 0.0 | 415.1 |
| Removals | 225.3 | 216.5 | 0.0 | 441.8 |
| Risk and Contingency | 153.7 | 147.7 | 0.0 | 301.4 |
| Other | 0.0 | 0.0 | 0.0 | 0.0 |
| **Subtotal** | **1,382.0** | **1,328.3** | **0.0** | **2,710.3** |

| Indirect Capital Costs | 2023 | 2024 | 2025+ | Total |
|---|---|---|---|---|
| Indirects/Overheads (including benefits) | 820.7 | 788.9 | 0.0 | 1,609.6 |
| Capitalized interest or AFUDC, if any | 0.0 | 0.0 | 0.0 | 0.0 |
| **Subtotal** | **820.7** | **788.9** | **0.0** | **1,609.6** |
| | | | | |
| **Total Capital Costs (Gross)** | **2,202.7** | **2,117.2** | **0.0** | **4,319.9** |
| | | | | |
| Less Total Customer Contribution | **0.0** | **0.0** | **0.0** | **0.0** |
| **Project Costs (Net of Reimbursement)** | **2,202.7** | **2,117.2** | **0.0** | **4,319.9** |

## 3. Technical Justification

### Background, Project Need/Justification, and Project Scope

### a. Background

[redacted]

The design and condition of network secondary bus can have a significant impact on reliability, safety, restorability, and the demand on maintenance resources. The open secondary bus work in some underground network locations have been judged as unreliable, unsafe, and consequently in demand of inordinate

maintenance expense. A PURA docket 06-10-21 was issued to address type B networks following the cable fault on 10/6/2006 in the Waterbury underground secondary network system.

## b. Project Need

The purpose of this project is to mitigate the secondary network Type B construction by converting the network into a conventional underground system with a loop. The New Canaan network system is fed by feeders that also feed OH loads. This configuration is problematic in that a faulted feeder along with a network protector being stuck in the closed position could cause severe overvoltage to equipment on the OH portion of the feeder. Converting the Network Secondary system to conventional UG system will mitigate this issue.

## c. Project Scope



# 4. Alternatives Considered

Several loop designs were considered as shown on the Geographic Maps in Attachment B. Their pros and cons are as follows:

**Option 1 - OPEN LOOP WITH 2 SOURCES AND EXPRESS (Preferred)**

Pros

[redacted]

[redacted] ption 1 created the most reliable alternative to the network.

**Option 2 - OPEN UG LOOP WITH 2 SOURCES**

[redacted]

**Option 3 - RISER TO UCT**

Pros

[redacted]

**Option 4 - AUTO TRANSFER** [redacted]

Pros

[redacted]

Con

[redacted]

**Option 5 – RECONDUCTOR EXISTING NETWORK SECONDARIES**

A fifth option considered was to keep the [redacted]

**Project Option Comparison**

[redacted]

| Authorization Type | Full | Partial | Partial | Partial | Partial |
|---|---|---|---|---|---|
| Capital Cost | $4,319.9K | $3,427K | $2,951K | $2,974K | $4,659K |
| Expense Cost | $77.1K | $61K | $52K | $53K | $83K |
| Total Cost | $4,397K | $3,488K | $3,003K | $3,027K | $4,742K |
| Preferred option | X | | | | |

## 5. Project Schedule

Add any additional milestones that are pertinent to the project

| Milestone/Phase Name | Estimated Date |
|---|---|
| Partial Approval | October, 2022 |
| 100% Detailed Engineering Completion | June 2023 |
| Fully Funded | October 2023 |
| Construction Start | October 2023 |
| In Service Date | December 2024 |

## 6. Regulatory Decisions

N/A

## 7. Codes and Standards

N/A

## 8. Risk and Contingencies

| Risk Event | Risk Horizon | Likelihood of Occurrence | Risk Mitigation |
|---|---|---|---|
| Actual cost higher than estimated due to scope changes. | 2023 | Medium | 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 | 2023 | Low | Design to minimize customer impact. Project Preplanning and customer/community outreach. |
| Internal construction resources not available to perform the work. | 2023 | 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. | 2023 | Low | Plan internal resources to perform the work. Use competitive bidding to ensure lowest outside labor cost. |
| Materials Shortage or long lead times | 2023 | Medium | Pre-order long lead time material; minimize the use of non-standard and non-stocked material. |
| Storm delays | 2023 | Low | If storm activity delays work, we may be forced to use external resources. |
| System abnormal configuration | 2024 | Medium | Schedule work to minimize system abnormal time. Install temporary bypasses/equipment if system will be abnormal for extended periods. |

## 9. References

| References |
|---|
| 1. N/A |

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

| Attachment | Included in Submittal? |
|---|---|
| A. Cost Estimate | *YES* |
| B. Geographic Maps | *YES* |
| C. One-Line Diagram | *YES* |
| D. Load Sheet | *YES* |
| E. Partial Funding PAF | *YES* |

