# Chicago Eisenhower Expressway Reconstruction and Expansion Benefit-Cost Analysis 

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## Introduction

On December 31, 2016, the Illinois Department of Transportation (IDOT) released for public comment the proposed I-290 Eisenhower Expressway Reconstruction and Expansion Project (proposed Project) draft environmental impact statement (DEIS). The undertaking extends about 13 miles from Racine Avenue to west of Mannheim Road, traversing the Illinois municipalities of Chicago, Oak Park, Forest Park, Maywood, Broadview, Westchester, Bellwood and Hillside (IDOT, 2016). Benefit-cost analysis (BCA) is conducted to determine practicality using monetary values determined by market, stated preference, and revealed preference studies. Discount rates of 3,5 and 7 percent are used in a comprehensive BCA with more than 20 monetized elements in addition to a conventional method with about one-half this number (2016 \$, 35-year useful life). Results are presented in the form of net present values (NPV) and benefit cost ratios. The contrasting outcomes demonstrate the importance of thoroughness, transparency, and support for the value assumptions to accurately inform decisionmakers.

## Economic/Econometric Models

Highway expansion projects are typically proposed to relieve congestion while reducing travel time and accidents. Viability can be estimated using travel demand models and BCA. As discussed by Litman (2017a), increased roadway capacity often induces additional travel as some trips previously foregone at the margin become advantageous for some individuals. This is due to an increase in the good of roadway capacity without an increase in price. Congestion often will return in the long-run resulting in conditions similar to or worse than the original problem. In turn, environmental impacts such as air emissions and fuel consumption, which initially might be reduced in the short-run, may increase above original levels. BCA is beneficial in determining the best alternative to address this dilemma and maximize economic efficiency (Litman, 2017a).

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BCA is typically conducted using a discount rate(s) to put current and future benefits and costs into a shared form by means of various software products (Transportation Research Board, 2017). As outlined by Weisbrod et al. (2009), transportation project sponsors have traditionally monetized some of the benefits in terms of direct effects such as travel time savings, reduced accidents, and lower operating costs when using BCA. However, there often is not consideration given to potential values for indirect effects or impacts to human health and the environment. More specifically, these consist of human mortality/morbidity (non-accidents), and the quality of air, water, aesthetics, land and noise levels. Others are broader social goals such as conservation of natural resources and environmental justice. This may be due to confusion caused by the collection of methodologies available to calculate such values and concerns with doublecounting. Further, funding programs may require differing approaches such as cost-effectiveness analysis, selective criteria analysis, or financial impact analysis (Weisbrod et al., 2009).

Linear regression econometric models can be used in concert with BCA to determine the predicted impacts of the proposed Project on dependent variables (DVs) such as criteria air pollutants, employment, travel time, accidents and income. This can be done via elasticities established by past research or in newly developed models utilizing various independent variables (IVs). For example, as discussed by Litman (2017b), the long-run price elasticity of automobile travel demand that can be used is -0.3 meaning that a 1 percent increase in fuel price such as emission charges will reduce vehicle miles traveled (VMT) 0.3 percent. In turn, air emissions reductions can be calculated at the rate of about 14-35 percent per 1-7 percent VMT reduction (Litman, 2017b). Alternatively, a new model can be developed from U.S. metropolitan statistical area data using IVs of population density, fuel price, and household income to predict estimates for the DV of VMT. Air emissions can then be estimated in similar fashion. Elasticities

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from existing research can be used in the BCA spreadsheet for purposes of sensitivity analysis to determine whether variations in the assumptions will have substantive impacts on the BCA outcome.

## Data Collection Techniques

According to Weisbrod et al. (2009), analytical quantification techniques consist of those outlining loss avoidances in terms of damage, prevention or control costs. Benefits can also be shown in terms of value gains through observed behavior (revealed preferences), contingent valuation (CV)(stated preferences), and expected growth to income. Regional economic impact and simulation or forecasting models have characteristics of revealed preference modeling using regression analysis through associations of observed land development form with localized metrics of agglomeration, multimodalism and market access. CV uses surveys of the public to determine willingness to pay (WTP) for improved transportation amenities and environmental quality, particularly values for clean air and water and undeveloped land. CV can also uncover stated values for pain, sorrow, and impaired quality of life. These are influenced by actual medical, legal and insurance costs which can vary geographically (Weisbrod et al., 2009).

According to the U.S. Environmental Protection Agency (USEPA, 2010), revealed preference methods are based on data obtained from observations of real choices. Various types include production or cost functions, travel cost models, hedonic models, averting behavior models, and cost of illness. The upside of revealed preference techniques is valuations are based on actual behavior. Their downside is that they cannot estimate non-use values such as those related to biological diversity. Stated preference techniques are surveys conducted to obtain responses to hypothetical scenarios. Their advantages are the development of non-use values based on situations comparable to actual policies. The downside is general bias that can be

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complicated to address. Revealed preference and stated preference methods can be combined by pooling data, using a jointly estimated mixed model, or by using both separately and testing for convergent validity between them (i.e., related and measuring the same thing). Alternative approaches consist of break-even analysis and bounding analysis (range value may be in) which can be useful if valuation estimates are not possible. However, they cannot be used in determining policy that is economically efficient (USEPA, 2010).

According to Maibach et al. (2008), measures of market price can be used to quantify effects in terms of losses or compensation if such resource costs are available. A revealed preferences example is hedonic pricing using the estimation of noise costs based upon home locational sales price differences or stated preferences. Environmental effects costing such as for habitat losses and long-term risks requires the use of alternative risk scenarios. Perhaps the best technique is the impact pathway approach (IPA) which uses a dose-response function or alternately the avoidance cost approach to quantify effects on human health and the environment. WTP for an improvement or alternatively willingness to accept compensation for nonimprovement can be used. Building damage from air pollution can be quantified using repair costs. IPA can be used for impacts to nature by quantifying crop losses at factor costs or using the compensation cost approach determined by actual repair costs. Climate change valuation can be addressed through the avoidance cost approach as determined by greenhouse gas avoidance costs, shadow prices of emissions trading, or costs for damages (Maibach et al., 2008).

Commonly accepted monetized values or value ranges have been assembled by transportation experts based upon meta-analysis. Of note, is the U.S. Department of Transportation's (USDOT) TIGER Benefit-Cost Analysis Resource Guide which provides support to applicants for the Transportation Investments Generating Economic Recovery funding

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(USDOT, 2016). Another is Victoria Transport Policy Institute's (VTPI) Transportation Benefit and Cost Techniques/Cost Analysis Spreadsheet and supporting documentation (Litman, 2016).

## Vehicle Miles Traveled Costs

Predicted VMT data are from the IDOT Draft Environmental Impact Statement (DEIS) Summary, Table S-2. VMT estimates, either directly or indirectly, are a factor in determining most of the benefits and costs for each of the measured criteria in the analysis of the proposed Project. Of note is that the DEIS with the proposed Project shows a small reduction of $-8,853$ in 2040 daily VMT in the study area, however, regional daily VMT increases by 52,211 (IDOT, 2016). Respective auto and heavy truck VMT operating cost unit values of $\$ 0.27$ (AAA, 2016) and $\$ 1.83$ (American Transportation Research Institute, 2012) are in Appendix Table 1 along with all others used in the BCA. Research shows that personal vehicular travel is underpriced by up to 30 percent or more (Litman, 2011). Therefore, a conservative assumption is made in the comprehensive BCA of a $\$ 0.50$ fuel surcharge regionwide to measure the effect on economic efficiency as measured by NPV. The price elasticity of travel demand assumed in the BCA is -.2 .

The aforementioned fuel price elasticity of travel demand is tested by conducting cross sectional linear regression (data in Attachment 1) on 2015 per capita VMT for the 50 largest U.S. urbanized areas against the average annual gasoline prices (Gas Buddy, n.d.) while controlling for a combined variable of weighted population density (Wilson et al., 2012) multiplied by per capita personal income (Bureau of Economic Analysis, n.d.). The results are in Appendix Figure 1 and show that the model is strong in terms of the $R^{2}, F$, and Significance $F$ values. The controlling variable is statistically significant. A 1 percent increase in gas price can be expected to decrease per capita VMT by 0.1 percent. This price elasticity of demand is about the same as the empirical short-run citation, yet, it is not statistically significant based on the $t$ Stat and $P$-value.

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## Opportunity Costs-Linear Park Construction

The estimated total capital costs of the proposed Project are about $\$ 2,332.9$ million according to the IDOT DEIS (IDOT, 2016). This cost is reduced in the BCA by the opportunity costs of removing I-290 and constructing an alternative project of a linear park with bicycle and pedestrian pathways. These alternate costs are from market-based rates of comparable projects. Locational differences could affect their reliability. Road removal costs are about $\$ 31.4$ million for excavation of lane pavement, replacement of topsoil, and debris disposal (EDR Companies, 2011). Estimated costs for building one pedestrian and one bicycle 13-mile granular linear pathway are about $\$ 1.5$ million (Northwestern Indiana Regional Planning Commission, 2010). Thus, the total linear park alternative capital costs are about $\$ 32.9$ million and subtracted from the I-290 capital costs resulting in a discounted range of $\$ 1,827.0-\$ 2,076.5$ million. Of note is that a third option of removing the thruway and restoring the street grid might cost about 93 percent of the full I-290 renewal cost based on the Syracuse, New York I-80 urban expressway cost analysis (N.Y. Department of Transportation, 2017). The implications of the linear park option are that the costs are comparatively small to I-290 retention.

## Ecological Costs

Ecological impacts are opportunity costs for the value of I-290 land that could be converted back to a natural state from existing concrete. Bein (1997) provides values for categories of land using shadow pricing or estimates given the absence of a market. These are based on revealed preferences and stated preference surveys of wetlands, biodiversity, open space and recreation from several cited studies. One such stated preference study includes use and non-use values (such as bequest, option and existence) totaling $\$ 653$ per acre for increasing the acreage of Colorado wilderness by 50 percent (Walsh et al., 1984). Similarly, another cited

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use/non-use contingent valuation study resulted in a value of $\$ 7,836$ for one acre of riparian habitat in the Pacific Northwest (Buchanan, 1986).

Bein (1997) cites other revealed preference and stated preference studies that do not consider values for non-use, intangibles, or indirect economic benefits. However, the order of magnitude differences in values by land use type are useful. Bein (1997) summarizes these with a matrix of lower bound value estimates based on conversions between different land categories. Accordingly, the ecological costs value of converting the 236 acres of I-290 to the linear park are $\$ 11,440$ per acre and equate to a total discounted value range of about $\$ 36.2-\$ 63.2$ million. Note that value is higher than if the land were simply converted to farmland or road buffer but lower than if it transitioned to wetlands (Bein, 1997). This presumably is due to the higher value of greenspace in dense urban locations where such land is rare and accessible to large numbers of people. The implications of these ecological costs are that they are a very small part of the opportunity costs and not extensive compared to the travel time savings of implementing the proposed Project. Reliability of the values is moderate as there is a wide range of them in the different surveys.

## Noise Costs

The Transportation Research Board (TRB) BCA web site provides noise impact values per VMT for urban highways from several studies. The research mainly uses the revealed preference methodology of hedonic pricing by documenting the change in home property values near traffic noise. Dollar values for noise impacts per VMT derived from these cited studies are in the following ranges: heavy trucks (\$0.037-\$0.27); and auto (\$0.001-\$0.029)(TRB, n.d.). Mid-ranges are used in the BCA. An alternate method is CV. However, stated preferences data may not have the same accuracy as they are not based on actual human decisions.

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The noise values from the TRB (n.d.), based on cited revealed preference or hedonic pricing method of home values near expressways, multiplied against the VMT changes from the proposed Project for cars and heavy trucks result in a total discounted cost range of \$1,067.9$\$ 1,896.8$ million. The implications of these noise costs are that they depress housing values ( Lu, 2011). Yet, the extent is a relatively small part of both the overall opportunity costs and the travel time savings of executing the proposed Project. Delucchi and Hsu (1996) find that in the U.S. the total annual external noise costs from motor vehicle usage could range widely from $\$ 176-\$ 74,400$ million but likely does not exceed $\$ 8,800$ million. This is due to doubts about appropriate decibel levels to assign costs, noise attenuation from various urban features, interest rate, vehicle speeds, and noise costs outside of houses (Delucchi \& Hsu, 1996).

## Emissions Costs

Per the USDOT (2016), social cost of carbon $\left(\mathrm{CO}_{2}\right)$ values increase by year and range from $\$ 44-88$ per metric ton (MT). The $\mathrm{CO}_{2}$ values are only discounted at the 3 percent rate but are also used in the 5 and 7 percent BCA columns. Respective nitrous oxide $\left(\mathrm{NO}_{\mathrm{x}}\right)$, particulate matter (PM), volatile organic compounds (VOC) values are $\$ 7,389 ; \$ 338,031$; and $\$ 1,696$ per MT (USDOT, 2016). These are based upon values the USDOT (2016) derived from a metaanalysis by USEPA of stated preferences, revealed preferences, and market cost studies related to the value of a statistical life based upon WTP to avoid health impacts (USEPA, n.d., 2011).

The $\mathrm{CO}_{2}, \mathrm{NO}_{\mathrm{X}}, \mathrm{PM}_{10}, \mathrm{PM}_{2.5}$ and VOC combined discounted emissions costs are \$2,399.7-\$2,807.0 million. The implications are that by building the proposed Project an opportunity would be lost to reduce carbon and the other harmful emissions that contribute to global warming, and human health/environmental degradation. Per Delucchi (2000), there is a fair level of uncertainty in the literature on cost analyses of motor vehicle usage. However, it is

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generally agreed that there are higher risks from particulate emissions to human health/mortality as opposed to their impacts on forests, crops and other plant life (Delucchi, 2000). There is also consensus that the danger to human health is also significantly more severe than from noise, water pollution, and climate change (Delucchi, 2000). The risk from accruing carbon is potentially catastrophic to future generations but consensus is lacking on the likelihood that man's contributions will result in such a disaster (Tol, 2005).

## Resource Consumption Costs

The VTPI Transportation Cost and Benefit Analysis web site provides substantial details on numerous monetized costs based on cited studies. Resource consumption costs are external costs of transport resource production (primarily petroleum). These include military security costs for foreign oil, environmental damages from oil extraction, oil company tax subsidies, and human health risks from injuries and pollution during extraction. Values derived from the VTPI Transportation Cost Analysis Spreadsheet for average travel by vehicle type are: auto $\$ 0.045$; light truck/van $\$ 0.058$; and diesel bus $\$ 0.226$. They are based on a multitude of studies that include: stated preferences via WTP to pay for oil spill cleanup and various compilations of identified direct/indirect government support to the energy industry (VTPI, 2009). A revealed preferences alternative that could be considered is analysis of data on consumer purchases of personal vehicles. This is based upon the WTP to pay more for an eco-friendly vehicle or one with higher miles per gallon (mpg) as opposed to conventional vehicles with low mpg ratings.

Based on the VTPI data, the combined car and truck resource consumption costs due to the proposed Project are a discounted range of about $\$ 2,700.3-\$ 4,796.2$ million. The implications are that the undertaking would exacerbate regional dependence on fossil fuels through induced traffic/incentivizing trips by failing to privatize social costs of congestion and underpriced/

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subsidized fuel. Yet, the costs are relatively small and there is disagreement on the level of subsidies, if any, to motor-vehicle fuel (Delucchi \& Murphy, 2008).

## Other Elements

The element of human health is grounded on the concept that the amount of automobile travel or car accessibility/dependency has an impact on the level of exercise and cardiovascular well-being. Based upon three studies cited by Gotschi (2011), the annual medical care value for the cost of an inactive person and totally car-dependent is $\$ 610$. One of the studies estimated costs by associating a national health survey with a medical expenditure survey. Another was a cross-sectional stratified study with a medical expenditure survey. The third was a meta-analysis of scientific literature (Gotschi, 2011). These methods are legitimate approaches to estimating inactivity health costs subject to the accuracy of collected data. Appendix Table 1 provides a summary for all the aforementioned environmental elements in addition to others used along with the unit values and supporting sources. A spreadsheet is provided for the complete BCA and includes more details on the assumptions, values and methodologies (Attachment l).

## Results

As shown in Appendix Table 2 for the comprehensive BCA, at all three discount rates the net present values (NPVs) of the proposed Project are substantially negative and range from $(\$ 58,368.9)$ to $(\$ 34,417.1)$ million. Benefit-cost ratios range from 0.27 to 0.26 . The benefits accrue predominantly from the travel time savings. The main drawbacks are the opportunity costs of not removing the 13 -mile I-290 facility, implementing a $\$ 0.50$ per fuel gallon pricing surcharge on regional travel, and replacing the facility with a linear park. Specific underlying costs in order of magnitude come from increases in the following: VMT; health degradation;

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parking requirements; accidents; usage of non-renewable fuels; emissions; project capital; violent crime; noise; barrier effects; lack of transport diversity; and ecological impacts.

Cost effectiveness analysis at the mid-range 5 percent discount rate shows capital expenditures of about $\$ 1,945.6$ million to achieve the expected outcomes listed in Appendix Table 3. It takes less than $\$ 1$ in capital for a one-hour reduction in vehicle hours traveled (VHT). However, the amount of capital costs linked to increasing accidents, deaths and violent crime each by 1 unit is substantial. Sensitivity analysis was conducted to estimate changes in NPVs and benefit-cost ratios based upon variations in assumptions, including fuel price elasticity of travel demand and removal of several monetary elements. The results in Appendix Table 4 show that the comprehensive BCA is not substantially impacted by these scenarios. The exception is a conventional BCA that does not consider the more inclusive opportunity costs. This alternate BCA method removes the following elements: pricing, park capital, ecological, violent crime, parking, resource consumption, health, barrier effects, and transport diversity. The results are ranges in NPV from $\$ 10,648.3$ to $\$ 20,436.4$ million and benefit-cost ratios from 6.43 to 9.88 .

## Conclusion

The proposed Project rates poorly in comprehensive BCA due to the transport demand management (TDM) strategy of regional pricing and robust accounting for social costs, which brings into question the perceived need to rebuild/expand capacity of I-290. Conversely, the undertaking fares very well in the conventional BCA as many costs are not privatized. The analysis reveals the challenge in rational project selection when full accounting is not provided for all externalities. Caution is in order as the focus of BCA is on economic efficiency as opposed to economic impacts, there are substantive valuation uncertainties, the analysis may not address other social objectives such as equity, and it does not consider public transport impacts.

