

Town of Suffield, Connecticut Street Lighting Buy Back

Opportunity Review Update

10 February 2020

Revision 1

Executive Summary

A comprehensive assessment of the value proposition associated with purchase of the street lighting inventory for the Town of Suffield from Eversource Connecticut was provided prior to engaging Tanko Lighting in a phase 1 effort to complete a field audit of installed fixtures and poles, reconcile this inventory with Eversource records and provide projections of energy and net cost savings. This lighting purchase would allow change from Eversource Connecticut Rate 116 to Rate 117 and the conversion of this inventory to high efficiency LED lighting.

At this time, Tanko has completed the majority of tasks defined in their phase 1 scope of work and Eversource is in the process of reconciling the Tanko field audit findings with Eversource inventory records. A status report including interim field audit findings and preliminary financial projections was provided on 8 January 2020 to the Board of Selectmen and discussion was held with the Board of Finance on 13 January 2020.

This update incorporates and evaluates additional financial elements raised during the Board of Finance discussion and provides projected twenty-year cash flow and savings projections for two primary scenarios; where the lighting is purchased using existing funds and, where the inventory is purchased based on new debt funding. Both scenarios are compared to the current baseline where the lighting inventory continues to be owned and maintained by Eversource and billed under rate 116.

The inclusion of the expanded set of expected cost elements in these updated projections allows comparison of continuing with the current Eversource owned and maintained streetlighting inventory or pursuing two different scenarios for the acquisition of all fixtures and poles and retrofit of the lamps to high efficiency LED units. The **Cash Acquisition** scenario requires an initial capital outlay followed by projected annual cost savings of around \$48k to \$72k over the span of the projection or from \$4k to \$6k average monthly cost savings, both of which can be incorporated in town budget reductions following the initial acquisition from existing funds. The **Bond Acquisition** scenario requires no initial capital outlay and results in reduced annual savings due to added debt service that is deducted from the projected cost savings. The net undiscounted cost of this debt service is around \$157k over the span of the projection.

In either acquisition and retrofit scenario and based on the escalation parameters used, a Net Present Value of approximately \$337k has been calculated indicating overall favorable economics related to acquisition and retrofit.

Objectives and Overview

This document provides an updated review and summary of the field audit and preliminary financial analysis performed by Tanko Lighting with extension to include additional financial requirements associated with ownership of all town streetlighting. The initial survey results presented in October 2019 included verification and location of fixtures included in the streetlighting inventory provided by Eversource as well as identification of fixtures included in utility records that could not be located and fixtures which were located but are not included in utility records.

The methods used by Tanko Lighting includes physically locating all lighting fixtures and poles in the municipality and attempting to reconcile these units against the Eversource inventory. For all units located, GIS coordinates were provided to be used in reconciling the Eversource inventory and billing records and for subsequent use in map overlays and verification of fixture types. Two field audits were performed; the first performed in August 2019 identified the majority of units and flagged units that required a return visit to confirm data. The second field audit performed in September 2019 addressed open questions and resulted in the revised field audit data. This revised field audit data was then transmitted to Eversource for reconciliation with their inventory records which would serve as a basis for determining purchase value, unit conversion cost and life cycle financial analysis.

A preliminary inventory reconciliation was received back from Eversource in mid-December along with an updated Net Book Value (NBV). Review and comparison of inventory reconciliation comments from Eversource with the revised NBV has led to additional clarification requests to Eversource which are currently in progress.

Preliminary financial analysis was provided by Tanko Lighting and included assumptions for key financial projection parameters. Discussion with the town Boards in January has also identified additional key financial parameters that have been added to the updated financial projections presented in this report.