**Attachment A: Cost Estimates**

**Option 1 – OPEN UG LOOP AND EXPRESS CABLE FOR BACK_UP**

**Xfmrs and Cables**

Segment CD01915-01

**Estimate**

| Preliminary Estimate Summary | |
|---|---|
| Revision Number: | 0 |
| Contingency: | 28.00% |
| SubTotal: | $1,467,768 |
| Contingency Amount: | $410,975 |
| Estimate: | $1,878,743 |
| Reimbursement: | $0 |
| Net Amount: | $1,878,743 |
| Description: | |

| Item Description | CU | Amount |
|---|---|---|
| SWITCHING<br>OH/DB/UG - SWITCHING Network | 16-ALL15 | $42,146.40 |
| TRAFFIC<br>OH/DB/UG - Traffic Control - Police Officer | 16-ALL18 | $20,000.00 |
| DB CABLE<br>DB/UG - 4/0 - 3-1/C (3ph) Al | 16-UG113 | $53,760.00 |
| UG CABLE<br>DB/UG - 350/500 - 3-1/C (3ph) Cu | 16-UG114 | $125,280.00 |
| UG CABLE<br>UG - Cable Removal - all cables | 16-UG117 | $50,000.00 |
| UG CABLE<br>UG - Network Secondary Ring Bus | 16-UG118 | $184,000.00 |
| XF<br>UG - Submersible XF, 3-1ph - in manhole/vault | 16-UG133 | $296,932.80 |
| OTHER<br>OTHER<br>30% contractor adder | 16-ALL14 | $338,716.00 |
| OTHER<br>OTHER<br>MH cleaning | 16-ALL14 | $40,000.00 |

| Segment | | | CD01915-01 |
|---|---|---|---|
| XF<br>UG - Submersible XF, 3-1ph - in manhole/vault<br>remove network transformers | 16-UG133 | [redacted] | $296,932.80 |
| OTHER<br>OTHER<br>separate network secondaries | 16-ALL14 | | $20,000.00 |

**Civil Work**

Design Alternative — CD01915-05

**Estimate**

| | Preliminary Estimate Summary |
|---|---|
| Revision Number: | 1 |
| Contingency: | 24.00% |
| SubTotal: | $1,666,668 |
| Contingency Amount: | $400,000 |
| Estimate: | $2,066,668 |
| Reimbursement: | $0 |
| Net Amount: | **$2,066,668** |

Description:

| Item Description | CU | | Amount |
|---|---|---|---|
| TRAFFIC<br>OH/DB/UG - Traffic Control - Police Officer | 16-ALL18 | [redacted] | $20,000.00 |
| CONDUIT<br>UG-Ductline-up to 12 duct - Traveled Way / Paved | 16-UG137 | | $125,120.00 |
| ENCLOSURE<br>UG - MANHOLE - Rebuild, enlarge or re-roof | 16-UG141 | | $593,870.40 |
| ENCLOSURE<br>UG - HEXHOLE | 16-UG142 | | $183,566.40 |
| ENCLOSURE<br>UG - Network Vault or Switch Vault | 16-UG144 | | $296,936.00 |
| OTHER<br>OTHER<br>30% contractor adder | 16-ALL14 | | $384,615.00 |
| CONDUIT<br>UG-Ductline-up to 12 duct - Traveled Way / Paved<br>extra conduits for 2 new vaults | 16-UG137 | | $62,560.00 |

**Line Extension and Reclosers**

Segment CD01915-06

**Estimate**

| | Preliminary Estimate Summary |
|---|---|
| Revision Number: | 0 |
| Contingency: | 24.00% |
| SubTotal: | $369,474 |
| Contingency Amount: | $88,674 |
| Estimate: | $458,148 |
| Reimbursement: | $0 |
| Net Amount: | **$458,148** |

Description:

| Item Description | CU | [redacted] | Amount |
|---|---|---|---|
| SWITCHING<br>OH/DB/UG - SWITCHING Network | 16-ALL15 | | $28,097.60 |
| TRAFFIC<br>OH/DB/UG - Traffic Control - Police Officer | 16-ALL18 | | $10,000.00 |
| OH WIRE<br>OH - Line Extension - 3ph (556 kcmil) | 16-OH34 | | $12,000.00 |
| SECTIONALIZE<br>OH - Recloser - 3ph | 16-OH38 | | $191,958.40 |
| SECTIONALIZE<br>OH-Vertical Disconnect Switches-600/900 amp 3-1ph | 16-OH43 | | $20,566.40 |
| POLE<br>DB/UG - Riser - 3ph | 16-UG146 | | $21,588.80 |
| OTHER<br>OTHER<br>30% contractor adder | 16-ALL14 | | $85,263.00 |

**Option 2 – OPEN UG LOOP WITH 2 SOURCES**

Design Alternative CD01915-02

**Estimate**

| | Preliminary Estimate Summary |
|---|---|
| Revision Number: | 0 |
| Contingency: | 28.00% |
| SubTotal: | $2,724,942 |
| Contingency Amount: | $762,984 |
| Estimate: | $3,487,926 |
| Reimbursement: | $0 |
| Net Amount: | **$3,487,926** |
| Description: | |