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Appendix
Figure 1: Log-Log of 2015 Per Capita Vehicle Miles Traveled on Average Annual Gas Prices and Controlling for Weighted Population Density and Per Capita Income - 50 Largest U.S. Regions

| SUMMARY OUTPUT |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Regression Statistics |  |  |  |  |  |  |  |  |
| Multiple R | 0.734979 |  |  |  |  |  |  |  |
| R Square | 0.540194 |  |  |  |  |  |  |  |
| Adjusted R Square | 0.520628 |  |  |  |  |  |  |  |
| Standard Error | 0.064027 |  |  |  |  |  |  |  |
| Observations | 50 |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| ANOVA |  |  |  |  |  |  |  |  |
|  | df | SS | MS | F | ignificance $F$ |  |  |  |
| Regression | 2 | 0.226359 | 0.11318 | 27.60856 | $1.18 \mathrm{E}-08$ |  |  |  |
| Residual | 47 | 0.192674 | 0.004099 |  |  |  |  |  |
| Total | 49 | 0.419033 |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  | Coefficientsandard Errı |  | t Stat | $P$-value | Lower 95\% | Upper 95\% | wer 95.0\% | pper 95.0\% |
| Intercept | 5.815055 | 0.264406 | 21.99287 | $2.21 \mathrm{E}-26$ | 5.283138 | 6.346972 | 5.283138 | 6.346972 |
| GASPRI15 log | -0.1 | 0.190231 | -0.52569 | 0.601578 | -0.4827 | 0.282693 | -0.4827 | 0.282693 |
| (PCPI15*WPD)LOG | G -0.21737 | 0.035375 | -6.14462 | $1.63 \mathrm{E}-07$ | -0.28853 | -0.1462 | -0.28853 | -0.1462 |

## Table 1: Unit Values and Sources Summary

| Element | Values* |  | Source |
| :--- | :--- | :--- | :--- |
| VMT | $\$ 0.27$ per VMT auto | $\$ 1.83$ per VMT truck | AAA, 2016; ATRI, 2012 |
| Land/Ecological | $\$ 2,615$ per acre |  | Bein, 1997 |
| Noise | $\$ 0.015$ per VMT auto | $\$ 0.15$ per VMT truck | TRB, n.d. |
| NOX | $\$ 7,389$ per MT |  | USDOT, 2016 |
| PM | $\$ 338,031$ per MT |  | USDOT, 2016 |
| CO2 | $\$ 48-\$ 88$ per MT |  | USDOT, 2016 |
| Resource Consumption | $\$ 0.23$ |  | VTPI, 2009 |
| Parking | $\$ 0.144$ per VMT |  | VTPI, 2009 |
| Human Health | $\$ 0.11$ per VMT internal | $\$ 0.11$ per VMT external | Gotschi, 2011 |
| Barrier Effect | $\$ 0.02$ per VMT auto | $\$ 0.03$ per VMT truck | VTPI, 2009 |
| Transport Diversity | $\$ 0.008$ per VMT |  | VTPI, 2009 |
| VHT/Time | $\$ 14.36$ per hour auto | $\$ 27.80$ per hour truck | USDOT, 2016 |
| Statistical Life | $\$ 9.78$ million |  | USDOT, 2016 |
| Injuries | $\$ 10,714$ per accident |  | USDOT, 2016 |
| Property Damage | $\$ 3,547$ per accident |  | USDOT, 2016 |
| Violent Crime | $\$ 293,191$ per incident |  | IDOT,2016; McCollister, 2010 |
| Construction | $\$ 2.3$ billion |  | NIRPC, 2010 |
| Const. (park opp. costs) | $\$ 32.9$ million |  | WTFPC, n.d.; HNTB, 2002 |
| O\&M | $\$ 1.0$ million per year |  | NRPA, 2013; EDR Cos., 2011 |
| O\&M (park opp. costs) | $\$ 1.92$ million per year |  |  |
| Residual | To be determined |  |  |

* All values in 2016 U.S. dollars. MT = metric ton. O\&M = operating and maintenance. AAA= American Automobile Association. ATRI=American Transportation Research Institute. NIRPC=Northwestern Indiana Regional Planning Commission. WTFPC=Wisconsin Transportation Finance and Policy Commission.
NRPA=National Recreation and Park Association.


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## Appendix

Table 2: I-290 Eisenhower Expressway System Benefit-Cost Analysis Summary (2016 \$ in millions; numbers may not add exactly due to rounding)

| DISCOUNTED COSTS | 3\% | 5\% | 7\% |
| :---: | :---: | :---: | :---: |
| Capital | (\$2,076.5) | (\$1,945.6) | (\$1,827.1) |
| Ecological | (\$63.2) | (\$46.7) | (\$36.2) |
| VMT Increase - Auto | (\$19,324.8) | (\$14,153.9) | (\$10,880.1) |
| VMT Increase - Heavy Truck | (\$9,858.6) | (\$7,220.7) | (\$5,550.5) |
| Noise - Auto | (\$1,073.6) | (\$786.3) | (\$604.4) |
| Noise - Heavy Truck | (\$823.2) | (\$602.9) | (\$463.5) |
| $\mathrm{CO}_{2}$ Increase ( $3 \%$ only discount) | (\$1,875.4) | (\$1,875.4) | (\$1,875.4) |
| $\mathrm{NO}_{\mathrm{X}}$ Increase | (\$477.1) | (\$349.5) | (\$268.6) |
| PM Increase | (\$346.7) | (\$253.7) | (\$194.9) |
| VOC Increase | (\$107.8) | (\$78.9) | (\$60.7) |
| Resource Consumption | (\$4,796.2) | (\$3,512.8) | (\$2,700.3) |
| Parking | (\$10,306.5) | $(\$ 7,548.7)$ | $(\$ 5,802.7)$ |
| Health - Internal | (\$7,873.1) | $(\$ 5,766.4)$ | $(\$ 4,433.6)$ |
| Health - External | (\$7,873.1) | $(\$ 5,766.4)$ | (\$4,433.6) |
| Barrier Effect | (\$1,290.6) | (\$945.3) | (\$726.6) |
| Transport Diversity Loss | (\$572.6) | (\$419.4) | (\$322.4) |
| Fatalities Increased | (\$6,549.2) | (\$4,796.7) | (\$3,687.2) |
| Injuries Increased | (\$2,139.3) | (\$1,566.8) | (\$1,204.4) |
| Property Damage Increased | (\$708.2) | (\$518.7) | (\$398.7) |
| Violent Crime Increase | (\$2,162.9) | (\$1,570.3) | (\$1,197.9) |
| TOTAL DISCOUNTED COSTS | (\$80,298.4) | (\$59,725.1) | (\$46,666.8) |
| DISCOUNTED BENEFITS | 3\% | 5\% | 7\% |
| Vehicle Hours Traveled - Auto | \$19,126.5 | \$13,949.6 | \$10,685.1 |
| Vehicle Hours Traveled - Heavy Truck | \$2,787.0 | \$2,032.7 | \$1,557.0 |
| Operating \& Maintenance | \$16.1 | \$10.9 | \$7.7 |
| Value of Existing ROW(undiscounted) (opportunity costs negates) | \$0 | \$0 | \$0 |
| TOTAL DISCOUNTED BENEFITS | \$21,929.6 | \$15,993.2 | \$12,249.7 |
| NET PRESENT VALUE | (\$58,368.9) | (\$43,731.9) | (\$34,417.1) |
| BENEFIT-COST RATIO | 0.27 | 0.27 | 0.26 |

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Table 3: Table 2 I-90 Eisenhower Expressway Reconstruction/Expansion Project CostEffectiveness Summary (2016 \$)

|  | I-290 Project Alone |  | Net with Opportunity Costs |  |
| :--- | :--- | :--- | :--- | :--- |
| Metric | Total Reduction or <br> Increase | Cost for One | Total Reduction <br> or Increase | Cost for One |
| VHT Reduced | $-24,609,729$ | $\$ 79.05$ | $-2,345,808,911$ | $\$ 0.83$ |
| Accidents | $-12,102$ | $\$ 160,762$ | $+317,842$ | $\$ 6,121$ |
| Deaths | -41 | $\$ 47,452,458$ | $+1,190$ | $\$ 1,634,958$ |
| Violent Crime |  |  | $+13,314$ | $\$ 146,132$ |

Table 4: Sensitivity Analysis (2016 \$ in millions)

|  | 3\% |  | 5\% |  | 7\% |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Change | NPV | B/C Ratio | NPV | B/C Ratio | NPV | B/C Ratio |
| No Change | (\$58,368.9) | 0.27 | (\$43,731.9) | 0.27 | (\$34,417.1) | 0.26 |
| Removal of noise, all emissions, and resource consumption costs |  |  |  |  |  |  |
|  | (\$48,868.9) | 0.31 | (\$36,272.3) | 0.31 | (\$28,249.2) | 0.30 |
| Removal of health impacts. |  |  |  |  |  |  |
|  | (\$42,622.8) | 0.34 | (\$32,191.1) | 0.33 | $(\$ 25,551.9)$ | 0.32 |
| Removal of linear park and trail opportunity costs |  |  |  |  |  |  |
|  | (\$58,335.4) | 0.27 | (\$43,713.0) | 0.27 | (\$34,407.1) | 0.26 |
| Removal of violent crime costs |  |  |  |  |  |  |
|  | (\$56,206.0) | 0.28 | (\$42,161.6) | 0.28 | (\$33,219.2) | 0.27 |
| Assumed capital costs changes |  |  |  |  |  |  |
| +25\% | $(\$ 58,887.9)$ | 0.27 | (\$44,218.3) | 0.27 | (\$34,873.9) | 0.26 |
| $+50 \%$ | (\$59,407.1) | 0.27 | (\$44,704.6) | 0.27 | (\$35,330.6) | 0.26 |
| Conventional BCA analysis |  |  |  |  |  |  |
|  | \$20,436.4 | 9.88 | \$14,396.1 | 7.80 | \$10,648.3 | 6.43 |
| Assumed fuel price elasticity of travel demand change from -0.2 to -0.1 |  |  |  |  |  |  |
|  | (\$24,879.6) | 0.47 | (\$18,983.6) | 0.46 | (\$15,303.0) | 0.45 |
| Assumed fuel price elasticity of travel demand change from -0.2 to -0.3 |  |  |  |  |  |  |
|  | (\$91,858.2) | 0.19 | (\$68,480.1) | 0.19 | (\$53,631.2) | 0.19 |

