Appendix E, Attachment J – Cost-Benefit Analysis – Assessment of Alternatives

Environmental Statement
East-West Arterial Extension:
Section 2 (Woodland Drive – Lookout Road)
Section 3 (Lookout Road – Frank Sound Road)

FINAL Cost-Benefit Analysis Assessment of Alternatives: Grand Cayman East-West Arterial Extension

Whitman, Requardt & Associates, LLP
Grand Cayman National Roads Authority

DECEMBER 2024

EBP

Contents

Attachments

Attachment A – Solar Cost-Benefit Analysis: Grand Cayman East-West Arterial Extension

Attachment B – CBA Evaluation Sheets: Grand Cayman East-West Arterial Extension

List of Tables

List of Terms

AMCB	Analysis of Monetized Costs & Benefits
AMI	acute myocardial infarction
CAGR	compound annual growth rate
CBA	Cost-Benefit Analysis
EIA	Environmental Impact Assessment
EBP	EBP United States
EWA	East-West Arterial
GBP	British Pounds
GHG	greenhouse gas
IRR	Internal Rate of Return
kWh	kilowatt hour
MOVES	Motor Vehicle Emission Simulator
MW	megawatt
MWh	megawatt hour
O&M	operations and maintenance
ROW	Right of Way
tCO_2e	tonnes of carbon dioxide equivalent
TREDIS	Transportation Economic Development Impact System
UK	United Kingdom
US	United States
USD	United States Dollars
USDOT	United States Department of Transportation
VMT	vehicle miles travelled
WebTAG	UK Transport Appraisal Guidance

1. Introduction

The East-West Arterial (EWA) Extension Environmental Impact Assessment (EIA) is proposed to evaluate an alternative east-west travel route on Grand Cayman. EBP performed a Cost-Benefit Analysis (CBA) by monetizing the anticipated costs and quantitative benefits of construction of the EWA Extension Alternatives B1, B2, and B3 compared to a No-Build scenario (Figure 1).

This report focuses on describing the methodology used to quantify and monetize benefits, discount future cost and benefits values to constant 2023 United States dollars (USD) and compare the Net Present Value and Cost-Benefit ratio for the three Build alternatives. Note that not all benefits are monetized as part of the Shortlist Evaluation CBA. Additional qualitative and quantitative evaluation of benefits can be found within the Shortlist Alternatives Evaluation Document.

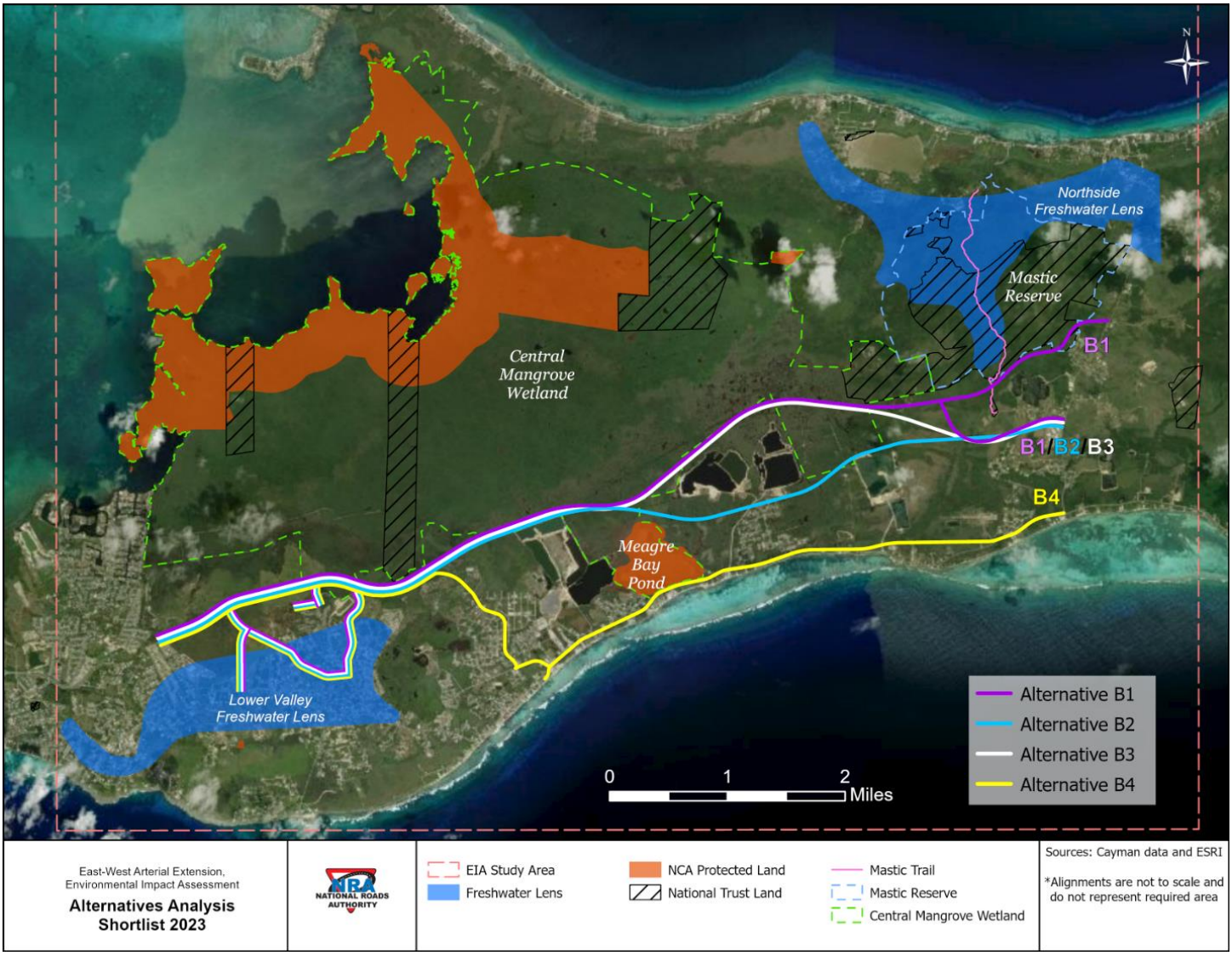

Figure 1: Shortlist of Build Alternatives

2. Methodology

CBA is a process that compares a stream of future costs with a stream of future benefits, expressed in money terms. This CBA uses methodology and parameter values recommended in the UK Transport Appraisal Guidance (WebTAG), dated November 2023, and in the USDOT Benefit-Cost Analysis Guidance for Discretionary Grant Programs, dated December 2023. The analysis in this report involves three steps: (1) itemize relevant costs and benefits in constant 2023 dollars, (2) apply a discount rate that represents the time value of money, ensuring an equitable comparison among expected benefits and costs that are further out in the future, and (3) sum and compare the total discounted benefits and costs occurring over the project life cycle to identify their ratio and difference. This discounting process is important because costs are largely up front in early years, and most benefits occur further out in time. For this report, we show costs and benefit streams in both undiscounted and discounted terms, though only the latter can be used for cost-benefit comparison. The analysis period is 52 years, beginning in 2024 with Right of Way acquisition and ending in 2074 with the final year of roadway construction spending.

2.1 Discount Rate

EBP presents results using UK Transport Appraisal Guidance (WebTAG) standard discount rates of 3.5% for years 1-30 and 3% for years 31-51 (WebTAG Data Book Unit A1.1.1).[1] For health-related noise benefits, results are presented with WebTAG standard discount rate of 1.5% for years 1-30 and 1.29% for years 31-51. The usage of these discount rates was agreed upon by the NRA and EAB.

EBP also conducted an additional sensitivity analysis with 2% and 5% discount rates included in the supplementary materials to this report (Attachment B) and Table 14.

2.2 Overview of Costs

Road Construction and Maintenance, Right of Way Costs

The stream of future costs is expressed in constant 2023 dollars. Alternatives B1, B2 and B3 include the new and rehab construction costs of the Will T Connector. Construction is anticipated to occur in phases, with improvements planned in 2026, 2036, 2046, and 2074. Rehabilitation spending occurs in five years: 2026, 2036, 2046, 2060, and 2074. There are no new construction costs for the No-Build scenario.

All costs totals have subtracted the No-Build scenario anticipated costs for comparison. Original construction costs for the No-Build and Build alternatives can be found in the separate Engineering Assessment of Alternatives report.

[1] https://www.gov.uk/government/publications/tag-data-book

Table 1. Road Construction and Maintenance, Right of Way Costs

Road Construction, Right of Way Costs (US 2023 $M)							
Alternative	Year	New Construction Cost Subtotal	Rehab Construction Cost Subtotal	Total Construction Cost w/ 20% Contingency	ROW Cost	Total Cost Undiscounted	Total Cost Discounted
B1 minus No-Build	2024	-	-	-	22.543	22.543	
	2026	236.462	-11.284	270.213	-	270.213	
	2036	150.965	6.501	188.960	-	188.960	
	2046	131.962	10.955	171.501	-	171.501	
	2060	-	19.241	23.089	-	23.089	
	2074	100.401	46.452	176.224	-	176.224	
	Total	**619.790**	**71.866**	**829.987**	**22.543**	**852.530**	**510.819**
B2 minus No-Build	2024	-	-	-	21.510	21.510	
	2026	211.925	-11.284	240.769	-	240.769	
	2036	142.552	3.879	175.717	-	175.717	
	2046	123.018	7.910	157.113	-	157.113	
	2060	-	15.376	18.451	-	18.451	
	2074	93.644	28.335	146.375	-	146.375	
	Total	**571.139**	**44.214**	**738.424**	**21.510**	**759.934**	**460.110**
B3 minus No-Build	2024	-	-	-	20.159	20.159	
	2026	212.008	-11.284	240.868	-	240.868	
	2036	139.599	4.135	172.481	-	172.481	
	2046	123.855	8.372	158,673	-	158.673	
	2060	-	15.945	19.134	-	19.134	
	2074	85.041	40.834	151.050	-	151.050	
	Total	**560.503**	**58.002**	**742.206**	**20.159**	**762.365**	**458.797**

Solar Canopy Costs

The proposed solar canopy is an elevated structure with solar photovoltaic panels, designed to provide shade and generate electricity along a 6-mile (9.7-km) section of the proposed micro-mobility path and sidewalk. All costs are expressed in constant 2023 dollars. Solar canopy costs are assumed equal for Build alternatives B1, B2 and B3.

This solar canopy facility is estimated to start operation in 2046, so our analysis assumes capital costs will be incurred in 2045, with operations and maintenance (O&M) costs incurred over a subsequent 30-year equipment life. The anticipated costs are based on the information provided by the EWA EIA project team (see separate Engineering – Assessment of Alternatives report) which shows current costs for implementing the solar canopy, with further adjustment by EBP to reflect expected future changes (reductions) in solar equipment costs by 2045. The adjustment factors applied were developed by the US Department of Energy, National Renewable Energy Lab. Further documentation can be found in Attachment A.

Table 2. Solar Canopy Costs (US 2023 $M)

	Sum 2045-2074	Discounted Sum
Solar PV System		
Capital Cost	58.441	
O&M Cost	7.918	
Total Cost	**66.359**	**30.001**
Integrated Battery Backup		
Capital Cost	6.735	
O&M Cost	8.831	
Total Cost	15.566	6.042
Total Solar with Backup	**81.925**	**36.043**

2.3 Overview of Benefits

Solar Canopy

The proposed solar canopy is estimated to be built in a later phase of the road project, with a build year of 2045 and opening year of 2046. Costs and benefits are monetized through 2075 to account for an anticipated 30-year useful life of the canopy. The main savings benefits will be (1) electricity cost savings to users, and (2) carbon emissions reductions compared to the "No-Build" scenario. This section summarizes those benefits. Deeper analysis and documentation of detailed assumptions can be found in Attachment A. Solar canopy benefits are assumed equal for Alternative B1, Alternative B2, and Alternative B3.

The proposed solar canopy would have an electricity generating capacity rated at 22.234 MW (DC), with a battery backup system. It is projected to produce 38,174 MWh per year starting in 2045 (with a slight degradation over time, falling to 31,060 MWh by 2075). The electricity cost savings is based on a levelized solar cost of $0.096/kWh (representing distribution of capital and operating costs over a 30-year lifetime), compared to an estimated electricity cost of USD $0.236/kWh with diesel fuel. The greenhouse gas (GHG) reduction is based on diesel generator emissions of 0.566 tons/MWh, compared to zero for solar generation. The value of GHG savings is based on United Kingdom (UK) Appraisal Guidance which assumes a carbon reduction valuation increasing from $380/metric tonne in 2036 to in $513/metric tonne in 2045. All values are discounted to constant 2023 dollars, with benefits summed over the 30-year lifetime of the facility. Further documentation can be found in Attachment A.

Table 3. Solar Canopy Benefits (US 2023 $M)

Impact Measure	Sum 2046-2074	Annual Average	Discounted Sum
Solar Output (MWh, AC)	1,072,267	35.742	
Reduction in CO_2 (metric tons)	566,644	18.279*	
$ Electric Cost Savings (USD $ millions)	253.055	8.435	83.627
$ Value of CO_2 Reduction (USD $ millions)	366.056	11.808*	114.899
Total $ Benefit (USD $ millions)	**619.111**	**19.971**	**198.526**

**CO_2 annual average savings include the carbon disbenefit in year 2045 of manufacturing solar canopy and battery components and are tabulated over 30 years. Annual average carbon savings after installation are slightly higher than the values in Table 2.*

Traffic

Benefits from transportation efficiency accrue from 2026-2074. Benefits are derived primarily from travel time savings enabled by the improvements planned in 2026, 2036, 2046, and 2074. Transportation models evaluated the No-Build and full build conditions for each of the Build alternatives (B1, B2, and B3) in each year. The models used assessed the impacts of the proposed alternatives only in the years that each phase is set to be implemented. The analysis assumed that the percent improvement in conditions in each phase's opening year would occur in all future years until a new phase opens. Travel time includes a 2.5 percent reliability buffer to account for people's trip planning for on-time arrival and it also includes freight movement efficiencies.

The EWA EIA project team provided travel performance during the AM peak hour, the PM peak hour, and under free flow conditions. EBP measured the share of daily traffic accounted for in AM and PM peak hours and assumed the remainder of daily traffic experienced free flow conditions. This provides a conservative estimate of travel performance since congestion would also occur outside the AM and PM peak travel periods. Daily travel performance is annualized with a factor of 365 assuming that tourism travel and personal trips would continue to exist on the weekends, even if there is less school and commute travel. Traffic data was developed in coordination with the EWA EIA project team as part of the traffic evaluation, contributing to multiple components within the process including the CBA. Please see the separate Traffic Evaluation report for additional information regarding the traffic volumes and analysis.

The increased accessibility provided by the improved facility in Build alternatives B1, B2, and B3 is estimated to result in additional vehicular travel miles along with operating cost disbenefits (in terms of fuel consumption and vehicle wear and tear) from this additional vehicle use. The estimated disbenefits also included additional particulate matter, nitrogen dioxide, sulfur oxides, and volatile organic compounds resulting from an increase in travel. These disbenefits may be overstated, or the project could provide benefits, because improved traffic operations may reduce emissions just as they reduce fuel consumption and carbon emissions. Without access to more detailed modelling for these public health-affecting pollutants, they are included conservatively based on baseline emissions rates developed with the United States (US) Environmental Protection

Agency's Motor Vehicle Emission Simulator (MOVES) model for average travel conditions and the change in total vehicle miles travelled (VMT).

As documented in the Traffic – Assessment of Alternatives report, the Royal Cayman Islands Police Service provided a compilation of motor vehicle accident statistics in Grand Cayman by district from 2012 to 2022, as well as a list of road fatalities from 2018 to 2020. However, this data was insufficient to conduct a detailed quantitative safety analysis for this project. Therefore, safety benefits were not quantified due to the limited location-specific crash data.

The model accounts for the following modes: private car, taxi, transit bus, school bus, truck transportation, walking, and biking. Short-term visitors are assigned to the transportation network separately as they have different travel behaviour than local private car users.

Based on United States Department of Transportation (USDOT) guidance, the below values were utilized for estimated trip purpose. Note that visitors are also assumed to include business travellers at an 11.8% rate and a higher value of time was also applied to these business travellers.

- Non-Business: Commuting – 88.2% of AM/PM peak, 0% of remaining 22 hours - this category represents drivers in their personal vehicles commuting from their home to place of work
- Non-Business: Other – 0% of AM/PM peak, 88.2% of remaining 22 hours - this category is anything besides business or commuting, i.e., groceries, education, tourism, social activities, etc.
- Business – 11.8% of all hours - this category includes drivers in an official work vehicle or traveling while on the clock (dump truck, Water Authority truck, Mosquito Authority truck, plumbers, carpenters, business meetings, etc.)

The EWA EIA team prepared an analysis of estimated traffic carbon emissions for 2026 and 2074 using the MOVES model, and EBP interpolated between these years using a compound annual growth rate (CAGR). Data for 2036 and 2046 years was calculated and given the time frame, the analysis did not impose the phase-based step function used for other benefits (as that would apply the 2026 percentage change for all years between 2026 and 2073 in this case). The carbon emissions change from traffic is documented further in the Carbon Monetization section.

For non-carbon emissions, EBP referenced USDOT Benefit Cost Analysis Guidance to monetize damages from emissions.[2]

[2] Table A-6: Damage Costs for Emissions per Metric Ton: https://www.transportation.gov/sites/dot.gov/files/2023-12/Benefit%20Cost%20Analysis%20Guidance%202024%20Update.pdf

Additional monetization factors for the travel benefits analysis are presented in Table 4. Discounted travel benefits are summarized in Table 5.

Table 4. Travel Benefits Monetization Factors

Measure	Adjustment Factor
Vehicle Operating Cost per VMT – Passenger Car	US $.166
Vehicle Operating Cost per VMT – Light-Duty EV	US $0.149
Vehicle Operating Cost per VMT – Taxi	US $0.182
Vehicle Operating Cost per VMT – Passenger Bus	US $1.548
Vehicle Operating Cost per VMT – All Trucks	US $0.600
Grand Cayman Value of Time – Personal	US $14.53
Grand Cayman Value of Time – Business	US $29.06
Grand Cayman Fuel Price - Regular	US $5.63/gallon
Grand Cayman Fuel Price – Diesel	US $5.58/gallon
Fuel per mile – Passenger Car	0.0435 gallons
Fuel per mile – Light-Duty Electric Vehicle	0.3527 kWh
Fuel per mile – Bus (diesel)	0.2433 gallons
Fuel per mile – All Trucks	0.1504 gallons

Table 5. WebTAG Transportation Economic Efficiency Table (US 2023 $M)

Transportation Economic Efficiency Table			
Benefit	**B1**	**B2**	**B3**
Non-business: Commuting			
User Travel Time	129.72	133.99	128.31
Vehicle Operating Cost	-6.68	-7.52	-6.36
Net Non Business Benefits: Commuting	**123.04**	**126.47**	**121.95**
Non-business: Other			
User Travel Time	293.74	303.39	290.54
Vehicle Operating Cost	-47.52	-53.46	-45.22
Net Non-Business Benefits: Other	**246.22**	**249.93**	**245.32**
Business			
User Travel Time	139.62	145.56	140.40
Vehicle Operating Cost	-9.53	-11.44	-9.26
Net Business Impact	**130.09**	**134.12**	**131.14**
Total			
Present Value of Transport Economic Efficiency Benefits*	**499.34**	**510.51**	**498.41**

**Present Value of Transport Economic Efficiency Benefits in Table 5 represent economic benefits of changes to transportation. The sum of these values and non-carbon emissions values in Tables 14-16 is represented in the supplemental spreadsheet (Attachment B) as Transportation Economic Development Impact System (TREDIS) Transportation Benefits. Subtotals for non-business and business benefits were tabulated outside of the supplemental spreadsheet.*

Noise

Noise benefits occur from 2026-2074 and their valuations based on the WebTAG approach to incorporating noise pollution into economic analysis.[3][4] The WebTAG Unit A3 Noise Assessment Workbook automatically calculates the monetary value of changes in noise per number of households affected under each Build alternative (B1, B2, and B3) compared to the No-Build

[3] https://www.gov.uk/guidance/noise-pollution-economic-analysis#:~:text=The%20approach%20to%20use%20for,large%20effect%20on%20the%20decision.