| Item Description | CU | [redacted] | Amount |
|---|---|---|---|
| SWITCHING<br>OH/DB/UG - SWITCHING Network | 16-ALL15 | | $42,146.40 |
| TRAFFIC<br>OH/DB/UG - Traffic Control - Police Officer | 16-ALL18 | | $40,000.00 |
| DB CABLE<br>DB/UG - 4/0 - 3-1/C (3ph) Al | 16-UG113 | | $53,760.00 |
| UG CABLE<br>UG - Cable Removal - all cables | 16-UG117 | | $50,000.00 |
| UG CABLE<br>UG - Network Secondary Ring Bus | 16-UG118 | | $184,000.00 |
| XF<br>UG - Submersible XF, 3-1ph - in manhole/vault | 16-UG133 | | $296,932.80 |
| CONDUIT<br>UG-Ductline-up to 12 duct - Traveled Way / Paved | 16-UG137 | | $187,680.00 |
| ENCLOSURE<br>UG - MANHOLE - Rebuild, enlarge or re-roof | 16-UG141 | | $593,870.40 |
| ENCLOSURE<br>UG - HEXHOLE | 16-UG142 | | $183,566.40 |

| Design Alternative | | [redacted] | CD01915-02 |
|---|---|---|---|
| OTHER<br>OTHER<br>CONTRACTOR ADDER | 16-ALL14 | | $756,053.00 |
| OTHER<br>OTHER<br>MH cleaning | 16-ALL14 | | $40,000.00 |
| XF<br>UG - Submersible XF, 3-1ph - in manhole/vault<br>remove network transformers | 16-UG133 | | $296,932.80 |

**Option 3 – RISER TO UCT**

Design Alternative CD01915-03

**Estimate**

| | Preliminary Estimate Summary |
|---|---|
| Revision Number: | 0 |
| Contingency: | 28.00% |
| SubTotal: | $2,346,321 |
| Contingency Amount: | $656,970 |
| Estimate: | $3,003,291 |
| Reimbursement: | $0 |
| Net Amount: | **$3,003,291** |
| Description: | |

| Item Description | CU | [redacted] | Amount |
|---|---|---|---|
| SWITCHING<br>OH/DB/UG - SWITCHING Network | 16-ALL15 | | $42,146.40 |
| TRAFFIC<br>OH/DB/UG - Traffic Control - Police Officer | 16-ALL18 | | $40,000.00 |
| SECTIONALIZE<br>OH - Cutouts or Arresters - 3ph | 16-OH20 | | $13,891.20 |
| XF<br>OH - OH XF's - bank of 3-1ph | 16-OH46 | | $5,019.20 |
| DB CABLE<br>DB/UG - 4/0 - 3-1/C (3ph) Al | 16-UG113 | | $40,320.00 |
| UG CABLE<br>UG - Cable Removal - all cables | 16-UG117 | | $40,000.00 |
| UG CABLE<br>UG - Network Secondary Ring Bus | 16-UG118 | | $184,000.00 |
| XF<br>UG - Submersible XF, 3-1ph - in manhole/vault | 16-UG133 | | $296,932.80 |
| CONDUIT<br>UG-Ductline-up to 12 duct - Traveled Way / Paved | 16-UG137 | | $37,536.00 |

| Design Alternative | | [redacted] | CD01915-03 |
|---|---|---|---|
| ENCLOSURE<br>UG - MANHOLE - Rebuild, enlarge or re-roof | 16-UG141 | | $593,870.40 |
| ENCLOSURE<br>UG - HEXHOLE | 16-UG142 | | $61,188.80 |
| POLE<br>DB/UG - Riser - 3ph | 16-UG146 | | $32,383.20 |
| OTHER<br>OTHER<br>30% CONTRACTOR ADDER | 16-ALL14 | | $622,100.00 |
| OTHER<br>OTHER<br>MH CLEANING | 16-ALL14 | | $40,000.00 |
| XF<br>UG - Submersible XF, 3-1ph - in manhole/vault remove network transformers | 16-UG133 | | $296,932.80 |