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|  | $\underset{\text { AVMT }}{\substack{\text { Alt }}}$ | $\begin{gathered} \text { 1-290 Hot 3+Alt } \\ \text { AVMT Increase in } \\ \text { Region } \end{gathered}$ | Opportunity Cost of Existing I-290 Induced AVMT Excluding Project | UZA Pricing (+ $\$ 0.50$ or $+20 \%$ per gal.) AVMT Opportunity Cost ${ }^{5}$ | Chicago UZA <br> Estimated Per <br> Capita VMT $w / n o$ <br> Project, <br> Incuced $\&$ <br> w/Pricing | Average Annual <br> Daily Traffic per Fwy Lane Reduced Reduced | Violent Crime Reduction per Populatio Population | Chicago MSA Total Annual Vioalentcrime Reduction | Murder Value | Rape value | Robbery Value | Aggravated Assault Value | Total Annual Crime Reduction Opportunity Cost ${ }^{6}$ | $\begin{array}{\|l\|l} \text { Proportio } \\ \text { n Auto } \\ \text { Traffic } \end{array}$ | Auto VMT Net Change | vmi | Auto VMT Project and Opportunity Cost $^{7}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 12020 | 68,358,724,360 | 17,735,434 | 364,655,672 | 2,719,053,330 | 7,358 | 212,327 | 3.14 | 280 | \$53,053,881 | \$6,172,281 | \$4,826,252 | \$18,040,955 | ( $\$ 82,093,370)$ | 0.93 | 2,884,343,325 | 50.27 | (\$778,772,698) |
| 2021 | 68,604,815,768 | 17,799,282 | 365,968,432 | 2,728,841,922 | 7,358 | 213,092 | 3.15 | 282 | \$53,436,557 | \$6,216,802 | \$4,861,064 | \$18,171,083 | $(\$ 82,685,506)$ | 0.93 | 2,894,726,961 | \$0.27 | $(\$ 781,576,280)$ |
| 2022 | 68,851,793,104 | 17,863,359 | 367,285,919 | 2,738,665,753 | 7,358 | 213,859 | 3.17 | 284 | \$53,821,993 | \$6,261,643 | \$4,896,127 | \$18,302,151 | (\$83,281,913) | 0.93 | 2,905,147,978 | \$0.27 | (\$784,389,954) |
| 2023 | 69,099,659,560 | 17,927,667 | 368,608,148 | 2,748,524,950 | 7,358 | 214,629 | 3.18 | 286 | \$54,210,209 | \$6,306,808 | \$4,931,442 | \$18,434,163 | ( $\$ 83,882,622)$ | 0.93 | 2,915,606,511 | \$0.27 | (\$787,213,758) |
| 2024 | 69,348,418,334 | 17,992,207 | 369,935,137 | 2,758,419,640 | 7,358 | 215,401 | 3.19 | 288 | \$54,601,225 | \$6,352,299 | \$4,967,012 | \$18,567,128 | $(\$ 84,487,664)$ | 0.93 | 2,926,102,695 | \$0.27 | (\$790,047,728) |
| 2025 | 69,598,072,640 | 18,056,979 | 371,266,904 | 2,768,349,950 | 7,358 | 216,177 | 3.20 | 291 | \$54,995,061 | \$6,398,118 | \$5,002,839 | \$18,701,052 | (\$85,097,071) | 0.93 | 2,936,636,664 | \$0.27 | (\$792,891,899) |
| 2026 | 69,848,625,702 | 18,121,984 | 372,603,465 | 2,778,316,010 | 7,358 | 216,955 | 3.21 | 293 | \$55,391,738 | \$6,444,267 | \$5,038,925 | \$18,835,942 | ( $\$ 85,710,872)$ | 0.93 | 2,947,208,556 | \$0.27 | (\$795,746,310) |
| 2027 | 70,100,080,754 | 18,187,223 | 373,944,837 | 2,788,317,948 | 7,358 | 217,736 | 3.22 | 295 | \$55,791,277 | \$6,490,750 | \$5,075,270 | \$18,971,805 | ( $\$ 86,329,101)$ | 0.93 | 2,957,818,507 | \$0.27 | (\$798,610,997) |
| 2028 | 70,352,441,045 | 18,252,697 | 375,291,038 | 2,798,355,892 | 7,358 | 218,520 | 3.23 | 297 | \$56,193,697 | \$6,537,567 | \$5,111,878 | \$19,108,648 | (\$86,951,790) | 0.93 | 2,968,466,654 | \$0.27 | ( $5801,485,997)$ |
| 102029 | 70,605,709,833 | 18,318,407 | 376,642,086 | 2,808,429,974 | 7,358 | 219,306 | 3.25 | 299 | \$56,599,020 | \$6,584,722 | \$5,148,750 | \$19,246,478 | ( $\$ 87,578,970)$ | 0.93 | 2,979,153,134 | \$0.27 | $(\$ 804,371,346)$ |
| 112030 | 70,859,890,388 | 18,384,353 | 377,997,998 | 2,818,540,321 | 7,358 | 220,096 | 3.26 | 301 | \$57,007,266 | \$6,632,218 | \$5,185,887 | \$19,385,302 | (\$88,210,673) | 0.93 | 2,989,878,085 | \$0.27 | ( $5807,267,083)$ |
| $12 \quad 2031$ | 71,114,985,993 | 18,450,537 | 379,358,790 | 2,828,687,067 | 7,358 | 220,888 | 3.27 | 303 | \$57,418,457 | \$6,680,056 | \$5,223,293 | \$19,525,127 | $(\$ 88,846,933)$ | 0.93 | 3,000,641,646 | \$0.27 | ( $5810,173,244$ ) |
| $13 \quad 2032$ | 71,370,999,943 | 18,516,958 | 380,724,482 | 2,838,870,340 | 7,358 | 221,684 | 3.28 | 305 | \$57,832,615 | \$6,728,239 | \$5,260,968 | \$19,665,961 | $(\$ 89,487,783)$ | 0.93 | 3,011,443,956 | \$0.27 | ( $5813,089,868)$ |
| 142033 | 71,627,935,543 | 18,583,620 | 382,095,090 | 2,849,090,273 | 7,358 | 222,482 | 3.29 | 308 | \$58,249,759 | \$6,776,769 | \$5,298,915 | \$19,807,811 | (\$90,133,254) | 0.93 | 3,022,285,154 | \$0.27 | $(\$ 816,016,992)$ |
| $15 \quad 2034$ | 71,885,796,111 | 18,650,521 | 383,470,633 | 2,859,346,998 | 7,358 | 223,283 | 3.30 | 310 | \$58,669,912 | \$6,825,650 | \$5,337,136 | \$19,950,684 | $(\$ 90,783,382)$ | 0.93 | 3,033,165,381 | \$0.27 | ( $\$ 818,954,653)$ |
| 162035 | 72,144,584,977 | 18,717,662 | 384,851,127 | 2,869,640,647 | 7,358 | 224,086 | 3.32 | 312 | \$59,093,096 | \$6,874,883 | \$5,375,633 | \$20,094,587 | $(\$ 91,438,199)$ | 0.93 | 3,044,084,776 | \$0.27 | $(\$ 821,902,890)$ |
| $\begin{array}{ll}17 & 2036\end{array}$ | 72,404,305,483 | 18,785,046 | 386,236,591 | 2,879,971,354 | 7,358 | 224,893 | 3.33 | 314 | \$59,519,332 | \$6,924,471 | \$5,414,407 | \$20,239,529 | ( $\$ 92,097,739)$ | 0.93 | 3,055,043,481 | \$0.27 | ( $\$ 824,861,740)$ |
| 18 2037 <br> 18  | 72,664,960,982 | 18,852,672 | 387,627,043 | 2,890,339,251 | 7,358 | 225,703 | 3.34 | 317 | \$59,948,642 | \$6,974,417 | \$5,453,461 | \$20,385,516 | (\$92,762,036) | 0.93 | 3,066,041,638 | \$0.27 | ( $\$ 827,831,242)$ |
| 192038 | 72,926,554,842 | 18,920,542 | 389,022,500 | 2,900,744,472 | 7,358 | 226,515 | 3.35 | 319 | \$60,381,050 | \$7,024,723 | \$5,492,797 | \$20,532,556 | (\$93,431,125) | 0.93 | 3,077,079,388 | \$0.27 | ( $5830,811,435)$ |
| 202039 | 73,189,090,439 | 18,988,656 | 390,422,981 | 2,911,187,152 | 7,358 | 227,331 | 36 | 321 | \$60,816,576 | \$7,075,392 | \$5,532,416 | \$20,680,656 | $(\$ 94,105,040)$ | 0.93 | 3,088,156,874 | \$0.27 | $(\$ 833,802,356)$ |
| 212040 | 73,452,571,165 | 19,057,015 | 391,828,504 | 2,921,667,426 | 7,358 | 228,149 | 3.38 | 324 | \$61,255,243 | \$7,126,427 | \$5,572,321 | \$20,829,825 | ( $\$ 94,783,816)$ | 0.93 | 3,099,274,238 | \$0.27 | ( $\$ 836,804,044)$ |
| $22 \quad 2041$ | 73,717,000,421 | 19,125,620 | 393,239,086 | 2,932,185,429 | 7,358 | 228,970 | 3.39 | 326 | \$61,697,075 | \$7,177,829 | \$5,612,514 | \$20,980,070 | $(\$ 95,467,488)$ | 0.93 | 3,110,431,626 | \$0.27 | $(\$ 839,816,539)$ |
| 232042 | 73,982,381,623 | 19,194,472 | 394,654,747 | 2,942,741,296 | 7,358 | 229,795 | 3.40 | 328 | \$62,142,093 | \$7,229,603 | \$5,652,997 | \$21,131,398 | $(\$ 96,156,091)$ | 0.93 | 3,121,629,180 | \$0.27 | ( $5842,839,878)$ |
| $24 \quad 2043$ | 74,248,718,197 | 19,263,573 | 396,075,504 | 2,953,335,165 | 7,358 | 230,622 | 3.41 | 331 | \$62,590,322 | \$7,281,750 | \$5,693,772 | \$21,283,818 | ( $\$ 96,849,661)$ | 0.93 | 3,132,867,045 | \$0.27 | ( $\$ 845,874,102)$ |
| $25 \quad 2044$ | 74,516,013,582 | 19,332,921 | 397,501,376 | 2,963,967,171 | 7,358 | 231,452 | 3.43 | 333 | \$63,041,783 | \$7,334,273 | \$5,734,841 | \$21,437,337 | ( $\$ 97,548,234)$ | 0.93 | 3,144,145,366 | \$0.27 | $(\$ 848,919,249)$ |
| $26 \quad 2045$ | 74,784,271,231 | 19,402,520 | 398,932,381 | 2,974,637,453 | 7,358 | 232,285 | 3.44 | 335 | \$63,496,501 | \$7,387,174 | \$5,776,206 | \$21,591,964 | ( $\$ 98,251,845)$ | 0.93 | 3,155,464,289 | \$0.27 | ( $\$ 851,975,358)$ |
| 272046 | 75,053,494,607 | 19,472,369 | 400,368,538 | 2,985,346,148 | 7,358 | 233,122 | 3.45 | 338 | \$63,954,499 | \$7,440,458 | \$5,817,869 | \$21,747,706 | ( $\$ 98,960,532)$ | 0.93 | 3,166,823,961 | \$0.27 | $(\$ 855,042,469)$ |
| 28 2047 | 75,323,687,188 | 19,542,470 | 401,809,864 | 2,996,093,394 | 7,358 | 233,961 | 3.46 | 340 | \$64,415,800 | \$7,494,126 | \$5,859,833 | \$21,904,571 | $(\$ 99,674,330)$ | 0.93 | 3,178,224,527 | \$0.27 | (\$858,120,622) |
| 292048 | 75,594,852,462 | 19,612,822 | 403,256,380 | 3,006,879,330 | 7,358 | 234,803 | 3.48 | 343 | \$64,880,429 | \$7,548,180 | \$5,902,100 | \$22,062,568 | (\$100,393,277) | 0.93 | 3,189,666,135 | \$0.27 | $(\$ 861,209,857)$ |
| 302049 | 75,866,993,931 | 19,683,429 | 404,708,103 | 3,017,704,096 | 7,358 | 235,648 | 3.49 | 345 | \$65,348,409 | \$7,602,625 | \$5,944,672 | \$22,221,704 | (\$101,117,410) | 0.93 | 3,201,148,933 | \$0.27 | ( $\$ 864,310,212)$ |
| 312050 | 76,140,115,109 | 19,754,289 | 406,165,052 | 3,028,567,831 | 7,358 | 236,497 | 3.50 | 348 | \$65,819,764 | \$7,657,463 | \$5,987,550 | \$22,381,989 | ( $\$ 101,846,766)$ | 0.93 | 3,212,673,070 | \$0.27 | ( $\$ 867,421,729)$ |
| 322051 | 76,414,219,523 | 19,825,404 | 407,627,246 | 3,039,470,675 | 7,358 | 237,348 | 3.51 | 350 | \$66,294,519 | \$7,712,695 | \$6,030,738 | \$22,543,429 | (\$102,581,382) | 0.93 | 3,224,238,693 | \$0.27 | $(\$ 870,544,447)$ |
| 332052 | 76,689,310,714 | 19,896,776 | 409,094,704 | 3,050,412,769 | 7,358 | 238,203 | 3.53 | 353 | \$66,772,699 | \$7,768,327 | \$6,074,238 | \$22,706,034 | (\$103,321,298) | 0.93 | 3,235,845,952 | \$0.27 | $(\$ 873,678,407)$ |
| 342053 | 76,965,392,232 | 19,968,404 | 410,567,445 | 3,061,394,255 | 7,358 | 239,060 | 3.54 | 355 | \$67,254,328 | \$7,824,359 | \$6,118,051 | \$22,869,812 | (\$104,066,550) | 0.93 | 3,247,494,997 | \$0.27 | $(\$ 876,823,649)$ |
| 352054 | 77,242,467,644 | 20,040,291 | 412,045,488 | 3,072,415,275 | 7,358 | 239,921 | 3.55 | 358 | \$67,739,431 | \$7,880,796 | \$6,162,180 | \$23,034,771 | ( $\$ 104,817,178)$ | 0.93 | 3,259,185,979 | \$0.27 | ( $\$ 879,980,214$ ) |
| 362055 | 77,520,540,528 | 20,112,436 | 413,528,852 | 3,083,475,970 | 7,358 | 240,784 | 3.56 | 360 | \$68,228,033 | \$7,937,640 | \$6,206,628 | \$23,200,920 | (\$105,573,220) | 0.93 | 3,270,919,049 | \$0.27 | (\$883,148,143) |
| 372056 | 77,799,614,474 | 20,184,840 | 415,017,556 | 3,094,576,483 | 7,358 | 241,651 | 3.58 | 363 | \$68,720,159 | \$7,994,894 | \$6,251,396 | \$23,368,267 | ( $\$ 106,334,716)$ | 0.93 | 3,282,694,357 | \$0.27 | $(\$ 886,327,477)$ |
| $38 \quad 2057$ | 78,079,693,086 | 20,257,506 | 416,511,619 | 3,105,716,958 | 7,358 | 242,521 | 3.59 | 366 | \$69,215,834 | \$8,052,561 | \$6,296,487 | \$23,536,821 | (\$107,101,704) | 0.93 | 3,294,512,057 | \$0.27 | $(\$ 889,518,255)$ |
| 392058 | 78,360,779,981 | 20,330,433 | 418,011,061 | 3,116,897,539 | 7,358 | 243,394 | 3.60 | 368 | \$69,715,085 | \$8,110,644 | \$6,341,903 | \$23,706,591 | ( $\$ 107,874,224)$ | 0.93 | 3,306,372,301 | \$0.27 | ( $\$ 892,720,521)$ |
| 402059 | 78,642,878,789 | 20,403,622 | 419,515,900 | 3,128,118,371 | 7,358 | 244,270 | 3.62 | 371 | \$70,217,938 | \$8,169,145 | \$6,387,647 | \$23,877,586 | (\$108,652,316) | 0.93 | 3,318,275,241 | \$0.27 | ( $\$ 8959,934,315)$ |
| 412060 | 78,925,993,152 | 20,477,075 | 421,026,158 | 3,139,379,597 | 7,358 | 245,150 | 3.63 | 374 | \$70,724,417 | \$8,228,069 | \$6,433,721 | \$24,049,814 | ( $\$ 109,436,021$ ) | 0.93 | 3,330,221,032 | \$0.27 | ( $5899,159,679$ ) |
| TOTALS |  | 132,604,937 | 16,079,494,434 | 119,896,67 |  |  |  | 13,314 | \$2,520,555,723 | \$293,241,115 | \$229,292, | 857,114 | ( $53,900,203,101)$ |  | 127,185,139,393 |  | ( $534,339,987,636)$ |
| $\left.\begin{array}{\|l\|} \hline 3 \% \text { Discount } \\ 5 \% \text { Discount } \\ 7 \% \text { Discount } \end{array} \right\rvert\,$ |  |  |  |  |  |  |  |  |  |  |  |  | ( $\$ 2,162,858,238)$ |  |  |  | (\$19,324,776,798) |
|  |  |  |  |  |  |  |  |  |  |  |  |  | ( $\$ 1,570,264,446)$ |  |  |  | (\$14,153,861,607) |
|  |  |  |  |  |  |  |  |  |  |  |  |  | ( $\$ 1,197,894,631$ ) |  |  |  | (\$10,880,053,191) |