[4] https://assets.publishing.service.gov.uk/media/65ae62ff75154600107b4acb/tag-unit-a3-environmental-impact-appraisal.pdf

scenario[5]. WebTAG assigns a monetary value to each shift from one decibel range to another based on research of health impacts of these changes. These standard appraisal values are found in WebTAG Data Book Table A3.1 and are also embedded in the WebTAG Noise Workbook.

The noise workbook calculates values for five types of noise impacts: sleep disturbance, amenity loss, acute myocardial infarction (AMI or heart attack) risk, stroke risk, and dementia risk. Noise decibel values were provided by the EWA EIA project team for the Build alternatives (B1, B2, and B3) and No-Build scenario. Since the noise analysis prepared for the EWA shortlist evaluation did not include nighttime noise, EBP excluded sleep disturbance disbenefits from the analysis.

To value the impact of environmental noise resulting from each alternative compared to the No-Build scenario, 1,287 households in the study area were evaluated. Future noise levels for these households were projected for the No-Build scenario and for each of the Build Alternatives (B1, B2, and B3) in 2026 and 2074. EBP tabulated the number of households moving from one decibel range noise level under the No-Build scenario to a higher or lower range under each alternative, as specified in the WebTAG noise Assessment Workbook.

WebTAG Data Book Table A3.1 contains the annual value of the impact of a 1 decibel change in noise level on a household, assuming an average household size of 2.3 people. EBP used an average household size of 2.7 people in the analysis to adjust to the estimated household size within Bodden Town District.

The WebTAG Noise Workbook automatically calculates the total monetary value of the shift from No-Build to Build alternatives B1, B2, and B3 in the opening year 2026 and the horizon year 2074. These values are listed in constant 2023 U.S. Dollars in Table 6.

Table 6. Total Noise Benefits (US 2023 $M)

	Sum 2026-2074	Annual Average	Discounted Sum
B1 minus No-Build	-16.735	-.342	-11.934
B2 minus No-Build	-15.923	-.324	-11.323
B3 minus No-Build	-17.143	-.349	-12.141

EBP used the CAGR to interpolate noise benefits between 2026 and 2074. Multipliers were then applied to convert British Pounds (GBP) to USD, adjust to 2023 prices, and to reflect the Grand Cayman wage rate. These results were added to the CBA matrix and discounted benefits to constant 2023 dollars.

[5] https://www.gov.uk/government/publications/tag-environmental-impacts-worksheets

Carbon Monetization

To value the benefits of carbon sequestration, traffic-related GHG emissions, and solar-related GHG emissions, EBP used WebTAG's recommended central factor carbon cost (WebTAG Data Book A3.4).[6][7] The WebTAG values were converted from GBP to USD and adjusted to constant 2023 dollars. Table 7 summarizes the values used to monetize carbon sequestration and emissions in the analysis.

Table 7. Carbon Monetization Values

Year	WebTAG Carbon Values, £ per tCO_2e (2010£)	Carbon Values, $ per tCO_2e (US 2023$)
2026	213.59	379.76
2030	226.90	403.43
2040	263.92	469.25
2050	306.29	544.58
2060	355.46	632.01
2070	412.53	733.48
2074	437.84	778.48

Greenhouse Gas Emissions

The EWA EIA project team provided estimated traffic-related GHG emissions data as metric tonnes of carbon emitted in opening year 2026 and horizon year 2074. Details regarding the methodology can be found in the separate Greenhouse Gases and Traffic Evaluation Assessment of Alternatives reports. These values are summarized in Table 8. EBP subtracted No-Build carbon emissions from emissions under each build alternative, then interpolated annual emissions using CAGR. These values are summarized below in Table 8.

Table 8. Traffic- Related Carbon Emissions

Year	2026 tCO2e	2074 tCO2e	CAGR	Sum 2026-2074 tCO2e
No Build	64,134.45	124,738.99	1.40%	4.47M
B1	68,030.90	115,680.89	1.11%	4.4M
B2	70,044.02	115,237.72	1.04%	4.45M
B3	68,038.24	114,976.32	1.10%	4.39M

Carbon emissions are monetized by multiplying metric tonnes in each year by the corresponding central factor carbon price, as referenced in Table 7. Benefits (or savings) are recorded as positive

[6] https://assets.publishing.service.gov.uk/media/65ae62ff75154600107b4acb/tag-unit-a3-environmental-impact-appraisal.pdf
[7] https://www.gov.uk/government/publications/tag-data-book

values. Disbenefits, or increased monetary value of emissions compared to the No-Build alternative, are recorded as negative values. The discounted value of traffic-related carbon emissions in Table 9 is negative in 2026 and positive in 2074 for all three Build alternatives. The discounted sum of emissions values over the project's lifespan is positive for B1 and B3, reflecting overall savings. The discounted sum is negative for B2, reflecting an overall loss.

Alternative B2 is the alternative in which people are likely to most increase the miles they travel to take advantage of faster speeds to access better opportunities. Therefore, carbon emissions in the opening year are highest under Alternative B2. The value of travel benefits under Alternative B2 is also the highest among the alternatives. When total carbon emissions are monetized and summed over the time horizon, this results in a negative value for Alternative B2 (minus) Future No-Build and positive values for Alternative B1 (minus) Future No-Build and Alternative B3 (minus) Future No-Build.

Table 9. Value of Traffic-Related Carbon Emissions

	2026 Discounted Value (US 2023 $M)	2074 Discounted Value (US 2023 $M)	Discounted Sum (US 2023 $M)
B1 minus No-Build	-1.335	1.562	7.993
B2 minus No-Build	-2.024	1.638	-5.345
B3 minus No-Build	-1.337	1.683	10.988

Table 10 displays one-time carbon emissions related to construction of the three Build alternatives (B1, B2, and B3). The sums of benefits for all three alternatives are negative, reflecting a monetary loss due to carbon emissions during construction. For the evaluation, all construction and materials were assumed to occur in the initial construction phase (2024-2025) to provide a conservative estimate on emissions.

Table 10. One-Time Carbon Emissions from Construction (2024-2025)

Alternative	tCO2e	Sum 2024-2025 (US $M)	Annual Average (US $M)	Discounted Sum (US 2023 $M)
B1 minus No-Build	119,899	-44.514	-22.257	-42.276
B2 minus No-Build	67,328	-24.996	-12.498	-23.739
B3 minus No-Build	98,576	-36.597	-18.299	-34.757

Carbon Sequestration Loss

The EWA EIA project team tabulated the annual metric ton loss of ecosystem services from 2026-2074 (carbon sequestration) that was estimated to occur under each of the Build alternatives (B1, B2 and B3) compared to the No-Build scenario. These values are summarized in Table 11. These estimated values were monetized according to the WebTAG carbon pricing schedule in Table 7, adjusted for constant 2023 dollars, and multiplied by -1 to reflect a loss (disbenefit) in the analysis. All three alternatives are negative, reflecting a monetary loss due to carbon sequestration loss. For

the evaluation, all loss of ecosystem services was assumed to occur in the initial construction phase (2024-2025) to provide a conservative estimate on emissions.

Table 11. Annual Carbon Sequestration Loss

Alternative	tCO_2e	Sum 2026-2074 (US 2023 $M)	Annual Average (US 2023 $M)	Discounted Sum (US 2023 $M)
B1	453.5	-16.554	-0.338	-7.094
B2	300.7	-10.977	-0.224	-4.704
B3	354.6	-12.944	-0.264	-5.547

Amenity Value Loss

Ecosystem services from amenity value are measured in the number of houses and correlating amenity value to mangroves based on the 2020 Cayman Islands Ecosystem Accounting. The studies conducted for the EWA EIA project team included an estimate of a one-time loss of Amenity Value to occur in 2026 using 2017 USD. These values were converted to constant 2023 USD and multiplied values by -1 to reflect a loss (disbenefit) in the CBA. All three alternatives are negative, reflecting a monetary loss due to amenity value loss. These values are reflected below in Table 12.

Table 12. Amenity Loss Value Benefits (US 2023 $M)

Alternative	2026 Sum	Discounted Sum
B1	-12.556	-11.325
B2	-9.431	-8.506
B3	-10.431	-9.408

3. Results

The following provides summaries of the CBA results for the elements described in the previous sections of this report. Table 13 provides the overall CBA results and Tables 14, 15, and 16 provide summaries of the estimated monetized costs and benefits for each of the elements included in the WebTAG analysis for each of the Build alternatives (B1, B2, and B3). Based on the results, all three of the Build alternatives are anticipated to provide greater benefit than cost over the lifespan (2026-2074).

For clarity, some categories from the original WebTAG Analysis of Monetized Costs & Benefits (AMCB) worksheet were excluded in Tables 14-16 because they were not relevant to the project or data was not available at this stage of analysis.[8] These categories include: Journey Quality, Physical Activity, Accidents, Wider Public Finances, and Broad Transport Budget. The Greenhouse Gases category was replaced with Total Carbon Benefits. The Local Air Quality category was replaced with Non-Carbon Emissions (VOCs, NO_X, SO_2, PM2.5), and is tabulated as part of broader transportation benefits.

Table 13. CBA Results Summary (US 2023 $M)

Alternative	Present Value Costs	Present Value Benefits	Net Present Value (Benefit – Cost)	Benefit / Cost Ratio*	Internal Rate of Return (IRR)
B1 minus No-Build	546.863	644.293	97.430	1.2	3.8%
B2 minus No-Build	496.154	666.285	170.131	1.3	4.4%
B3 minus No-Build	494.841	657.558	162.717	1.3	4.2%

**A BCR above 1.0 represents the anticipated benefits being greater than the anticipated costs*

As shown in Table 13 above and Tables 15-17 below, all three of the Build alternatives (B1, B2, and B3) are anticipated to result in greater benefit than cost over the lifespan (2026-2074) with the conservation estimates utilized within the Shortlist of Alternatives CBA. Additional refinements will occur as part of the Preferred Alternative CBA.

Build Alternative B1 shows the highest present value costs and the lowest present value benefits of the three Build Alternatives, resulting in the lowest benefit/cost ratio and Internal Rate of Return (IRR) of the three Build alternatives. Build alternatives B2 and B3 show similar present value costs, with Alternative B2 showing slightly higher present value benefits. This results in similar benefit/cost ratios for Alternatives B2 and B3. Alternative B2 shows a Net Present Value that is about five percent higher than Alternative B3 and slightly higher IRR.

Table 14 presents results of a sensitivity analysis using two percent and five percent discount rates in addition to the WebTAG discount schedule. While a two percent discount rate raises benefit/cost

[8] https://www.gov.uk/government/publications/webtag-appraisal-tables

ratios overall, B2 and B3 still yield similar results. A five percent discount rate raises the benefit/cost ratio for B2 to 0.9, slightly higher than B1 and B3.

Table 14. Sensitivity Analysis Results

Alternative	Metric	2% Discount Rate	WebTAG Discount Schedule	5% Discount Rate
B1 minus No-Build Transportation + Solar	NPV (US 2023 $M)	306.365	97.430	-109.435
	BCR	1.5	1.2	0.8
	IRR	1.8%	3.8%	-1.1%
B2 minus No-Build Transportation + Solar	NPV (US 2023 $M)	390.408	170.131	-48.155
	BCR	1.7	1.3	0.9
	IRR	2.4%	4.4%	-0.5%
B3 minus No-Build Transportation + Solar	NPV (US 2023 $M)	401.945	162.717	-76.411
	BCR	1.7	1.3	0.8
	IRR	2.2%	4.2%	-0.3%

Table 15. Alternative B1 WebTAG Analysis of Monetized Costs and Benefits

Alternative B1 Monetized Costs and Benefits (US 2023 $M)	
Noise	-11.935
Electric Cost Savings from Solar Canopy	83.627
Amenity Loss from Construction	-11.325
Total Carbon Benefits	73.521
Subtotal - Carbon Emissions from Construction	-42.276
Subtotal - Carbon Sequestration Impact	-7.094
Subtotal - Carbon Emissions from Traffic	7.993
Subtotal - Carbon Emissions Savings from Solar Canopy	114.899
Total Transportation Benefits*	510.405
Subtotal - Economic Efficiency: Consumer Users (Commuting)	123.04
Subtotal - Economic Efficiency: Consumer Users (Other)	246.22
Subtotal - Economic Efficiency: Business Users and Providers	130.09
Subtotal – Freight and Reliability	11.065
Present Value of Benefits (PVB)	644.293
Total Construction Cost with Contingency	489.039
Right of Way Cost	21.780
Solar Canopy Cost	36.043
Present Value of Costs (PVC)	546.863
OVERALL IMPACTS	
Net Present Value (NPV)	**97.430**
Benefit to Cost Ratio (BCR)	**1.2**

**Transportation benefit subtotals include the value of disbenefits from non-carbon emissions (VOCs, NOX, SO_2, $PM_{2.5}$), associated with travel, totalling -$1.885M*

Table 16. Alternative B2 WebTAG Analysis of Monetized Costs and Benefits

Alternative B2 Monetized Costs and Benefits (US 2023 $M)	
Noise	-11.323
Electric Cost Savings from Solar Canopy	83.627
Amenity Loss from Construction	-8.506
Total Carbon Benefits	81.110
Subtotal - Carbon Emissions from Construction	-23.739
Subtotal - Carbon Sequestration Impact	-4.704
Subtotal - Carbon Emissions from Traffic	-5.345
Subtotal - Carbon Emissions Savings from Solar Canopy	114.899
Total Transportation Benefits*	521.37
Subtotal - Economic Efficiency: Consumer Users (Commuting)	126.47
Subtotal - Economic Efficiency: Consumer Users (Other)	249.93
Subtotal - Economic Efficiency: Business Users and Providers	134.12
Subtotal – Freight and Reliability	10.867
Present Value of Benefits (PVB)	666.285
Total Construction Cost with Contingency	439.328
Right of Way Cost	20.782
Solar Canopy Cost	36.043
Present Value of Costs (PVC)	496.154
OVERALL IMPACTS	
Net Present Value (NPV)	**170.131**
Benefit to Cost Ratio (BCR)	**1.3**

**Transportation benefit subtotals include the value of disbenefits from non-carbon emissions (VOCs, NOX, SO_2, $PM_{2.5}$), associated with travel, totalling -$2.14M*

Table 17. Alternative B3 Analysis of Monetized Costs and Benefits

Alternative B3 Monetized Costs and Benefits (US 2023 $M)	
Noise	-12.141
Electric Cost Savings From Solar Canopy	83.627
Amenity Loss from Construction	-9.408
Total Carbon Benefits	85.582
Subtotal - Carbon Emissions from Construction	-34.757
Subtotal - Carbon Sequestration Impact	-5.547
Subtotal - Carbon Emissions from Traffic	10.988
Subtotal - Carbon Emissions Savings from Solar Canopy	114.899
Total Transportation Benefits	509.898
Subtotal - Economic Efficiency: Consumer Users (Commuting)	121.95
Subtotal - Economic Efficiency: Consumer Users (Other)	245.32
Subtotal - Economic Efficiency: Business Users and Providers	131.14
Subtotal – Freight and Reliability	11.488
Present Value of Benefits (PVB)	657.558
Total Construction Cost with Contingency	439.320
Right of Way Cost	19.477
Solar Canopy Cost	36.043
Present Value of Costs (PVC)	494.841
OVERALL IMPACTS	
Net Present Value (NPV)	**162.717**
Benefit to Cost Ratio (BCR)	**1.3**

**Transportation benefit subtotals include the value of disbenefits from non-carbon emissions (VOCs, NOX, SO_2, $PM_{2.5}$), associated with travel, totalling -$1.806M*

4. Conclusion

Based on the CBA results documented in the previous section, the following provides summaries of each alternative utilizing WebTAG discount rates. It should be noted that a benefit/cost ratio above 1.0 represents the anticipated benefits being greater than the anticipated costs.

- *No-Build* – The CBA evaluates each of the Build alternatives (B1, B2, and B3) in comparison to the No-Build scenario. Therefore, the No-Build scenario does not have a separate CBA.

- *Alternative B2* – Alternative B2 is anticipated to provide the highest present value of benefits (~$666,285,000 USD) and require the second highest present value of costs (~$496,154,000 USD). Overall, Alternative B2 and Alternative B3 both provide the highest benefit/cost ratio at 1.3.

- *Alternative B3* – Alternative B3 is anticipated to provide the second highest present value of benefits (~$657,558,000 USD) and require the lowest present value of costs (~$494,841,000 USD). Overall, Alternative B2 and Alternative B3 both provide the highest benefit/cost ratio at 1.3.

- *Alternative B1* – Alternative B1 is anticipated to provide the least present value of benefits (~$644,293,000 USD) and require the highest present value of costs (~$546,863,000 USD). Overall, Alternative B1 provides the lowest benefit/cost ratio at 1.2.

The results of the Shortlist of Alternatives CBA show that each shortlisted alternative is expected to have a benefit/cost ratio above 1.0, which indicates that the anticipated benefits are greater than the anticipated costs. With this positive assessment, the CBA results are also anticipated to be a conservative estimate of project benefits, yet an equivalent comparison among all alternatives. For example, peak travel scenarios were conservatively estimated to be only one-hour in the AM and one-hour in the PM, although weekday peak travel times have been noted to extend up to about three hours. Additionally, there are a number of benefits which were qualitatively assessed and discussed in the individual discipline technical reports (e.g., Traffic and Engineering Assessment of Alternatives technical reports) but not monetized as part of the Shortlist Evaluation due to available data, its level of detail, and its applicability at the time of assessment, such as safety benefits, public transportation benefits, and pedestrian/bicycle amenities. Additional refinements will occur as part of the Preferred Alternative assessment as applicable and therefore potentially change the CBA from what is portrayed in the Shortlist Evaluation.

This CBA Assessment is one in a series of Technical Reports that have been prepared for the Shortlist Evaluation. The level of benefits, costs, and the identification of the most beneficial alternative will differ based on the resource/feature evaluated in each of the Technical Reports. Therefore, the most beneficial alternative described in this evaluation summary and in each technical document does not move an alternative forward to the Preferred Evaluation nor does it constitute any special weighting or extra consideration in the Shortlist Evaluation Document. The

comprehensive analysis of all the resources/features evaluated along with the rationale for the identification of the Preferred Alternative are presented in the Shortlist Evaluation Document.

Attachment A

Solar Cost-Benefit Analysis: Grand Cayman East-West Arterial Extension

COST-BENEFIT ANALYSIS FOR CAYMAN ISLAND SOLAR CANOPY

Prepared for Whitman, Requardt & Associates, LLP

APRIL 2024

EBP

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List of Terms

AC	alternating current
CBA	Cost-Benefit Analysis
CAPEX	capital expenditure
CI$	Cayman Islands Dollar
CO_2	carbon dioxide
CUC	Caribbean Utilities Company, Ltd.
DC	direct current
EIA	Environmental Impact Assessment
EWA	East-West Arterial
IPP	independent power producer
IRP	Integrated Resource Plan
kW	kilowatt
kWh	kilowatt hour
MW	megawatt
MWh	megawatt hour
NREL	National Renewable Energy Lab
O&M	operations and maintenance
OfReg	Utility Regulation Competitions Office
PPA	power purchase agreement
PV	photovoltaic
US	United States
USD	United States Dollar
USDOE	United States Department of Energy
WebTAG	UK Transport Analysis Guidance

1. Overview

The project team conducted Cost-Benefit Analysis (CBA) to determine the economic efficiency of putting in a 6-mile (9.7-km) canopy of photovoltaic (PV) solar panels along the proposed East-West Arterial (EWA) corridor, intended to provide shade for a micromobility and sidewalk path as well as providing electricity generation. Benefits and costs were based on comparison of two scenarios: "build case" (doing the project) versus a "base case" (not doing the project). The analysis compares the benefit (electricity cost savings from availability of solar energy in place of diesel-generated electricity) against an accounting of the associated cost (capital and operating expenses) over a 30-year solar PV lifetime. It applies a discount rate for future years to derive a "net present value" of benefits. As documented below, the analysis is based on generally conservative or high-end cost assumptions to maximize validity of the findings.

2. Capital Cost (CAPEX)

The basis for determining solar canopy costs is provided within the separate Engineering – Assessment of Alternatives report. It provided estimated cost for a solar PV generation facility with 235 canopy sections. The generation capacity is rated at 22.234 MW (DC), which provides 19.35 MW (AC). Further adjustment was then made to add costs of a battery backup system and scheduled implementation in 2045, by which time capital and operating costs (expressed in constant USD) are expected to have changed. Both the engineering report's findings and the additional adjustment processes are explained here.