Survey Results and Streetlighting Inventory

Field survey included three categories for fixtures with the following grouping slightly modified from the Tanko survey report:

- **Fixtures Found in the Field:** these include fixtures and poles that were physically located and which also correspond to the Eversource inventory and billing
- **Utility Records – Fixtures Not Found:** this group of fixtures are included in utility billing records but were not physically located in the field survey
- **Fixtures without Utility Record:** this group of fixtures have been located in the field and include GIS coordinates but are not included in utility billing records

The streetlighting inventory maintained by Eversource Connecticut, provided with effective date 18 December 2019 and valid for six months, indicates a total of 694 fixtures. Actual Eversource billing for the month of March 2019, used as a preliminary validation of the unit inventory, also showed a total of 694 fixtures included in a total of five billing accounts with 689 included in the major account 51004814034.

Of these 694 fixtures currently being billed, 680 had been physically located and verified, 13 fixtures could not be located and one pole was located with no fixture present. In addition, 71 fixtures not included in current utility billing were located during the field audit and documented, many of which are now attributed to DOT or private party ownership or to be outside of the town boundaries.

Preliminary reconciliation from Eversource comparing the field audit data transmitted and internal company records results in the following summary of fixtures, all of which have been physically located and with GIS coordinates documented. The NBV fixture count updated by Eversource in December 2019 is also shown for reference and is seen to not agree with the field audit data preliminary reconciliation

Summary of field survey reconciliation and Eversource comments

Utility NBV inventory, total fixtures	694	18 December 2019 inventory, separately reported
Fixtures verified against utility records	680	current billing
Fixtures billed but not located by field audit	13	current billing, fixtures located by Eversource
Fixtures located but without utility billing	16	field audit fixtures, identified by Eversource as municipal
Candidate purchase	709	
<i>Delta from December 2019 NBV</i>	<i>15</i>	<i>further Eversource NBV and records reconciliation requested</i>

Summary of billing corrections required

Fixtures located but without utility billing	16	add to town billing records and consider for purchase
Poles located with no fixtures	1	remove from current billing

Summary of field audit fixtures attributed to others, not currently billed

Fixtures located but without utility billing	16	identified by Eversource as municipal
Department of Transportation responsible	22	identified by Eversource as DOT
Private parties	30	identified by Eversource as private
Other towns	3	includes East Granby and Windsor Locks
Reconciled fixtures with no utility billing	71	

Financial Projections

The overall street lighting purchase value proposition analysis has been updated in this report to include assessment of purchase using existing funds or using new debt obligations and includes estimates for expected maintenance costs that must be assumed by the town, added casualty insurance costs, loss of property tax due to the reduction in Eversource property valuation, one time energy efficiency rebates from Eversource and loan payments, if applicable. These cost components are first projected over a twenty-year project horizon based on assumed escalation rates and are then evaluated as a combined Net Present Value by applying an assumed discount rate. The basis for assumed financial projection rates are discussed below.

The initial costs to acquire the lighting inventory and retrofit the fixtures to LEDs is based on the field audit results, Eversource updated Net Book Value (NBV) provided in December 2019 and Tanko comprehensive estimates for fixture conversion and are summarized by the following. Note that the recommended candidate purchase unit count is under review by Eversource at this time and has not been validated in a revised NBV. When reconciled, this may represent a 2.1% increase in the values presented.

Eversource inventory basis	694 fixtures and 264 poles
Eversource Net Book Value (NBV)	\$389,783
Tanko estimated cost to retrofit	\$279,115
Combined acquisition and retrofit cost	\$668,898

The acquisition of street lighting from Eversource results in a number of new expenses that are compensated by reduction in utility billing. These include the following year 1 estimates

Maintenance cost	\$16,680
Property insurance	\$1,489
Lost property tax	\$7,836

Projection of future costs and savings and over a twenty-year horizon requires assumption of a number of key financial metrics based on best interpretation of historical data and factors which may affect future trends. These projections relate to both the cost of energy and the cost of products and services. The key financial metrics and values adopted based on research or as provided by third party sources included in the analysis are:

General inflation	2.5%
Electricity rate inflation for Connecticut	2.5%
Discount rate and debt financing	2.1%
Lighting inventory annualized depreciation rate	1.25%
Maintenance increase after warranty expiration	25%

A cash flow and savings workbook has also been provided with this report to allow testing of alternate values for these key financial parameters. The summary results presented below are based on the values shown here.