| ¢ | $\begin{gathered} \text { Calendar } \\ \text { year } \end{gathered}$ | $\begin{array}{\|l\|l\|} \substack{\text { Proportio } \\ \text { n Heavy } \\ \text { Tk }} \end{array}$ |  | VMT Value | Heay Truck VMT Project and Opportunity Cost' | Auto Noise VMT) | Auto Noise Project and Opportunity Costs ${ }^{8}$ | Truck Noise <br> Value (per VMT) | Truck Noise and Project Opportunity Costs ${ }^{8}$ | Combined Auto/Light Truck \& Heavy Truck MPG | $1-290$ Project co, Decrease MT) | Opportunity Costs $\mathrm{CO}_{2}$ Increase (MT) | $\mathrm{CO}_{2}$ Value (per MT) | Undiscounted $\mathrm{CO}_{2}$ Costs @ 3\% Avg scc | NPV CO ${ }_{2}$ Project and Opportunity Costs @ $3 \%$ Avg SCC ${ }^{9}$ Undisc/(1.03^A)] | $\left\lvert\, \begin{gathered} 1-290 \\ \text { Project No } \mathrm{O}_{\mathrm{x}} \\ \text { Decrease } \\ (\mathrm{MT}) \end{gathered}\right.$ |  | $\begin{gathered} \mathrm{NO}_{\mathrm{x}} \text { Value } \\ \text { (ear } \mathrm{MT}) \end{gathered}$ | $\mathrm{NO}_{\mathrm{x}}$ Project and Opportunity Costs ${ }^{10}$ |  | Opportuni th Costs PMo Increase (preas MT) (per |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | 2020 | 0.07 | 217,101,111 | \$1.83 | (5397,295,032) | \$0.0150 | (\$43,265,150) | \$0.1528 | ( $533,173,050)$ | 36 | -0.001 | 1,353,959 | 548.00 | \$64,990,016 | $(563,097,103)$ | -1.76 | 250 | 57,399 | (\$19,227,629) | 10 | 42 |
| 2 | 2021 | 0.07 | 217,882,675 | \$1.83 | ( $\$ 398,725,294)$ | \$0.0150 | (\$43,420,904) | \$0.1528 | (\$33,292,47 | 20.54 | -0.001 | 1,346,923 | \$49.00 | \$65,999,237 | ( $\$ 62,210,611)$ | -1.76 | , | \$7,399 | $(\$ 19,296,886)$ | -5. | 42 |
|  | 2022 | 0.07 | 218,667,052 | \$1.83 | ( $5400,160,705$ ) | \$0.0150 | (\$43,577,220) | \$0.1528 | (\$33,412,326) | 20.72 | -0.001 | 1,340,027 | \$50.00 | \$67,001,362 | (\$61,315,737) | -1.76 | 3,274 | \$7,399 | (\$19,366,393) | -5.1 | 42 |
| 4 | 2023 | 0.07 | 219,454,254 | \$1.83 | (\$401,601,284) | \$0.0150 | (\$43,734,098) | \$0.1528 | (\$33,532,610) | 20.90 | -0.001 | 1,333,267 | \$51.00 | \$67,996,628 | ( $\$ 60,414,123)$ | -1.76 | 285 | \$7,399 | (\$19,436,149) | -5.10 | 42 |
| 5 | 2024 | 0.07 | 220,244,289 | \$1.83 | (\$403,047,049) | \$0.0150 | (\$43,891,540) | \$0.1528 | (\$33,653,327) | 21.08 | -0.001 | 1,326,640 | \$52.00 | \$68,985,266 | (\$59,507,296) | -1.76 | 3,297 | \$7,399 | (\$19,506,157) | -5.10 | 43 |
| 6 | 2025 | 0.07 | 221,037,168 | \$1.83 | ( $\$ 404,498,018)$ | \$0.0150 | (\$44,049,550) | \$0.1528 | (\$33,774,479) | 21.26 | -0.001 | 1,320,141 | \$53.00 | \$69,967,498 | (\$58,596,678) | -1.76 | 3,309 | \$7,399 | (\$19,576,417) | -5.10 |  |
| 7 | 2026 | 0.07 | 221,832,902 | \$1.83 | ( $\$ 405,954,211$ ) | \$0.0150 | (\$44,208,128) | \$0.1528 | ( $\$ 33,896,067)$ | 21.44 | -0.001 | 1,313,769 | \$54.00 | \$70,943,540 | (\$57,683,590) | -1.76 | 3,321 | \$7,399 | (\$19,646,929) | -5.10 | 43 |
| 8 | 2027 | 0.07 | 222,631,501 | \$1.83 | (\$407,415,646) | \$0.0150 | (\$44,367,278) | \$0.1528 | ( $\$ 34,018,093)$ | 21.62 | -0.001 | 1,307,520 | \$55.00 | \$71,913,598 | (\$56,769,259) | -1.76 | 3,333 | \$7,399 | (\$19,717,696) | -5.10 | 43 |
| 9 | 2028 | 0.07 | 223,432,974 | \$1.83 | (\$408,882,342) | \$0.0150 | $(\$ 44,527,000)$ | \$0.1528 | ( $\$ 34,140,558)$ | 21.80 | -0.001 | 1,301,391 | \$56.00 | \$72,877,876 | (\$55,854,824) | -1.76 | 3,345 | \$7,399 | (\$19,788,717) | -5.10 |  |
| 10 | 2029 | 0.07 | 224,237,333 | \$1.83 | $(\$ 410,354,319)$ | \$0.0150 | $(\$ 44,687,297)$ | \$0.1528 | ( $\$ 34,263,464)$ | 21.98 | -0.001 | 1,295,378 | \$57.00 | \$73,836,569 | ( $\$ 54,941,341)$ | -1.76 | 3,357 | \$7,399 | (\$19,859,994) | -5.10 | 43 |
| 11 | 2030 | 0.07 | 225,044,587 | \$1.83 | (\$411,831,594) | \$0.0150 | (\$44,848,171) | \$0.1528 | ( $\$ 34,386,813)$ | 22.16 | -0.001 | 1,289,480 | \$58.00 | \$74,789,865 | (\$54,029,789) | -1.76 | 3,369 | \$7,399 | (\$19,931,528) | -5.10 | 44 |
| 12 | 2031 | 0.07 | 225,854,748 | \$1.83 | ( $\$ 413,314,188)$ | \$0.0150 | (\$45,009,625) | \$0.1528 | $(\$ 34,510,605)$ | 22.34 | -0.001 | 1,283,694 | \$59.00 | \$75,737,947 | (\$53,121,073) | -1.76 | 3,381 | \$7,399 | $(\$ 20,003,319)$ | -5.10 | 44 |
| 13 | 2032 | 0.07 | 226,667,825 | \$1.83 | $(\$ 414,802,119)$ | \$0.0150 | (\$45,171,659) | \$0.1528 | ( $\$ 34,634,844)$ | 52 | -0.001 | 1,278,017 | \$60.00 | \$76,680,995 | ( $\$ 52,216,026)$ | -1.76 | 3,393 | \$7,399 | $(\$ 20,075,368)$ | -5.10 |  |
| 14 | 2033 | 0.07 | 227,483,829 | \$1.83 | ( $\$ 416,295,407)$ | \$0.0150 | (\$45,334,277) | \$0.1528 | ( $\$ 34,759,529)$ | 22.70 | -0.001 | 1,272,446 | \$61.00 | \$77,619,179 | (\$51,315,422) | -1.76 | 3,406 | \$7,399 | (\$20,147,677) | -5.10 | 44 |
| 15 | 2034 | 0.07 | 228,302,771 | \$1.83 | $(\$ 417,794,070)$ | \$0.0150 | (\$45,497,481) | \$0.1528 | ( $\$ 34,884,663)$ | 22.88 | -0.001 | 1,266,979 | \$62.00 | \$78,552,668 | (\$50,419,968) | -1.76 | 3,418 | \$7,399 | (\$20,220,246) | -5.10 | 44 |
| 16 | 2035 | 0.07 | 229,124,661 | \$1.83 | ( $\$ 419,298,129)$ | \$0.0150 | (\$45,661,272) | \$0.1528 | (\$35,010,248) | 23.06 | -0.001 | 1,261,613 | \$63.00 | \$79,481,623 | (\$49,530,319) | -1.76 | 3,430 | \$7,399 | (\$20,293,077) | -5.10 |  |
| 17 | 2036 | 0.07 | 229,949,509 | \$1.83 | ( $\$ 420,807,602)$ | \$0.0150 | (\$45,825,652) | \$0.1528 | ( $\$ 35,136,285$ ) | 23.24 | -0.001 | 1,256,347 | \$64.00 | \$80,406,201 | ( $\$ 48,647,074$ ) | -1.76 | 3,442 | \$7,399 | (\$20,366,169) | -5.10 |  |
| 18 | 2037 | 0.07 | 230,777,328 | \$1.83 | $(\$ 422,322,509)$ | \$0.0150 | (\$45,990,625) | \$0.1528 | (\$35,262,776) | 23.42 | -0.001 | 1,251,178 | \$65.00 | \$81,326,556 | (\$47,770,780) | -1.76 | 3,455 | \$7,399 | (\$20,439,525) | -5.10 | 45 |
| 19 | 2038 | 0.07 | 231,608,126 | \$1.83 | (\$423,842,871) | \$0.0150 | (\$46,156,191) | \$0.1528 | (\$35,389,722) | 23.60 | -0.001 | 1,246,104 | \$66.00 | \$82,242,836 | (\$46,901,940) | -1.76 | 3,467 | \$7,399 | (\$20,513,145) | -5.10 | 45 |
| 20 | 2039 | 0.07 | 232,441,915 | \$1.83 | ( $5425,368,705$ ) | \$0.0150 | $(\$ 46,322,353)$ | \$0.1528 | (\$35,517,125) | 23.78 | -0.001 | 1,241,122 | \$67.00 | \$83,155,184 | $(\$ 46,041,009)$ | -1.76 | 3,480 | \$7,399 | $(\$ 20,587,030)$ | -5.10 |  |
| 21 | 2040 | 0.07 | 233,278,706 | \$1.83 | (\$426,900,032) | \$0.0150 | (\$46,489,114) | \$0.1528 | (\$35,644,986) | 23.96 | -0.001 | 1,236,231 | \$68.00 | \$84,063,742 | $(\$ 45,188,404)$ | -1.76 | 3,492 | \$7,399 | $(\$ 20,661,181)$ | -5.10 |  |
| 22 | 2041 | 0.07 | 234,118,509 | \$1.83 | ( $\$ 428,436,872)$ | \$0.0150 | (\$46,656,474) | \$0.1528 | ( $\$ 35,773,308$ ) | 24.14 | -0.001 | 1,231,430 | \$69.00 | \$84,968,645 | (\$44,344,498) | -1.76 | 3,505 | \$7,399 | ( $\$ 20,735,599)$ | -5.10 | 45 |
| 23 | 2042 | 0.07 | 234,961,336 | \$1.83 | (\$429,979,245) | \$0.0150 | (\$46,824,438) | \$0.1528 | (\$35,902,092) | 24.32 | -0.001 | 1,226,715 | \$70.00 | \$85,870,025 | (\$43,509,633) | -1.76 | 3,517 | \$7,399 | ( $\$ 20,810,284)$ | -5.10 | 45 |
| 24 | 204 | 07 | 235,807,197 | \$1.83 | (\$431,527,170) | \$0.0150 | $(\$ 46,993,006)$ | \$0.1528 | (\$36,031,340) | 24.50 | -0.001 | 1,222,085 | \$71.00 | \$86,768,011 | (\$42,684,112) | -1.7 | 3,53 | \$7,399 | (\$20,885,23) | -5.10 |  |
| 25 | 2044 | 0.07 | 236,656,103 | \$1.83 | ( $\$ 433,080,668)$ | \$0.0150 | (\$47,162,180) | \$0.1528 | (\$36,161,053) | 24.68 | -0.001 | 1,217,538 | \$72.00 | \$87,62,728 | $(\$ 41,868,207)$ | -1.76 | 3,543 | \$7,399 | ( $\$ 20,960,463)$ | -5.10 | 46 |
| 26 | 2045 | 0.07 | 237,508,065 | \$1.83 | (\$434,639,759) | \$0.0150 | (\$47,331,964) | \$0.1528 | (\$36,291,232) | 24.86 | -0.001 | 1,213,073 | \$73.00 | \$88,54,299 | (\$41,062,161) | -1.76 | 3,556 | \$7,399 | (\$21,035,959) | -5.10 | 46 |
| 27 | 2046 | 0.07 | 238,363,094 | \$1.83 | ( $\$ 436,204,462)$ | \$0.0150 | $(\$ 47,502,359)$ | \$0.1528 | ( $\$ 36,421,881$ ) | 25.04 | -0.001 | 1,208,687 | \$74.00 | \$89,442,841 | ( $\$ 40,266,188)$ | -1.76 | 3,568 | \$7,399 | (\$21,111,726) | -5.10 |  |
| 28 | 2047 | 0.07 | 239,221,201 | \$1.83 | (\$437,774,798) | \$0.0150 | (\$47,673,368) | \$0.1528 | $(\$ 36,553,000)$ | 25.22 | -0.001 | 1,204,380 | \$75.00 | \$90,328,469 | (\$39,480,474) | -1.76 | 3,581 | \$7,399 | (\$21,187,765) | -5.10 |  |
| 29 | 2048 | 0.07 | 240,082,397 | \$1.83 | (\$439,350,787) | \$0.0150 | (\$47,844,992) | \$0.1528 | $(\$ 36,684,590)$ | 25.40 | -0.001 | 1,200,149 | \$76.00 | \$91,211,297 | (\$38,705,182) | -1.76 | 3,594 | \$7,399 | ( $\$ 21,264,079)$ | -5.1 | 46 |
| 30 | 2049 | 0.07 | 240,946,694 | \$1.83 | ( $\$ 440,932,450)$ | \$0.0150 | (\$48,017,234) | \$0.1528 | $(\$ 36,816,655)$ | 25.58 | -0.001 | 1,195,993 | \$77.00 | \$92,091,433 | (\$37,940,451) | -1.76 | 3,607 | \$7,399 | (\$21,340,667) | -5.10 |  |
| 31 | 2050 | 0.07 | 241,814,102 | \$1.83 | $(\$ 442,519,807)$ | \$0.0150 | (\$48,190,096) | \$0.1528 | (\$36,949,195) | 25.76 | -0.001 | 1,191,910 | \$78.00 | \$92,968,985 | $(\$ 37,186,399)$ | -1.76 | 3,620 | \$7,399 | (\$21,417,531) | 5.10 |  |
| 32 | 2051 | 0.07 | 242,684,633 | \$1.83 | ( $\$ 444,112,878)$ | \$0.0150 | (\$48,363,580) | \$0.1528 | (\$37,082,212) | 25.94 | -0.001 | 1,187,899 | \$79.00 | \$93,844,055 | (\$36,443,122) | -1.76 | 3,633 | \$7,399 | (\$21,494,672) | -5.10 |  |
| 33 | 2052 | 0.07 | 243,558,297 | \$1.83 | ( $\$ 445,711,684)$ | \$0.0150 | ( $\$ 48,537,689)$ | \$0.1528 | $(\$ 37,215,708)$ | 26.12 | -0.001 | 1,183,959 | \$80.00 | \$94,716,746 | (\$35,710,699) | -1.76 | 3,646 | \$7,399 | $(\$ 21,572,090)$ | -5.10 | 47 |
| 34 | 2053 | 0.07 | 244,435,107 | \$1.83 | ( $\$ 447,316,246)$ | \$0.0150 | (\$48,712,425) | \$0.1528 | ( $\$ 37,349,684)$ | 26.30 | -0.001 | 1,180,088 | \$81.00 | \$95,587,155 | $(\$ 34,989,190)$ | -1.76 | 3,659 | \$7,399 | (\$21,649,787) | -5.10 |  |
| 35 | 2054 | 0.07 | 245,315,074 | \$1.83 | $(\$ 448,926,585)$ | \$0.0150 | (\$48,887,790) | \$0.1528 | $(\$ 37,484,143)$ | 26.48 | -0.001 | 1,176,285 | \$82.00 | \$96,455,379 | $(\$ 34,278,640)$ | -1.76 | 3,672 | \$7,399 | (\$21,727,764) | -5.10 |  |
| 36 | 2055 | 0.07 | 246,198,208 | \$1.83 | (\$450,542,721) | \$0.0150 | (\$49,063,786) | \$0.1528 | $(\$ 37,619,086)$ | 26.66 | -0.001 | 1,172,548 | \$83.00 | \$97,321,512 | (\$33,579,077) | -1.76 | 3,686 | \$7,399 | (\$21,806,022) | -5.10 | 48 |
| 37 | 2056 | 0.07 | 247,084,522 | \$1.83 | ( $\$ 452,164,674)$ | \$0.0150 | (\$49,240,415) | \$0.1528 | ( $\$ 37,754,515$ ) | 26.84 | -0.001 | 1,168,877 | \$84.00 | \$98,185,646 | ( $\$ 32,890,516)$ | -1.76 | 3,699 | \$7,399 | ( $\$ 21,884,561)$ | -5.10 | 48 |
| 38 | 2057 | 0.07 | 247,974,026 | \$1.83 | (\$453,792,467) | \$0.0150 | (\$49,417,681) | \$0.1528 | (\$37,890,431) | 27.02 | -0.001 | 1,165,269 | \$85.00 | \$99,047,869 | (\$32,212,957) | -1.76 | 3,712 | \$7,399 | (\$21,963,383) | -5.10 |  |
| 39 | 2058 | 0.07 | 248,866,732 | \$1.83 | (\$455,426,120) | \$0.0150 | (\$49,595,585) | \$0.1528 | (\$38,026,837) | 27.20 | -0.001 | 1,161,724 | \$86.00 | \$99,908,269 | (\$31,546,390) | -1.76 | 3,726 | \$7,399 | (\$22,042,489) | -5.10 | 48 |
| 40 | 2059 | 0.07 | 249,762,653 | \$1.83 | ( $\$ 457,065,654)$ | \$0.0150 | (\$49,774,129) | \$0.1528 | (\$38,163,733) | 27.38 | -0.001 | 1,158,241 | \$87.00 | \$100,766,932 | (\$30,890,792) | -1.76 | 3,739 | \$7,399 | (\$22,121,879) | -5.10 |  |
| 41 | 2060 | 0.07 | 250,661,798 | \$1.83 | ( $\$ 458,711,090)$ | \$0.0150 | (\$49,953,315) | \$0.1528 | ( $\$ 38,301,123$ ) | 27.56 | -0.001 | 1,154,817 | \$88.00 | \$101,623,939 | ( $\$ 30,246,130)$ | -1.76 | 3,753 | \$7,399 | ( $\$ 22,201,555$ ) | -5.10 | 48 |
|  | TALS |  | 9,573, |  | (\$17,518,727,265) |  | (\$1,907,777,091) |  | (\$1,462,765,861) |  |  | 36,969,114 |  |  | ( $\$ 1,875,407,189)$ |  | 143,314 |  | ( $5847,874,749$ | -209.04 | 1,852 |
|  | Discount |  |  |  | ( $\$ 9,858,637,626)$ |  | ( $\$ 1,073,598,711$ ) |  | $(5823,169,306)$ |  |  |  |  |  | ( $\$ 1,875,407,189)$ |  |  |  | ( $5477,136,714$ ) |  |  |
|  | Discount |  |  |  | (\$7,220,667,749) |  | (\$786,325,645) |  | (\$602,906,028) |  |  |  |  |  | (\$1,875,407,189) |  |  |  | (\$329,463,136) |  |  |
|  | Discount |  |  |  | (\$5,550,516,980) |  | $(\$ 604,447,400)$ |  | (\$463,453,003) |  |  |  |  |  | (\$1,875,407,189) |  |  |  | (\$268,630,782) |  |  |



| $\underset{\substack{a}}{\substack{\text { colendar } \\ \text { Year }}}$ | Barrier Effect Project and Opportunity Costs ${ }^{14}$ | $\begin{array}{\|c\|} \text { Transport } \\ \text { Diversity Value } \end{array}$ | Transport Diversity Project and Opportunity Costs ${ }^{15}$ | $\begin{aligned} & \text { Uncompensate } \\ & \text { d Moving costs } \\ & \text { Value per HH } \end{aligned}$ | Number of HHs | Uncompensated HH Displacement Moving Costs ${ }^{16}$ | Annual Region Base VTHT Excluding Coridor Corridor | $\begin{array}{\|c\|} \text { Region VHT } \\ \text { Reduction Outside } \\ \text { Corridor w/--290 } \\ \text { Project } \end{array}$ | Annual Corridor VHT Base | Project Corridor AVHT Reduction w/l-290 Project | C-290 Removal <br> Croridor <br> Additional Travel <br> Time (Opportunity <br> Cost of Remona is <br> Project Benefit) | Chicago UZA 20\% <br>  <br> VHT Additional <br> Travel Time <br> (Opportunity Cost of <br> I-290 Removal is <br> Benefit) | Proportion Auto Traffic | Time Value (per hr) |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2020 | (\$52,011,223) | 50.008 | (\$23,074,747) | \$1,990 | 0 | So | 2,468,020,327 | 4,931,586 | 86,716,163 | 558,107 | 14,216,079 | 36,946,331 | 0.93 | \$14.36 | \$756,577,510 |
| 2021 | (\$52,198,464) | \$0.008 | (\$23,157,816) | \$1,990 | 0 | \$0 | 2,476,905,200 | 4,949,340 | 87,028,341 | 560,116 | 14,267,257 | 37,079,338 | 0.93 | \$14.36 | \$759,301,189 |
| 2022 | ( $\$ 52,386,378)$ | \$0.008 | (\$23,241,184) | \$1,990 | 0 | \$0 | 2,485,822,059 | 4,967,157 | 87,341,643 | 562,133 | 14,318,619 | 37,212,824 | 0.93 | \$14.36 | \$762,034,673 |
| 2023 | ( $\$ 52,574,969)$ | \$0.008 | (\$23,324,852) | \$1,990 | 0 | \$0 | 2,494,771,018 | 4,985,039 | 87,656,073 | 564,156 | 14,370,166 | 37,346,790 | 0.93 | \$14.36 | \$764,777,998 |
| 2024 | ( $\$ 52,764,239)$ | \$0.008 | (\$23,408,822) | \$1,990 | 0 | \$0 | 2,503,752,194 | 5,002,985 | 87,971,635 | 566,187 | 14,421,899 | 37,481,238 | 0.93 | \$14.36 | \$767,531,199 |
| 2025 | (\$52,954,190) | \$0.008 | $(\$ 23,493,093)$ | \$1,990 | 0 | \$0 | 2,512,765,702 | 5,020,996 | 88,288,333 | 568,226 | 14,473,818 | 37,616,171 | 0.93 | \$14.36 | \$770,294,311 |
| 2026 | ( $\$ 53,144,825$ ) | \$0.008 | (\$23,577,668) | \$1,990 | 0 | \$0 | 2,521,811,658 | 5,039,072 | 88,606,171 | 570,271 | 14,525,923 | 37,751,589 | 0.93 | \$14.36 | \$773,067,371 |
| 2027 | (\$53,336,147) | \$0.008 | (\$23,662,548) | \$1,990 | 0 | \$0 | 2,530,890,180 | 5,057,212 | 88,925,153 | 572,324 | 14,578,217 | 37,887,495 | 0.93 | \$14.36 | \$775,850,413 |
| 2028 | ( $\$ 53,528,157)$ | \$0.008 | (\$23,747,733) | \$1,990 | 0 | \$0 | 2,540,001,385 | 5,075,418 | 89,245,284 | 574,384 | 14,630,698 | 38,023,890 | 0.93 | \$14.36 | \$778,643,475 |
| 102029 | (\$53,720,858) | \$0.008 | ( $\$ 23,833,225)$ | \$1,990 | 0 | \$0 | 2,549,145,390 | 5,093,690 | 89,566,567 | 576,452 | 14,683,369 | 38,160,776 | 0.93 | \$14.36 | \$781,446,591 |
| 11 2030 <br> 1  | (\$53,914,253) | \$0.008 | (\$23,919,025) | \$1,990 | 0 | \$0 | 2,558,322,313 | 5,112,027 | 89,889,006 | 578,527 | 14,736,229 | 38,298,154 | 0.93 | \$14.36 | \$784,259,799 |
| $12 \quad 2031$ | ( $\$ 54,108,345$ ) | \$0.008 | (\$24,005,133) | \$1,990 | 0 | \$0 | 2,567,532,274 | 5,130,430 | 90,212,607 | 580,610 | 14,789,279 | 38,436,028 | 0.93 | \$14.36 | \$787,083,134 |
| $\begin{array}{ll}13 & 2032\end{array}$ | ( $\$ 54,303,135$ ) | \$0.008 | (\$24,091,552) | \$1,990 | 0 | \$0 | 2,576,775,390 | 5,148,900 | 90,537,372 | 582,700 | 14,842,521 | 38,574,397 | 0.93 | \$14.36 | \$789,916,633 |
| 14 2033 <br> 1  | (\$54,498,626) | \$0.008 | (\$24,178,281) | \$1,990 | 0 | \$0 | 2,586,051,781 | 5,167,436 | 90,863,307 | 584,798 | 14,895,954 | 38,713,265 | 0.93 | \$14.36 | \$792,760,333 |
| $15 \quad 2034$ | (\$54,694,821) | \$0.008 | $(\$ 24,265,323)$ | \$1,990 | 0 | \$0 | 2,595,361,568 | 5,186,039 | 91,190,415 | 586,903 | 14,949,579 | 38,852,633 | 0.93 | \$14.36 | \$795,614,271 |
| 16 2035 | (\$54,891,722) | \$0.008 | ( $\$ 24,352,678)$ | \$1,990 | 0 | \$0 | 2,604,704,869 | 5,204,708 | 91,518,700 | 589,016 | 15,003,398 | 38,992,502 | 0.93 | \$14.36 | \$798,478,482 |
| 172036 | (\$55,089,332) | \$0.008 | ( $\$ 24,440,348)$ | \$1,990 | 0 | \$0 | 2,614,081,807 | 5,223,445 | 91,848,167 | 591,137 | 15,057,410 | 39,132,875 | 0.93 | \$14.36 | \$801,353,004 |
| 18 2037 | ( $\$ 55,287,654$ ) | \$0.008 | ( $\$ 24,528,333)$ | \$1,990 | 0 | S0 | 2,623,492,501 | 5,242,250 | 92,178,821 | 593,265 | 15,111,617 | 39,273,754 | 0.93 | \$14.36 | \$804,237,875 |
| 192038 | (\$55,486,690) | \$0.008 | ( $\$ 24,616,635)$ |  |  |  | 2,632,937,074 | 5,261,122 | 92,510,665 | 595,401 | 15,166,019 | 39,415,139 | 0.93 | \$14.36 | \$807,133,132 |
| 20 2039 | (\$55,686,442) | \$0.008 | ( $\$ 24,705,255$ ) |  |  |  | 2,642,415,648 | 5,280,062 | 92,843,703 | 597,544 | 15,220,616 | 39,557,034 | 0.93 | \$14.36 | \$810,038,811 |
| 21 2040 | ( $\$ 55,886,913)$ | \$0.008 | (\$24,794,194) |  |  |  | 2,851,535,855 | 5,299,070 | 93,177,930 | 599,695 | 15,275,409 | 42,693,552 | 0.93 | \$14.36 | \$852,940,701 |
| $22 \quad 2041$ | $(\$ 56,088,106)$ | \$0.008 | ( $\$ 24,883,453)$ |  |  |  | 2,861,801,384 | 5,318,147 | 93,513,371 | 601,854 | 15,330,400 | 42,847,249 | 0.93 | \$14.36 | \$856,011,288 |
| 23 2042 <br> 1  | ( $\$ 56,290,023$ ) | \$0.008 | (\$24,973,033) |  |  |  | 2,872,103,869 | 5,337,292 | 93,850,019 | 604,021 | 15,385,590 | 43,001,499 | 0.93 | \$14.36 | \$859,092,928 |
| 24 2043 | ( $\$ 56,492,667)$ | \$0.008 | $(\$ 25,062,936)$ |  |  |  | 2,882,443,443 | 5,356,506 | 94,187,879 | 606,195 | 15,440,978 | 43,156,304 | 0.93 | \$14.36 | \$862,185,663 |
| 25 2044 | (\$56,696,041) | \$0.008 | (\$25,153,163) |  |  |  | 2,892,820,239 | 5,375,790 | 94,526,955 | 608,377 | 15,496,565 | 43,311,667 | 0.93 | \$14.36 | \$865,289,531 |
| $26 \quad 2045$ | (\$56,900,146) | \$0.008 | (\$25,243,714) |  |  |  | 2,903,234,392 | 5,395,142 | 94,867,252 | 610,568 | 15,552,353 | 43,467,589 | 0.93 | \$14.36 | \$868,404,574 |
| $27 \quad 2046$ | (\$57,104,987) | \$0.008 | ( $\$ 25,334,592)$ |  |  |  | 2,913,686,036 | 5,414,565 | 95,208,774 | 612,766 | 15,608,341 | 43,624,072 | 0.93 | \$14.36 | \$871,530,830 |
| 2882047 | (\$57,310,565) | \$0.008 | (\$25,425,796) |  |  |  | 2,924,175,306 | 5,434,057 | 95,551,526 | 614,972 | 15,664,531 | 43,781,119 | 0.93 | \$14.36 | \$874,668,341 |
| 292048 | $(\$ 57,516,883)$ | \$0.008 | $(\$ 25,517,329)$ |  |  |  | 2,934,702,337 | 5,453,620 | 95,895,511 | 617,185 | 15,720,924 | 43,938,731 | 0.93 | \$14.36 | \$877,817,147 |
| 302049 | (\$57,723,944) | \$0.008 | ( $\$ 25,609,191)$ |  |  |  | 2,945,267,265 | 5,473,253 | 96,240,735 | 619,407 | 15,777,519 | 44,096,910 | 0.93 | \$14.36 | \$880,977,289 |
| 31 2050 | (\$57,931,750) | \$0.008 | (\$25,701,385) |  |  |  | 2,955,870,227 | 5,492,957 | 96,587,202 | 621,637 | 15,834,318 | 44,255,659 | 0.93 | \$14.36 | \$884,148,807 |
| 32 2051 | ( $\$ 58,140,304)$ | \$0.008 | (\$25,793,910) |  |  |  | 2,966,511,360 | 5,512,731 | 96,934,916 | 623,875 | 15,891,322 | 44,414,979 | 0.93 | \$14.36 | \$887,331,743 |
| 33 2052 | ( $\$ 58,349,609)$ | \$0.008 | (\$25,886,768) |  |  |  | 2,977,190,801 | 5,532,577 | 97,283,881 | 626,121 | 15,948,530 | 44,574,873 | 0.93 | \$14.36 | \$890,526,137 |
| 34 2053 | ( $558,559,668$ ) | \$0.008 | (\$25,979,960) |  |  |  | 2,987,908,688 | 5,552,495 | 97,634,103 | 628,375 | 16,005,945 | 44,735,343 | 0.93 | \$14.36 | \$893,732,031 |
| 35 2054 | $(\$ 58,770,483)$ | \$0.008 | ( $\$ 26,073,488)$ |  |  |  | 2,998,665,159 | 5,572,484 | 97,985,586 | 630,637 | 16,063,567 | 44,896,390 | 0.93 | \$14.36 | \$896,949,466 |
| $36 \quad 2055$ | ( $\$ 58,982,056$ ) | \$0.008 | (\$26,167,352) |  |  |  | 3,009,460,354 | 5,592,544 | 98,338,334 | 632,907 | 16,121,395 | 45,058,017 | 0.93 | \$14.36 | \$900,178,484 |
| 37 2056 | $(\$ 59,194,392)$ | \$0.008 | ( $\$ 26,261,555)$ |  |  |  | 3,020,294,411 | 5,612,678 | 98,692,352 | 635,186 | 16,179,432 | 45,220,226 | 0.93 | \$14.36 | \$903,419,127 |
| 38 2057 | ( $559,407,492$ ) | \$0.008 | ( $\$ 26,356,096)$ |  |  |  | 3,031,167,471 | 5,632,883 | 99,047,645 | 637,473 | 16,237,678 | 45,383,019 | 0.93 | \$14.36 | \$906,671,436 |
| 3392058 | ( $\$ 59,621,359)$ | \$0.008 | ( $\$ 26,450,978)$ |  |  |  | 3,042,079,674 | 5,653,162 | 99,404,216 | 639,768 | 16,296,134 | 45,546,398 | 0.93 | \$14.36 | \$909,935,453 |
| $40 \quad 2059$ | (\$59,835,995) | \$0.008 | (\$26,546,202) |  |  |  | 3,053,031,161 | 5,673,513 | 99,762,071 | 642,071 | 16,354,800 | 45,710,365 | 0.93 | \$14.36 | \$913,211,221 |
| 412060 | ( $\$ 60,051,405$ ) | \$0.008 | ( $\$ 26,641,768$ ) |  |  |  | 3,064,022,073 | 5,693,938 | 100,121,215 | 644,382 | 16,413,677 | 45,874,922 | 0.93 | \$14.36 | \$916,498,781 |
| Totals | (\$2,293,435,256) |  | ( $\$ 1,017,481,115$ ) |  | 0 | 50 |  |  |  | 24,609,729 | 626,858,079 | 1,694,341,103 |  |  | \$34,231,921,183 |
| $3 \%$ Discount | (\$1,290,627,268) |  | $(5572,585,979)$ |  |  | \$0 |  |  |  |  |  |  |  |  | \$19,126,453,131 |
| 5\% Discount | $(\$ 945,281,797)$ |  | ( $\$ 419,373,677)$ |  |  | \$0 |  |  |  |  |  |  |  |  | \$13,949,597,402 |
| 7\% Discount | $(\$ 726,636,766)$ |  | ( $\$ 322,371,946$ ) |  |  | \$0 |  |  |  |  |  |  |  |  | \$10,685,053,907 |