**Option 4 – AUTO TRANSFER 31A15 TO 31A6**

Design Alternative CD01915-04

**Estimate**

Preliminary Estimate Summary

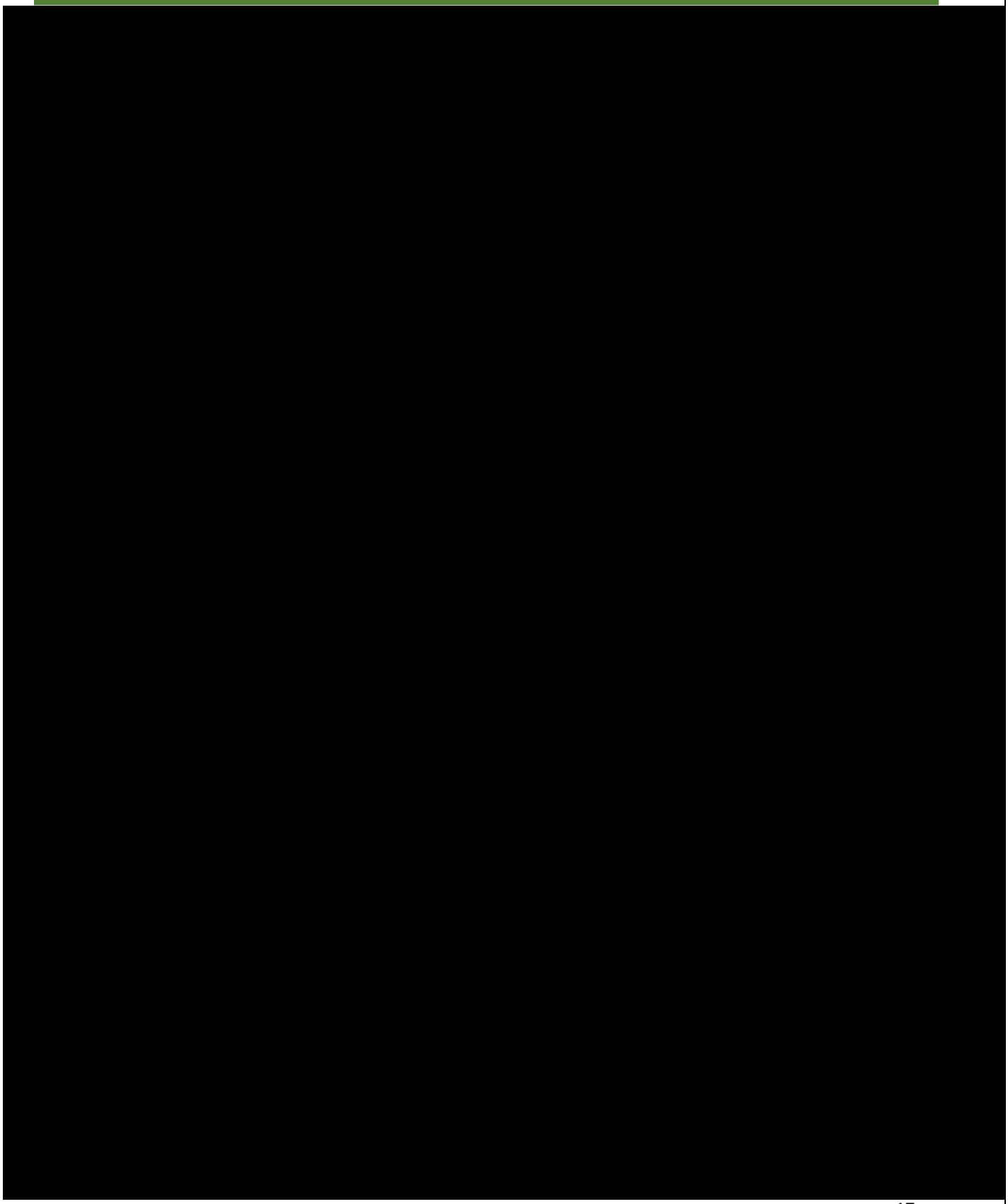
| | |
|---|---|
| Revision Number: | 0 |
| Contingency: | 24.00% |
| SubTotal: | $2,441,127 |
| Contingency Amount: | $585,871 |
| Estimate: | $3,026,998 |
| Reimbursement: | $0 |
| Net Amount: | **$3,026,998** |
| Description: | |