Two different values for inflation rates are used. General inflation is applied to the cost of goods and services including maintenance. Lost property tax and property insurance. The value adopted is related to the Bureau of Labor Statistics and Consumer Price Index and other available data. Electricity rate inflation is applied to the cost of energy from Eversource and is applied to both the estimate of current arrangement energy costs under rate 116 and the estimated cost under rate 117 following acquisition and retrofit to LED units. In both case, current values for the validated annual baseline utility cost and estimated LED unit annual cost are used as year 1 values that are then escalated over twenty years.

The discount or debt financing rate is applied in the case where the lighting inventory is purchased under a new debt obligation and repaid over the span of the value proposition projection.

The lighting inventory annualized depreciation rate is applied to the lighting inventory net book value to estimate the expected loss in property taxes. This rate is based on unit age depreciation data provided by Eversource and processed to determine a population weighted age-based depreciation rate. This rate is then used in combination with the general inflation rate to project property tax losses based on current NBV and mill rate calculated for year 1 and then escalated over the twenty-year horizon.

The increase in maintenance cost rate is applied in year eleven assuming a ten-year manufacturer warranty on parts. Following the end of warranty, lamp replacements will require new purchase rather than warranty replacement. The rates of unit failures are expected to be low during the span of this projection with typical LED unit life of 100,000 hours and at a typical 4,150 burn hours per year corresponds to a 24-year unit life. The cost of maintenance includes an assumed population failure rate and costs that include monthly fees to cover call center and other administrative services and the cost of unit replacement as needed. All cost estimates are escalated at the general inflation rate.

Projected costs of streetlighting are shown in the following table for the current arrangement with Eversource owned and maintained lighting under rate 116. The table includes undiscounted cashflow projects based on the applied escalation rates and a top line Net Present Value of the cost of streetlighting over the analysis span of twenty years.

CURRENT ARRANGEMENT	Energy Cost
Net Present Value of Payments	\$ 2,109,078
Day of Transaction	
Year 1	\$ 103,716
2	\$ 106,309
3	\$ 108,967
4	\$ 111,691
5	\$ 114,483
6	\$ 117,345
7	\$ 120,279
8	\$ 123,286
9	\$ 126,368
10	\$ 129,527
11	\$ 132,765
12	\$ 136,084
13	\$ 139,486
14	\$ 142,974
15	\$ 146,548
16	\$ 150,212
17	\$ 153,967
18	\$ 157,816
19	\$ 161,762
20	\$ 165,806
Total Undiscounted Cashflow	\$ 2,649,390

Projection of cost elements and savings over the same twenty-year horizon for the case where the inventory is purchased using existing funds, represented as Cash. This projection also included the twenty-year escalated costs and a top line NPV calculation. All values are based on the rates listed above.