| - | $\begin{gathered} \text { Calendar } \\ \text { Year } \end{gathered}$ |  | Property Damage Only \$3547 per Accident Opportunity Costs ${ }^{18}$ | Total Accident Death/ Injury/PDO Opportunity Costs ${ }^{18}$ | esidual Value | $\begin{array}{\|c} \substack{\text { Discount } \\ \text { Fartor } \\ (3 \% \text { or }} \end{array}$ | Discount Factor (5\%) | $\begin{array}{\|c\|c\|c\|c\|c\|c\|c\|c\|ccc\|c\|c\|} \substack{\text { Factor } \\ (7 \%)} \end{array}$ | NPV Costs (3\% Discount) | NPV Benefits (3\% Discount) | NPV Costs (5\% Discount) | NPV Benefits (5\% Discount) | NPV Costs (7\% Discount) | NPV Benefits (7\% Discount) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | 2020 | ( $586,209,248$ ) | ( $528,540,041$ ) | ( $5378,672,615$ ) |  | 0.9709 | 0.9524 | 0.9346 | ( $53,417,193,416$ ) | \$841,597,968 | ( $53,353,282,836$ ) | \$825,561,752 | (53,291,790,494) | \$810,132,311 |
| 2 | 2021 | (\$86,519,601) | (\$28,642,785) | (\$380,035,836) |  | 0.9426 | 0.9070 | 0.8734 | (\$3,329,627,221) | \$820,008,332 | ( $\$ 3,206,223,835$ ) | \$789,038,359 | (\$3,089,753,224) | \$759,808,272 |
| 3 | 2022 | $(\$ 86,831,072)$ | ( $528,745,899$ ) | ( $\$ 381,403,965$ ) |  | 0.9151 | 0.8638 | 0.8163 | ( $53,243,952,668)$ | \$798,950,804 | ( $\$ 3,065,535,801)$ | \$754,162,063 | ( $52,900,334,999)$ | \$712,691,007 |
| 4 | 2023 | ( $\$ 87,143,664)$ | ( $\$ 28,849,384$ ) | $(\$ 382,777,020)$ |  | 0.8885 | 0.8227 | 0.7629 | ( $\$ 3,160,737,458$ ) | \$778,519,630 | (\$2,931,135,572) | \$720,864,490 | ( $52,722,470,028$ ) | \$668,466,658 |
| 5 | 2024 | ( $\$ 87,457,381)$ | (\$28,953,242) | ( $\$ 384,155,017)$ |  | 0.8626 | 0.7835 | 0.7130 | (\$3,079,319,977) | \$758,546,557 | ( $\$ 2,802,404,624)$ | \$688,988,207 | ( $\$ 2,555,596,377)$ | \$626,992,459 |
| 6 | 2025 | $(\$ 87,772,227)$ | ( $\$ 29,057,474$ ) | ( $\$ 385,537,975)$ |  | 0.8375 | 0.7462 | 0.6663 | $(\$ 3,000,082,486)$ | \$739,125,620 | ( $\$ 2,679,416,630)$ | \$658,549,895 | ( $\$ 2,398,790,104$ ) | \$588,035,105 |
| 7 | 2026 | $(\$ 88,088,208)$ | ( $\$ 29,162,081$ ) | (\$386,925,912) |  | 0.8131 | 0.7107 | 0.6227 | (\$2,611,193,182) | \$720,902,006 | ( $\$ 2,289,609,881$ ) | \$630,113,216 | (\$2,013,249,232) | \$552,091,599 |
| 8 | 2027 | ( $\$ 88,405,325)$ | ( $\$ 29,267,064$ ) | ( $\$ 388,318,845$ ) |  | 0.7894 | 0.6768 | 0.5820 | (\$2,545,014,584) | \$702,406,427 | (\$2,190,091,321) | \$602,215,188 | (\$1,891,274,933) | \$517,862,352 |
| 9 | 2028 | (\$88,723,584) | ( $\$ 29,372,426$ ) | (\$389,716,793) |  | 0.7664 | 0.6446 | 0.5439 | (\$2,480,533,904) | \$684,393,597 | (\$2,095,192,161) | \$575,626,452 | (\$1,776,005,022) | \$485,701,563 |
| 10 | 2029 | $(\$ 89,042,989)$ | ( $\$ 29,478,166$ ) | (\$391,119,773) |  | 0.7441 | 0.6139 | 0.5083 | (\$2,417,773,762) | \$666,869,476 | ( $\$ 2,004,333,659)$ | \$550,183,001 | ( $\$ 1,669,008,966)$ | \$455,543,280 |
| 11 | 2030 | ( $\$ 89,363,544$ ) | $(\$ 29,584,288)$ | (\$392,527,804) |  | 0.7224 | 0.5847 | 0.4751 | ( $\$ 2,356,438,156)$ | \$649,750,123 | (\$1,917,565,465) | \$525,898,252 | (\$1,568,252,125) | \$427,320,437 |
| 12 | 2031 | $(\$ 89,685,253)$ | ( $\$ 29,690,791$ ) | (\$393,940,905) |  | 0.7014 | 0.5568 | 0.4440 | (\$2,296,866,256) | \$633,130,884 | ( $\$ 1,834,297,745$ ) | \$502,605,184 | ( $\$ 1,473,455,919)$ | \$400,784,306 |
| 13 | 2032 | $(\$ 90,008,120)$ | ( $529,797,678$ ) | ( $\$ 395,359,092)$ |  | 0.6810 | 0.5303 | 0.4150 | (\$2,238,759,884) | \$616,927,257 | ( $\$ 1,754,894,745$ ) | \$480,406,056 | ( $\$ 1,384,691,358)$ | \$375,954,202 |
| 14 | 2033 | ( $\$ 90,332,149)$ | ( $529,904,950$ ) | (\$396,782,384) |  | 0.6611 | 0.5051 | 0.3878 | (\$2,181,816,223) | \$601,053,484 | (\$1,679,081,198) | \$459,222,682 | (\$1,301,063,131) | \$352,576,828 |
| 15 | 2034 | (\$90,657,345) | $(\$ 30,012,607)$ | ( $\$ 398,210,801$ ) |  | 0.6419 | 4810 | 0.3624 | (\$2,126,698,146) | \$585,696,270 | (\$1,606,253,904) | \$438,884,415 | (\$1,222,632,481) | \$330,668,840 |
| 16 | 2035 | ( $\$ 90,983,711$ ) | ( $530,120,653$ ) | ( $\$ 399,644,360)$ |  | 0.6232 | 0.4581 | 0.3387 | (\$2,072,779,548) | \$570,678,687 | (\$1,536,774,337) | \$419,492,790 | (\$1,149,136,407) | \$310,155,442 |
| 17 | 2036 | (\$91,311,252) | ( $\$ 30,229,087$ ) | ( $5401,083,080)$ |  | 0.6050 | 0.4363 | 0.3166 | (\$2,020,076,546) | \$556,005,023 | ( $\$ 1,470,357,286)$ | \$400,966,928 | ( $\$ 1,080,307,521)$ | \$290,960,645 |
| 18 | 2037 | ( $\$ 91,639,973)$ | ( $\$ 30,337,912$ ) | (\$402,526,979) |  | 0.5874 | 0.4155 | 0.2959 | (\$1,968,932,394) | \$541,771,830 | (\$1,406,712,984) | \$383,224,711 | (\$1,015,546,949) | \$272,915,023 |
| 19 | 2038 | (\$91,969,877) | ( $\$ 30,447,128$ ) | (\$403,976,076) |  | 0.5703 | 0.3957 | 0.2765 | (\$1,919,038,720) | \$527,891,892 | ( $\$ 1,345,875,329)$ | \$366,275,331 | ( $\$ 954,574,778)$ | \$255,939,169 |
| 20 | 2039 | (\$92,300,968) | ( $\$ 30,556,738$ ) | (\$405,430,390) |  | 0.5537 | 0.3769 | 0.2584 | (\$1,870,411,887) | \$514,369,598 | ( $\$ 1,287,878,437)$ | \$350,128,050 | $(\$ 897,436,051)$ | \$240,045,339 |
| 21 | 2040 | $(\$ 92,635,577)$ | (\$30,667,512) | (\$406,900,151) |  | 0.5375 | 0.3589 | 0.2415 | (\$1,822,743,124) | \$525,740,244 | ( $\$ 1,232,098,895)$ | \$351,047,765 | ( $5843,847,873$ ) | \$236,216,315 |
| 22 | 2041 | (\$92,969,065) | ( $530,777,915$ ) | (\$408,364,992) |  | 0.5219 | 0.3418 | 0.2257 | (\$1,776,698,039) | \$512,317,605 | ( $\$ 1,178,888,358)$ | \$335,524,348 | ( $\$ 793,515,210$ ) | \$221,556,013 |
| 23 | 2042 | (\$93,303,753) | ( $\$ 30,888,715$ ) | (\$409,835,106) |  | 0.5067 | 0.3256 | 0.2109 | (\$1,731,636,243) | \$499,185,683 | (\$1,128,281,735) | \$320,771,380 | ( $5746,146,108)$ | \$207,772,371 |
| 24 | 2043 | ( $\$ 93,639,647)$ | ( $\$ 30,999,915$ ) | (\$411,310,512) |  | 0.4919 | 0.3101 | 0.1971 | $(\$ 1,687,570,756)$ | \$486,348,161 | ( $\$ 1,079,641,518)$ | \$306,600,050 | (\$701,775,711) | \$194,875,427 |
| 25 | 2044 | $(\$ 93,976,750)$ | ( $531,111,515$ ) | (\$412,791,230) |  | 0.4776 | 0.2953 | 0.1842 | ( $\$ 1,644,850,299)$ | \$473,907,975 | ( $\$ 1,032,991,766)$ | \$293,017,222 | ( $5660,103,763$ ) | \$182,776,066 |
| 26 | 2045 | ( $\$ 94,315,066$ ) | (\$31,223,516) | (\$414,277,279) |  | 0.4637 | 0.2812 | 0.1722 | $(\$ 1,603,154,887)$ | \$461,770,350 | ( $\$ 988,356,693)$ | \$280,029,809 | ( $\$ 621,162,156)$ | \$171,483,404 |
| 27 | 2046 | ( $\$ 94,654,600)$ | ( $\$ 31,335,921$ ) | $(\$ 415,768,677)$ |  | 0.4502 | 0.2678 | 0.1609 | (\$1,562,497,770) | \$449,939,056 | ( $5945,760,674$ ) | \$267,644,778 | $(\$ 584,306,751)$ | \$160,806,739 |
| 28 | 2047 | $(\$ 94,995,357)$ | ( $\$ 31,448,730)$ | ( $5417,265,444$ ) |  | 0.4371 | 0.2551 | 0.1504 | (\$1,522,892,274) | \$438,417,890 | (\$905,228,244) | \$255,869,146 | (\$549,901,739) | \$150,853,468 |
| 29 | 2048 | ( $\$ 95,337,340)$ | ( $\$ 31,561,945$ ) | $(\$ 418,767,600)$ |  | 0.4243 | 0.2429 | 0.1406 | (\$1,484,011,172) | \$427,110,017 | $(\$ 866,102,837)$ | \$244,508,657 | ( $\$ 517,635,237)$ | \$141,531,153 |
| 30 | 2049 | ( $\$ 95,680,554$ ) | ( $\$ 31,675,568$ ) | ( $\$ 420,275,163$ ) |  | 0.4120 | 0.2314 | 0.1314 | ( $\$ 1,446,547,957)$ | \$416,220,254 | ( $5829,085,541$ ) | \$233,770,308 | ( $\$ 487,190,515$ ) | \$132,745,974 |
| 31 | 2050 | $(\$ 96,025,004)$ | ( $\$ 31,789,600)$ | (\$421,788,154) |  | 0.4000 | 0.2204 | 0.1228 | (\$1,409,833,661) | \$405,550,797 | (\$793,515,041) | \$223,458,489 | (\$458,589,108) | \$124,504,095 |
| 32 | 2051 | ( $\$ 96,370,694$ ) | ( $\$ 31,904,043$ ) | ( $\$ 423,306,591)$ |  | 0.3883 | 0.2099 | 0.1147 | ( $\$ 1,373,878,129)$ | \$395,104,465 | ( $5759,488,891$ ) | \$213,578,231 | ( $5431,508,266$ ) | \$116,709,972 |
| 33 | 2052 | $(\$ 96,717,629)$ | ( $532,018,898$ ) | (\$424,830,495) |  | 0.3770 | 0.1999 | 0.1072 | (\$1,339,036,972) | \$384,986,216 | (\$726,784,763) | \$204,134,601 | (\$406,311,698) | \$109,470,882 |
| 34 | 2053 | ( $\$ 97,065,812)$ | ( $532,134,166$ ) | ( $\$ 426,359,884$ ) |  | 0.3660 | 0.1904 | 0.1002 | ( $\$ 1,304,977,007)$ | \$375,097,530 | ( $5695,660,448$ ) | \$195,132,704 | ( $5382,674,380)$ | \$102,690,635 |
| 35 | 2054 | $(\$ 97,415,249)$ | ( $\$ 32,249,849$ ) | $(\$ 427,894,780)$ |  | 0.3545 | 0.1813 | 0.0937 | (\$1,269,061,364) | \$364,659,602 | ( $\$ 665,705,582)$ | \$186,474,829 | $(\$ 360,614,572)$ | \$96,374,470 |
| 36 | 2055 | ( $\$ 97,765,944$ ) | ( $\$ 32,365,948$ ) | (\$429,435,201) |  | 0.3450 | 0.1727 | 0.0875 | (\$1,239,590,443) | \$356,123,642 | $(\$ 637,283,897)$ | \$178,268,270 | ( $5339,451,525$ ) | \$90,321,214 |
| 37 | 2056 | (\$98,117,902) | ( $\$ 32,482,465$ ) | (\$430,981,168) |  | 0.3350 | 0.1644 | 0.0818 | $(\$ 1,208,286,712)$ | \$347,045,024 | (\$609,711,813) | \$170,311,050 | ( $\$ 319,897,706$ ) | \$84,741,143 |
| 38 | 2057 | ( $\$ 98,471,126)$ | ( $\$ 32,599,402$ ) | (\$432,532,700) |  | 0.3252 | 0.1566 | 0.0765 | (\$1,177,455,168) | \$338,104,429 | (\$583,704,133) | \$162,814,125 | $(\$ 301,619,566)$ | \$79,535,636 |
| 39 | 2058 | $(\$ 98,825,622)$ | ( $532,716,760)$ | ( $5434,089,818)$ |  | 0.3158 | 0.1491 | 0.0715 | ( $\$ 1,147,809,158)$ | \$329,512,399 | $(\$ 558,572,288)$ | \$155,574,093 | ( $\$ 284,278,461$ ) | \$74,604,612 |
|  | 2059 | (\$99,181,394) | ( $\$ 32,834,541$ ) | (\$435,652,541) |  | 0.3066 | 0.1420 | 0.0668 | (\$1,118,653,427) | \$321,063,624 | ( $5534,681,706$ ) | \$148,698,743 | ( $\$ 267,885,391)$ | \$69,951,240 |
| 41 | 2060 | ( $\$ 99,538,447)$ | ( $\$ 32,952,745$ ) | $(\$ 437,220,890)$ |  | 0.2976 | 0.1366 | 0.0624 | ( $\$ 1,089,994,493)$ | \$312,759,999 | ( $\$ 516,676,326)$ | \$143,558,521 | ( $\$ 252,451,432$ ) | \$65,578,709 |
|  | TALS | ( $53,801,448,025$ ) | ( $\$ 1,258,490,062)$ | (\$16,697,793,996) | 50 |  |  |  | ( $580,298,425,472)$ | \$21,929,560,425 | (\$59,725,058,900) | \$15,993,194,143 | (546,666,837,266) | \$12,249,744,374 |
|  | Discount | ( $52,139,251,208)$ | (\$708,210,757) |  | \$0 |  | 368,865,047) |  | B/C Ratio: | 0.27 | B/C Ratio: | 0.27 | B/C Ratio: | 0.26 |
|  | Discount | (\$1,566,827,889) | $(\$ 518,706,902)$ |  | \$0 |  | 331,864,757) |  | NPV: | (\$58,368,865,047) | NPV: | (\$43,731,864,757) | NPV: | (\$34,417,092,892) |
|  | Discount | (\$1,204,416,151) | (\$398,728,523) |  |  |  | 417,092,892] |  |  |  |  |  |  |  |