To derive a conservative estimate of the capital and operating costs, the Engineering – Assessment of Alternatives report utilized a US national benchmark for capital cost of the specified type and size of generation (using NREL - National Renewable Energy Lab), and then applied a further 1.5 multiplier to allow for local Cayman Island factors (including additional shipping and weather-proofing). It also recognized an additional cost for the solar canopy structure (higher level racking for the PV panels).

The total estimated solar canopy capital cost (CAPEX), if implemented today, is reported as United States Dollars (USD) $78.154 million. That includes $33.352 million for the solar canopy racking structure and $44.802 million for the photovoltaic (PV) module, DC/AC inverter, and all other costs including those for other equipment and transmission interconnection, as well as costs of design, project management, installation, overhead, and permitting. The PV system is assumed to have a lifespan of 30 years. This is a conservative assumption, as the United States Department of Energy (USDOE/Berkeley Lab) now reports an average lifespan time of 32.4 years for utility scale solar generation.

The Engineering – Assessment of Alternatives cost estimate was based on current solar canopy costs if implemented today, but the CBA is based on a scenario of implementation in 2046. The technology for solar PV systems is rapidly evolving, with efficiency rising and costs falling over time. That is why NREL's "moderate" projection of future market price for an installed utility-scale

20MW solar PV system, when expressed in (inflation-adjusted) constant dollar terms, is projected to decline 44% from 2023 to 2046.[1] This cost reduction, applicable for the system excluding racking (which is not projected to have technology savings), amounts to $19.713 million. That leads us to project a total capital cost of $58.441 million in 2046, in place of the $78.154 million applicable for a purchase and installation in 2023. All costs cited here are in constant 2023 US dollars, as that is the most recent full year of available inflation data. Actual expenses to be incurred in the future will be higher due to inflation in the intervening years.

The EWA Environmental Impact Assessment (EIA) project team was also requested to include the incremental cost of adding a battery backup system, an option that is further discussed later in this memo. NREL provides estimates of the market price for a typical utility-scale solar PV system integrated with battery backup, including Li-ion batteries, cabinets, and a bi-directional inverter, and a 4-hour battery system rated at half the max kW rating of the solar PV panels. We derived the incremental capital cost by comparing NREL's estimated cost of an integrated system with battery backup with that of a system without battery backup.[2] Given a 22.234 MW solar PV system with an 11 MW battery backup, that incremental cost today would be USD $11.600 million applicable for installation in the US. Applying the 1.5 multiplier for local Cayman Island factors, the additional cost of installation today becomes $17.400 million. As battery technology is also rapidly evolving, NREL forecasts for this incremental cost to fall 61% from 2023 to 2046, which would reduce the added Cayman Islands 2046 cost of a battery backup to $6.735 million.

3. Operating and Maintenance (O&M) Cost

Solar PV systems have negligible operating costs (e.g., there are no fuel purchases or mechanical systems), but they do have periodic maintenance upkeep requirements. Thus O&M for the proposed solar canopy includes preventative maintenance, corrective maintenance, monitoring, and insurance costs. The Engineering – Assessment of Alternatives report estimated this cost, if implemented today, to be USD $380,201/year based on a cost ratio of USD $17.10/kW (DC) or $18.97/kW (AC). That is in line with the USDOE/Berkeley Lab average for all existing solar PV projects, though it is noted that the US average operating cost for new projects has been falling and is now down to around USD $15/kW(DC). So once again, the cost estimates for Cayman Island are based on conservative assumptions.

For this CBA, we recognize that the solar canopy would not be anticipated to be implemented until 2046, by which time lower annual costs are anticipated because improved PV panels will require less maintenance. NREL's "moderate" projections for future O&M costs of a utility-scale solar PV system show a reduction in annual O&M cost to $13.64/kW (AC) by 2046, when the solar canopy would start operation. That translates to USD $263,934/year for 2046 implementation, in place of the current year $380,201/year cost estimate for the solar canopy O&M. Again, all costs cited here

[1] https://atb.nrel.gov/electricity/2021/utility-scale_pv
[2] https://atb.nrel.gov/electricity/2021/utility-scale_pv-plus-battery

are in constant 2023 US dollars for use in CBA, and actual expenses to be incurred in the future will be higher due to inflation.

The option of adding a battery backup system adds significantly to O&M cost. The reason is that batteries degrade in output over time, requiring periodic partial replacement of battery cells (i.e., 20% capacity augmentations after 10 and 20 years) to return the backup system to its rated capacity. NREL's estimated O&M cost (for US locations) to maintain a 11MW battery backup capacity starting in 2046 is $196,239/year in constant 2023 US dollars.[3] Since a large part of this O&M element (58%) is battery replacement, we subject that fraction of O&M cost to a 50% cost premium as adopted in the Engineering – Assessment of Alternatives report to allow for Cayman Islands' higher equipment acquisition costs. The result is an estimated $294,358/year O&M cost for a battery backup.

4. Calculation of "Levelized Cost" Over Time

"Levelized Cost" is a measure of the lifetime unit cost of producing electricity from solar PV, based on total CAPEX costs, annual O&M costs, and kWh of electric output over each of the 30 years, with a discount rate factor (3%) applied to future years to provide a "net present value" for the 30-year system lifetime. It calculates the solar PV unit cost of electricity, based on an annual output of 39,510 MWh in the first year (2046), degrading to 32,210 MWh by the 30th year (2075). The result is a levelized cost of USD $0.09/kWh for a solar PV canopy without battery backup, and $0.12/kWh with a battery backup. These costs appear favorable compared to the current Cayman Islands cost of electricity including diesel fuel costs (discussed in Section 5 below).

5. Designation of Base (No-Build) Scenario

To compute a benefit/cost ratio for the solar canopy, it is necessary to compare a "Build" scenario against a "No-Build" scenario where a solar canopy is not built. Currently, Grand Cayman depends almost entirely on diesel fueled generators for electricity, so the No-Build scenario assumes that without the solar canopy there would be continued use of diesel fuel. The current generators are operated by the public electric utility, Caribbean Utilities Company, Ltd. (CUC). The standard residential rate for electric energy is currently Cayman Island Dollar (CI$) 0.128 per kWh, which includes generation, transmission, and distribution costs but excludes diesel fuel cost. The fuel cost varies from month to month. As of February 2024, that cost is CI$0.180/kWh for diesel fuel plus CI$0.014/kWh for government fuel import duty (total is CI$0.194/kWh).

For the CBA, we need to consider conditions starting in 2046. In this case, there is no expectation of new technology innovations or cost reductions for diesel-fueled generators in future years. Most long-term global forecasts for diesel fuel assume stagnant or declining demand over time, with relatively little shift in long-term price trends beyond the general overall rate of inflation. The

[3] https://atb.nrel.gov/electricity/2022/utility-scale_battery_storage

Integrated Resource Plan (IRP) for the Cayman Islands also supports this long-term assumption of generally stable diesel cost.[4] We adopt current fuel costs to represent our base scenario assumption for continued diesel reliance, which is consistent with both the recent past and a reasonable expectation for future diesel fuel costs. From February 2023 to February 2024, the CUC fuel + duty cost varied from CI$0.175/kWh to CI$0.229/kWh, so the current CI$0.194/kWh is a central value.[5] For our analysis, we use the USD equivalent, which is USD $0.231.

We note that an alternative long-term trend for avoided fuel cost is also provided in the IRP, reflecting a transition over time from diesel fuel to natural gas to renewables over the period to 2045 (see IRP, Exhibit 59, p.89). However, this solar canopy project is intended to be part of that transition. Accordingly, the analysis for this project keeps to the basic comparison of solar costs versus diesel fuel cost. Assumptions for our base case, reflecting current costs, are shown in Table 1.

Table 1. Assumptions for Base Case Calculation of Energy Cost

Measure Applied for the Project Lifetime	Cayman Island Dollars (CI$)	US Dollars (USD)
Standard Residential Rate (excl. fuel) $/kWh	$0.128	$0.152
Avoided Cost = Diesel Fuel Cost $/kWh*	$0.194	$0.231
Total	$0.322	$0.383

**represents savings associated with use of solar PV instead of diesel generation*

With the avoided cost shown in Table 1, and the expected MWh production level shown in Table 2(b), the annual "avoided cost" associated with paying for diesel fuel (the fuel cost that is incurred in the Base Case but avoided with proposed solar generation) is USD $9,009,017 (0.236/kWh * 38,173,800 kWh) for 2046.

6. Developing the Build and Base (No-Build) Comparison

The comparison of scenarios is not as simple as measuring the difference in cost of electricity using solar PV-powered generation versus the cost using diesel-powered generation. The reason is that the diesel facilities can operate 24 hours/day, while solar PV generates electricity only during daylight hours, and its output is further reduced by the extent of clouds. As a result, utility-scale solar PV generation can only be used as a power source for the island's electric grid if accompanied by ancillary power generation for times when the solar PV is not operating (i.e., night), plus backup power for times when solar PV is operating at a reduced level (i.e., during times of partial or total cloud cover). The backup can be in various forms, including use of available "spinning reserve" or battery power.

[4] https://www.cuc-cayman.com/otherpdf/download_pdf?file=1579022301PACE_CUC_IRP_Final_Report_280717.PDF, see IRP, Exhibit 41, p.67, projection to 2045 for "diesel only" portfolios.

[5] https://www.cuc-cayman.com/customer-service/fuel-cost/

In the short term, the most straightforward scenario is to assume that solar PV will provide lower cost energy when it is operating, but it will not reduce the need for investing in and maintaining conventional (diesel-fueled) generation capacity, as the latter will be needed for hours in which the solar PV is not working. In that case, the ratepayer savings associated with solar PV will be the avoided cost of diesel fuel during hours of solar PV operation (as long as that "savings from avoided diesel cost" is greater than the "levelized cost of solar PV energy"). Both cost factors were discussed in Sections 1-3 above. There would be further cost to install and maintain battery energy storage to fill in during periods when solar PV power generation is reduced by weather conditions, though that need might be reduced if CUC has spinning reserve ready to kick in.

In the long run, the benefit of a solar canopy can potentially become more than just the diesel cost savings. For example, energy demand tends to be highest during daytime hours when most people are awake, most businesses are operating, and temperatures tend to be highest. Those are the times when solar PV is generating electricity, so solar PV could eventually become an important source of peak supply during those hours, potentially reducing or delaying needs for future development of other generation capacity. More sophisticated options will eventually become possible as CUC gains a more diversified portfolio of electricity generation technologies.

In fact, CUC's IRP (2017) describes scenarios for implementation of renewable (solar, wind, landfill gas) resources to account for up to 70% of electricity generation by 2037. It also discusses how greater use of renewable technologies will increase the need for more sophisticated dispatch balancing and load management systems, to allow for periods of peak demand and reduced renewable capacity. It recommends that CUC itself procure "long duration energy storage systems" to help dispatch power to fill gaps at times of peak load.

There are additional cost uncertainties associated with institutional arrangements required for implementation of the solar canopy. The Utility Regulation and Competition Office (OfReg) oversees energy supply and operation for the Cayman Islands. It reports that implementation of a solar canopy would require the setup of an independent power producer (IPP) for the solar generation, which would then negotiate a power purchase agreement (PPA) with CUC to be approved by OfReg, that would set costs and specifications for an interconnection between the solar canopy and CUC's high-voltage transmission system.

At this early point in the planning process, the intent of this CBA is to screen options as part of a pre-feasibility assessment. For that reason, it is beyond the scope of this study by the National Roads Authority and its transportation investment consultants to develop or determine how the solar energy implementation process would ultimately be organized and implemented, or to assess about how the project could fit into CUC's IRP and its long-term goals for systemwide renewable power transition.

7. Analysis and Results

This initial CBA is intended to represent a simple screening process that shows the magnitude of possible benefit associated with investing in the costs of a solar canopy as part of the proposed EWA project. We include four factors: (1) cost of installing and operating a solar canopy, (2) cost of installing and maintaining a typical battery backup system, (3) consumer benefit in the form of avoided diesel that would be saved from energy bills, and (4) broader societal benefit in the form of reduced carbon dioxide emissions from reduction in diesel-based electricity generation.

The level of carbon dioxide (CO_2) reduction was calculated in the Engineering – Assessment of Alternatives report and its valuation is based on the UK Transport Analysis Guidance (WebTAG), adjusted to 2023 USD. It assumes an increasing CO_2 value/tonne over time (from $380/tonne in 2036 to in $513/tonne in 2045). All values are shown in 2023 USD, with all benefits after installation over 2046-2075 (30 years). A 3.5% annual discount rate is applied to calculate the discounted sum of benefits and costs through 2053 (year 30), then a 3% discount rate from 2054-2075. This is in line with UK WebTAG recommendations. The usage of these discount rates was agreed upon by the NRA and EAB.

Results for this solar canopy CBA are shown in Table 2. Note that battery backup is represented as a cost option that has no additional benefit in terms of cost savings or emissions savings; its benefit is to ensure support for adequate electric grid stability and reliability.

Table 2. Cost-Benefit Analysis of Solar Canopy Implementatin vs Base Case (30 year lifetime)

(A) Cost (US 2023 $M)

	Sum 2045-2074	Discounted Sum
Solar PV System		
Capital Cost (see note A)	58.441	
O&M Cost	7.918	
Total Cost	**66.359**	**30.001**
Integrated Battery Backup		
Capital Cost (see note A)	6.735	
O&M Cost	8.831	
Total Cost	**15.566**	**6.042**
Total Solar with Backup	**81.925**	**36.043**

(B) Benefit (US 2023 $M)

	Sum 2045-2074	Annual Average	Discounted Sum
Solar Output (MWh, AC)	1,072,267	35.742	
Reduction in CO_2 (metric tons)	566,644	18.279*	
Electric Cost Savings USD $	253.055	8.435	83.627
Value of CO_2 Reduction USD $	366.056	11.808*	114.899
Total Benefits	619.111	19.971	198.526

**CO_2 annual average savings include the carbon disbenefit in year 2045 of manufacturing solar canopy and battery components and are tabulated over 30 years. Annual average carbon savings after installation are slightly higher than the values in Table 2.*

(C) Cost Benefit Results (Net Benefit in millions of constant 2023 US Dollars)

	Ratepayer Cost Savings	Societal Benefit (Ratepayer Savings + Carbon Reduction)
Solar PV without Backup		
Net Benefit (Benefit – Cost)	53.625	168.524
Benefit / Cost Ratio	2.8	6.6
Solar PV with Backup		
Net Benefit (Benefit – Cost)	47.584	162.482
Benefit / Cost Ratio	2.3	5.5

Interpretation of Results

The results in Table 2(C) indicate a ratepayer benefit/cost ratio exceeding 2.3, meaning that the avoided cost of diesel fuel associated with implementation of the solar canopy is at least 2.3 times greater than the cost of implementing the project. It also indicates a total societal benefit/cost ratio exceeding 5.5, which reflects the larger payoff evident when also counting the value of carbon dioxide (greenhouse gas) reduction.

It is important to acknowledge that there are significant factors that could make these results larger or smaller:

- Capital costs for solar canopy and battery equipment are assumed to be roughly 1.5 times US mainland costs, as a conservative assumption. If the actual cost differential is reduced, then the benefit/cost ratio would rise even further.

- The timing of a start in 2046 has implications because it is assumed that technology improvements in both solar PV panels and backup batteries will have occurred and reduced costs by that year. In this analysis, we utilized the NREL "moderate" cost reduction

scenarios rather than the more aggressive "advanced" technology scenarios which would show even greater cost reductions in the future. However, we could alternatively consider an extreme case with no technology improvement at all between now and 2046. In that case, the analysis would assume current capital cost (35% higher than in table 1) and current O&M costs (39% higher than in Table 1). The result would be an energy cost Benefit/Cost ratio of 1.7 rather than 2.3, and a total societal Benefit/Cost ratio of 4.0 instead of 5.5.

The above sensitivity analysis confirms that under a variety of alternative assumptions, the benefits of a solar canopy (in terms of avoiding diesel fuel costs and carbon emissions) would still be expected to significantly exceed the investment cost of purchasing, installing, and operating the proposed solar facility. Ultimately, the feasibility of a solar canopy will depend on further refinement of specifications and costs, and determination of how to address the previously noted institutional, legal, and financial requirements for implementation.

Attachment B

CBA Evaluation Sheets: Grand Cayman East-West Arterial Extension

TAG Discounting (3.5 for 30 years then 3.0)

Benefits PV		
B1 - No Build	$	644,293,209
B2 - No Build	$	666,284,599
B3 - No Build	$	657,557,753

Costs PV		
B1 - No Build	$	546,862,917
B2 - No Build	$	496,153,933
B3 - No Build	$	494,840,571

	NPV (Benefits - Costs)	Benefit to Cost Ratio
B1	$ 97,430,292	1.2
B2	$ 170,130,666	1.3
B3	$ 162,717,183	1.3

5% Discounting

Benefits PV		
B1 - No Build	$	345,148,836
B2 - No Build	$	365,060,712
B3 - No Build	**$**	**336,804,315**

Costs PV		
B1 - No Build	$	454,583,584
B2 - No Build	$	413,215,539
B3 - No Build	$	413,215,539

	NPV (Benefits - Cos	Benefit to Cost Ratio
B1	$ (109,434,749)	0.8
B2	$ (48,154,826)	0.9
B3	$ (76,411,224)	0.8

2% Discounting

Benefits PV		
B1 - No Build	$	963,475,851
B2 - No Build	$	986,276,692
B3 - No Build	**$**	**997,101,965**

Costs PV		
B1 - No Build	$	657,090,674
B2 - No Build	$	595,868,718
B3 - No Build	$	595,156,919

	NPV (Benefits - Costs	Benefit to Cost Ratio
B1	$ 306,385,177	1.5
B2	$ 390,407,974	1.7
B3	$ 401,945,046	1.7

Cost Summary with Will T Connector Included (undiscounted 2023$)							
		New Construction Cost Subtotal	Rehab Construction Cost Subtotal	Total Construction Cost	Total Construction Cost w/ Contingency	ROW Cost	Total Cost
B1 - No Build	2024	-	-	-	-	22,542,686.00	22,542,686.00
	2026	236,461,638.13	(11,283,931.54)	225,177,706.59	270,213,247.91	-	270,213,247.91
	2036	150,965,173.15	6,501,331.82	157,466,504.97	188,959,805.96	-	188,959,805.96
	2046	131,962,249.52	10,955,222.07	142,917,471.59	171,500,965.91	-	171,500,965.91
	2060	-	19,241,100.37	19,241,100.37	23,089,320.44	-	23,089,320.44
	2074	100,401,121.67	46,452,096.88	146,853,218.55	176,223,862.26	-	176,223,862.26
Total B1		619,790,182.47	71,865,819.60	691,656,002.07	829,987,202.48	22,542,686.00	**852,529,888.48**
B2 - No Build	2024	-	-	-	-	21,509,800.00	21,509,800.00
	2026	211,924,577.94	(11,283,931.54)	200,640,646.40	240,768,775.68	-	240,768,775.68
	2036	142,551,915.69	3,878,634.39	146,430,550.08	175,716,660.10	-	175,716,660.10
	2046	123,018,337.55	7,909,372.72	130,927,710.27	157,113,252.32	-	157,113,252.32
	2060	-	15,375,661.35	15,375,661.35	18,450,793.62	-	18,450,793.62
	2074	93,644,146.63	28,334,709.88	121,978,856.51	146,374,627.81	-	146,374,627.81
Total B2		571,138,977.81	44,214,446.80	615,353,424.61	738,424,109.53	21,509,800.00	**759,933,909.53**
B3 - No Build	2024	-	-	-	-	20,158,564.00	20,158,564.00
	2026	212,007,580.38	(11,283,931.54)	200,723,648.84	240,868,378.61	-	240,868,378.61
	2036	139,599,273.05	4,135,039.76	143,734,312.81	172,481,175.37	-	172,481,175.37
	2046	123,854,993.41	8,372,344.17	132,227,337.58	158,672,805.10	-	158,672,805.10
	2060	-	15,944,697.69	15,944,697.69	19,133,637.23	-	19,133,637.23
	2074	85,041,015.20	40,834,133.89	125,875,149.09	151,050,178.91	-	151,050,178.91
Total B3		560,502,862.04	58,002,283.97	618,505,146.01	742,206,175.21	20,158,564.00	**762,364,739.21**