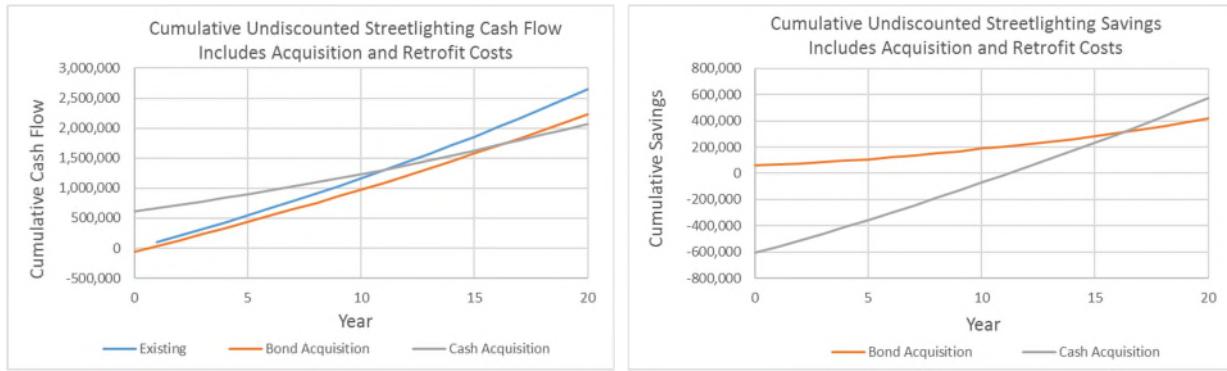
PROPOSED ARRANGEMENT	Energy Cost (1)	Maintenance Cost (2)	Lost Property Taxes (3)	MIRMA Insurance Increase (4)	Rebate Incentive (5)	Cash		
						Acquisition & Retrofit Cost (6)	Total Annual Cost	Current to Proposed Savings
Net Present Value of Payments	\$ 610,338	\$ 382,417	\$ 141,539	\$ 30,279	\$ (61,887)	\$ 668,898	\$ 1,771,585	\$ 337,493
Day of Transaction					\$ (61,887)	\$ 668,898	\$ 607,011	
Year 1	\$ 30,014	\$ 16,680	\$ 7,836	\$ 1,489	\$ -	\$ -	\$ 56,019	\$ 47,697
2	\$ 30,764	\$ 17,097	\$ 7,932	\$ 1,526	\$ -	\$ -	\$ 57,319	\$ 48,990
3	\$ 31,533	\$ 17,524	\$ 8,028	\$ 1,564	\$ -	\$ -	\$ 58,650	\$ 50,316
4	\$ 32,322	\$ 17,963	\$ 8,126	\$ 1,603	\$ -	\$ -	\$ 60,014	\$ 51,677
5	\$ 33,130	\$ 18,412	\$ 8,225	\$ 1,644	\$ -	\$ -	\$ 61,410	\$ 53,073
6	\$ 33,958	\$ 18,872	\$ 8,325	\$ 1,685	\$ -	\$ -	\$ 62,840	\$ 54,505
7	\$ 34,807	\$ 19,344	\$ 8,427	\$ 1,727	\$ -	\$ -	\$ 64,304	\$ 55,975
8	\$ 35,677	\$ 19,827	\$ 8,529	\$ 1,770	\$ -	\$ -	\$ 65,804	\$ 57,482
9	\$ 36,569	\$ 20,323	\$ 8,633	\$ 1,814	\$ -	\$ -	\$ 67,340	\$ 59,028
10	\$ 37,483	\$ 20,831	\$ 8,739	\$ 1,860	\$ -	\$ -	\$ 68,913	\$ 60,614
11	\$ 38,420	\$ 26,690	\$ 8,845	\$ 1,906	\$ -	\$ -	\$ 75,861	\$ 56,904
12	\$ 39,381	\$ 27,357	\$ 8,953	\$ 1,954	\$ -	\$ -	\$ 77,645	\$ 58,440
13	\$ 40,365	\$ 28,041	\$ 9,062	\$ 2,003	\$ -	\$ -	\$ 79,471	\$ 60,015
14	\$ 41,375	\$ 28,742	\$ 9,172	\$ 2,053	\$ -	\$ -	\$ 81,342	\$ 61,632
15	\$ 42,409	\$ 29,461	\$ 9,284	\$ 2,104	\$ -	\$ -	\$ 83,258	\$ 63,290
16	\$ 43,469	\$ 30,197	\$ 9,397	\$ 2,157	\$ -	\$ -	\$ 85,220	\$ 64,992
17	\$ 44,556	\$ 30,952	\$ 9,512	\$ 2,210	\$ -	\$ -	\$ 87,230	\$ 66,737
18	\$ 45,670	\$ 31,726	\$ 9,628	\$ 2,266	\$ -	\$ -	\$ 89,289	\$ 68,527
19	\$ 46,812	\$ 32,519	\$ 9,745	\$ 2,322	\$ -	\$ -	\$ 91,398	\$ 70,364
20	\$ 47,982	\$ 33,332	\$ 9,864	\$ 2,380	\$ -	\$ -	\$ 93,558	\$ 72,247
Total Undiscounted Cashflow	\$ 766,697	\$ 485,888	\$ 176,264	\$ 38,036	\$ (61,887)	\$ 668,898	\$ 2,073,896	\$ 1,182,505