| $\stackrel{\square}{\mathrm{a}}$ | $\begin{gathered} \text { Calendar } \\ \text { Year } \end{gathered}$ | 3+ Alternative (Design/Const) | Capital Opportunity Costs under Park/Trail Alternative ${ }^{1}$ (Design/Const | Capital Costs I-290 HOT3+ Alternative Net (Design/Const) | $\begin{gathered} \text { osM costs } 1-290 \\ \text { Hot }+3 \text { Alterative } \end{gathered}$ | Costs under Park/Trail Iternativ | 1-290 HOT 3+ O\&M Benefits Considering Opportunity Costs | Farm Crops Production Loss Costs ${ }^{3}$ | $\left.\begin{array}{\|c} \text { Ecalogical } \\ \text { Acrage coss } \\ \text { (ravenenent } \end{array} \right\rvert\,$ | Ecologica Value Per Acre | Ecological Land Opportunity Costs | $\begin{aligned} & \text { Eccological } \\ & \text { Acreage Coss } \\ & \text { (nduced } \\ & \text { Development } \end{aligned}$ | Ecologica Value Per Acre | Ecological Land Loss Induced Developmen Costs ${ }^{4}$ | Chicago UZA Estimated Population | Chicago UZA Estimated AVMT-No Build | $\underset{\substack{\text { Study Area AVMT-No } \\ \text { Buidd }}}{ }$ | $\left.\begin{array}{\|c} \text { Chicago UZA } \\ \text { Estimed der } \\ \text { Capita MT-No } \\ \text { cuild } \end{array} \right\rvert\,$ |
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|  |  |  <br>  according to the document are $\$ 2,571,000,000$. These costs are then deflated to 2016 dollars. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|  |  | Growth Through Ecological Restoration of the Niagra Gorge Rim, Part II Robert Moses Parkway, Its Current Purpose and Future Prospects. Available via: http://niagara.nypa.gov/RelicensingGreenwayFunds/EcologicalGreenway/NGR_Part02.pdf. <br>  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|  |  |  Available via https://www.dot.ny.gov/i81opportunities/repository/l-81Corridor-Study.pdf). |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  <br>  (http://modot org/newsandinfo/documents/Legislative Toll Report 8-8-02 pdf). Using this assumption brings the total estimated annual O\&M costs to $\$ 1,025,910$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|  |  | Tops Production Costs: N/A. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| $\stackrel{\text { b }}{ }$ | $\begin{gathered} \text { Calendar } \\ \text { year } \end{gathered}$ | $\underset{\text { AVMT }}{\text { A-290 Hot } 3+\text { Alt }}$ | 1-290 Hot $3+$ Att AVMT Increase in Region | Opportunity Cost of Existing I-290 Induced AVMT Excluding Project | UZA Pricing $1+\$ 0.50$ or $+20 \%$ per gal.) AVMT Opportunity Cost ${ }^{5}$ |  |  | Violent Crime <br> Reduction per 100,000 Populatio | Chicago MSA Total Annual Violent Crime Reduction | Murder Value | Ve Value | Robberr Value | Aggravated Assault Value | Total Annual Crime Reduction Opportunity Cost $^{6}$ | $\begin{gathered} \text { Proportio } \\ \text { netuto } \\ \text { Traffic } \end{gathered}$ | Auto VMT Net Change | VMTV | Auto VMT Project and Opportunity Cost't |
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 cing to calculute potential per capita VMT reductions not realized. An assumption is made that the average eperson reduces health care costs proportionately by reducing driving and presumably increasing cardiovascular activity. The unrealized per capita VMT change is about 0.04 which is multipied by 5610 to calculate opportunity costs of lost healt