		B1 - No Build			B2 - No Build			B3 - No Build		
N	Year	Cost	Benefit	Benefit - cost	Cost	Benefit	Benefit - cost	Cost	Benefit	Benefit - cost
1	2024	22,542,686.00	-22,088,674.94	-44,631,360.94	21,509,800.00	-12,403,659	-33,913,458.9655825	20,158,564.00	-18,160,395.17	-38,318,959.17
2	2025	0.00	-22,425,050.70	-22,425,050.70	0.00	-12,592,547	-12,592,547.1731802	0.00	-18,436,949.41	-18,436,949.41
3	2026	270,213,247.91	-12,089,882.33	-282,303,130.23	240,768,775.68	-7,533,952	-248,302,727.5118840	240,868,378.61	-13,562,841.55	-254,431,220.16
4	2027	0.00	585,446.06	585,446.06	0.00	2,085,586	2,085,585.7232398	0.00	-3,169,339.25	-3,169,339.25
5	2028	0.00	717,349.29	717,349.29	0.00	2,287,161	2,287,160.5655488	0.00	-3,204,070.67	-3,204,070.67
6	2029	0.00	842,213.44	842,213.44	0.00	2,502,183	2,502,183.3416439	0.00	-3,245,642.39	-3,245,642.39
7	2030	0.00	990,179.99	990,179.99	0.00	2,730,821	2,730,821.0676414	0.00	-3,273,905.35	-3,273,905.35
8	2031	0.00	1,151,396.01	1,151,396.01	0.00	2,973,247	2,973,247.3588496	0.00	-3,298,704.61	-3,298,704.61
9	2032	0.00	1,326,014.38	1,326,014.38	0.00	3,239,643	3,239,642.6672926	0.00	-3,319,879.17	-3,319,879.17
10	2033	0.00	1,504,193.96	1,504,193.96	0.00	3,520,195	3,520,194.5273381	0.00	-3,327,261.74	-3,327,261.74
11	2034	0.00	1,696,099.87	1,696,099.87	0.00	3,825,098	3,825,097.8096977	0.00	-3,340,678.53	-3,340,678.53
12	2035	0.00	1,911,903.63	1,911,903.63	0.00	4,144,555	4,144,554.9840748	0.00	-3,339,948.99	-3,339,948.99
13	2036	188,959,805.96	17,241,783.48	-171,718,022.48	175,716,660.10	13,178,776	-162,537,883.7052550	172,481,175.37	12,085,114.42	-160,396,060.95
14	2037	0.00	17,715,924.56	17,715,924.56	0.00	13,557,981	13,557,980.5213613	0.00	12,474,706.47	12,474,706.47
15	2038	0.00	18,224,519.16	18,224,519.16	0.00	13,952,394	13,952,394.3092943	0.00	12,869,029.43	12,869,029.43
16	2039	0.00	18,737,767.02	18,737,767.02	0.00	14,362,253	14,362,253.4298069	0.00	13,288,293.33	13,288,293.33
17	2040	0.00	19,265,875.55	19,265,875.55	0.00	14,777,803	14,777,802.6104009	0.00	13,722,716.24	13,722,716.24
18	2041	0.00	19,819,270.20	19,819,270.20	0.00	15,209,648	15,209,647.9091680	0.00	14,172,704.68	14,172,704.68
19	2042	0.00	20,377,925.42	20,377,925.42	0.00	15,657,658	15,657,657.7089725	0.00	14,628,270.90	14,628,270.90
20	2043	0.00	20,952,069.65	20,952,069.65	0.00	16,112,102	16,112,101.5032399	0.00	15,099,654.92	15,099,654.92
21	2044	0.00	21,551,939.94	21,551,939.94	0.00	16,593,259	16,593,258.9337217	0.00	15,587,105.74	15,587,105.74
22	2045	65,176,000.00	2,175,648.58	-63,000,351.42	65,176,000.00	-2,920,714	-68,096,713.5574243	65,176,000.00	-3,901,252.00	-69,077,252.00
23	2046	172,059,257.91	51,338,457.04	-120,720,800.86	157,671,544.32	53,035,491	-104,636,053.0034620	159,231,097.10	58,289,855.96	-100,941,241.13
24	2047	558,292.00	52,002,022.77	51,443,730.77	558,292.00	53,603,578	53,045,286.4660549	558,292.00	58,952,100.25	58,393,808.25
25	2048	558,292.00	52,693,526.53	52,135,234.53	558,292.00	54,210,778	53,652,485.8659205	558,292.00	59,612,675.29	59,054,383.29
26	2049	558,292.00	53,393,255.63	52,834,963.63	558,292.00	54,827,428	54,269,135.8574241	558,292.00	60,311,882.50	59,753,590.50
27	2050	558,292.00	54,121,508.07	53,563,216.07	558,292.00	55,463,879	54,905,587.3048770	558,292.00	61,030,034.43	60,471,742.43
28	2051	558,292.00	54,868,592.88	54,310,300.88	558,292.00	56,130,496	55,572,204.0312124	558,292.00	61,767,455.17	61,209,163.17
29	2052	558,292.00	55,624,830.48	55,066,538.48	558,292.00	56,807,655	56,249,363.2639097	558,292.00	62,534,480.72	61,976,188.72
30	2053	558,292.00	56,420,553.16	55,862,261.16	558,292.00	57,515,748	56,957,456.0957059	558,292.00	63,311,459.43	62,753,167.43
31	2054	558,292.00	57,236,105.37	56,677,813.37	558,292.00	58,245,180	57,686,887.9605691	558,292.00	64,128,752.38	63,570,460.38
32	2055	558,292.00	58,071,844.24	57,513,552.24	558,292.00	58,996,371	58,438,079.1254276	558,292.00	64,956,733.86	64,398,441.86
33	2056	558,292.00	58,928,139.97	58,369,847.97	558,292.00	59,769,757	59,211,465.1981608	558,292.00	65,815,791.81	65,257,499.81
34	2057	558,292.00	59,815,376.29	59,257,084.29	558,292.00	60,585,790	60,027,497.6523758	558,292.00	66,696,328.26	66,138,036.26
35	2058	558,292.00	60,723,950.91	60,165,658.91	558,292.00	61,404,936	60,846,644.3695095	558,292.00	67,618,759.86	67,060,467.86
36	2059	558,292.00	61,664,276.03	61,105,984.03	558,292.00	62,267,682	61,709,390.1988124	558,292.00	68,553,518.36	67,995,226.36
37	2060	23,647,612.44	62,626,778.79	38,979,166.35	19,009,085.62	63,154,530	44,145,443.9157903	19,691,929.23	69,521,051.11	49,829,121.88
38	2061	558,292.00	63,621,901.84	63,063,609.84	558,292.00	64,065,999	63,507,706.9196945	558,292.00	70,531,821.61	69,973,529.61
39	2062	558,292.00	64,640,103.84	64,081,811.84	558,292.00	65,012,630	64,454,337.6506730	558,292.00	71,556,310.06	70,998,018.06
40	2063	558,292.00	65,681,859.98	65,123,567.98	558,292.00	65,994,980	65,436,688.4272130	558,292.00	72,615,013.92	72,056,721.92
41	2064	558,292.00	66,767,662.60	66,209,370.60	558,292.00	66,993,630	66,435,338.0045246	558,292.00	73,708,448.50	73,150,156.50
42	2065	558,292.00	67,888,021.73	67,329,729.73	558,292.00	68,039,178	67,480,885.8745373	558,292.00	74,827,147.60	74,268,855.60
43	2066	558,292.00	69,023,465.73	68,465,173.73	558,292.00	69,102,245	68,543,952.9682008	558,292.00	75,991,664.06	75,433,372.06
44	2067	558,292.00	70,194,541.87	69,636,249.87	558,292.00	70,213,474	69,655,182.3808033	558,292.00	77,192,570.49	76,634,278.49
45	2068	558,292.00	71,411,817.02	70,853,525.02	558,292.00	71,343,532	70,785,240.1210445	558,292.00	78,420,459.89	77,862,167.89
46	2069	558,292.00	72,655,878.26	72,097,586.26	558,292.00	72,533,108	71,974,815.8846222	558,292.00	79,695,946.36	79,137,654.36
47	2070	558,292.00	73,947,333.64	73,389,041.64	558,292.00	73,742,916	73,184,623.8531148	558,292.00	80,989,665.79	80,431,373.79
48	2071	558,292.00	75,336,812.82	74,778,520.82	558,292.00	75,173,696	74,615,403.5189684	558,292.00	82,372,276.65	81,813,984.65
49	2072	558,292.00	76,704,967.82	76,146,675.82	558,292.00	76,476,213	75,917,920.5374213	558,292.00	83,764,460.68	83,206,168.68
50	2073	558,292.00	78,102,473.83	77,544,181.83	558,292.00	77,811,260	77,252,967.6062250	558,292.00	85,196,923.73	84,638,631.73
51	2074	176,782,154.26	69,700,029.91	-107,082,124.35	146,932,919.81	91,459,657	-55,473,262.4379527	151,608,470.91	85,060,396.55	-66,548,074.35
52	2075	558,292.00	21,447,720.36	20,889,428.36	558,292.00	21,447,720	20,889,428.3639760	558,292.00	21,447,720.36	20,889,428.36
	IRR			**3.8%**			**4.4%**			**4.2%**

	N	Year	Cost Categories: all values in constant US 2023 $							Present Value Costs				
			New Construction Cost Subtotal (no inflation)	Rehab Construction Cost Total (no inflation)	Total Construction Cost Subtotal By Year (no inflation)	Total Construction Cost w/ contingency	ROW	Total Solar Cost	Total Cost	Total Costs Discounted 2%	Total Costs Discounted 3%	Total Costs Discounted 3.5%	Total Costs Discounted 5%	WebTAG Discount Schedule
	1	2024	0.00	0.00	0.00	0.00	22,542,686.00	0.00	22,542,686.00	22,100,672.55	21,886,102.91	21,780,372.95	21,469,224.76	3.5%
	2	2025	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	3	2026	236,461,638.13	-11,283,931.54	225,177,706.59	270,213,247.91	0.00	0.00	270,213,247.91	254,627,978.59	247,283,400.07	243,716,867.93	233,420,363.16	3.5%
	4	2027	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	5	2028	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	6	2029	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	7	2030	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	8	2031	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	9	2032	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	10	2033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	11	2034	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	12	2035	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	13	2036	150,965,173.15	6,501,331.82	157,466,504.97	188,959,805.96	0.00	0.00	188,959,805.96	146,072,075.94	128,672,433.08	120,821,684.67	100,209,419.52	3.5%
	14	2037	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	15	2038	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	16	2039	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	17	2040	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	18	2041	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	19	2042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	20	2043	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	21	2044	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	22	2045	0.00	0.00	0.00	0.00	0.00	65,176,000.00	65,176,000.00	42,158,381.01	34,014,865.64	30,577,361.51	22,280,407.20	3.5%
	23	2046	131,962,249.52	10,955,222.07	142,917,471.59	171,500,965.91	0.00	558,292.00	172,059,257.91	109,112,396.60	87,181,006.22	77,991,989.73	56,017,557.27	3.5%
	24	2047	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	347,102.13	274,642.67	244,507.96	173,108.43	3.5%
	25	2048	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	340,296.21	266,643.37	236,239.58	164,865.18	3.5%
B1-No Build	26	2049	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	333,623.73	258,877.06	228,250.80	157,014.45	3.5%
with Will T	27	2050	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	327,082.09	251,336.95	220,532.17	149,537.57	3.5%
Connector	28	2051	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	320,668.72	244,016.45	213,074.57	142,416.74	3.5%
	29	2052	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	314,381.10	236,909.18	205,869.14	135,634.99	3.5%
	30	2053	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	308,216.76	230,008.91	198,907.39	129,176.18	3.5%
	31	2054	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	302,173.29	223,309.62	192,181.05	123,024.93	3.0%
	32	2055	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	296,248.33	216,805.46	185,682.17	117,166.60	3.0%
	33	2056	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	290,439.54	210,490.74	179,403.07	111,587.24	3.0%
	34	2057	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	284,744.64	204,359.94	173,336.30	106,273.56	3.0%
	35	2058	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	279,161.42	198,407.71	167,474.68	101,212.92	3.0%
	36	2059	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	273,687.66	192,628.84	161,811.29	96,393.25	3.0%
	37	2060	0.00	19,241,100.37	19,241,100.37	23,089,320.44	0.00	558,292.00	23,647,612.44	11,365,301.05	7,921,546.67	6,622,078.99	3,888,510.12	3.0%
	38	2061	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	263,060.04	181,571.16	151,052.57	87,431.52	3.0%
	39	2062	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	257,902.00	176,282.68	145,944.51	83,268.12	3.0%
	40	2063	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	252,845.10	171,148.23	141,009.19	79,302.97	3.0%
	41	2064	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	247,887.35	166,163.33	136,240.76	75,526.64	3.0%
	42	2065	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	243,026.81	161,323.62	131,633.59	71,930.13	3.0%
	43	2066	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	238,261.58	156,624.88	127,182.21	68,504.89	3.0%
	44	2067	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	233,589.79	152,062.99	122,881.36	65,242.75	3.0%
	45	2068	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	229,009.59	147,633.97	118,725.95	62,135.95	3.0%
	46	2069	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	224,519.21	143,333.95	114,711.07	59,177.10	3.0%
	47	2070	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	220,116.87	139,159.17	110,831.95	56,359.14	3.0%
	48	2071	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	215,800.85	135,105.99	107,084.01	53,675.37	3.0%
	49	2072	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	211,569.47	131,170.87	103,462.81	51,119.40	3.0%
	50	2073	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	207,421.04	127,350.36	99,964.07	48,685.14	3.0%
	51	2074	100,401,121.67	46,452,096.88	146,853,218.55	176,223,862.26	0.00	558,292.00	176,782,154.26	64,391,666.05	39,150,738.80	30,583,035.05	14,681,964.49	3.0%
	52	2075						558,292.00	558,292.00	199,366.63	123,641.12	96,583.64	46,366.80	3.0%
		Total	**$ 619,790,182.47**	**$ 71,865,819.60**	**$ 691,656,002.07**	**$ 829,987,202.48**	**$ 22,542,686.00**	**$ 81,924,760.00**	**$ 934,454,648.48**	**$ 657,090,673.75**	**$ 571,231,102.61**	**$ 536,407,968.67**	**$ 454,583,584.47**	

	N	Year	Present Value Costs Using WebTAG Discount Schedule						
			New Construction Cost Subtotal (no inflation)	Rehab Construction Cost Total (no inflation)	Total Construction Cost Subtotal By Year (no inflation)	Total Construction Cost w/ contingency	ROW	Total Solar Cost	Total Cost
			Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%
B1-No Build with Will T Connector	1	2024	0.00	0.00	0.00	0.00	21,780,372.95	0.00	21,780,372.95
	2	2025	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3	2026	213,274,849.68	-10,177,459.74	203,097,389.94	243,716,867.93	0.00	0.00	243,716,867.93
	4	2027	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5	2028	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6	2029	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	7	2030	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	8	2031	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	9	2032	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	10	2033	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	11	2034	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	12	2035	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	13	2036	96,527,758.66	4,156,978.57	100,684,737.23	120,821,684.67	0.00	0.00	120,821,684.67
	14	2037	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	15	2038	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	16	2039	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	17	2040	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	18	2041	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	19	2042	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	20	2043	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	21	2044	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	22	2045	0.00	0.00	0.00	0.00	0.00	30,577,361.51	30,577,361.51
	23	2046	59,816,591.88	4,965,844.78	64,782,436.66	77,738,923.99	0.00	253,065.74	77,991,989.73
	24	2047	0.00	0.00	0.00	0.00	0.00	244,507.96	244,507.96
	25	2048	0.00	0.00	0.00	0.00	0.00	236,239.58	236,239.58
	26	2049	0.00	0.00	0.00	0.00	0.00	228,250.80	228,250.80
	27	2050	0.00	0.00	0.00	0.00	0.00	220,532.17	220,532.17
	28	2051	0.00	0.00	0.00	0.00	0.00	213,074.57	213,074.57
	29	2052	0.00	0.00	0.00	0.00	0.00	205,869.14	205,869.14
	30	2053	0.00	0.00	0.00	0.00	0.00	198,907.39	198,907.39
	31	2054	0.00	0.00	0.00	0.00	0.00	223,309.62	223,309.62
	32	2055	0.00	0.00	0.00	0.00	0.00	216,805.46	216,805.46
	33	2056	0.00	0.00	0.00	0.00	0.00	210,490.74	210,490.74
	34	2057	0.00	0.00	0.00	0.00	0.00	204,359.94	204,359.94
	35	2058	0.00	0.00	0.00	0.00	0.00	198,407.71	198,407.71
	36	2059	0.00	0.00	0.00	0.00	0.00	192,628.84	192,628.84
	37	2060	0.00	6,445,440.31	6,445,440.31	7,734,528.37	0.00	187,018.29	7,921,546.67
	38	2061	0.00	0.00	0.00	0.00	0.00	181,571.16	181,571.16
	39	2062	0.00	0.00	0.00	0.00	0.00	176,282.68	176,282.68
	40	2063	0.00	0.00	0.00	0.00	0.00	171,148.23	171,148.23
	41	2064	0.00	0.00	0.00	0.00	0.00	166,163.33	166,163.33
	42	2065	0.00	0.00	0.00	0.00	0.00	161,323.62	161,323.62
	43	2066	0.00	0.00	0.00	0.00	0.00	156,624.88	156,624.88
	44	2067	0.00	0.00	0.00	0.00	0.00	152,062.99	152,062.99
	45	2068	0.00	0.00	0.00	0.00	0.00	147,633.97	147,633.97
	46	2069	0.00	0.00	0.00	0.00	0.00	143,333.95	143,333.95
	47	2070	0.00	0.00	0.00	0.00	0.00	139,159.17	139,159.17
	48	2071	0.00	0.00	0.00	0.00	0.00	135,105.99	135,105.99
	49	2072	0.00	0.00	0.00	0.00	0.00	131,170.87	131,170.87
	50	2073	0.00	0.00	0.00	0.00	0.00	127,350.36	127,350.36
	51	2074	22,235,152.11	10,287,429.29	32,522,581.40	39,027,097.68	0.00	123,641.12	39,150,738.80
	52	2075	0.00	0.00	0.00	0.00	0.00	120,039.93	120,039.93
		Total	**$ 391,854,352.33**	**$ 15,678,233.20**	**$ 407,532,585.53**	**$ 489,039,102.64**	**$ 21,780,372.95**	**$ 36,043,441.72**	**$ 546,862,917.31**