Projection of cost elements and savings over the same twenty-year horizon for the case where the inventory is purchased using a new bond or debt obligation, represented as Bond. The cost element projections are the same as used in the Cash projection. The primary difference in the scenarios is that in this case, no initial cash outlay is required and the cost of acquisition is covered by a third party or debt obligation repaid in equal payments over the twenty-year analysis. The net undiscounted cost of this financing approach is \$157,171 as the difference between a cash acquisition and retrofit at \$668,898 and financed acquisition with twenty-year undiscounted total payments of \$826,069. For this analysis where the NPV discount rate used corresponds to the financing rate, the NPV for both cases is identical to the initial purchase and retrofit cost.

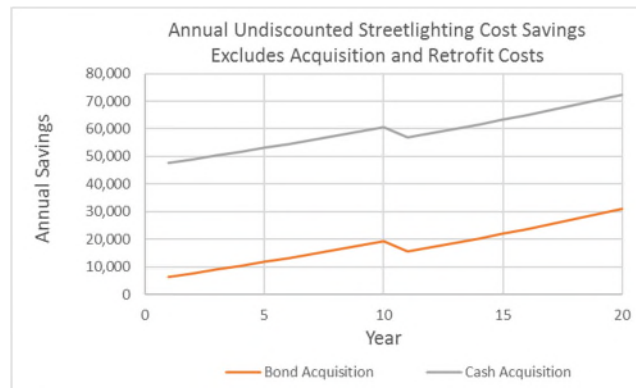
PROPOSED ARRANGEMENT	Energy Cost (1)	Maintenance Cost (2)	Lost Property Taxes (3)	MIRMA Insurance Increase (4)	Rebate Incentive (5)	Bond		
						Acquisition & Retrofit Cost (6)	Total Annual Cost	Current to Proposed Savings
Net Present Value of Payments	\$ 610,338	\$ 382,417	\$ 141,539	\$ 30,279	\$ (61,887)	\$ 668,898	\$ 1,771,585	\$ 337,493
Day of Transaction					\$ (61,887)		\$ (61,887)	
Year 1	\$ 30,014	\$ 16,680	\$ 7,836	\$ 1,489	\$ -	\$ 41,303	\$ 97,322	\$ 6,394
2	\$ 30,764	\$ 17,097	\$ 7,932	\$ 1,526	\$ -	\$ 41,303	\$ 98,623	\$ 7,686
3	\$ 31,533	\$ 17,524	\$ 8,028	\$ 1,564	\$ -	\$ 41,303	\$ 99,954	\$ 9,013
4	\$ 32,322	\$ 17,963	\$ 8,126	\$ 1,603	\$ -	\$ 41,303	\$ 101,317	\$ 10,374
5	\$ 33,130	\$ 18,412	\$ 8,225	\$ 1,644	\$ -	\$ 41,303	\$ 102,713	\$ 11,770
6	\$ 33,958	\$ 18,872	\$ 8,325	\$ 1,685	\$ -	\$ 41,303	\$ 104,143	\$ 13,202
7	\$ 34,807	\$ 19,344	\$ 8,427	\$ 1,727	\$ -	\$ 41,303	\$ 105,608	\$ 14,671
8	\$ 35,677	\$ 19,827	\$ 8,529	\$ 1,770	\$ -	\$ 41,303	\$ 107,107	\$ 16,178
9	\$ 36,569	\$ 20,323	\$ 8,633	\$ 1,814	\$ -	\$ 41,303	\$ 108,643	\$ 17,725
10	\$ 37,483	\$ 20,831	\$ 8,739	\$ 1,860	\$ -	\$ 41,303	\$ 110,216	\$ 19,311
11	\$ 38,420	\$ 26,690	\$ 8,845	\$ 1,906	\$ -	\$ 41,303	\$ 117,165	\$ 15,600
12	\$ 39,381	\$ 27,357	\$ 8,953	\$ 1,954	\$ -	\$ 41,303	\$ 118,948	\$ 17,136
13	\$ 40,365	\$ 28,041	\$ 9,062	\$ 2,003	\$ -	\$ 41,303	\$ 120,774	\$ 18,712
14	\$ 41,375	\$ 28,742	\$ 9,172	\$ 2,053	\$ -	\$ 41,303	\$ 122,645	\$ 20,329
15	\$ 42,409	\$ 29,461	\$ 9,284	\$ 2,104	\$ -	\$ 41,303	\$ 124,561	\$ 21,987
16	\$ 43,469	\$ 30,197	\$ 9,397	\$ 2,157	\$ -	\$ 41,303	\$ 126,524	\$ 23,688
17	\$ 44,556	\$ 30,952	\$ 9,512	\$ 2,210	\$ -	\$ 41,303	\$ 128,534	\$ 25,433
18	\$ 45,670	\$ 31,726	\$ 9,628	\$ 2,266	\$ -	\$ 41,303	\$ 130,593	\$ 27,224
19	\$ 46,812	\$ 32,519	\$ 9,745	\$ 2,322	\$ -	\$ 41,303	\$ 132,701	\$ 29,060
20	\$ 47,982	\$ 33,332	\$ 9,864	\$ 2,380	\$ -	\$ 41,303	\$ 134,862	\$ 30,944
Total Undiscounted Cashflow	\$ 766,697	\$ 485,888	\$ 176,264	\$ 38,036	\$ (61,887)	\$ 826,069	\$ 2,231,067	\$ 356,436