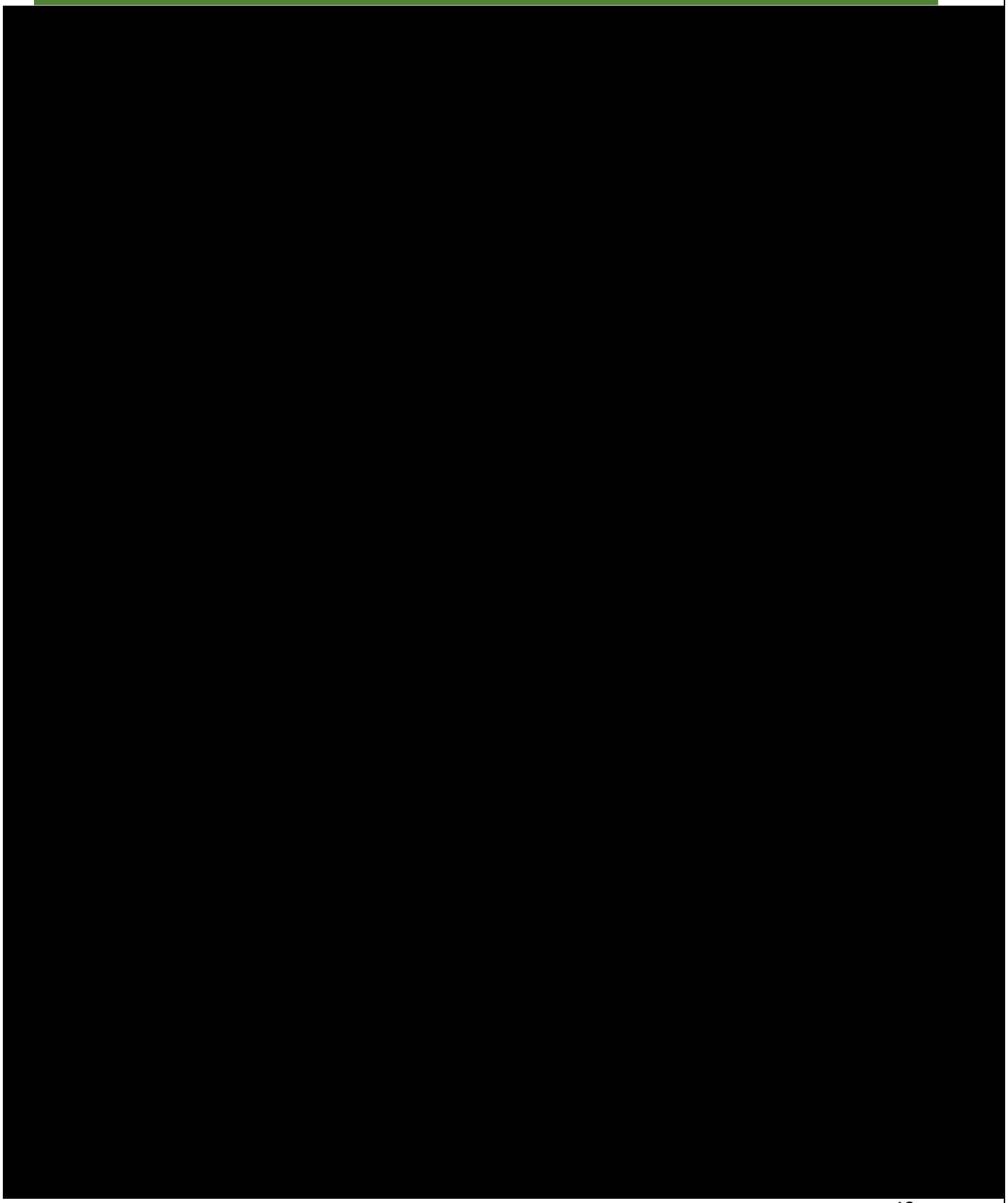
| Item Description | CU | [redacted] | Amount |
|---|---|---|---|
| SWITCHING<br>OH/DB/UG - SWITCHING Network | 16-ALL15 | | $42,146.40 |
| TRAFFIC<br>OH/DB/UG - Traffic Control - Police Officer | 16-ALL18 | | $40,000.00 |
| SECTIONALIZE<br>OH - Recloser - 3ph | 16-OH38 | | $95,979.20 |
| SECTIONALIZE<br>OH - Remove Recloser (any) | 16-OH42 | | $11,312.00 |
| DB CABLE<br>DB/UG - 4/0 - 3-1/C (3ph) Al | 16-UG113 | | $53,760.00 |
| UG CABLE<br>UG - Cable Removal - all cables | 16-UG117 | | $50,000.00 |
| UG CABLE<br>UG - Network Secondary Ring Bus | 16-UG118 | | $184,000.00 |
| XF<br>UG - Submersible XF, 3-1ph - in manhole/vault | 16-UG133 | | $296,932.80 |
| CONDUIT<br>UG-Ductline-up to 12 duct - Traveled Way / Paved | 16-UG137 | | $187,680.00 |

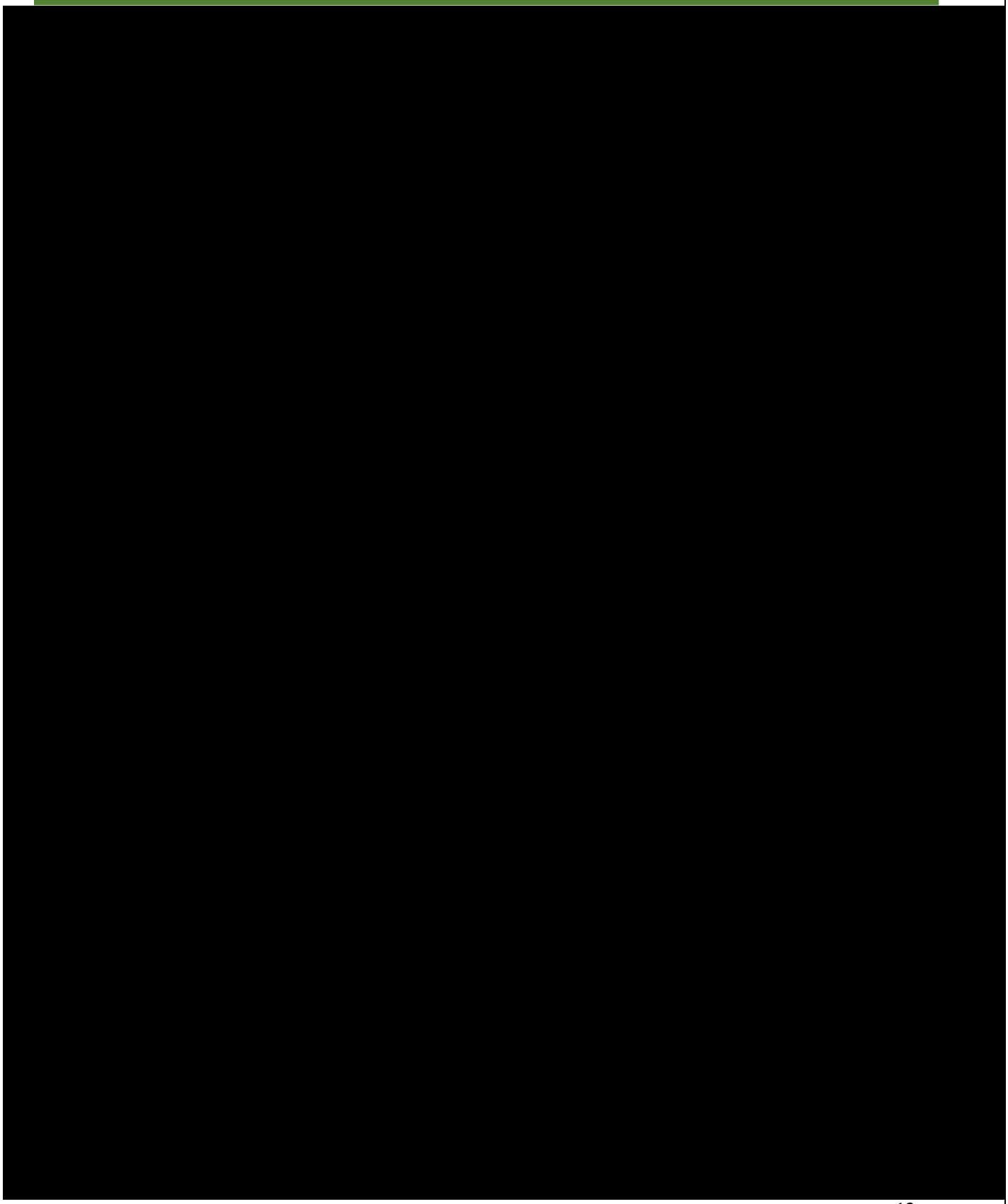
| Design Alternative | | [redacted] | CD01915-04 |
|---|---|---|---|
| ENCLOSURE<br>UG - MANHOLE - Rebuild, enlarge or re-roof | 16-UG141 | | $593,870.40 |
| ENCLOSURE<br>UG - HEXHOLE | 16-UG142 | | $183,566.40 |
| OTHER<br>OTHER<br>30% CONTRACTOR ADDER | 16-ALL14 | | $661,880.00 |
| OTHER<br>OTHER<br>MH CLEANING | 16-ALL14 | | $40,000.00 |