	N	Year	Cost Categories: all values in constant US 2023 $							Present Value Costs					
			New Construction Cost Subtotal (no inflation)	Rehab Construction Cost Total (no inflation)	Total Construction Cost Subtotal By Year (no inflation)	Total Construction Cost w/ contingency	ROW	Total Solar Cost	Total Cost	Total Costs Discounted 2%	Total Costs Discounted 3%	Total Costs Discounted 3.5%	Total Costs Discounted 5%	WebTAG Discount Schedule	New Construction Cost Subtotal (no inflation) Years 0-30 3.5%; Years 31-75 3%
B2-No Build with Will T Connector	1	2024	0.00	0.00	0.00	0.00	21,509,800.00	0.00	21,509,800.00	21,088,039.22	20,883,300.97	20,782,415.46	20,485,523.81	3.5%	0.00
	2	2025	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%	0.00
	3	2026	211,924,577.94	-11,283,931.54	200,640,646.40	240,768,775.68	0.00	0.00	240,768,775.68	226,881,794.78	220,337,536.90	217,159,640.98	207,985,120.98	3.5%	191,143,827.22
	4	2027	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%	0.00
	5	2028	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%	0.00
	6	2029	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%	0.00
	7	2030	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%	0.00
	8	2031	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%	0.00
	9	2032	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%	0.00
	10	2033	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%	0.00
	11	2034	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%	0.00
	12	2035	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%	0.00
	13	2036	142,551,915.69	3,878,634.39	146,430,550.08	175,716,660.10	0.00	0.00	175,716,660.10	135,834,693.45	119,654,495.15	112,353,962.21	93,186,296.51	3.5%	91,148,286.90
	14	2037	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%	0.00
	15	2038	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%	0.00
	16	2039	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%	0.00
	17	2040	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%	0.00
	18	2041	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%	0.00
	19	2042	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%	0.00
	20	2043	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%	0.00
	21	2044	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%	0.00
	22	2045	0.00	0.00	0.00		0.00	65,176,000.00	65,176,000.00	42,158,381.01	34,014,865.64	30,577,361.51	22,280,407.20	3.5%	0.00
	23	2046	123,018,337.55	7,909,372.72	130,927,710.27	157,113,252.32	0.00	558,292.00	157,671,544.32	99,988,342.89	79,890,870.47	71,470,245.87	51,333,330.57	3.5%	55,762,445.08
	24	2047	0.00	0.00	0.00		0.00	558,292.00	558,292.00	347,102.13	274,642.67	244,507.96	173,108.43	3.5%	0.00
	25	2048	0.00	0.00	0.00		0.00	558,292.00	558,292.00	340,296.21	266,643.37	236,239.58	164,865.18	3.5%	0.00
	26	2049	0.00	0.00	0.00		0.00	558,292.00	558,292.00	333,623.73	258,877.06	228,250.80	157,014.45	3.5%	0.00
	27	2050	0.00	0.00	0.00		0.00	558,292.00	558,292.00	327,082.09	251,336.95	220,532.17	149,537.57	3.5%	0.00
	28	2051	0.00	0.00	0.00		0.00	558,292.00	558,292.00	320,668.72	244,016.45	213,074.57	142,416.74	3.5%	0.00
	29	2052	0.00	0.00	0.00		0.00	558,292.00	558,292.00	314,381.10	236,909.18	205,869.14	135,634.99	3.5%	0.00
	30	2053	0.00	0.00	0.00		0.00	558,292.00	558,292.00	308,216.76	230,008.91	198,907.39	129,176.18	3.5%	0.00
	31	2054	0.00	0.00	0.00		0.00	558,292.00	558,292.00	302,173.29	223,309.62	192,181.05	123,024.93	3.0%	0.00
	32	2055	0.00	0.00	0.00		0.00	558,292.00	558,292.00	296,248.33	216,805.46	185,682.17	117,166.60	3.0%	0.00
	33	2056	0.00	0.00	0.00		0.00	558,292.00	558,292.00	290,439.54	210,490.74	179,403.07	111,587.24	3.0%	0.00
	34	2057	0.00	0.00	0.00		0.00	558,292.00	558,292.00	284,744.64	204,359.94	173,336.30	106,273.56	3.0%	0.00
	35	2058	0.00	0.00	0.00		0.00	558,292.00	558,292.00	279,161.42	198,407.71	167,474.68	101,212.92	3.0%	0.00
	36	2059	0.00	0.00	0.00		0.00	558,292.00	558,292.00	273,687.66	192,628.84	161,811.29	96,393.25	3.0%	0.00
	37	2060	0.00	15,375,661.35	15,375,661.35	18,450,793.62	0.00	558,292.00	19,009,085.62	9,135,974.35	6,367,719.33	5,323,144.85	3,125,771.03	3.0%	0.00
	38	2061	0.00	0.00	0.00		0.00	558,292.00	558,292.00	263,060.04	181,571.16	151,052.57	87,431.52	3.0%	0.00
	39	2062	0.00	0.00	0.00		0.00	558,292.00	558,292.00	257,902.00	176,282.68	145,944.51	83,268.12	3.0%	0.00
	40	2063	0.00	0.00	0.00		0.00	558,292.00	558,292.00	252,845.10	171,148.23	141,009.19	79,302.97	3.0%	0.00
	41	2064	0.00	0.00	0.00		0.00	558,292.00	558,292.00	247,887.35	166,163.33	136,240.76	75,526.64	3.0%	0.00
	42	2065	0.00	0.00	0.00		0.00	558,292.00	558,292.00	243,026.81	161,323.62	131,633.59	71,930.13	3.0%	0.00
	43	2066	0.00	0.00	0.00		0.00	558,292.00	558,292.00	238,261.58	156,624.88	127,182.21	68,504.89	3.0%	0.00
	44	2067	0.00	0.00	0.00		0.00	558,292.00	558,292.00	233,589.79	152,062.99	122,881.36	65,242.75	3.0%	0.00
	45	2068	0.00	0.00	0.00		0.00	558,292.00	558,292.00	229,009.59	147,633.97	118,725.95	62,135.95	3.0%	0.00
	46	2069	0.00	0.00	0.00		0.00	558,292.00	558,292.00	224,519.21	143,333.95	114,711.07	59,177.10	3.0%	0.00
	47	2070	0.00	0.00	0.00		0.00	558,292.00	558,292.00	220,116.87	139,159.17	110,831.95	56,359.14	3.0%	0.00
	48	2071	0.00	0.00	0.00		0.00	558,292.00	558,292.00	215,800.85	135,105.99	107,084.01	53,675.37	3.0%	0.00
	49	2072	0.00	0.00	0.00		0.00	558,292.00	558,292.00	211,569.47	131,170.87	103,462.81	51,119.40	3.0%	0.00
	50	2073	0.00	0.00	0.00		0.00	558,292.00	558,292.00	207,421.04	127,350.36	99,964.07	48,685.14	3.0%	0.00
	51	2074	93,644,146.63	28,334,709.88	121,978,856.51	146,374,627.81	0.00	558,292.00	146,932,919.81	53,519,290.70	32,540,232.29	25,419,164.37	12,202,950.69	3.0%	20,738,730.90
	52	2075						558,292.00	558,292.00	199,366.63	123,641.12	96,583.64	46,366.80	3.0%	0.00
		Total	**$ 571,138,977.81**	**$ 44,214,446.80**	**$ 615,353,424.61**	**$ 738,424,109.53**	**$ 21,509,800.00**	**$ 81,924,760.00**	**$ 841,858,669.53**	**$ 595,868,718.36**	**$ 518,810,029.98**	**$ 487,400,513.08**	**$ 413,215,538.74**		**$ 358,793,290.10**

	N	Year	Present Value Costs Using WebTAG Discount Schedule					
			Rehab Construction Cost Total (no inflation)	Total Construction Cost Subtotal By Year (no inflation)	Total Construction Cost w/ contingency	ROW	Total Solar Cost	Total Cost
			Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%
B2-No Build with Will T Connector	1	2024	0.00	0.00	0.00	20,782,415.46	0.00	20,782,415.46
	2	2025	0.00	0.00	0.00	0.00	0.00	0.00
	3	2026	-10,177,459.74	180,966,367.48	217,159,640.98	0.00	0.00	217,159,640.98
	4	2027	0.00	0.00	0.00	0.00	0.00	0.00
	5	2028	0.00	0.00	0.00	0.00	0.00	0.00
	6	2029	0.00	0.00	0.00	0.00	0.00	0.00
	7	2030	0.00	0.00	0.00	0.00	0.00	0.00
	8	2031	0.00	0.00	0.00	0.00	0.00	0.00
	9	2032	0.00	0.00	0.00	0.00	0.00	0.00
	10	2033	0.00	0.00	0.00	0.00	0.00	0.00
	11	2034	0.00	0.00	0.00	0.00	0.00	0.00
	12	2035	0.00	0.00	0.00	0.00	0.00	0.00
	13	2036	2,480,014.94	93,628,301.84	112,353,962.21	0.00	0.00	112,353,962.21
	14	2037	0.00	0.00	0.00	0.00	0.00	0.00
	15	2038	0.00	0.00	0.00	0.00	0.00	0.00
	16	2039	0.00	0.00	0.00	0.00	0.00	0.00
	17	2040	0.00	0.00	0.00	0.00	0.00	0.00
	18	2041	0.00	0.00	0.00	0.00	0.00	0.00
	19	2042	0.00	0.00	0.00	0.00	0.00	0.00
	20	2043	0.00	0.00	0.00	0.00	0.00	0.00
	21	2044	0.00	0.00	0.00	0.00	0.00	0.00
	22	2045	0.00	0.00	0.00	0.00	30,577,361.51	30,577,361.51
	23	2046	3,585,205.02	59,347,650.10	71,217,180.12	0.00	253,065.74	71,470,245.87
	24	2047	0.00	0.00	0.00	0.00	244,507.96	244,507.96
	25	2048	0.00	0.00	0.00	0.00	236,239.58	236,239.58
	26	2049	0.00	0.00	0.00	0.00	228,250.80	228,250.80
	27	2050	0.00	0.00	0.00	0.00	220,532.17	220,532.17
	28	2051	0.00	0.00	0.00	0.00	213,074.57	213,074.57
	29	2052	0.00	0.00	0.00	0.00	205,869.14	205,869.14
	30	2053	0.00	0.00	0.00	0.00	198,907.39	198,907.39
	31	2054	0.00	0.00	0.00	0.00	223,309.62	223,309.62
	32	2055	0.00	0.00	0.00	0.00	216,805.46	216,805.46
	33	2056	0.00	0.00	0.00	0.00	210,490.74	210,490.74
	34	2057	0.00	0.00	0.00	0.00	204,359.94	204,359.94
	35	2058	0.00	0.00	0.00	0.00	198,407.71	198,407.71
	36	2059	0.00	0.00	0.00	0.00	192,628.84	192,628.84
	37	2060	5,150,584.20	5,150,584.20	6,180,701.04	0.00	187,018.29	6,367,719.33
	38	2061	0.00	0.00	0.00	0.00	181,571.16	181,571.16
	39	2062	0.00	0.00	0.00	0.00	176,282.68	176,282.68
	40	2063	0.00	0.00	0.00	0.00	171,148.23	171,148.23
	41	2064	0.00	0.00	0.00	0.00	166,163.33	166,163.33
	42	2065	0.00	0.00	0.00	0.00	161,323.62	161,323.62
	43	2066	0.00	0.00	0.00	0.00	156,624.88	156,624.88
	44	2067	0.00	0.00	0.00	0.00	152,062.99	152,062.99
	45	2068	0.00	0.00	0.00	0.00	147,633.97	147,633.97
	46	2069	0.00	0.00	0.00	0.00	143,333.95	143,333.95
	47	2070	0.00	0.00	0.00	0.00	139,159.17	139,159.17
	48	2071	0.00	0.00	0.00	0.00	135,105.99	135,105.99
	49	2072	0.00	0.00	0.00	0.00	131,170.87	131,170.87
	50	2073	0.00	0.00	0.00	0.00	127,350.36	127,350.36
	51	2074	6,275,095.08	27,013,825.98	32,416,591.17	0.00	123,641.12	32,540,232.29
	52	2075	0.00	0.00	0.00	0.00	120,039.93	120,039.93
		Total	**$ 7,313,439.49**	**$ 366,106,729.59**	**$ 439,328,075.51**	**$ 20,782,415.46**	**$ 36,043,441.72**	**$ 496,153,932.70**

	N	Year	Cost Categories: all values in constant US 2023 $							Present Value Costs				
			New Construction Cost Subtotal (no inflation)	Rehab Construction Cost Total (no inflation)	Total Construction Cost Subtotal By Year (no inflation)	Total Construction Cost w/ contingency	ROW	Total Solar Cost	Total Cost	Total Costs Discounted 2%	Total Costs Discounted 3%	Total Costs Discounted 3.5%	Total Costs Discounted 5%	**WebTAG Discount Schedule**
B3-No Build with Will T Connector	1	2024	0.00	0.00	0.00	0.00	20,158,564.00	0.00	20,158,564.00	19,763,298.04	19,571,421.36	19,476,873.43	0.00	3.5%
	2	2025	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	3	2026	212,007,580.38	-11,283,931.54	200,723,648.84	240,868,378.61	0.00	0.00	240,868,378.61	226,975,652.85	220,428,687.69	217,249,477.11	208,071,161.74	3.5%
	4	2027	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	5	2028	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	6	2029	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	7	2030	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	8	2031	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	9	2032	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	10	2033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	11	2034	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	12	2035	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	13	2036	139,599,273.05	4,135,039.76	143,734,312.81	172,481,175.37	0.00	0.00	172,481,175.37	133,333,558.53	117,451,287.49	110,285,179.84	91,470,449.88	3.5%
	14	2037	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	15	2038	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	16	2039	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	17	2040	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	18	2041	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	19	2042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	20	2043	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	21	2044	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5%
	22	2045	0.00	0.00	0.00	0.00	0.00	65,176,000.00	65,176,000.00	42,158,381.01	34,014,865.64	30,577,361.51	0.00	3.5%
	23	2046	123,854,993.41	8,372,344.17	132,227,337.58	158,672,805.10	0.00	558,292.00	159,231,097.10	100,977,342.50	80,681,082.99	72,177,168.73	51,659,312.35	3.5%
	24	2047	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	347,102.13	274,642.67	244,507.96	0.00	3.5%
	25	2048	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	340,296.21	266,643.37	236,239.58	0.00	3.5%
	26	2049	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	333,623.73	258,877.06	228,250.80	0.00	3.5%
	27	2050	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	327,082.09	251,336.95	220,532.17	0.00	3.5%
	28	2051	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	320,668.72	244,016.45	213,074.57	0.00	3.5%
	29	2052	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	314,381.10	236,909.18	205,869.14	0.00	3.5%
	30	2053	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	308,216.76	230,008.91	198,907.39	0.00	3.5%
	31	2054	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	302,173.29	223,309.62	192,181.05	0.00	3.0%
	32	2055	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	296,248.33	216,805.46	185,682.17	0.00	3.0%
	33	2056	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	290,439.54	210,490.74	179,403.07	0.00	3.0%
	34	2057	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	284,744.64	204,359.94	173,336.30	0.00	3.0%
	35	2058	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	279,161.42	198,407.71	167,474.68	0.00	3.0%
	36	2059	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	273,687.66	192,628.84	161,811.29	0.00	3.0%
	37	2060	0.00	15,944,697.69	15,944,697.69	19,133,637.23	0.00	558,292.00	19,691,929.23	9,464,156.45	6,596,460.29	5,514,362.65	3,146,251.75	3.0%
	38	2061	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	263,060.04	181,571.16	151,052.57	0.00	3.0%
	39	2062	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	257,902.00	176,282.68	145,944.51	0.00	3.0%
	40	2063	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	252,845.10	171,148.23	141,009.19	0.00	3.0%
	41	2064	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	247,887.35	166,163.33	136,240.76	0.00	3.0%
	42	2065	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	243,026.81	161,323.62	131,633.59	0.00	3.0%
	43	2066	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	238,261.58	156,624.88	127,182.21	0.00	3.0%
	44	2067	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	233,589.79	152,062.99	122,881.36	0.00	3.0%
	45	2068	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	229,009.59	147,633.97	118,725.95	0.00	3.0%
	46	2069	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	224,519.21	143,333.95	114,711.07	0.00	3.0%
	47	2070	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	220,116.87	139,159.17	110,831.95	0.00	3.0%
	48	2071	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	215,800.85	135,105.99	107,084.01	0.00	3.0%
	49	2072	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	211,569.47	131,170.87	103,462.81	0.00	3.0%
	50	2073	0.00	0.00	0.00	0.00	0.00	558,292.00	558,292.00	207,421.04	127,350.36	99,964.07	0.00	3.0%
	51	2074	85,041,015.20	40,834,133.89	125,875,149.09	151,050,178.91	0.00	558,292.00	151,608,470.91	55,222,327.56	33,575,694.73	26,228,027.37	12,544,893.87	3.0%
	52	2075						558,292.00	558,292.00	199,366.63	123,641.12	96,583.64	46,366.80	3.0%
		Total	**$ 560,502,862.04**	**$ 58,002,283.97**	**$ 618,505,146.01**	**$ 742,206,175.21**	**$ 20,158,564.00**	**$ 81,924,760.00**	**$ 844,289,499.21**	**$ 595,156,918.90**	**$ 517,440,509.41**	**$ 485,823,028.48**	**$ 366,938,436.39**	

	N	Year	Present Value Costs Using WebTAG Discount Schedule						
			New Construction Cost Subtotal (no inflation)	Rehab Construction Cost Total (no inflation)	Total Construction Cost Subtotal By Year (no inflation)	Total Construction Cost w/ contingency	ROW	Total Solar Cost	Total Cost
			Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%
B3-No Build with Will T Connector	1	2024	0.00	0.00	0.00	0.00	19,476,873.43	0.00	19,476,873.43
	2	2025	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3	2026	191,218,690.67	-10,177,459.74	181,041,230.93	217,249,477.11	0.00	0.00	217,249,477.11
	4	2027	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5	2028	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6	2029	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	7	2030	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	8	2031	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	9	2032	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	10	2033	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	11	2034	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	12	2035	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	13	2036	89,260,354.94	2,643,961.60	91,904,316.53	110,285,179.84	0.00	0.00	110,285,179.84
	14	2037	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	15	2038	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	16	2039	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	17	2040	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	18	2041	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	19	2042	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	20	2043	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	21	2044	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	22	2045	0.00	0.00	0.00	0.00	0.00	30,577,361.51	30,577,361.51
	23	2046	56,141,689.16	3,795,063.33	59,936,752.49	71,924,102.99	0.00	253,065.74	72,177,168.73
	24	2047	0.00	0.00	0.00	0.00	0.00	244,507.96	244,507.96
	25	2048	0.00	0.00	0.00	0.00	0.00	236,239.58	236,239.58
	26	2049	0.00	0.00	0.00	0.00	0.00	228,250.80	228,250.80
	27	2050	0.00	0.00	0.00	0.00	0.00	220,532.17	220,532.17
	28	2051	0.00	0.00	0.00	0.00	0.00	213,074.57	213,074.57
	29	2052	0.00	0.00	0.00	0.00	0.00	205,869.14	205,869.14
	30	2053	0.00	0.00	0.00	0.00	0.00	198,907.39	198,907.39
	31	2054	0.00	0.00	0.00	0.00	0.00	223,309.62	223,309.62
	32	2055	0.00	0.00	0.00	0.00	0.00	216,805.46	216,805.46
	33	2056	0.00	0.00	0.00	0.00	0.00	210,490.74	210,490.74
	34	2057	0.00	0.00	0.00	0.00	0.00	204,359.94	204,359.94
	35	2058	0.00	0.00	0.00	0.00	0.00	198,407.71	198,407.71
	36	2059	0.00	0.00	0.00	0.00	0.00	192,628.84	192,628.84
	37	2060	0.00	5,341,201.66	5,341,201.66	6,409,441.99	0.00	187,018.29	6,596,460.29
	38	2061	0.00	0.00	0.00	0.00	0.00	181,571.16	181,571.16
	39	2062	0.00	0.00	0.00	0.00	0.00	176,282.68	176,282.68
	40	2063	0.00	0.00	0.00	0.00	0.00	171,148.23	171,148.23
	41	2064	0.00	0.00	0.00	0.00	0.00	166,163.33	166,163.33
	42	2065	0.00	0.00	0.00	0.00	0.00	161,323.62	161,323.62
	43	2066	0.00	0.00	0.00	0.00	0.00	156,624.88	156,624.88
	44	2067	0.00	0.00	0.00	0.00	0.00	152,062.99	152,062.99
	45	2068	0.00	0.00	0.00	0.00	0.00	147,633.97	147,633.97
	46	2069	0.00	0.00	0.00	0.00	0.00	143,333.95	143,333.95
	47	2070	0.00	0.00	0.00	0.00	0.00	139,159.17	139,159.17
	48	2071	0.00	0.00	0.00	0.00	0.00	135,105.99	135,105.99
	49	2072	0.00	0.00	0.00	0.00	0.00	131,170.87	131,170.87
	50	2073	0.00	0.00	0.00	0.00	0.00	127,350.36	127,350.36
	51	2074	18,833,454.02	9,043,257.32	27,876,711.34	33,452,053.60	0.00	123,641.12	33,575,694.73
	52	2075	0.00	0.00	0.00	0.00	0.00	120,039.93	120,039.93
		Total	**$ 355,454,188.78**	**$ 10,646,024.16**	**$ 366,100,212.95**	**$ 439,320,255.54**	**$ 19,476,873.43**	**$ 36,043,441.72**	**$ 494,840,570.69**