These projections are shown graphically in the following figures and are presented in tabular form in the appendix comparing the existing arrangements with the two acquisition and retrofit scenarios. In the **Cash Flow** chart on the left, the blue Existing curve represents current arrangements with Eversource ownership and maintenance. The Cash curve in grey shows the initial acquisition and conversion cost and crosses the Existing curve indicating a simple payback of around eleven years.

The chart on the right compares **cumulative streetlighting cost savings** for the two acquisition cases with Cash Acquisition shown in grey and Bond Acquisition shown in orange. The slope of the Cash Acquisition curve is steeper indicating a greater annual savings rate of savings following the initial cash outlay. The two scenarios cross around year sixteen and at the end of the projection in year twenty the net difference between the two scenarios corresponds to the cumulative cash flow associated with financing costs.



Projected undiscounted costs savings are shown graphically by the following chart. This comparison excludes the initial acquisition and retrofit costs in the Cash Acquisition case and includes annual costs associated with utility payments to Eversource under rate 117, maintenance, lost property taxes, property insurance and debt service where applicable and intended to represent budgeting requirements over the projection. The shift in both curves at year 11 corresponds to the estimated increase in maintenance cost at the expiration of lamp manufacturer warranty.



Conclusions

The inclusion of the expanded set of cost elements in these updated projections allows comparison of continuing with the current Eversource owned and maintained streetlighting inventory or pursuing two different scenarios for the acquisition of all fixtures and poles and retrofit of the lamps to high efficiency LED units. The Cash Acquisition scenario requires an initial capital outlay followed by projected annual cost savings of around \$48k to \$72k over the span of the projection or from \$4k to \$6k average monthly cost savings, both of which can be incorporated in town budget reductions following the initial acquisition from existing funds. The Bond Acquisition scenario requires no initial capital outlay and results in reduced annual savings due to added debt service that is deducted from the projected cost savings. The net undiscounted cost of this debt service is around \$157k over the span of the projection.