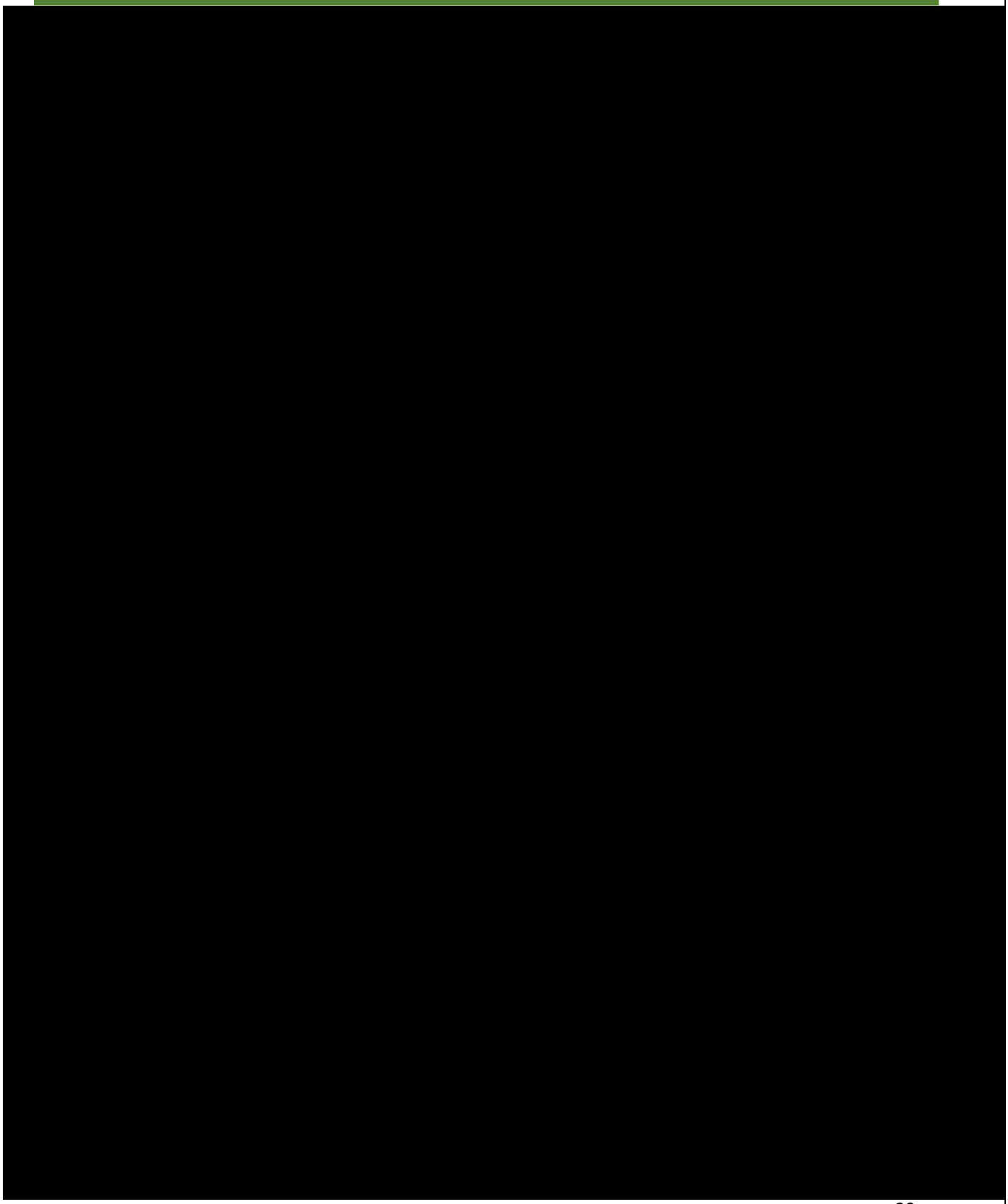
**Attachment B – Geographic Maps**

[redacted]