N	Year	Benefit Categories: all values in constant 2023 $ (sign may be "+" or "-" value)									Present Value Benefits		
		Noise Impact	Electric Cost Savings from Solar Canopy	Amenity Loss (construction)	Carbon Emissions (Construction)	Carbon Sequesetration Impact	Carbon emissions from traffic	Carbon emissions savings from solar canopy	TREDIS Transportation Benefits	Total Benefits (Undiscounted)	Total Benefits Discounted 2%	Total Benefits Discounted 3%	Total Benefits Discounted 3.5%
1	2024	0	0	0	-22088674.94	0	0	0.00	0	-22,088,675	-21,655,564	-21,445,315	-21,341,715
2	2025	0	0	0	-22425050.70	0	0	0.00	0	-22,425,051	-21,554,259	-21,137,761	-20,934,025
3	2026	-383,375	0	-12,556,250	0	-230,534	-1,479,724	0.00	2,560,000	-12,089,882	-11,392,566	-11,063,955	-10,904,381
4	2027	-381,631	0	0	0	-234,044	-1,448,879	0.00	2,650,000	585,446	540,862	520,161	510,182
5	2028	-379,888	0	0	0	-237,608	-1,415,155	0.00	2,750,000	717,349	649,725	618,792	603,989
6	2029	-378,144	0	0	0	-241,227	-1,378,416	0.00	2,840,000	842,213	747,861	705,340	685,141
7	2030	-376,401	0	0	0	-244,900	-1,338,519	0.00	2,950,000	990,180	862,011	805,107	778,273
8	2031	-374,657	0	0	0	-248,630	-1,295,317	0.00	3,070,000	1,151,396	982,705	908,923	874,383
9	2032	-372,914	0	0	0	-252,416	-1,248,656	0.00	3,200,000	1,326,014	1,109,550	1,016,280	972,938
10	2033	-371,170	0	0	0	-256,260	-1,198,376	0.00	3,330,000	1,504,194	1,233,963	1,119,262	1,066,351
11	2034	-369,427	0	0	0	-260,162	-1,144,311	0.00	3,470,000	1,696,100	1,364,110	1,225,299	1,161,736
12	2035	-367,683	0	0	0	-264,124	-1,086,289	0.00	3,630,000	1,911,904	1,507,523	1,340,971	1,265,266
13	2036	-365,940	0	0	0	-268,146	-1,024,130	0.00	18,900,000	17,241,783	13,328,459	11,740,816	11,024,468
14	2037	-364,196	0	0	0	-272,230	-957,649	0.00	19,310,000	17,715,925	13,426,457	11,712,313	10,944,576
15	2038	-362,453	0	0	0	-276,375	-886,653	0.00	19,750,000	18,224,519	13,541,086	11,697,625	10,878,045
16	2039	-360,709	0	0	0	-280,584	-810,940	0.00	20,190,000	18,737,767	13,649,448	11,676,757	10,806,181
17	2040	-358,966	0	0	0	-284,857	-730,302	0.00	20,640,000	19,265,876	13,758,967	11,656,172	10,735,019
18	2041	-357,222	0	0	0	-289,130	-644,378	0.00	21,110,000	19,819,270	13,876,648	11,641,732	10,669,925
19	2042	-355,479	0	0	0	-293,467	-553,129	0.00	21,580,000	20,377,925	13,988,035	11,621,246	10,599,694
20	2043	-353,735	0	0	0	-297,869	-456,326	0.00	22,060,000	20,952,070	14,100,142	11,600,653	10,529,795
21	2044	-351,992	0	0	0	-302,337	-353,731	0.00	22,560,000	21,551,940	14,219,449	11,585,230	10,464,995
22	2045	-350,248	0	0	0	-306,872	-245,098	-19,992,133.70	23,070,000	2,175,649	1,407,294	1,135,455	1,020,707
23	2046	-348,505	9,324,360	0	0	-311,475	-130,168	11,474,245.17	31,330,000	51,338,457	32,556,586	26,012,773	23,270,985
24	2047	-346,761	9,258,950	0	0	-316,147	-8,678	11,564,659.64	31,850,000	52,002,023	32,330,775	25,581,549	22,774,657
25	2048	-345,018	9,193,998	0	0	-320,889	119,649	11,655,786.56	32,390,000	52,693,527	32,118,331	25,166,722	22,297,107
26	2049	-343,274	9,129,502	0	0	-325,703	255,099	11,747,631.53	32,930,000	53,393,256	31,906,704	24,758,171	21,829,174
27	2050	-341,531	9,065,459	0	0	-330,588	397,968	11,840,200.23	33,490,000	54,121,508	31,707,737	24,364,911	21,378,658
28	2051	-339,787	9,001,865	0	0	-335,547	548,564	11,933,498.34	34,060,000	54,868,593	31,515,124	23,981,786	20,940,837
29	2052	-338,044	8,938,716	0	0	-340,580	707,206	12,027,531.62	34,630,000	55,624,830	31,323,027	23,604,194	20,511,554
30	2053	-336,300	8,876,011	0	0	-345,689	874,225	12,122,305.86	35,230,000	56,420,553	31,148,145	23,244,521	20,101,425
31	2054	-334,557	8,813,746	0	0	-350,874	1,049,963	12,217,826.91	35,840,000	57,236,105	30,978,811	22,893,706	19,702,404
32	2055	-332,813	8,751,918	0	0	-356,137	1,234,777	12,314,100.63	36,460,000	58,071,844	30,814,855	22,551,448	19,314,098
33	2056	-331,070	8,690,523	0	0	-361,479	1,429,033	12,411,132.98	37,090,000	58,928,140	30,656,111	22,217,455	18,936,128
34	2057	-329,326	8,629,559	0	0	-366,902	1,633,115	12,508,929.91	37,740,000	59,815,376	30,507,527	21,895,113	18,571,242
35	2058	-327,583	8,569,023	0	0	-372,405	1,847,419	12,607,497.46	38,400,000	60,723,951	30,363,652	21,580,284	18,215,780
36	2059	-325,839	8,508,911	0	0	-377,991	2,072,354	12,706,841.71	39,080,000	61,664,276	30,229,256	21,276,175	17,872,325
37	2060	-324,096	8,449,221	0	0	-383,661	2,308,346	12,806,968.76	39,770,000	62,626,779	30,099,115	20,978,902	17,537,478
38	2061	-322,352	8,389,950	0	0	-389,416	2,555,836	12,907,884.79	40,480,000	63,621,902	29,977,825	20,691,506	17,213,665
39	2062	-320,609	8,331,094	0	0	-395,257	2,815,280	13,009,596.02	41,200,000	64,640,104	29,860,381	20,410,342	16,897,731
40	2063	-318,865	8,272,652	0	0	-401,186	3,087,151	13,112,108.71	41,930,000	65,681,860	29,746,685	20,135,223	16,589,429
41	2064	-317,122	8,214,619	0	0	-407,204	3,371,940	13,215,429.18	42,690,000	66,767,663	29,645,524	19,871,926	16,293,404
42	2065	-315,378	8,156,993	0	0	-413,312	3,670,155	13,319,563.79	43,470,000	67,888,022	29,551,936	19,616,870	16,006,577
43	2066	-313,635	8,099,772	0	0	-419,512	3,982,321	13,424,518.95	44,250,000	69,023,466	29,457,058	19,364,046	15,723,952
44	2067	-311,891	8,042,952	0	0	-425,804	4,308,984	13,530,301.14	45,050,000	70,194,542	29,369,448	19,119,012	15,449,981
45	2068	-310,148	7,986,531	0	0	-432,191	4,650,709	13,636,916.87	45,880,000	71,411,817	29,292,899	18,884,043	15,186,383
46	2069	-308,404	7,930,505	0	0	-438,674	5,008,079	13,744,372.71	46,720,000	72,655,878	29,218,832	18,653,418	14,928,448
47	2070	-306,661	7,874,873	0	0	-445,254	5,381,701	13,852,675.27	47,590,000	73,947,334	29,155,094	18,432,021	14,680,001
48	2071	-304,917	7,819,631	0	0	-451,933	5,772,202	13,961,831.23	48,540,000	75,336,813	29,120,511	18,231,418	14,450,087
49	2072	-303,174	7,764,776	0	0	-458,712	6,180,231	14,071,847.32	49,450,000	76,704,968	29,067,995	18,021,855	14,214,983
50	2073	-301,430	7,710,306	0	0	-465,593	6,606,461	14,182,730.31	50,370,000	78,102,474	29,017,247	17,815,727	13,984,511
51	2074	-299,687	7,656,218	0	0	-472,577	7,051,588	14,294,487.04	41,470,000	69,700,030	25,387,750	15,435,991	12,057,996
52	2075		7,602,510		0			13,845,210.58		21,447,720	7,659,002	4,611,534	3,584,949
	Total	**$ (16,735,011.48)**	**$ 253,055,142.14**	**$ (12,556,250.00)**	**$ (44,513,725.64)**	**$ (16,554,466.03)**	**$ 59,085,535.16**	**$ 366,056,497.52**	**$ 1,399,000,000.00**	**$ 1,986,837,721.66**	**$ 963,475,851**	**$ 680,083,745**	**$ 572,927,493**

N	Year		Present Value Benefits Using WebTAG Discount Schedule										
		Total Benefits Discounted	WebTAG Discount Schedule - Health Impacts (Noise only)	Noise Impact	WebTAG Discount Schedule - All other Impacts	Electric Cost Savings from Solar Canopy	Amenity Loss (construction)	Carbon Emissions (Construction)	Carbon Sequesetration Impact	Carbon emissions from traffic	Carbon emissions savings from solar canopy	TREDIS Transportation Benefits	Total Benefits
		5%		Years 0-30 1.5% ; Years 31-75 1.29%		Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%	WebTAG
1	2024	-21,036,833	1.50%	0	3.5%	0	0	-21,341,715	0	0	0	0	-21,341,714.92
2	2025	-20,340,182	1.50%	0	3.5%	0	0	-20,934,025	0	0	0	0	-20,934,024.78
3	2026	-10,443,695	1.50%	-366,628	3.5%	0	-11,325,018	0	-207,928	-1,334,626	0	2,308,973	-10,925,226.90
4	2027	481,648	1.50%	-359,567	3.5%	0	0	0	-203,956	-1,262,614	0	2,309,322	483,185.07
5	2028	562,062	1.50%	-352,635	3.5%	0	0	0	-200,060	-1,191,522	0	2,315,426	571,209.43
6	2029	628,473	1.50%	-345,829	3.5%	0	0	0	-196,238	-1,121,342	0	2,310,342	646,932.90
7	2030	703,702	1.50%	-339,147	3.5%	0	0	0	-192,489	-1,052,064	0	2,318,673	734,972.95
8	2031	779,310	1.50%	-332,587	3.5%	0	0	0	-188,812	-983,679	0	2,331,393	826,315.08
9	2032	854,761	1.50%	-326,147	3.5%	0	0	0	-185,205	-916,178	0	2,347,939	920,408.72
10	2033	923,445	1.50%	-319,825	3.5%	0	0	0	-181,667	-849,551	0	2,360,700	1,009,655.73
11	2034	991,674	1.50%	-313,619	3.5%	0	0	0	-178,197	-783,791	0	2,376,762	1,101,154.96
12	2035	1,064,619	1.50%	-307,526	3.5%	0	0	0	-174,793	-718,888	0	2,402,273	1,201,066.88
13	2036	9,143,686	1.50%	-301,544	3.5%	0	0	0	-171,454	-654,833	0	12,084,738	10,956,907.12
14	2037	8,947,746	1.50%	-295,672	3.5%	0	0	0	-168,179	-591,618	0	11,929,366	10,873,896.94
15	2038	8,766,305	1.50%	-289,908	3.5%	0	0	0	-164,966	-529,235	0	11,788,590	10,804,480.78
16	2039	8,583,987	1.50%	-284,250	3.5%	0	0	0	-161,815	-467,674	0	11,643,692	10,729,954.08
17	2040	8,405,638	1.50%	-278,696	3.5%	0	0	0	-158,723	-406,927	0	11,500,686	10,656,340.02
18	2041	8,235,316	1.50%	-273,243	3.5%	0	0	0	-155,656	-346,908	0	11,364,804	10,588,996.02
19	2042	8,064,237	1.50%	-267,891	3.5%	0	0	0	-152,648	-287,713	0	11,224,960	10,516,706.71
20	2043	7,896,615	1.50%	-262,638	3.5%	0	0	0	-149,699	-229,334	0	11,086,603	10,444,932.71
21	2044	7,735,904	1.50%	-257,481	3.5%	0	0	0	-146,806	-171,762	0	10,954,480	10,378,430.63
22	2045	743,745	1.50%	-252,420	3.5%	0	0	0	-143,969	-114,988	-9,379,322	10,823,305	932,606.49
23	2046	16,714,328	1.50%	-247,451	3.5%	4,226,598	0	0	-141,187	-59,003	5,201,110	14,201,439	23,181,505.91
24	2047	16,124,159	1.50%	-242,575	3.5%	4,055,023	0	0	-138,459	-3,801	5,064,825	13,948,935	22,683,948.67
25	2048	15,560,544	1.50%	-237,788	3.5%	3,890,413	0	0	-135,783	50,629	4,932,111	13,705,731	22,205,312.06
26	2049	15,016,358	1.50%	-233,090	3.5%	3,732,484	0	0	-133,160	104,294	4,802,874	13,463,024	21,736,427.43
27	2050	14,496,355	1.50%	-228,479	3.5%	3,580,967	0	0	-130,586	157,202	4,677,024	13,228,960	21,285,087.86
28	2051	13,996,629	1.50%	-223,954	3.5%	3,435,601	0	0	-128,063	209,362	4,554,471	12,999,147	20,846,564.35
29	2052	13,513,848	1.50%	-219,512	3.5%	3,296,135	0	0	-125,588	260,781	4,435,130	12,769,749	20,416,694.88
30	2053	13,054,444	1.50%	-215,152	3.5%	3,162,331	0	0	-123,161	311,468	4,318,916	12,551,688	20,006,089.22
31	2054	12,612,518	1.29%	-224,857	3.0%	3,525,385	0	0	-140,345	419,972	4,886,974	14,335,539	22,802,667.92
32	2055	12,187,315	1.29%	-220,836	3.0%	3,398,694	0	0	-138,301	479,509	4,782,021	14,158,768	22,459,855.20
33	2056	11,778,117	1.29%	-216,882	3.0%	3,276,555	0	0	-136,287	538,783	4,679,323	13,983,903	22,125,395.82
34	2057	11,386,144	1.29%	-212,992	3.0%	3,158,806	0	0	-134,302	597,794	4,578,830	13,814,535	21,802,669.75
35	2058	11,008,662	1.29%	-209,166	3.0%	3,045,288	0	0	-132,347	656,542	4,480,495	13,646,722	21,487,535.46
36	2059	10,646,794	1.29%	-205,403	3.0%	2,935,850	0	0	-130,419	715,029	4,384,272	13,483,867	21,183,196.73
37	2060	10,298,074	1.29%	-201,702	3.0%	2,830,345	0	0	-128,520	773,257	4,290,116	13,322,271	20,885,766.79
38	2061	9,963,531	1.29%	-198,062	3.0%	2,728,631	0	0	-126,648	831,225	4,197,982	13,165,155	20,598,281.75
39	2062	9,640,940	1.29%	-194,482	3.0%	2,630,573	0	0	-124,804	888,935	4,107,826	13,009,046	20,317,093.44
40	2063	9,329,825	1.29%	-190,961	3.0%	2,536,038	0	0	-122,986	946,387	4,019,607	12,853,928	20,042,012.91
41	2064	9,032,436	1.29%	-187,498	3.0%	2,444,901	0	0	-121,195	1,003,584	3,933,282	12,705,739	19,778,812.20
42	2065	8,746,667	1.29%	-184,092	3.0%	2,357,038	0	0	-119,430	1,060,525	3,848,811	12,561,057	19,523,909.12
43	2066	8,469,483	1.29%	-180,743	3.0%	2,272,334	0	0	-117,691	1,117,212	3,766,154	12,414,025	19,271,290.62
44	2067	8,203,028	1.29%	-177,449	3.0%	2,190,673	0	0	-115,977	1,173,646	3,685,272	12,270,349	19,026,513.60
45	2068	7,947,886	1.29%	-174,210	3.0%	2,111,947	0	0	-114,288	1,229,827	3,606,128	12,132,444	18,791,847.65
46	2069	7,701,282	1.29%	-171,025	3.0%	2,036,050	0	0	-112,624	1,285,757	3,528,683	11,994,731	18,561,572.09
47	2070	7,464,925	1.29%	-167,892	3.0%	1,962,881	0	0	-110,984	1,341,436	3,452,901	11,862,225	18,340,567.12
48	2071	7,243,040	1.29%	-164,811	3.0%	1,892,341	0	0	-109,367	1,396,866	3,378,746	11,746,622	18,140,396.76
49	2072	7,023,407	1.29%	-161,782	3.0%	1,824,336	0	0	-107,775	1,452,047	3,306,185	11,618,292	17,931,303.51
50	2073	6,810,827	1.29%	-158,803	3.0%	1,758,775	0	0	-106,205	1,506,981	3,235,181	11,489,754	17,725,682.68
51	2074	5,788,669	1.29%	-155,874	3.0%	1,695,570	0	0	-104,658	1,561,667	3,165,703	9,184,078	15,346,486.53
52	2075	1,696,436	1.29%		3.0%	1,634,637					2,976,897		4,611,534.41
	Total	**$ 345,148,836**		**$ (11,934,778.55)**		**$ 83,627,202.95**	**$ (11,325,018.10)**	**$ (42,275,739.70)**	**$ (7,094,403.86)**	**$ 7,992,665.80**	**$ 114,898,528.23**	**$ 510,404,752.30**	**$ 644,293,209.07**