In either acquisition and retrofit scenario and based on the escalation parameters used, a Net Present Value of approximately \$337k has been calculated indicating overall favorable economics related to acquisition and retrofit.

Appendix 1. Undiscounted cumulative cash flow and annual savings projections

Year	Cumulative costs at end of fiscal year			Cumulative savings		Annual cost savings	
	Existing	Bond Acquisition	Cash Acquisition	Bond Acquisition	Cash Acquisition	Bond Acquisition	Cash Acquisition
0		-\$61,887	\$607,011	\$61,887	-\$607,011		
1	\$103,716	\$35,435	\$663,030	\$68,281	-\$559,314	\$6,394	\$47,697
2	\$210,025	\$134,058	\$720,349	\$75,967	-\$510,324	\$7,686	\$48,990
3	\$318,992	\$234,012	\$779,000	\$84,980	-\$460,008	\$9,013	\$50,316
4	\$430,682	\$335,329	\$839,013	\$95,353	-\$408,331	\$10,374	\$51,677
5	\$545,165	\$438,043	\$900,423	\$107,123	-\$355,258	\$11,770	\$53,073
6	\$662,511	\$542,186	\$963,263	\$120,325	-\$300,753	\$13,202	\$54,505
7	\$782,789	\$647,794	\$1,027,568	\$134,996	-\$244,778	\$14,671	\$55,975
8	\$906,075	\$754,901	\$1,093,371	\$151,174	-\$187,296	\$16,178	\$57,482
9	\$1,032,443	\$863,544	\$1,160,711	\$168,899	-\$128,268	\$17,725	\$59,028
10	\$1,161,970	\$973,760	\$1,229,624	\$188,210	-\$67,654	\$19,311	\$60,614
11	\$1,294,735	\$1,090,925	\$1,305,485	\$203,810	-\$10,750	\$15,600	\$56,904
12	\$1,430,820	\$1,209,873	\$1,383,130	\$220,947	\$47,690	\$17,136	\$58,440
13	\$1,570,306	\$1,330,647	\$1,462,601	\$239,659	\$107,705	\$18,712	\$60,015
14	\$1,713,280	\$1,453,293	\$1,543,942	\$259,987	\$169,337	\$20,329	\$61,632
15	\$1,859,828	\$1,577,854	\$1,627,200	\$281,974	\$232,628	\$21,987	\$63,290
16	\$2,010,039	\$1,704,377	\$1,712,420	\$305,662	\$297,619	\$23,688	\$64,992
17	\$2,164,006	\$1,832,911	\$1,799,651	\$331,095	\$364,356	\$25,433	\$66,737
18	\$2,321,823	\$1,963,504	\$1,888,940	\$358,319	\$432,883	\$27,224	\$68,527
19	\$2,483,584	\$2,096,205	\$1,980,338	\$387,379	\$503,246	\$29,060	\$70,364
20	\$2,649,390	\$2,231,067	\$2,073,896	\$418,323	\$575,494	\$30,944	\$72,247

Appendix 2 – Preliminary financial projection assumptions, provided by Tanko Lighting, 8 December 2020

The financial summary accounts for the following:

1. 695 Total Street Lights Converted to LED
 - 440 GE Cobra Head Lights
 - 248 Decorative Lights
 - 7 Flood Lights
 - Once we have the ownership review feedback from John at Eversource we will be able to provide exact quantities for the scope of work. Until then, our estimates will include lights that are still under Eversource's review.
2. Maintenance: \$2/fixture/month while the cobra heads are under warranty (10 years).
 - \$1/fixture/month admin fee
 - \$1/fixture/month time and materials (estimate)
3. Maintenance: \$2.50/fixture/month **after** the warranty period expires.
 - \$1/fixture/month admin fee
 - \$1.50/fixture/month time and materials (estimate)

The LED cobra heads that would be installed during the project have a rated lifetime of about 100,000 operating hours. Eversource's tariffs state your lights operate 4,150 hours per year. Therefore, the LED lights are rated to last about 24 years.