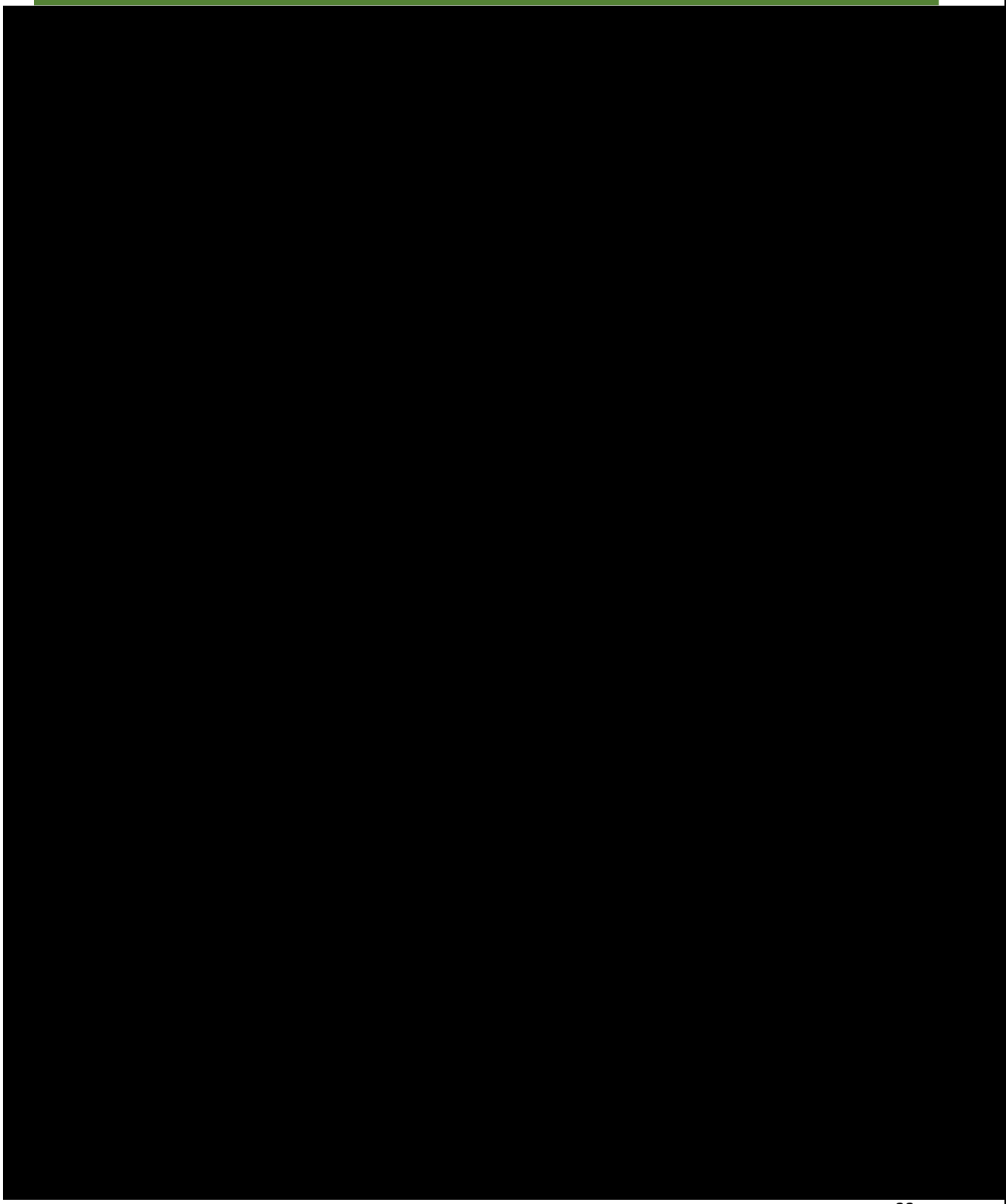






[redacted]

[redacted]



**Attachment E: Partial Funding PAF**

# Operations Project Authorization Form

| | |
|---|---|
| **Project Title: New Canaan Network Conversion** | **Project Number: CD01915** |
| **Date Prepared**: 10/20/2022 | **Company:** Eversource CT |
| **Organization:** Electric Field Operations | **Class(es) of Plant:** D Line |
| **Project Initiator:** [redacted] | **Project Category:** NTWRK 500KCMIL CBL RPL PRG |
| **Project Manager:** [redacted] | **Project Type:** Program |
| **Project Sponsor:** [redacted] | **Capital Investment part of original Operating Plan:** No |
| **Estimated in service date:** 12/31/2024 | **Emergency Related Request?** Choose an item |
| **Eng./Constr. Resources Budgeted?** No | **Facility Type** (check all that apply)**:** |
| **Total Gross Capital Request: $3,753K** | **Authorization Type:** Partial Funding |