N	Year	Undiscounted Benefit Categories: all values in constant 2023 $ (sign may be "+" or "-" value)									Present Value Benefits		
		Noise Impact	Electric Cost Savings from Solar Canopy	Amenity Loss (construction)	Carbon Emissions (construction)	Carbon Sequesetration Impact	Carbon emissions from traffic	Carbon emissions savings from solar canopy	TREDIS Transportation Benefits	Total Benefits (Undiscounted)	Total Benefits Discounted 2%	Total Benefits Discounted 3%	Total Benefits Discounted 3.5%
1	2024	0.00	0.00	0.00	-12403658.97	0.00	0.00	0.00	0.00	-12403658.97	-12,160,450	-12,042,387	-11,984,212
2	2025	0.00	0.00	0.00	-12592547.17	0.00	0.00	0.00	0.00	-12592547.17	-12,103,563	-11,869,683	-11,755,278
3	2026	-355612.29	0.00	-9431250.00	0.00	-152858.74	-2244230.80	0.00	4,650,000.00	-7533951.83	-7,099,411	-6,894,633	-6,795,193
4	2027	-354334.70	0.00	0.00	0.00	-155186.53	-2214893.04	0.00	4,810,000.00	2085585.72	1,926,759	1,853,016	1,817,467
5	2028	-353057.11	0.00	0.00	0.00	-157549.78	-2182232.54	0.00	4,980,000.00	2287160.57	2,071,552	1,972,925	1,925,728
6	2029	-351779.53	0.00	0.00	0.00	-159949.02	-2146088.12	0.00	5,160,000.00	2502183.34	2,221,867	2,095,539	2,035,528
7	2030	-350501.94	0.00	0.00	0.00	-162384.79	-2106292.21	0.00	5,350,000.00	2730821.07	2,377,344	2,220,407	2,146,401
8	2031	-349224.35	0.00	0.00	0.00	-164857.65	-2062670.64	0.00	5,550,000.00	2973247.36	2,537,638	2,347,109	2,257,918
9	2032	-347946.76	0.00	0.00	0.00	-167368.18	-2015042.40	0.00	5,770,000.00	3239642.67	2,710,788	2,482,916	2,377,026
10	2033	-346669.17	0.00	0.00	0.00	-169916.93	-1963219.37	0.00	6,000,000.00	3520194.53	2,887,786	2,619,355	2,495,532
11	2034	-345391.58	0.00	0.00	0.00	-172504.50	-1907006.11	0.00	6,250,000.00	3825097.81	3,076,385	2,763,332	2,619,984
12	2035	-344113.99	0.00	0.00	0.00	-175131.47	-1846199.55	0.00	6,510,000.00	4144554.98	3,267,953	2,906,907	2,742,797
13	2036	-342836.40	0.00	0.00	0.00	-177798.45	-1780588.76	0.00	15,480,000.00	13178776.39	10,187,623	8,974,105	8,426,564
14	2037	-341558.82	0.00	0.00	0.00	-180506.04	-1709954.63	0.00	15,790,000.00	13557980.52	10,275,255	8,963,422	8,375,873
15	2038	-340281.23	0.00	0.00	0.00	-183254.86	-1634069.60	0.00	16,110,000.00	13952394.31	10,366,834	8,955,511	8,328,053
16	2039	-339003.64	0.00	0.00	0.00	-186045.54	-1552697.39	0.00	16,440,000.00	14362253.43	10,462,123	8,950,082	8,282,796
17	2040	-337726.05	0.00	0.00	0.00	-188878.72	-1465592.62	0.00	16,770,000.00	14777802.61	10,553,753	8,940,814	8,234,247
18	2041	-336448.46	0.00	0.00	0.00	-191711.90	-1372191.72	0.00	17,110,000.00	15209647.91	10,649,178	8,934,065	8,188,283
19	2042	-335170.87	0.00	0.00	0.00	-194587.58	-1272583.83	0.00	17,460,000.00	15657657.71	10,747,898	8,929,343	8,144,420
20	2043	-333893.28	0.00	0.00	0.00	-197506.40	-1166498.82	0.00	17,810,000.00	16112101.50	10,842,982	8,920,880	8,097,393
21	2044	-332615.70	0.00	0.00	0.00	-200468.99	-1053656.38	0.00	18,180,000.00	16593258.93	10,947,831	8,919,694	8,057,204
22	2045	-331338.11	0.00	0.00	0.00	-203476.03	-933765.72	-19,992,133.70	18,540,000.00	-2920713.56	-1,889,232	-1,524,299	-1,370,255
23	2046	-330060.52	9324360.00	0.00	0.00	-206528.17	-806525.16	11,474,245.17	33,580,000.00	53035491.32	33,632,771	26,872,646	24,040,226
24	2047	-328782.93	9258949.61	0.00	0.00	-209626.09	-671621.77	11,564,659.64	33,990,000.00	53603578.47	33,326,497	26,369,409	23,476,070
25	2048	-327505.34	9193998.08	0.00	0.00	-212770.48	-528730.95	11,655,786.56	34,430,000.00	54210777.87	33,043,143	25,891,369	22,939,127
26	2049	-326227.75	9129502.19	0.00	0.00	-215962.04	-377516.07	11,747,631.53	34,870,000.00	54827427.86	32,763,735	25,423,189	22,415,518
27	2050	-324950.16	9065458.73	0.00	0.00	-219201.47	-217628.02	11,840,200.23	35,320,000.00	55463879.30	32,494,182	24,969,231	21,908,911
28	2051	-323672.58	9001864.54	0.00	0.00	-222489.49	-48704.78	11,933,498.34	35,790,000.00	56130496.03	32,239,929	24,533,335	21,422,447
29	2052	-322394.99	8938716.46	0.00	0.00	-225826.83	129629.01	12,027,531.62	36,260,000.00	56807655.26	31,989,090	24,106,122	20,947,718
30	2053	-321117.40	8876011.36	0.00	0.00	-229214.24	317762.51	12,122,305.86	36,750,000.00	57515748.10	31,752,770	23,695,727	20,491,619
31	2054	-319839.81	8813746.14	0.00	0.00	-232652.45	516099.17	12,217,826.91	37,250,000.00	58245179.96	31,524,969	23,297,323	20,049,759
32	2055	-318562.22	8751917.71	0.00	0.00	-236142.24	725057.24	12,314,100.63	37,760,000.00	58996371.13	31,305,439	22,910,476	19,621,586
33	2056	-317284.63	8690523.01	0.00	0.00	-239684.37	945070.22	12,411,132.98	38,280,000.00	59769757.20	31,093,945	22,534,767	19,206,576
34	2057	-316007.04	8629558.99	0.00	0.00	-243279.64	1176587.43	12,508,929.91	38,830,000.00	60585789.65	30,900,459	22,177,119	18,810,437
35	2058	-314729.45	8569022.63	0.00	0.00	-246928.83	1420074.56	12,607,497.46	39,370,000.00	61404936.37	30,704,164	21,822,295	18,420,060
36	2059	-313451.87	8508910.94	0.00	0.00	-250632.76	1676014.18	12,706,841.71	39,940,000.00	62267682.20	30,525,059	21,484,369	18,047,211
37	2060	-312174.28	8449220.93	0.00	0.00	-254392.25	1944906.38	12,806,968.76	40,520,000.00	63154529.54	30,352,757	21,155,690	17,685,265
38	2061	-310896.69	8389949.64	0.00	0.00	-258208.14	2227269.31	12,907,884.79	41,110,000.00	64065998.92	30,187,078	20,835,938	17,333,821
39	2062	-309619.10	8331094.15	0.00	0.00	-262081.26	2523639.84	13,009,596.02	41,720,000.00	65012629.65	30,032,469	20,527,968	16,995,114
40	2063	-308341.51	8272651.52	0.00	0.00	-266012.48	2834574.19	13,112,108.71	42,350,000.00	65994980.43	29,888,494	20,231,213	16,668,515
41	2064	-307063.92	8214618.87	0.00	0.00	-270002.67	3160648.55	13,215,429.18	42,980,000.00	66993630.00	29,745,856	19,939,180	16,348,547
42	2065	-305786.33	8156993.32	0.00	0.00	-274052.71	3502459.81	13,319,563.79	43,640,000.00	68039177.87	29,617,735	19,660,548	16,042,216
43	2066	-304508.75	8099772.01	0.00	0.00	-278163.50	3860626.25	13,424,518.95	44,300,000.00	69102244.97	29,490,679	19,386,147	15,741,899
44	2067	-303231.16	8042952.11	0.00	0.00	-282335.95	4235788.24	13,530,301.14	44,990,000.00	70213474.38	29,377,370	19,124,169	15,454,148
45	2068	-301953.57	7986530.80	0.00	0.00	-286570.99	4628609.01	13,636,916.87	45,680,000.00	71343532.12	29,264,889	18,865,985	15,171,861
46	2069	-300675.98	7930505.29	0.00	0.00	-290869.55	5039775.42	13,744,372.71	46,410,000.00	72533107.88	29,169,460	18,621,898	14,903,223
47	2070	-299398.39	7874872.79	0.00	0.00	-295232.60	5469998.78	13,852,675.27	47,140,000.00	73742915.85	29,074,499	18,381,068	14,639,420
48	2071	-298120.80	7819630.56	0.00	0.00	-299661.09	5920015.61	13,961,831.23	48,070,000.00	75173695.52	29,057,460	18,191,944	14,418,800
49	2072	-296843.21	7764775.85	0.00	0.00	-304156.00	6390588.58	14,071,847.32	48,850,000.00	76476212.54	28,981,306	17,968,108	14,172,590
50	2073	-295565.63	7710305.95	0.00	0.00	-308718.34	6882507.31	14,182,730.31	49,640,000.00	77811259.61	28,909,052	17,749,299	13,932,369
51	2074	-294288.04	7656218.15	0.00	0.00	-313349.12	7396589.34	14,294,487.04	62,720,000.00	91459657.37	33,313,542	20,254,947	15,822,377
52	2075		7602509.78		0.00			13,845,210.58		21447720.36	7,659,002	4,611,534	3,584,949
	Total	**$ (15,922,558.03)**	**$ 253,055,142.14**	**$ (9,431,250.00)**	**$ (24,996,206.14)**	**$ (10,976,687.84)**	**$ 35,644,089.92**	**$ 366,056,497.52**	**$ 1,427,260,000.00**	**$ 2,020,689,027.57**	**$ 986,276,691.98**	**$ 701,011,437.90**	**$ 593,360,660.27**

N	Year	Total Benefits Discounted	WebTAG Discount Schedule - Health Impacts (Noise only)	Present Value Benefits Using WebTAG Discount Schedule								
				Noise Impact	WebTAG Discount Schedule - All other Impacts	Electric Cost Savings from Solar Canopy	Amenity Loss (construction)	Carbon Emissions (construction)	Carbon Sequesetration Impact	Carbon emissions from traffic	Carbon emissions savings from solar canopy	TREDIS Transportation Benefits	Total Benefits
		5%		Years 0-30 1.5% ; Years 31-75 1.29%		Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%	WebTAG
1	2024	-11,813,009	1.50%	0	3.5%	0	0	-11,984,212	0	0	0	0	-11,984,212
2	2025	-11,421,811	1.50%	0	3.5%	0	0	-11,755,278	0	0	0	0	-11,755,278
3	2026	-6,508,111	1.50%	-340,078	3.5%	0	-8,506,447	0	-137,870	-2,024,168	0	4,194,034	-6,814,529
4	2027	1,715,817	1.50%	-333,849	3.5%	0	0	0	-135,236	-1,930,151	0	4,191,637	1,792,401
5	2028	1,792,050	1.50%	-327,729	3.5%	0	0	0	-132,653	-1,837,381	0	4,193,026	1,895,264
6	2029	1,867,168	1.50%	-321,717	3.5%	0	0	0	-130,119	-1,745,844	0	4,197,663	1,999,983
7	2030	1,940,744	1.50%	-315,812	3.5%	0	0	0	-127,633	-1,655,527	0	4,205,052	2,106,080
8	2031	2,012,411	1.50%	-310,010	3.5%	0	0	0	-125,195	-1,566,416	0	4,214,734	2,213,113
9	2032	2,088,303	1.50%	-304,312	3.5%	0	0	0	-122,803	-1,478,499	0	4,233,628	2,328,014
10	2033	2,161,094	1.50%	-298,713	3.5%	0	0	0	-120,457	-1,391,763	0	4,253,513	2,442,579
11	2034	2,236,455	1.50%	-293,214	3.5%	0	0	0	-118,156	-1,306,196	0	4,280,911	2,563,344
12	2035	2,307,843	1.50%	-287,813	3.5%	0	0	0	-115,899	-1,221,784	0	4,308,209	2,682,714
13	2036	6,988,986	1.50%	-282,506	3.5%	0	0	0	-113,685	-1,138,516	0	9,897,976	8,363,269
14	2037	6,847,701	1.50%	-277,294	3.5%	0	0	0	-111,513	-1,056,379	0	9,754,774	8,309,588
15	2038	6,711,340	1.50%	-272,174	3.5%	0	0	0	-109,383	-975,361	0	9,615,908	8,258,989
16	2039	6,579,514	1.50%	-267,145	3.5%	0	0	0	-107,294	-895,450	0	9,481,045	8,211,156
17	2040	6,447,506	1.50%	-262,206	3.5%	0	0	0	-105,244	-816,634	0	9,344,307	8,160,224
18	2041	6,319,923	1.50%	-257,353	3.5%	0	0	0	-103,210	-738,735	0	9,211,359	8,112,061
19	2042	6,196,267	1.50%	-252,587	3.5%	0	0	0	-101,216	-661,942	0	9,081,918	8,066,174
20	2043	6,072,482	1.50%	-247,906	3.5%	0	0	0	-99,260	-586,243	0	8,950,698	8,017,290
21	2044	5,956,024	1.50%	-243,308	3.5%	0	0	0	-97,342	-511,625	0	8,827,679	7,975,405
22	2045	-998,446	1.50%	-238,791	3.5%	0	0	0	-95,461	-438,077	-9,379,322	8,698,053	-1,453,598
23	2046	17,266,834	1.50%	-234,355	3.5%	4,226,598	0	0	-93,616	-365,586	5,201,110	15,221,332	23,955,483
24	2047	16,620,750	1.50%	-229,998	3.5%	4,055,023	0	0	-91,807	-294,142	5,064,825	14,886,163	23,390,064
25	2048	16,008,593	1.50%	-225,719	3.5%	3,890,413	0	0	-90,033	-223,731	4,932,111	14,568,951	22,851,992
26	2049	15,419,706	1.50%	-221,515	3.5%	3,732,484	0	0	-88,293	-154,343	4,802,874	14,256,170	22,327,377
27	2050	14,855,907	1.50%	-217,387	3.5%	3,580,967	0	0	-86,587	-85,966	4,677,024	13,951,832	21,819,884
28	2051	14,318,532	1.50%	-213,332	3.5%	3,435,601	0	0	-84,914	-18,588	4,554,471	13,659,409	21,332,646
29	2052	13,801,211	1.50%	-209,350	3.5%	3,296,135	0	0	-83,273	47,800	4,435,130	13,370,808	20,857,251
30	2053	13,307,847	1.50%	-205,439	3.5%	3,162,331	0	0	-81,664	113,212	4,318,916	13,093,232	20,400,588
31	2054	12,834,877	1.29%	-214,966	3.0%	3,525,385	0	0	-93,058	206,433	4,886,974	14,899,521	23,210,290
32	2055	12,381,342	1.29%	-211,380	3.0%	3,398,694	0	0	-91,703	281,567	4,782,021	14,663,606	22,822,805
33	2056	11,946,333	1.29%	-207,851	3.0%	3,276,555	0	0	-90,367	356,316	4,679,323	14,432,565	22,446,541
34	2057	11,532,796	1.29%	-204,378	3.0%	3,158,806	0	0	-89,051	430,684	4,578,830	14,213,523	22,088,414
35	2058	11,132,118	1.29%	-200,959	3.0%	3,045,288	0	0	-87,754	504,671	4,480,495	13,991,444	21,733,186
36	2059	10,750,977	1.29%	-197,594	3.0%	2,935,850	0	0	-86,476	578,279	4,384,272	13,780,595	21,394,926
37	2060	10,384,855	1.29%	-194,283	3.0%	2,830,345	0	0	-85,217	651,510	4,290,116	13,573,509	21,065,980
38	2061	10,033,079	1.29%	-191,023	3.0%	2,728,631	0	0	-83,976	724,366	4,197,982	13,370,047	20,746,027
39	2062	9,696,502	1.29%	-187,816	3.0%	2,630,573	0	0	-82,753	796,848	4,107,826	13,173,238	20,437,916
40	2063	9,374,302	1.29%	-184,658	3.0%	2,536,038	0	0	-81,548	868,958	4,019,607	12,982,682	20,141,078
41	2064	9,063,006	1.29%	-181,551	3.0%	2,444,901	0	0	-80,360	940,698	3,933,282	12,792,051	19,849,020
42	2065	8,766,142	1.29%	-178,493	3.0%	2,357,038	0	0	-79,190	1,012,068	3,848,811	12,610,181	19,570,414
43	2066	8,479,150	1.29%	-175,484	3.0%	2,272,334	0	0	-78,037	1,083,071	3,766,154	12,428,052	19,296,091
44	2067	8,205,240	1.29%	-172,522	3.0%	2,190,673	0	0	-76,900	1,153,709	3,685,272	12,254,006	19,034,239
45	2068	7,940,286	1.29%	-169,607	3.0%	2,111,947	0	0	-75,780	1,223,983	3,606,128	12,079,556	18,776,226
46	2069	7,688,268	1.29%	-166,739	3.0%	2,036,050	0	0	-74,677	1,293,894	3,528,683	11,915,142	18,532,354
47	2070	7,444,289	1.29%	-163,916	3.0%	1,962,881	0	0	-73,589	1,363,445	3,452,901	11,750,058	18,291,780
48	2071	7,227,358	1.29%	-161,138	3.0%	1,892,341	0	0	-72,518	1,432,637	3,378,746	11,632,882	18,102,951
49	2072	7,002,461	1.29%	-158,404	3.0%	1,824,336	0	0	-71,462	1,501,471	3,306,185	11,477,322	17,879,448
50	2073	6,785,432	1.29%	-155,713	3.0%	1,758,775	0	0	-70,421	1,569,949	3,235,181	11,323,235	17,661,007
51	2074	7,595,831	1.29%	-153,066	3.0%	1,695,570	0	0	-69,395	1,638,072	3,165,703	13,890,171	20,167,055
52	2075	1,696,436	1.29%	0	3.0%	1,634,637	0	0			2,976,897		4,611,534
	Total	**$ 365,060,712.31**		**$ (11,323,153.50)**		**$ 83,627,202.95**	**$ (8,506,447.14)**	**$ (23,739,489.09)**	**$ (4,704,051.24)**	**$ (5,345,401.63)**	**$ 114,898,528.23**	**$ 521,377,410.29**	**$ 666,284,598.86**