 6. Moving Costs. N/A.
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."The residual value can be approximated as the difference in cost between rebuilding the road at the end of the period using the structure remaining and the costruction costift the initial proiet
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| - | ${ }_{\text {calendar }}^{\text {Year }}$ | $\begin{gathered} \text { Proportio } \\ \text { n Heary } \\ \text { Tk } \end{gathered}$ |  | MTValue | Heavy Truck VMT Project and Opportunity Cost' | Auto Noise Value (per VMT) | Auto Noise Project and Opportunity Costs ${ }^{8}$ | $\begin{aligned} & \text { Truck Noise } \\ & \text { Value (per } \end{aligned}$ VMT) | Truck Noise and Project Opportunity Costs ${ }^{8}$ | $\begin{gathered}\text { Combined } \\ \text { Auto/Light Truck \& } \\ \text { Heayy Truck MPG }\end{gathered}$ | $1-29$ Project CO $_{2}$ Decrease (MT) | Opportunity Costs $\mathrm{CO}_{2}$ Increase (MT) |  | Undiscounted $\mathrm{CO}_{2}$ Costs @ 3\% Avg SCC | NPV CO $\mathrm{O}_{2}$ Project and Opportunity Costs @ $3 \%$ Avg SCC ${ }^{9}$ Undisc/(1.03^A)] | $\left\lvert\, \begin{gathered} \text { P-290 } \\ \text { Proejet } \\ \text { Decrease } \\ \text { Dere } \\ \text { (MT) } \end{gathered}\right.$ | $\begin{gathered} \text { Opportunit } \\ \mathrm{y} \text { Costs } \mathrm{NN}_{\mathrm{x}} \\ \text { Increase } \\ \text { (MT) } \end{gathered}$ | $\underset{\substack{\mathrm{No}_{\mathrm{x}}^{\text {( } \mathrm{Val} \text { MTe }} \mathrm{M}}}{ }$ | $\mathrm{NO}_{\mathrm{x}}$ Project and Opportunity Costs ${ }^{10}$ | $\begin{gathered} 1-290 \\ \text { Project } \\ \text { PM } 10 \\ \text { Pecrease } \\ \text { (per MT) } \\ \hline \end{gathered}$ | $\begin{gathered} \text { Opportuni } \\ \text { th Costs } \\ \text { PNio } \\ \text { Pniese } \\ \text { (neraese } \\ \text { (per MT) } \\ \hline \end{gathered}$ |
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| Calendar Year | $\begin{gathered} 1-290 \\ \text { Project } \\ \text { PM } \\ \text { PM }_{25} \\ \text { Decrease } \\ \text { (per MT) } \\ \hline \end{gathered}$ | $\begin{aligned} & \text { Opportuni } \\ & \text { ty Costs } \\ & \text { PM } \\ & \text { PMrease } \\ & \text { Incras } \\ & \text { (per MT) } \end{aligned}$ |  |  | 1-290 <br> Project Vocs (MT) |  | vocs value <br> (per MT) | VOCs Project and Opportunity Costs ${ }^{10}$ | Resource Externalities Value-Car | Resource Externalities Value-Hvy Tk | Resource Consumption Project and Opportunity Costs ${ }^{11}$ | $\left\lvert\, \begin{gathered} \text { Parking Internal } \\ \text { + External Costs } \\ \text { Value } \end{gathered}\right.$ | otal Parking Project and Opportunity Costs ${ }^{12}$ |  | Per Capita VMT Project <br> $\underset{\substack{\& \\ \text { Opportunity }}}{\substack{\text { and } \\ \hline}}$ <br> Cost | Per Capita VM Proportion Reduction Project \&opp Cost | Health Care Project and Opportunity Costs (Note Not used in final calculations as covered in adjacent columns) ${ }^{13}$ | Heath Value. | Health Internal Project and Opportunity Costs Reduced Cardivascular Activity ${ }^{13}$ | Heath Value External | Health External Project and Opportunity Costs Reduced Life ${ }^{13}$ | Barrier fffect Value-car | Barrier Effect Value-Heavy Truck |
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| \% | ${ }^{\text {Calendar }}$ Year | Barrier Effect Project and Opportunity Costs ${ }^{14}$ | ( $\begin{gathered}\text { Transport } \\ \text { iversity } \\ \text { Value }\end{gathered}$ | $\begin{gathered} \text { Transport Divesity } \\ \text { Projectand opportunity } \\ \text { Costs } \end{gathered}$ | $\left\lvert\, \begin{aligned} & \text { Uncompensate } \\ & \text { d Moving Costs } \\ & \text { Value per HH } \end{aligned}\right.$ | ${ }_{\text {Hhts of }}$ | Uncompensated HH Displacement Moving Costs ${ }^{16}$ | Annual Region Base <br> VHT Excluding <br> Coridor | Region VHT Reduction Outside Corridor w/--290 Project | Annual Corridor | Project Corridor AVHT Reduction w/l-290 Project | C-290 Removal Coridor Additional Travel Time (Opportunity Cost of Remova is Project Benefit) | Pricing Increase \& VHT Additional Travel Time (Opportunity Cost o I-290 Removal is Benefit) | Proportion <br> Auto Trafic | Value | Auto VHT Benefits of I290 Project and Additional Benefits from Opportunity Costs of Removal/Pricing ${ }^{17}$ |
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| \% | ${ }_{\text {calendar }}^{\substack{\text { Calend } \\ \text { Year }}}$ | $\begin{gathered} \text { Proportio } \\ \text { nHeary } \\ \mathrm{Tk} \end{gathered}$ | $\begin{gathered} \text { Time value } \\ \text { (per hr) } \end{gathered}$ | $\underset{\substack{\text { Heavy Truck Travelt } \\ \text { Bentime }}}{\text { Tin }}$ | $\begin{aligned} & \text { Accidents No- } \\ & \text { build } \end{aligned}$ | $\begin{aligned} & \text { Reduced } \\ & \text { Accidents I- } \\ & 290 \text { Corridor } \\ & \text { HoT } 3+\text { Alt. } \end{aligned}$ | $\begin{gathered} 1-290 \text { Induced } \\ \text { Accidentand } \\ \text { inficing } \\ \text { Opportunity Costs } \end{gathered}$ | Net Increased Accidents | ${ }_{\text {Value of }}^{\substack{\text { Vatictical Life }}}$ | Death/ Crash Ratio | ( ${ }_{\substack{\text { Deaths } \\ \text { Increased }}}$ | Deaths Project, Induced Traffic and No Pricing Opportunity Costs ${ }^{18}$ | $\begin{gathered} \text { No Iniury } \\ \text { AISO } \\ 0.4376^{*} \\ 50 \end{gathered}$ | $\underset{\substack{\text { Minor AIS } \\ \text { 0.41739 * }}}{\text { * }}$ \$2,144 | Moderate AIS 2 0.08872 * \$38,078 | Serious AIS $\underset{\substack{0.04817 * \\ \$ 84718}}{ }$ \$84,718 | $\begin{gathered} \text { Severe } \\ \text { A54, } \\ \text { A.00617* } \\ 1900,999 \end{gathered}$ | $\begin{gathered} \text { Critical } \\ \text { A55 } \\ \text { A.0.29* } \\ \text { (423,999 } \end{gathered}$ |
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| ¢ | ${ }^{\text {calendar }}$ Year |  | Property Damage Only \＄3547 per Accident Opportunity Costs ${ }^{18}$ | $\begin{aligned} & \text { Total Accident Death/ } \\ & \text { Injury/PDo Opportunity } \\ & \text { Costs }{ }^{18} \end{aligned}$ | dual | $\begin{array}{\|l\|l\|} \substack{\text { Discount } \\ \text { Farotor } \\ (3 \% \%)} \\ \mid ⿰ 亻 ⿱ 丶 ⿻ 工 二 十 \end{array}$ | $\begin{gathered} \text { Discount } \\ \text { Factor (5\%) } \end{gathered}$ | $\begin{array}{\|l\|l\|} \substack{\text { Discount } \\ \text { Fartor } \\ \text { (7\%\%) }} \end{array}$ | NpV Costs（3\％Discount） | NPV Benefits（3\％Discount） | NPV Costs（5\％Discount） | NPV Benefits（5\％Discount） | NPV Costs（7\％Discount） | NPV Benefits（7\％Discount） |
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|  | I- 290 HOT $3+$ Alt AVMT | $\underset{\substack{1-299 \text { Hot } 3+\text { Alt } \\ \text { AMT Increase in } \\ \text { Region }}}{ }$ | I-290 Induced AVMT Excluding Project Opportunity Cost | UZA Pricing ( $+\$ 0.50$ or <br> +20\% per gal.) AVMT Opportunity Cost ${ }^{5}$ |  | Daily Traffic per Fwy Lane Reduced | Violent Crime Reduction per 100,000 Populatio | Chicago MSA Total Annual Reduction | Murder Value | ape V | Robbervalue | Agravated Assautt Value | Total Annual Crime Reduction Opportunity Cost ${ }^{6}$ | $\begin{aligned} & \text { Proportio } \\ & \text { PA Autio } \\ & \text { Traffic } \end{aligned}$ | Auto vit Net Change | VMT Value | Auto VMT Projectand Opportunity Cost' |
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| 12020 | 68,358,724,360 | 17,735,434 | 364,655,672 | 2,718,343,913 | 7,315 | ,327 | 3.14 | 280 | \$53,053,881 | \$6,172,281 | \$4,826,25 | \$18,040,955 |  | 0.93 | 16,493,954 | \$0.27 | (\$4,453,367) |
| 2021 | 68,604,815,768 | 17,799,282 | 365,968,432 | 2,728,129,951 | 7,315 | 213,092 | 3.15 | 282 | \$53,436,557 | \$6,216,802 | \$4,861,064 | \$18,171,083 |  | 0.93 | 16,553,332 | \$0.27 | ( $\$ 4,469,400)$ |
| 32022 | 68,851,793,104 | 17,863,359 | 367,285,919 | 2,737,951,219 | 7,315 | 213,859 | 3.17 | 284 | \$53,821,993 | \$6,261,643 | \$4,896,127 | \$18,302,151 |  | 0.93 | 16,612,924 | \$0.27 | $(\$ 4,485,489)$ |
| 42023 | 69,099,659,560 | 17,927,667 | 368,608,148 | 2,747,807,843 | 7,315 | 214,629 | 3.18 | 286 | \$54,210,209 | \$6,306,808 | \$4,931,442 | \$18,434,163 |  | 0.93 | 16,672,730 | \$0.27 | (\$4,501,637) |
| 2024 | 69,348,418,334 | 17,992,207 | 369,935,137 | 2,757,699,951 | 7,315 | 215,401 | 3.19 | 288 | \$54,601,225 | \$6,352,299 | \$4,967,012 | \$18,567,128 |  | 0.93 | 16,732,752 | \$0.27 | $(\$ 4,517,843)$ |
| 6 2025 | 69,598,072,640 | 18,056,979 | 371,266,904 | 2,767,627,671 | 7,315 | 216,177 | 3.20 | 291 | \$54,995,061 | \$6,398,118 | \$5,002,839 | \$18,701,052 |  | 0.93 | 16,792,990 | \$0.27 | $(\$ 4,534,107)$ |
| $7 \quad 2026$ | 69,848,625,702 | 18,121,984 | 372,603,465 | 2,777,591,131 | 7,315 | 216,955 | 3.21 | 293 | \$55,391,738 | \$6,444,267 | \$5,038,925 | \$18,835,942 |  | 0.93 | 16,853,445 | \$0.27 | ( $54,550,430)$ |
| 82027 | 70,100,080,754 | 18,187,223 | 373,944,837 | 2,787,590,459 | 7,315 | 217,736 | 3.22 | 295 | \$55,791,277 | \$6,490,750 | \$5,075,270 | \$18,971,805 |  | 0.93 | 16,914,117 | \$0.27 | ( $\$ 4,566,812)$ |
| 2028 | 70,352,441,045 | 18,252,697 | 375,291,038 | 2,797,625,785 | 7,315 | 218,520 | 3.23 | 297 | \$56,193,697 | \$6,537,567 | \$5,111,878 | \$19,108,648 |  | 0.93 | 16,975,008 | \$0.27 | ( $54,583,252)$ |
| 102029 | 70,605,709,833 | 18,318,407 | 376,642,086 | 2,807,697,237 | 7,315 | 219,306 | 3.25 | 299 | \$56,599,020 | \$6,584,722 | \$5,148,750 | \$19,246,478 |  | 0.93 | 17,036,118 | \$0.27 | (\$4,599,752) |
| 112030 | 70,859,890,388 | 18,384,353 | 377,997,998 | 2,817,804,947 | 7,315 | 220,096 | 3.26 | 301 | \$57,007,266 | \$6,632,218 | \$5,185,887 | \$19,385,302 |  | 0.93 | 17,097,448 | \$0.27 | (\$4,616,311) |
| $12 \quad 2031$ | 71,114,985,993 | 18,450,537 | 379,358,790 | 2,827,949,045 | 7,315 | 220,888 | 3.27 | 303 | \$57,418,457 | \$6,680,056 | \$5,223,293 | \$19,525,127 |  | 0.93 | 17,158,999 | \$0.27 | ( $\$ 4,632,930)$ |
| 132032 | 71,370,999,943 | 18,516,958 | 380,724,482 | 2,838,129,662 | 7,315 | 221,684 | 3.28 | 305 | \$57,832,615 | \$6,728,239 | \$5,260,968 | \$19,665,961 |  | 0.93 | 17,220,771 | \$0.27 | $(\$ 4,649,608)$ |
| $14 \quad 2033$ | 71,627,935,543 | 18,583,620 | 382,095,090 | 2,848,346,929 | 7,315 | 222,482 | 3.29 | 308 | \$58,249,759 | \$6,776,769 | \$5,298,915 | \$19,807,811 |  | 0.93 | 17,282,766 | \$0.27 | (\$4,666,347) |
| $15 \quad 2034$ | 71,885,796,111 | 18,650,521 | 383,470,633 | 2,858,600,977 | 7,315 | 223,283 | 3.30 | 310 | \$58,669,912 | \$6,825,650 | \$5,337,136 | \$19,950,684 |  | 0.93 | 17,344,984 | \$0.27 | ( $\$ 4,683,146)$ |
| 162035 | 72,144,584,977 | 18,717,662 | 384,851,127 | 2,868,891,941 | 7,315 | 224,086 | 3.32 | 312 | \$59,093,096 | \$6,874,883 | \$5,375,633 | \$20,094,587 |  | 0.93 | 17,407,426 | \$0.27 | $(\$ 4,700,005)$ |
| 172036 | 72,404,305,483 | 18,785,046 | 386,236,591 | 2,879,219,952 | 7,315 | 224,893 | 3.33 | 314 | \$59,519,332 | \$6,924,471 | \$5,414,407 | \$20,239,529 |  | 0.93 | 17,470,093 | \$0.27 | ( $\$ 4,716,925)$ |
| 182037 | 72,664,960,982 | 18,852,672 | 387,627,043 | 2,889,585,144 | 7,315 | 225,703 | 3.34 | 317 | \$59,948,642 | \$6,974,417 | \$5,453,461 | \$20,385,516 |  | 0.93 | 17,532,985 | \$0.27 | ( $54,733,906)$ |
| 192038 | 72,926,554,842 | 18,920,542 | 389,022,500 | 2,899,987,650 | 7,315 | 226,515 | 3.35 | 319 | \$60,381,050 | \$7,024,723 | \$5,492,797 | \$20,532,556 |  | 0.93 | 17,596,104 | \$0.27 | (\$4,750,948) |
| $20 \quad 2039$ | 73,189,090,439 | 18,988,656 | 390,422,981 | 2,910,427,606 | 7,315 | 227,331 | 3.36 | 321 | \$60,816,576 | \$7,075,392 | \$5,532,416 | \$20,680,656 |  | 0.93 | 17,659,450 | \$0.27 | ( $\$ 4,768,051)$ |
| 212040 | 73,452,571,165 | 19,057,015 | 391,828,504 | 2,920,905,145 | 7,315 | 228,149 | 3.38 | 324 | \$61,255,243 | \$7,126,427 | \$5,572,321 | \$20,829,825 |  | 0.93 | 17,723,024 | \$0.27 | $(\$ 4,785,216)$ |
| $22 \quad 2041$ | 73,717,000,421 | 19,125,620 | 393,239,086 | 2,931,420,404 | 7,315 | 228,970 | 3.39 | 326 | \$61,697,075 | \$7,177,829 | \$5,612,514 | \$20,980,070 |  | 0.93 | 17,786,827 | \$0.27 | $(\$ 4,802,443)$ |
| 232042 | 73,982,381,623 | 19,194,472 | 394,654,747 | 2,941,973,517 | 7,315 | 229,795 | 3.40 | 328 | \$62,142,093 | \$7,229,603 | \$5,652,997 | \$21,131,398 |  | 0.93 | 17,850,859 | \$0.27 | ( $\$ 4,819,732)$ |
| $24 \quad 2043$ | 74,248,718,197 | 19,263,573 | 396,075,504 | 2,952,564,622 | 7,315 | 230,622 | 3.41 | 331 | \$62,590,322 | \$7,281,750 | \$5,693,772 | \$21,283,818 |  | 0.93 | 17,915,123 | \$0.27 | $(\$ 4,837,083)$ |
| $25 \quad 2044$ | 74,516,013,582 | 19,332,921 | 397,501,376 | 2,963,193,855 | 7,315 | 231,452 | 3.43 | 333 | \$63,041,783 | \$7,334,273 | \$5,734,841 | \$21,437,337 |  | 0.93 | 17,979,617 | \$0.27 | $(\$ 4,854,497)$ |
| 262045 | 74,784,271,231 | 19,402,520 | 398,932,381 | 2,973,861,352 | 7,315 | 232,285 | 3.44 | 335 | \$63,496,501 | \$7,387,174 | \$5,776,206 | \$21,591,964 |  | 0.93 | 18,044,344 | \$0.27 | ( $\$ 4,871,973)$ |
| 272046 | 75,053,494,607 | 19,472,369 | 400,368,538 | 2,984,567,253 | 7,315 | 233,122 | 3.45 | 338 | \$63,954,499 | \$7,440,458 | \$5,817,869 | \$21,747,706 |  | 0.93 | 18,109,303 | \$0.27 | ( $\$ 4,889,512)$ |
| 282047 | 75,323,687,188 | 19,542,470 | 401, 809,864 | 2,995,311,695 | 7,315 | 233,961 | 3.46 | 340 | \$64,415,800 | \$7,494,126 | \$5,859,833 | \$21,904,571 |  | 0.93 | 18,174,497 | \$0.27 | (\$4,907,114) |
| 292048 | 75,594,852,462 | 19,612,822 | 403,256,380 | 3,006,094,817 | 7,315 | 234,803 | 3.48 | 343 | \$64,880,429 | \$7,548,180 | \$5,902,100 | \$22,062,568 |  | 0.93 | 18,239,925 | \$0.27 | ( $\$ 4,924,780)$ |
| 302049 | 75,866,993,931 | 19,683,429 | 404,708,103 | 3,016,916,759 | 7,315 | 235,648 | 3.49 | 345 | \$65,348,409 | \$7,602,625 | \$5,944,672 | \$22,221,704 |  | 0.93 | 18,305,589 | \$0.27 | (\$4,942,509) |
| 312050 | 76,140,115,109 | 19,754,289 | 406,165,052 | 3,027,777,659 | 7,315 | 236,497 | 3.50 | 348 | \$65,819,764 | \$7,657,463 | \$5,987,550 | \$22,381,989 |  | 0.93 | 18,371,489 | \$0.27 | ( $\$ 4,960,302)$ |
| 322051 | 76,414,219,523 | 19,825,404 | 407,627,246 | 3,038,677,659 | 7,315 | 237,348 | 3.51 | 350 | \$66,294,519 | \$7,712,695 | \$6,030,738 | \$22,543,429 |  | 0.93 | 18,437,626 | \$0.27 | (\$4,978,159) |
| 332052 | 76,689,310,714 | 19,896,776 | 409,094,704 | 3,049,616,898 | 7,315 | 238,203 | 3.53 | 353 | \$66,772,699 | \$7,768,327 | \$6,074,238 | \$22,706,034 |  | 0.93 | 18,504,002 | \$0.27 | ( $\$ 4,996,080)$ |
| 342053 | 76,965,392,232 | 19,968,404 | 410,567,445 | 3,060,595,519 | 7,315 | 239,060 | 3.54 | 355 | \$67,254,328 | \$7,824,359 | \$6,118,051 | \$22,869,812 |  | 0.93 | 18,570,616 | \$0.27 | ( $\$ 5,014,066)$ |
| $35 \quad 2054$ | 77,242,467,644 | 20,040,291 | 412,045,488 | 3,071,613,663 | 7,315 | 239,921 | 3.55 | 358 | \$67,739,431 | \$7,880,796 | \$6,162,180 | \$23,034,771 |  | 0.93 | 18,637,470 | \$0.27 | $(\$ 5,032,117)$ |
| 362055 | 77,520,540,528 | 20,112,436 | 413,528,852 | 3,082,671,472 | 7,315 | 240,784 | 3.56 | 360 | \$68,228,033 | \$7,937,640 | \$6,206,628 | \$23,200,920 |  | 0.93 | 18,704,565 | \$0.27 | ( $55,050,233)$ |
| 372056 | 77,799,614,474 | 20,184,840 | 415,017,556 | 3,093,769,089 | 7,315 | 241,651 | 3.58 | 363 | \$68,720,159 | \$7,994,894 | \$6,251,396 | \$23,368,267 |  | 0.93 | 18,771,901 | \$0.27 | ( $\$ 5,068,413)$ |
| 382057 | 78,079,693,086 | 20,257,506 | 416,511,619 | 3,104,906,658 | 7,315 | 242,521 | 3.59 | 366 | \$69,215,834 | \$8,052,561 | \$6,296,487 | \$23,536,821 |  | 0.93 | 18,839,480 | \$0.27 | ( $55,086,660)$ |
| 392058 | 78,360,779,981 | 20,330,433 | 418,011,061 | 3,116,084,322 | 7,315 | 243,394 | 3.60 | 368 | \$69,715,085 | \$8,110,644 | \$6,341,903 | \$23,706,591 |  | 0.93 | 18,907,302 | \$0.27 | (\$5,104,972) |
| 402059 | 78,642,878,789 | 20,403,622 | 419,515,900 | 3,127,302,226 | 7,315 | 244,270 | 3.62 | 371 | \$70,217,938 | \$8,169,145 | \$6,387,647 | \$23,877,586 |  | 0.93 | 18,975,369 | \$0.27 | ( $\$ 5,123,350)$ |
| 412060 | 78,925,993,152 | 20,477,075 | 421,026,158 | 3,138,560,514 | 7,315 | 245,150 | 3.63 | 374 | \$70,724,417 | \$8,228,069 | \$6,433,721 | \$24,049,814 |  | 0.93 | 19,043,680 | \$0.27 | ( $\$ 5,141,794)$ |
| totals |  | 132,604,937 | 16,079,494,434 | 119,865,394,113 |  |  |  | 13,314 | \$2,520,555,723 | \$293,241,115 | \$229,292,137 | \$857,114,126 | 50 |  | 727,301,004 |  | ( $5196,371,271$ ) |
| 3\% Discount |  |  |  |  |  |  |  |  |  |  |  |  | \$0 |  |  |  | (\$110,507,640) |
| 5\% Discount |  |  |  |  |  |  |  |  |  |  |  |  | \$0 |  |  |  | (\$80,938,055) |
| 7\% Discount |  |  |  |  |  |  |  |  |  |  |  |  | \$0 |  |  |  | (\$62,216,967) |