## Executive Summary

This project was originally granted initial funding approval for 3.8 million dollars to convert the New Canaan Network from a network system to a conventional underground system. There has been a slight scope change with the addition of 2 transformer vaults causing the total cost to increase by $574K or 15% of the original initial approved funding. Some work that was scheduled to be performed in 2024 will also need to be completed in 2023. This project is being constructed as part of a PURA commitment to remove type B (500cu) secondaries from networks by converting the system to a conventional UG system or reconductoring the secondaries with type A (4/0 7CT). [redacted]

The project is expected to be completed over 2 years with civil work, line extensions and recloser work scheduled for 2023 and UG transformer and cable work scheduled for 2024.

## Project Costs Summary

*Note: Dollar values are in thousands*

| Capital Costs | 2023 | 2024 | 2025+ | Total |
|---|---|---|---|---|
| Internal Labor and Construction Equipment | $101 | $97 | $0 | $198 |
| Outside Services | $641 | $616 | $0 | $1,257 |
| Materials | $280 | $269 | $0 | $548 |
| Removals | $158 | $152 | $0 | $310 |
| Risk and Contingency | ($6) | ($6) | $0 | ($12) |
| Other | $0 | $0 | $0 | $0 |
| **Subtotal** | **$1,174** | **$1,128** | **$0** | **$2,302** |

| Indirect Capital Costs | 2023 | 2024 | 2025+ | Total |
|---|---|---|---|---|
| Indirects/Overheads (including benefits) | $699 | $671 | $0 | $1,370 |
| Capitalized interest or AFUDC, if any | $42 | $40 | $0 | $82 |
| **Subtotal** | **$740** | **$711** | **$0** | **$1,452** |
| | | | | |
| **Total Capital Costs (Gross)** | **$1,914** | **$1,839** | **$0** | **$3,753** |
| | | | | |
| Less Total Customer Contribution | **$0** | **$0** | **$0** | **$0** |
| | | | | |
| **Project Costs (Net)** | **$1,914** | **$1,839** | **$0** | **$3,753** |

## Technical Justification:

**Project Need, Objective and Justification:**

The New Canaan Secondary Network is presently comprised of the old Type B configuration which has 500 CU secondary cables and open bus secondary connections. This project is being established because of a PURA commitment to remove underground secondary type B construction.

The purpose of this project is to mitigate the secondary network Type B construction by converting the network into a conventional underground system with a loop. [redacted]

**Project Scope:**



**Major Material:**

- 6 wye-wye UCT's
- 6 Hex holes
- 2 Transformer vaults
- 4 Reclosers
- 4000' of 4/0 Al cable
- 2 Network Secondary Ring Bus

**Background:**





## Alternatives Considered:

Alternatives were considered (please describe below)

Loop Options.docx

The alternatives were not selected because they do not provide the same reliability as the preferred option. The goal is to provide a reliable service that is like the existing network service.

Below are the costs for the different options explored in this project:

Option 1 (Preferred) -- $3,820K

- [redacted]

Option 2 – 3,427K

- [redacted]

Option 3 – 2,952K

- [redacted]

Option 4 – 2,974K

- [redacted]

Option 5 – 4,659K

- [redacted]

**Project Option Comparison**

| [redacted] | | | | | |
|---|---|---|---|---|---|
| Cost | $3.81M | $3.43M | $2.96M | $2.98M | 4.7M |
| Preferred option | X | | | | |

## Regulatory Approvals:

*Are Regulatory body approvals needed for the project?*

No

## Project Schedule

| Milestone/Phase Name | Estimated Date |
|---|---|
| 100% Engineering Completion | 06/30/2023 |
| Construction Start | 09/01/2023 |
| Testing/Commissioning | 10/30/2024 |
| In Service Date | 12/31/2024 |

## Risks and Risk Mitigation Plans

| Risk Event | Risk Horizon | Likelihood of Occurrence | Risk Mitigation |
|---|---|---|---|
| Actual cost higher than estimated due to scope changes. | 2023 | Medium | Included contingency costs in the funding request. Perform detailed Field Analysis and walk down in project development to avoid potential issues. |
| Internal construction resources not available to perform the work. | 2023 | 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. | 2023 | Low | Plan internal resources to perform the work. Use competitive bidding to ensure lowest outside labor cost. |
| Materials Shortage or long lead times | 2023 | Medium | Pre-order long lead time material; minimize the use of non-standard and non-stocked material. |
| Storm delays | 2023 | Low | If storm activity delays work, we may be forced to use external resources. |
| System abnormal configuration | 2023 | Medium | Schedule work to minimize system abnormal time. Install temporary bypasses/equipment if system will be abnormal for extended periods. |

## References

CD01915_project_needs_statement revi

load Projections.xlsx

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

New Canaan map-Before.pdf

New Canaan map FINAL.pdf

New Canaan oneline.pdf