B3 Benefits

Year #	Year	Benefit Categories: all values in constant 2023 $ (sign may be "+" or "-" value)									Total Benefits Discounted
		Noise Impact	Electric Cost Savings from Solar Canopy	Amenity Loss (construction)	Carbon Emissions (construction)	Carbon Sequesetration Impact	Carbon emissions from traffic	Carbon emissions savings from solar canopy	TREDIS Transportation Benefits	Total Benefits (Undiscounted)	2%
1	2024	0.00	0.00	0.00	-18,160,395.17	0.00	0.00	0.00	0.00	-18,160,395.17	-17,804,308.99
2	2025	0.00	0.00	0.00	-18,436,949.41	0.00	0.00	0.00	0.00	-18,436,949.41	-17,721,020.20
3	2026	-368,821.58	0.00	-10,431,250.00	0.00	-180,258.42	-1,482,511.55	0.00	-1,100,000.00	-13,562,841.55	-12,780,568.52
4	2027	-368,031.08	0.00	0.00	0.00	-183,003.48	-1,395,316.21	0.00	-1,170,000.00	-3,116,350.77	-2,879,026.40
5	2028	-367,240.57	0.00	0.00	0.00	-185,790.33	-1,305,121.38	0.00	-1,240,000.00	-3,098,152.28	-2,806,091.98
6	2029	-366,450.06	0.00	0.00	0.00	-188,619.63	-1,211,855.92	0.00	-1,320,000.00	-3,086,925.61	-2,741,101.60
7	2030	-365,659.56	0.00	0.00	0.00	-191,492.01	-1,115,447.22	0.00	-1,390,000.00	-3,062,598.78	-2,666,176.54
8	2031	-364,869.05	0.00	0.00	0.00	-194,408.13	-1,015,821.17	0.00	-1,460,000.00	-3,035,098.36	-2,590,427.22
9	2032	-364,078.55	0.00	0.00	0.00	-197,368.66	-912,902.16	0.00	-1,530,000.00	-3,004,349.37	-2,513,905.15
10	2033	-363,288.04	0.00	0.00	0.00	-200,374.27	-806,612.98	0.00	-1,590,000.00	-2,960,275.30	-2,428,456.81
11	2034	-362,497.54	0.00	0.00	0.00	-203,425.66	-696,874.86	0.00	-1,660,000.00	-2,922,798.06	-2,350,698.45
12	2035	-361,707.03	0.00	0.00	0.00	-206,523.51	-583,607.41	0.00	-1,720,000.00	-2,871,837.95	-2,264,424.62
13	2036	-360,916.53	0.00	0.00	0.00	-209,668.54	-466,728.58	0.00	13,640,000.00	12,602,686.36	9,742,286.46
14	2037	-360,126.02	0.00	0.00	0.00	-212,861.46	-346,154.64	0.00	13,960,000.00	13,040,857.88	9,883,340.49
15	2038	-359,335.51	0.00	0.00	0.00	-216,103.00	-221,800.17	0.00	14,280,000.00	13,482,761.32	10,017,890.26
16	2039	-358,545.01	0.00	0.00	0.00	-219,393.91	-93,577.97	0.00	14,620,000.00	13,948,483.11	10,160,714.13
17	2040	-357,754.50	0.00	0.00	0.00	-222,734.94	38,600.91	0.00	14,970,000.00	14,428,111.47	10,304,017.06
18	2041	-356,964.00	0.00	0.00	0.00	-226,075.96	174,787.90	0.00	15,330,000.00	14,921,747.94	10,447,601.71
19	2042	-356,173.49	0.00	0.00	0.00	-229,467.10	315,051.82	0.00	15,690,000.00	15,419,411.23	10,584,358.17
20	2043	-355,382.99	0.00	0.00	0.00	-232,909.11	459,484.33	0.00	16,060,000.00	15,931,192.24	10,721,235.68
21	2044	-354,592.48	0.00	0.00	0.00	-236,402.74	608,178.93	0.00	16,440,000.00	16,457,183.71	10,858,051.82
22	2045	-353,801.98	0.00	0.00	0.00	-239,948.78	761,230.98	-19,992,133.70	16,830,000.00	-2,994,653.48	-1,937,058.77
23	2046	-353,011.47	9,324,360.00	0.00	0.00	-243,548.02	918,737.76	11,474,245.17	38,110,000.00	59,230,783.44	37,561,551.83
24	2047	-352,220.96	9,258,949.61	0.00	0.00	-247,201.24	1,080,798.46	11,564,659.64	38,620,000.00	59,924,985.51	37,256,651.16
25	2048	-351,430.46	9,193,998.08	0.00	0.00	-250,909.25	1,247,514.26	11,655,786.56	39,120,000.00	60,614,959.19	36,946,688.84
26	2049	-350,639.95	9,129,502.19	0.00	0.00	-254,672.89	1,418,988.36	11,747,631.53	39,650,000.00	61,340,809.23	36,655,996.91
27	2050	-349,849.45	9,065,458.73	0.00	0.00	-258,492.99	1,595,325.99	11,840,200.23	40,190,000.00	62,082,642.51	36,371,863.83
28	2051	-349,058.94	9,001,864.54	0.00	0.00	-262,370.38	1,776,634.48	11,933,498.34	40,740,000.00	62,840,568.03	36,094,023.17
29	2052	-348,268.44	8,938,716.46	0.00	0.00	-266,305.94	1,963,023.27	12,027,531.62	41,310,000.00	63,624,696.98	35,827,849.88
30	2053	-347,477.93	8,876,011.36	0.00	0.00	-270,300.53	2,154,603.99	12,122,305.86	41,880,000.00	64,415,142.76	35,561,725.12
31	2054	-346,687.43	8,813,746.14	0.00	0.00	-274,355.03	2,351,490.45	12,217,826.91	42,480,000.00	65,242,021.03	35,311,980.93
32	2055	-345,896.92	8,751,917.71	0.00	0.00	-278,470.36	2,553,798.71	12,314,100.63	43,080,000.00	66,075,449.77	35,061,834.20
33	2056	-345,106.41	8,690,523.01	0.00	0.00	-282,647.42	2,761,647.14	12,411,132.98	43,700,000.00	66,935,549.29	34,821,795.73
34	2057	-344,315.91	8,629,558.99	0.00	0.00	-286,887.13	2,975,156.41	12,508,929.91	44,330,000.00	67,812,442.28	34,586,255.54
35	2058	-343,525.40	8,569,022.63	0.00	0.00	-291,190.43	3,194,449.60	12,607,497.46	44,990,000.00	68,726,253.86	34,365,024.69
36	2059	-342,734.90	8,508,910.94	0.00	0.00	-295,558.29	3,419,652.16	12,706,841.71	45,650,000.00	69,647,111.62	34,142,626.47
37	2060	-341,944.39	8,449,220.93	0.00	0.00	-299,991.66	3,650,892.06	12,806,968.76	46,330,000.00	70,595,145.69	33,928,798.75
38	2061	-341,153.89	8,389,949.64	0.00	0.00	-304,491.54	3,888,299.73	12,907,884.79	47,040,000.00	71,580,488.74	33,727,809.20
39	2062	-340,363.38	8,331,094.15	0.00	0.00	-309,058.91	4,132,008.17	13,009,596.02	47,750,000.00	72,573,276.05	33,525,095.94
40	2063	-339,572.87	8,272,651.52	0.00	0.00	-313,694.80	4,382,153.01	13,112,108.71	48,480,000.00	73,593,645.57	33,329,856.70
41	2064	-338,782.37	8,214,618.87	0.00	0.00	-318,400.22	4,638,872.49	13,215,429.18	49,230,000.00	74,641,737.95	33,141,693.81
42	2065	-337,991.86	8,156,993.32	0.00	0.00	-323,176.22	4,902,307.56	13,319,563.79	49,990,000.00	75,707,696.59	32,955,872.88
43	2066	-337,201.36	8,099,772.01	0.00	0.00	-328,023.86	5,172,601.95	13,424,518.95	50,780,000.00	76,811,667.69	32,780,819.66
44	2067	-336,410.85	8,042,952.11	0.00	0.00	-332,944.22	5,449,902.14	13,530,301.14	51,590,000.00	77,943,800.32	32,611,743.62
45	2068	-335,620.35	7,986,530.80	0.00	0.00	-337,938.39	5,734,357.51	13,636,916.87	52,410,000.00	79,094,246.45	32,444,206.99
46	2069	-334,829.84	7,930,505.29	0.00	0.00	-343,007.46	6,026,120.31	13,744,372.71	53,260,000.00	80,283,161.00	32,286,172.49
47	2070	-334,039.34	7,874,872.79	0.00	0.00	-348,152.57	6,325,345.76	13,852,675.27	54,110,000.00	81,480,701.92	32,125,262.78
48	2071	-333,248.83	7,819,630.56	0.00	0.00	-353,374.86	6,632,192.10	13,961,831.23	55,030,000.00	82,757,030.21	31,988,704.55
49	2072	-332,458.32	7,764,775.85	0.00	0.00	-358,675.49	6,946,820.63	14,071,847.32	55,940,000.00	84,032,310.00	31,844,753.09
50	2073	-331,667.82	7,710,305.95	0.00	0.00	-364,055.62	7,269,395.77	14,182,730.31	56,870,000.00	85,336,708.60	31,704,966.61
51	2074	-330,877.31	7,656,218.15	0.00	0.00	-369,516.45	7,600,085.13	14,294,487.04	56,210,000.00	85,060,396.55	30,982,655.87
52	2075		7,602,509.78					13,845,210.58		21,447,720.36	7,659,002.43
	Total	**$ (17,142,622.93)**	**$ 253,055,142.14**	**$ (10,431,250.00)**	**$ (36,597,344.59)**	**$ (12,944,241.80)**	**$ 102,866,178.00**	**$ 366,056,497.52**	**$ 1,496,510,000.00**	**$ 2,141,372,358.34**	**$ 1,016,839,514.18**

Year #	Year	Present Value Benefits		
		Total Benefits Discounted	Total Benefits Discounted	Total Benefits Discounted
		3%	3.5%	5%
1	2024	-17,631,451.62	-17,546,275.53	-17,295,614.45
2	2025	-17,378,593.09	-17,211,089.56	-16,722,856.61
3	2026	-12,411,921.32	-12,232,906.01	-11,716,092.48
4	2027	-2,768,837.29	-2,715,719.65	-2,563,829.49
5	2028	-2,672,493.37	-2,608,561.09	-2,427,483.38
6	2029	-2,585,251.60	-2,511,215.97	-2,303,511.42
7	2030	-2,490,173.07	-2,407,174.96	-2,176,531.78
8	2031	-2,395,934.67	-2,304,888.77	-2,054,274.03
9	2032	-2,302,583.62	-2,204,384.18	-1,936,630.39
10	2033	-2,202,722.83	-2,098,594.85	-1,817,352.24
11	2034	-2,111,491.50	-2,001,958.00	-1,708,899.49
12	2035	-2,014,249.36	-1,900,534.39	-1,599,146.83
13	2036	8,581,816.17	8,058,210.00	6,683,473.65
14	2037	8,621,543.35	8,056,404.53	6,586,519.40
15	2038	8,654,071.43	8,047,733.74	6,485,438.72
16	2039	8,692,233.53	8,044,172.67	6,389,960.83
17	2040	8,729,244.72	8,039,398.24	6,294,937.24
18	2041	8,764,954.28	8,033,289.23	6,200,294.48
19	2042	8,793,474.77	8,020,494.49	6,101,984.62
20	2043	8,820,714.88	8,006,473.72	6,004,298.80
21	2044	8,846,547.18	7,991,129.55	5,907,180.43
22	2045	-1,562,887.19	-1,404,943.57	-1,023,721.91
23	2046	30,011,749.22	26,848,463.20	19,283,843.51
24	2047	29,479,122.02	26,244,574.90	18,580,815.03
25	2048	28,950,042.09	25,649,037.48	17,899,765.45
26	2049	28,443,409.82	25,078,433.57	17,251,534.27
27	2050	27,948,926.21	24,523,403.83	16,628,731.44
28	2051	27,466,151.44	23,983,375.54	16,030,229.06
29	2052	26,998,908.71	23,461,489.62	15,457,386.06
30	2053	26,538,185.93	22,949,724.68	14,904,211.39
31	2054	26,095,969.74	22,458,283.63	14,376,697.50
32	2055	25,659,544.19	21,976,014.59	13,867,001.35
33	2056	25,236,458.92	21,509,251.05	13,378,578.23
34	2057	24,822,398.63	21,054,139.34	12,908,423.86
35	2058	24,424,169.61	20,616,285.95	12,459,402.17
36	2059	24,030,511.82	20,186,011.56	12,025,090.23
37	2060	23,648,169.24	19,768,872.32	11,608,357.47
38	2061	23,279,846.94	19,366,956.06	11,209,888.55
39	2062	22,915,269.26	18,971,561.86	10,824,156.54
40	2063	22,560,635.49	18,587,728.71	10,453,659.60
41	2064	22,215,471.24	18,214,925.59	10,097,653.90
42	2065	21,876,437.26	17,850,292.69	9,754,150.94
43	2066	21,548,970.77	17,498,150.73	9,425,129.68
44	2067	21,229,691.83	17,155,610.84	9,108,616.51
45	2068	20,915,573.68	16,820,122.41	8,802,913.51
46	2069	20,611,620.01	16,495,609.74	8,509,748.14
47	2070	20,309,779.13	16,175,522.62	8,225,412.85
48	2071	20,027,102.08	15,873,332.27	7,956,435.42
49	2072	19,743,415.79	15,572,888.08	7,694,327.15
50	2073	19,465,907.40	15,279,825.65	7,441,679.04
51	2074	18,837,746.28	14,715,315.02	7,064,365.33
52	2075	4,611,534.41	3,584,948.73	1,696,436.42
	Total	**$ 707,878,728.89**	**$ 591,619,211.88**	**$ 346,232,784.26**

Year #	Year	Present Value Benefits Using WebTAG Discount Schedule									
		WebTAG Discount Schedule - Health Impacts (Noise only)	Noise Impact	WebTAG Discount Schedule - All other Impacts	Electric Cost Savings from Solar Canopy	Amenity Loss (construction)	Carbon Emissions (construction)	Carbon Sequesetration Impact	Carbon emissions from traffic	Carbon emissions savings from solar canopy	TREDIS Transportation Benefits
			Years 0-30 1.5% ; Years 31-75 1.29%		Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%	Years 0-30 3.5%; Years 31-75 3%
1	2024	1.50%	0.00	3.5%	0.00	0.00	-17,546,275.53	0.00	0.00	0.00	0.00
2	2025	1.50%	0.00	3.5%	0.00	0.00	-17,211,089.56	0.00	0.00	0.00	0.00
3	2026	1.50%	-352,710.35	3.5%	0.00	-9,408,389.85	0.00	-162,582.77	-1,337,140.48	0.00	-992,136.98
4	2027	1.50%	-346,753.08	3.5%	0.00	0.00	0.00	-159,476.96	-1,215,937.47	0.00	-1,019,587.41
5	2028	1.50%	-340,894.85	3.5%	0.00	0.00	0.00	-156,430.47	-1,098,877.18	0.00	-1,044,046.73
6	2029	1.50%	-335,134.05	3.5%	0.00	0.00	0.00	-153,442.19	-985,845.57	0.00	-1,073,820.85
7	2030	1.50%	-329,469.06	3.5%	0.00	0.00	0.00	-150,510.99	-876,731.43	0.00	-1,092,527.44
8	2031	1.50%	-323,898.32	3.5%	0.00	0.00	0.00	-147,635.78	-771,426.34	0.00	-1,108,740.87
9	2032	1.50%	-318,420.27	3.5%	0.00	0.00	0.00	-144,815.50	-669,824.59	0.00	-1,122,608.39
10	2033	1.50%	-313,033.40	3.5%	0.00	0.00	0.00	-142,049.09	-571,823.12	0.00	-1,127,180.91
11	2034	1.50%	-307,736.21	3.5%	0.00	0.00	0.00	-139,335.53	-477,321.45	0.00	-1,137,009.88
12	2035	1.50%	-302,527.21	3.5%	0.00	0.00	0.00	-136,673.81	-386,221.64	0.00	-1,138,267.27
13	2036	1.50%	-297,404.97	3.5%	0.00	0.00	0.00	-134,062.93	-298,428.19	0.00	8,721,472.65
14	2037	1.50%	-292,368.05	3.5%	0.00	0.00	0.00	-131,501.93	-213,848.03	0.00	8,624,233.79
15	2038	1.50%	-287,415.05	3.5%	0.00	0.00	0.00	-128,989.86	-132,390.44	0.00	8,523,598.03
16	2039	1.50%	-282,544.60	3.5%	0.00	0.00	0.00	-126,525.77	-53,966.97	0.00	8,431,440.43
17	2040	1.50%	-277,755.32	3.5%	0.00	0.00	0.00	-124,108.75	21,508.57	0.00	8,341,340.58
18	2041	1.50%	-273,045.90	3.5%	0.00	0.00	0.00	-121,710.51	94,099.01	0.00	8,253,076.27
19	2042	1.50%	-268,415.01	3.5%	0.00	0.00	0.00	-119,358.62	163,876.00	0.00	8,161,242.78
20	2043	1.50%	-263,861.35	3.5%	0.00	0.00	0.00	-117,052.17	230,921.15	0.00	8,071,208.10
21	2044	1.50%	-259,383.67	3.5%	0.00	0.00	0.00	-114,790.29	295,313.99	0.00	7,982,785.64
22	2045	1.50%	-254,980.71	3.5%	0.00	0.00	0.00	-112,572.12	357,132.00	-9,379,322.14	7,895,805.12
23	2046	1.50%	-250,651.23	3.5%	4,226,598.43	0.00	0.00	-110,396.82	416,450.63	5,201,110.49	17,274,715.50
24	2047	1.50%	-246,394.03	3.5%	4,055,023.04	0.00	0.00	-108,263.54	473,343.39	5,064,825.19	16,913,904.51
25	2048	1.50%	-242,207.92	3.5%	3,890,412.61	0.00	0.00	-106,171.50	527,881.90	4,932,110.99	16,553,510.22
26	2049	1.50%	-238,091.72	3.5%	3,732,484.41	0.00	0.00	-104,119.87	580,135.90	4,802,874.31	16,210,413.65
27	2050	1.50%	-234,044.29	3.5%	3,580,967.18	0.00	0.00	-102,107.89	630,173.30	4,677,024.04	15,875,542.02
28	2051	1.50%	-230,064.49	3.5%	3,435,600.67	0.00	0.00	-100,134.80	678,060.26	4,554,471.44	15,548,597.83
29	2052	1.50%	-226,151.20	3.5%	3,296,135.20	0.00	0.00	-98,199.82	723,861.21	4,435,130.09	15,232,986.28
30	2053	1.50%	-222,303.33	3.5%	3,162,331.22	0.00	0.00	-96,302.24	767,638.88	4,318,915.87	14,920,939.84
31	2054	1.29%	-233,009.91	3.0%	3,525,385.16	0.00	0.00	-109,738.49	940,565.95	4,886,973.70	16,991,453.93
32	2055	1.29%	-229,517.82	3.0%	3,398,693.77	0.00	0.00	-108,140.35	991,734.62	4,782,021.32	16,729,559.43
33	2056	1.29%	-226,076.90	3.0%	3,276,555.27	0.00	0.00	-106,565.49	1,041,213.45	4,679,322.88	16,476,046.98
34	2057	1.29%	-222,686.39	3.0%	3,158,806.06	0.00	0.00	-105,013.57	1,089,040.83	4,578,830.00	16,226,770.41
35	2058	1.29%	-219,345.57	3.0%	3,045,288.38	0.00	0.00	-103,484.25	1,135,254.35	4,480,495.29	15,988,699.07
36	2059	1.29%	-216,053.73	3.0%	2,935,850.18	0.00	0.00	-101,977.19	1,179,890.88	4,384,272.41	15,750,730.20
37	2060	1.29%	-212,810.16	3.0%	2,830,344.84	0.00	0.00	-100,492.09	1,222,986.54	4,290,116.01	15,519,759.47
38	2061	1.29%	-209,614.16	3.0%	2,728,631.04	0.00	0.00	-99,028.61	1,264,576.76	4,197,981.71	15,298,638.21
39	2062	1.29%	-206,465.05	3.0%	2,630,572.52	0.00	0.00	-97,586.45	1,304,696.23	4,107,826.08	15,077,231.82
40	2063	1.29%	-203,362.16	3.0%	2,536,037.92	0.00	0.00	-96,165.29	1,343,378.98	4,019,606.62	14,861,875.64
41	2064	1.29%	-200,304.81	3.0%	2,444,900.59	0.00	0.00	-94,764.82	1,380,658.34	3,933,281.77	14,652,226.48
42	2065	1.29%	-197,292.36	3.0%	2,357,038.46	0.00	0.00	-93,384.75	1,416,566.99	3,848,810.82	14,445,071.61
43	2066	1.29%	-194,324.14	3.0%	2,272,333.82	0.00	0.00	-92,024.78	1,451,136.94	3,766,153.96	14,245,970.29
44	2067	1.29%	-191,399.53	3.0%	2,190,673.20	0.00	0.00	-90,684.61	1,484,399.56	3,685,272.24	14,051,660.26
45	2068	1.29%	-188,517.89	3.0%	2,111,947.21	0.00	0.00	-89,363.96	1,516,385.61	3,606,127.53	13,859,228.27
46	2069	1.29%	-185,678.61	3.0%	2,036,050.39	0.00	0.00	-88,062.54	1,547,125.21	3,528,682.53	13,673,787.48
47	2070	1.29%	-182,881.08	3.0%	1,962,881.07	0.00	0.00	-86,780.08	1,576,647.87	3,452,900.73	13,487,391.77
48	2071	1.29%	-180,124.68	3.0%	1,892,341.22	0.00	0.00	-85,516.29	1,604,982.54	3,378,746.42	13,317,194.02
49	2072	1.29%	-177,408.83	3.0%	1,824,336.36	0.00	0.00	-84,270.91	1,632,157.54	3,306,184.64	13,143,119.34
50	2073	1.29%	-174,732.94	3.0%	1,758,775.37	0.00	0.00	-83,043.66	1,658,200.64	3,235,181.20	12,972,449.63
51	2074	1.29%	-172,096.43	3.0%	1,695,570.45	0.00	0.00	-81,834.29	1,683,139.05	3,165,702.62	12,448,445.59
52	2075	1.29%		3.0%	1,634,636.92					2,976,897.50	
	Total		**$ (12,141,362.77)**		**$ 83,627,202.95**	**$ (9,408,389.85)**	**$ (34,757,365.09)**	**$ (5,547,245.00)**	**$ 25,335,352.19**	**$ 114,898,528.23**	**$ 509,898,196.39**

Year #	Year	Total Benefits WebTAG
1	2024	-17,546,275.53
2	2025	-17,211,089.56
3	2026	-12,252,960.42
4	2027	-2,741,754.91
5	2028	-2,640,249.23
6	2029	-2,548,242.65
7	2030	-2,449,238.91
8	2031	-2,351,701.31
9	2032	-2,255,668.75
10	2033	-2,154,086.52
11	2034	-2,061,403.07
12	2035	-1,963,689.93
13	2036	7,991,576.56
14	2037	7,986,515.78
15	2038	7,974,802.69
16	2039	7,968,403.10
17	2040	7,960,985.08
18	2041	7,952,418.87
19	2042	7,937,345.16
20	2043	7,921,215.73
21	2044	7,903,925.67
22	2045	-1,493,937.86
23	2046	26,757,826.99
24	2047	26,152,438.55
25	2048	25,555,536.30
26	2049	24,983,696.67
27	2050	24,427,554.35
28	2051	23,886,530.92
29	2052	23,363,761.77
30	2053	22,851,220.24
31	2054	26,001,630.34
32	2055	25,564,350.95
33	2056	25,140,496.20
34	2057	24,725,747.33
35	2058	24,326,907.27
36	2059	23,932,712.75
37	2060	23,549,904.62
38	2061	23,181,184.94
39	2062	22,816,275.15
40	2063	22,461,371.72
41	2064	22,115,997.54
42	2065	21,776,810.77
43	2066	21,449,246.09
44	2067	21,129,921.12
45	2068	20,815,806.77
46	2069	20,511,904.44
47	2070	20,210,160.29
48	2071	19,927,623.22
49	2072	19,644,118.14
50	2073	19,366,830.24
51	2074	18,738,926.99
52	2075	4,611,534.41
	Total	**$ 671,904,917.04**

Table A 1.1.1: Green Book Discount Rates		
current year	(standard)	Discount rate (health)
0-30	3.50%	1.50%
31-75	3.00%	1.29%
76-125	2.50%	1.07%
126-200	2.00%	0.86%
201-300	1.50%	0.64%
301 and over	1.00%	0.43%

Source: TAG Data Book Unit A1.1.1