|  | $\begin{gathered} \text { Calendar } \\ \text { year } \end{gathered}$ | $\begin{array}{\|c\|c\|c\|c\|c\|c\|c\|l\|} \substack{\text { Propeav } \\ \text { n Hky } \\ \mathrm{Tk}} \end{array}$ | Heavy Truck VMT Net Change L, | vmivalue | Heaw Truck VMT Project and Opportunity Cost' | $\begin{aligned} & \text { Auto Noise } \\ & \text { Value ( per } \end{aligned}$ vмті) | Auto Noise Projectand Opportunity Costs ${ }^{8}$ | Truck Noise <br> Value (per VMT) | Truck Noise and Project Opportunity Costs ${ }^{8}$ | Combined Auto/Light Truck \& Heavy Truck MP | 1-290 Project CO2 Decrease (MT) | Opportunity Costs <br> co, 1 ncease (MT) | $\left.\begin{array}{c} \mathrm{co}_{2} \text { (ealue } \mathrm{Va} \end{array}\right)$ | Undiscounted $\mathrm{CO}_{2}$ Costs @ 3\% Avg SCC | NPV CO ${ }_{2}$ Project and Opportunity Costs @ $3 \%$ Avg SCC ${ }^{9}$ [Undisc/(1.03^A)] | $\left\lvert\, \begin{gathered} \text { Pr-290 } \\ \text { Project NO }{ }_{x} \\ \text { Decrease } \\ \text { (MT) } \end{gathered}\right.$ | Opportunit y Costs $\mathrm{NO}_{x}$ Increase (MT) | $\mathrm{NO}_{\mathrm{x}}$ Value (per MT) | $\mathrm{NO}_{\mathrm{x}}$ Project and Opportunity Costs ${ }^{10}$ |  | $\begin{array}{\|l\|l} \text { Opportuni } \\ \text { ty Costs } \\ \text { PM } \\ \text { PM } \\ \text { Increase } \\ \text { (per MT } \end{array}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | 2020 | 0.07 | 1,241,480 | \$1.83 | ( $52,271,909)$ | \$0.0150 | ( $\$ 247,409)$ | \$0.1528 | (\$189,698) | 20.36 | -0.95 |  | \$48.00 | (546) | \$44 | ${ }^{-1.76}$ |  | \$7,399 | \$10,435 | -5.10 |  |
| 2 | 2021 | 0.07 | 1,245,950 | \$1.83 | $(\$ 2,280,088)$ | \$0.0150 | $(\$ 248,300)$ | \$0.1528 | $(\$ 190,381)$ | 20.54 | -0.95 |  | \$49.00 | (\$47) | \$44 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 3 | 2022 | 0.07 | 1,250,435 | \$1.83 | ( $\$ 2,288,296)$ | \$0.0150 | (\$249,194) | \$0.1528 | $(\$ 191,066)$ | 20.72 | -0.95 |  | \$50.00 | (\$48) | \$44 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 4 | 2023 | 0.07 | 1,254,937 | \$1.83 | (\$2,296,534) | \$0.0150 | (\$250,091) | \$0.1528 | (\$191,754) | 20.90 | -0.95 |  | \$51.00 | (\$49) | \$43 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 5 | 2024 | 0.07 | 1,259,454 | \$1.83 | $(\$ 2,304,802)$ | \$0.0150 | (\$250,991) | \$0.1528 | (\$192,445) | 21.08 | -0.95 |  | \$52.00 | (\$50) | \$43 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 6 | 2025 | 0.07 | 1,263,989 | \$1.83 | ( $\$ 2,313,099)$ | \$0.0150 | (\$251,895) | \$0.1528 | $(\$ 193,137)$ | 21.26 | -0.95 |  | \$53.00 | (\$51) | \$42 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 7 | 2026 | 0.07 | 1,268,539 | \$1.83 | (\$2,321,426) | \$0.0150 | $(\$ 222,802)$ | \$0.1528 | (\$193,833) | 21.44 | -0.95 |  | \$54.00 | (\$52) | \$42 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 8 | 2027 | 0.07 | 1,273,106 | \$1.83 | ( $\$ 2,329,783)$ | \$0.0150 | (\$253,712) | \$0.1528 | $(\$ 194,531)$ | 21.62 | -0.95 |  | \$55.00 | (\$52) | \$41 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 9 | 2028 | 0.07 | 1,277,689 | \$1.83 | $(\$ 2,338,170)$ | \$0.0150 | (\$254,625) | \$0.1528 | (\$195,231) | 21.80 | -0.95 |  | \$56.00 | (\$53) | \$41 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 10 | 2029 | 0.07 | 1,282,288 | \$1.83 | $(\$ 2,346,588)$ | \$0.0150 | (\$255,542) | \$0.1528 | (\$195,934) | 21.98 | -0.95 |  | \$57.00 | (\$54) | \$40 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 11 | 2030 | 0.07 | 1,286,905 | \$1.83 | ( $\$ 2,355,036)$ | \$0.0150 | (\$256,462) | \$0.1528 | (\$196,639) | 22.16 | -0.95 |  | \$58.00 | (\$55) | \$40 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 12 | 2031 | 0.07 | 1,291,538 | \$1.83 | ( $\$ 2,363,514)$ | \$0.0150 | $(\$ 257,385)$ | \$0.1528 | $(\$ 197,347)$ | 22.34 | -0.95 |  | \$59.00 | (\$56) | \$39 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 13 | 2032 | 0.07 | 1,296,187 | \$1.83 | ( $\$ 2,372,022)$ | \$0.0150 | (\$258,312) | \$0.1528 | $(\$ 198,057)$ | 22.52 | -0.95 |  | \$60.00 | (\$57) | \$39 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 14 | 2033 | 0.07 | 1,300,853 | \$1.83 | $(\$ 2,380,562)$ | \$0.0150 | (\$259,241) | \$0.1528 | $(\$ 198,770)$ | 22.70 | -0.95 |  | \$61.00 | (\$58) | \$38 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 15 | 2034 | 0.07 | 1,305,536 | \$1.83 | (\$2,389,132) | \$0.0150 | ( $\$ 260,175)$ | \$0.1528 | (\$199,486) | 22.88 | -0.95 |  | \$62.00 | (\$59) | \$38 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 16 | 2035 | 0.07 | 1,310,236 | \$1.83 | $(\$ 2,397,733)$ | \$0.0150 | (\$261,111) | \$0.1528 | $(\$ 200,204)$ | 23.06 | -0.95 |  | \$63.00 | (\$60) | \$37 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 17 | 2036 | 0.07 | 1,314,953 | \$1.83 | (\$2,406,364) | \$0.0150 | (\$262,051) | \$0.1528 | (\$200,925) | 23.24 | -0.95 |  | \$64.00 | (\$61) | \$37 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 18 | 2037 | 0.07 | 1,319,687 | \$1.83 | ( $\$ 2,415,027)$ | \$0.0150 | (\$262,995) | \$0.1528 | (\$201,648) | 23.42 | -0.95 |  | \$65.00 | (\$62) | \$36 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 19 | 2038 | 0.07 | 1,324,438 | \$1.83 | (\$2,423,721) | \$0.0150 | (\$263,942) | \$0.1528 | (\$202,374) | 23.60 | -0.95 |  | \$66.00 | (\$63) | \$36 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 20 | 2039 | 0.07 | 1,329,206 | \$1.83 | $(\$ 2,432,447)$ | \$0.0150 | $(\$ 264,892)$ | \$0.1528 | (\$203,103) | 23.78 | -0.95 |  | \$67.00 | (\$64) | \$35 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 21 | 2040 | 0.07 | 1,333,991 | \$1.83 | ( $\$ 2,441,204)$ | \$0.0150 | (\$265,845) | \$0.1528 | (\$203,834) | 23.96 | -0.95 |  | \$68.00 | (\$65) | \$35 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 22 | 2041 | 0.07 | 1,338,793 | \$1.83 | (\$2,449,992) | \$0.0150 | (\$266,802) | \$0.1528 | (\$204,568) | 24.14 | -0.95 |  | \$69.00 | (\$66) | \$34 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 23 | 2042 | 0.07 | 1,343,613 | \$1.83 | ( $\$ 2,458,812)$ | \$0.0150 | (\$267,763) | \$0.1528 | (\$205,304) | 24.32 | -0.95 |  | \$70.00 | (\$67) | \$34 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 24 | 2043 | 0.07 | 1,348,450 | \$1.83 | (\$2,467,664) | \$0.0150 | ( $\$ 268,727)$ | \$0.1528 | $(\$ 206,043)$ | 24.50 | -0.95 |  | \$71.00 | (\$68) | \$33 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 25 | 2044 | 0.07 | 1,353,305 | \$1.83 | $(\$ 2,476,547)$ | \$0.0150 | (\$289,694) | \$0.1528 | $(\$ 206,785)$ | 24.68 | -0.95 |  | \$72.00 | (\$69) | \$33 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 26 | 2045 | 0.07 | 1,358,176 | \$1.83 | $(\$ 2,485,463)$ | \$0.0150 | (\$270,665) | \$0.1528 | $(\$ 207,529)$ | 24.86 | -0.95 |  | \$73.00 | (\$70) | \$32 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 27 | 2046 | 0.07 | 1,363,066 | \$1.83 | $(\$ 2,494,410)$ | \$0.0150 | (\$271,640) | \$0.1528 | $(\$ 208,276)$ | 25.04 | -0.95 |  | \$74.00 | (\$71) | \$32 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 28 | 2047 | 0.07 | 1,367,973 | \$1.83 | (\$2,503,390) | \$0.0150 | (\$272,617) | \$0.1528 | $(\$ 209,026)$ | 25.22 | -0.95 |  | \$75.00 | (\$72) | \$31 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 29 | 2048 | 0.07 | 1,372,898 | \$1.83 | $(\$ 2,512,403)$ | \$0.0150 | (\$273,599) | \$0.1528 | $(\$ 209,779)$ | 25.40 | -0.95 |  | \$76.00 | (\$73) | \$31 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 30 | 2049 | 0.07 | 1,377,840 | \$1.83 | ( $\$ 2,521,447)$ | \$0.0150 | (\$274,584) | \$0.1528 | (\$210,534) | 25.58 | -0.95 |  | \$77.00 | (\$73) | \$30 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 31 | 2050 | 0.07 | 1,382,800 | \$1.83 | (\$2,530,524) | \$0.0150 | (\$275,572) | \$0.1528 | (\$211,292) | 25.76 | -0.95 |  | \$78.00 | (\$74) | \$30 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 32 | 2051 | 0.07 | 1,387,778 | \$1.83 | (\$2,539,634) | \$0.0150 | (\$276,564) | \$0.1528 | $(\$ 212,053)$ | 25.94 | -0.95 |  | \$79.00 | (\$75) | \$29 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 33 | 2052 | 0.07 | 1,392,774 | \$1.83 | ( $\$ 2,548,777)$ | \$0.0150 | (\$277,560) | \$0.1528 | (\$212,816) | 26.12 | -0.95 |  | \$80.00 | (\$76) | \$29 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 34 | 2053 | 0.07 | 1,397,788 | \$1.83 | $(\$ 2,557,953)$ | \$0.0150 | $(\$ 278,559)$ | \$0.1528 | (\$213,582) | 26.30 | -0.95 |  | \$81.00 | (\$77) | \$28 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 35 | 2054 | 0.07 | 1,402,820 | \$1.83 | (\$2,567,161) | \$0.0150 | (\$279,562) | \$0.1528 | (\$214,351) | 26.48 | -0.95 |  | \$82.00 | (\$78) | \$28 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 36 | 2055 | 0.07 | 1,407,870 | \$1.83 | $(\$ 2,576,403)$ | \$0.0150 | (\$280,568) | \$0.1528 | (\$215,123) | 26.66 | -0.95 |  | \$83.00 | (\$79) | \$27 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 37 | 2056 | 0.07 | 1,412,939 | \$1.83 | $(\$ 2,585,678)$ | \$0.0150 | (\$281,579) | \$0.1528 | (\$215,897) | 26.84 | -0.95 |  | \$84.00 | (\$80) | \$27 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 38 | 2057 | 0.07 | 1,418,025 | \$1.83 | $(\$ 2,594,986)$ | \$0.0150 | (\$282,592) | \$0.1528 | (\$216,674) | 27.02 | -0.95 |  | \$85.00 | (\$81) | \$26 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 39 | 2058 | 0.07 | 1,423,130 | \$1.83 | (\$2,604,328) | \$0.0150 | (\$283,610) | \$0.1528 | (\$217,454) | 27.20 | -0.95 |  | \$86.00 | (582) | \$26 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 40 | 2059 | 0.07 | 1,428,254 | \$1.83 | (\$2,613,704) | \$0.0150 | (\$284,631) | \$0.1528 | (\$218,237) | 27.38 | -0.95 |  | \$87.00 | (\$83) | \$25 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
| 41 | 2060 | 0.07 | 1,433,395 | \$1.83 | ( $\$ 2,623,113)$ | \$0.0150 | ( $\$ 285,655)$ | \$0.1528 | (\$219,023) | 27.56 | -0.95 |  | \$88.00 | (\$84) | \$25 | -1.76 |  | \$7,399 | \$10,435 | -5.10 |  |
|  | TALS |  | 54,743,086 |  | (\$100,179,848) |  | (\$10,909,515) |  | ( $58,364,744]$ |  |  | 0 |  |  | \$1,429 |  | 0 |  | 5427,819 | 209.04 | 0 |
|  | Discount |  |  |  | ( $556,376,060$ ) |  | ( $56,139,313$ ) |  | ( $54,707,247$ ) |  |  |  |  |  | \$1,429 |  |  |  | \$244,290 |  |  |
|  | Discount |  |  |  | (\$41,290,979) |  | ( $\$ 4,496,559$ ) |  | ( $\$ 3,447,684)$ |  |  |  |  |  | \$1,429 |  |  |  | \$180,471 |  |  |
|  | Discount |  |  |  | (\$31,740,316) |  | (\$3,456,498) |  | ( $\$ 2,650,230)$ |  |  |  |  |  | \$1,429 |  |  |  | \$139,759 |  |  |


| \% | $\begin{gathered} \text { Calendar } \\ \text { Year } \end{gathered}$ | $\begin{gathered} 1-290 \\ \text { Project }^{\text {Pro }} \\ \text { Pecrease } \\ \text { (perase } \\ \text { (per MT) } \\ \hline \end{gathered}$ | $\begin{array}{\|c} \text { Opportuni } \\ \text { opy Costs } \\ \text { PM } \\ \text { PM } \\ \text { Increase } \\ \text { (per MT) } \end{array}$ | PM Value (per MT) | PM Project and Opportunity Costs ${ }^{10}$ | $\begin{array}{\|c} 1-290 \\ \text { Proeiect } \\ \text { vocs } \\ \text { Decrease } \\ \text { (MT) } \\ \hline \end{array}$ | $\begin{gathered} \text { Opportunit } \\ \text { y Costs } \\ \text { voct } \\ \text { Increase } \\ \text { (MT) } \end{gathered}$ | vocs Value <br> (per MT) | VOCs Project and Opportunity Costs ${ }^{10}$ | $\begin{array}{\|c\|c} \text { Resource } \\ \text { Externalites } \\ \text { Value-Car } \end{array}$ | $\begin{gathered} \text { Resource } \\ \text { Externalities } \\ \text { Value-Hyy Tk } \\ \hline \end{gathered}$ | Resource Consumption Project and Opportunity Costs ${ }^{11}$ | $\begin{gathered} \text { Parking Internal } \\ + \text { Exxernal costs } \\ \text { value } \end{gathered}$ | Total Parking Project and Opportunity Costs ${ }^{12}$ | Annual Inactivity Health Care Costs Per Capita | $\begin{gathered} \text { Chicago UZA } \\ \text { Per Capita } \\ \text { VMT Project } \\ \& \\ \text { Opportunity } \\ \text { Cost } \end{gathered}$ |  | Health Care Project and Opportunity Costs (Note Not used in final calculations as covered in adjacent columns) ${ }^{13}$ | Health Value Internal | Health Internal Project and Opportunity Costs Reduced Cardivascular Activity ${ }^{13}$ | $\begin{gathered} \text { Health Value - } \\ \text { External } \end{gathered}$ | Health External Project and Opportunity Costs Reduced Life ${ }^{13}$ | Barrier Effect Value-Car | Barrier Effect Value-Heavy Truck |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | 2020 | -0.09 |  | \$373,117 | \$967,749 | - $\$ 1.61$ |  | \$1,696 | \$2,188 | \$0.05 | 50.23 |  | 50.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | 50.02 | \$0.03 |
| 2 | 2021 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 3 | 2022 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 4 | 2023 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 5 | 2024 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 6 | 2025 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 7 | 2026 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 8 | 2027 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 9 | 2028 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 10 | 2029 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 11 | 2030 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 12 | 2031 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 13 | 2032 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 14 | 2033 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 15 | 2034 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 16 | 2035 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 17 | 2036 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 18 | 2037 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 19 | 2038 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 20 | 2039 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 21 | 2040 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 22 | 2041 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 23 | 2042 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 24 | 2043 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 25 | 2044 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 26 | 2045 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 27 | 2046 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 28 | 2047 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 29 | 2048 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 30 | 2049 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 31 | 2050 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 32 | 2051 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 33 | 2052 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 34 | 2053 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 35 | 2054 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 36 | 2055 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 37 | 2056 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 38 | 2057 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 39 | 2058 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 40 | 2059 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| 41 | 2060 | -0.09 |  | \$373,117 | \$967,749 | -\$1.61 |  | \$1,696 | \$2,188 | \$0.05 | \$0.23 |  | \$0.144 |  | \$610 | 348 | 0.05 |  | 0.11 |  | 0.11 |  | \$0.02 | \$0.03 |
| TOT | tals | -3.64 | 0 |  | \$39,677,701 |  |  |  | \$89,728 |  |  | S0 |  | 50 |  |  |  |  |  | 50 |  | 50 |  |  |
|  | Discount |  |  |  | \$22,656,490 |  |  |  | \$51,236 |  |  | 50 |  | \$0 |  |  |  |  |  | \$0 |  | S0 |  |  |
| 5\% D | Discount Discount |  |  |  | $\$ 16,737,603$ $\$ 12,261834$ |  |  |  | $\$ 37,851$ $\$ 29,312$ |  |  | \$0 |  | \$0 |  |  |  |  |  | \$0 |  | \$0 |  |  |
|  | Discount |  |  |  | \$12,961,834 |  |  |  | \$29,312 |  |  | \$0 |  |  |  |  |  |  |  | \$0 |  |  |  |  |


| 5 | $\begin{gathered} \text { Calendar } \\ \text { year } \end{gathered}$ |  | $\begin{gathered} \text { Transport } \\ \text { Diversity Value } \end{gathered}$ | Transport Diversity Project and Oportunity Costs ${ }^{15}$ | $\begin{aligned} & \text { Uncompensate } \\ & \text { d Moving Costs } \\ & \text { Value per HH } \end{aligned}$ | Number of HHs | Uncompensated HH Displacement Moving Costs ${ }^{16}$ | $\begin{gathered} \text { Annual Region Base } \\ \text { VHT Excluding } \\ \text { Corididor } \end{gathered}$ | CHANGED TO REGION AS WHOLE! Region VHT Reduction Outside Corridor w/l-290 Project | Annual Corridor VHT Base | Project Corridor AVHT Reduction w/I-290 Project |  | Chicago UZA 20\% <br> Pricing Increase \& VHT Additional Travel Time Opportunity Cost Reduction | Proportion Auto Traffic | Time Value <br> (per hr) | Auto VHT Benefits of I290 Project and Additional Benefits from Opportunity Costs of Removal/Pricing ${ }^{17}$ | Auto MPG | Aut outr Alternate Benentitus sing ule eof Half Methodogy: Trips Retained | Auto VHT Alternate Benefits using Rule of Half Methodology: Trips Forgone | Auto VHT Alternate Benefits using Rule of Half Methodology |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 12020 |  | \$0.008 |  | \$1,990 | 0 | 50 | 2,468,020,327 | 5,489,693 | 86,716,163 | 558,107 | 14,216,079 | 36,937,960 | 0.93 | \$14.36 | \$763,919,116 | 21.40 | \$1,484,594,060 | ( $54,260,681$ ) | \$1,480,333,378 |
|  | 22021 |  | \$0.008 |  | \$1,990 | 0 | \$0 | 2,476,905,200 | 5,509,456 | 87,028,341 | 560,116 | 14,267,257 | 37,070,936 | 0.93 | \$14.36 | \$766,669,225 | 21.40 | \$1,489,938,598 | ( $54,276,020)$ | \$1,485,662,579 |
|  | 32022 |  | \$0.008 |  | \$1,990 | 0 | \$0 | 2,485,822,059 | 5,529,290 | 87,341,643 | 562,133 | 14,318,619 | 37,204,392 | 0.93 | \$14.36 | \$769,429,234 | 21.40 | \$1,495,302,377 | $(\$ 4,291,413)$ | \$1,491,010,964 |
|  | 42023 |  | \$0.008 |  | \$1,990 | 0 | \$0 | 2,494,771,018 | 5,549,195 | 87,656,073 | 564,156 | 14,370,166 | 37,338,327 | 0.93 | \$14.36 | \$772,199,179 | 21.40 | \$1,500,685,466 | $(\$ 4,306,862)$ | \$1,496,378,603 |
|  | 52024 |  | \$0.008 |  | \$1,990 | 0 | \$0 | 2,503,752,194 | 5,569,172 | 87,971,635 | 566,187 | 14,421,899 | 37,472,745 | 0.93 | \$14.36 | \$774,979,096 | 21.40 | \$1,506,087,933 | ( $54,322,367)$ | \$1,501,765,566 |
|  | 62025 |  | \$0.008 |  | \$1,990 | 0 | \$0 | 2,512,765,702 | 5,589,222 | 88,288,333 | 568,226 | 14,473,818 | 37,607,647 | 0.93 | \$14.36 | \$777,769,021 | 21.40 | \$1,511,509,850 | ( $54,337,928$ ) | \$1,507,171,922 |
|  | 72026 |  | \$0.008 |  | \$1,990 | 0 | \$0 | 2,521,811,658 | 5,609,343 | 88,606,171 | 570,271 | 14,525,923 | 37,743,035 | 0.93 | \$14.36 | \$780,568,990 | 21.40 | \$1,516,951,285 | (\$4,353,544) | \$1,512,597,741 |
| 8 | $8 \quad 2027$ |  | \$0.008 |  | \$1,990 | 0 | \$0 | 2,530,890,180 | 5,629,536 | 88,925,153 | 572,324 | 14,578,217 | 37,878,910 | 0.93 | \$14.36 | \$783,379,038 | 21.40 | \$1,522,412,310 | (\$4,369,217) | \$1,518,043,093 |
| 9 | 9 2028 |  | \$0.008 |  | \$1,990 | 0 | \$0 | 2,540,001,385 | 5,649,803 | 89,245,284 | 574,384 | 14,630,698 | 38,015,274 | 0.93 | \$14.36 | \$786,199,203 | 21.40 | \$1,527,892,994 | ( $54,384,946$ ) | \$1,523,508,048 |
| 10 | 10 2029 |  | \$0.008 |  | \$1,990 | 0 | \$0 | 2,549,145,390 | 5,670,142 | 89,566,567 | 576,452 | 14,683,369 | 38,152,129 | 0.93 | \$14.36 | \$789,029,520 | 21.40 | \$1,533,393,409 | ( $\$ 4,400,732)$ | \$1,528,992,677 |
| 11 | 112030 |  | \$0.008 |  | \$1,990 | 0 | \$0 | 2,558,322,313 | 5,690,554 | 89,889,006 | 578,527 | 14,736,229 | 38,289,476 | 0.93 | \$14.36 | \$791,870,026 | 21.40 | \$1,538,913,625 | ( $54,416,574$ ) | \$1,534,497,051 |
| 12 | 12.2031 |  | \$0.008 |  | \$1,990 | 0 | \$0 | 2,567,532,274 | 5,711,040 | 90,212,607 | 580,610 | 14,789,279 | 38,427,318 | 0.93 | \$14.36 | \$794,720,758 | 21.40 | \$1,544,453,714 | ( $54,432,474$ ) | \$1,540,021,240 |
| 13 | 13 2032 |  | \$0.008 |  | \$1,990 | 0 | \$0 | 2,576,775,390 | 5,731,600 | 90,537,372 | 582,700 | 14,842,521 | 38,565,657 | 0.93 | \$14.36 | \$797,581,753 | 21.40 | \$1,550,013,748 | ( $54,448,431$ ) | \$1,545,565,317 |
| 14 | 14 2033 |  | \$0.008 |  | \$1,990 | 0 | \$0 | 2,586,051,781 | 5,752,234 | 90,863,307 | 584,798 | 14,895,954 | 38,704,493 | 0.93 | \$14.36 | \$800,453,047 | 21.40 | \$1,555,593,797 | ( $54,464,445$ ) | \$1,551,129,352 |
| 15 | [ 2034 |  | \$0.008 |  | \$1,990 | 0 | \$0 | 2,595,361,568 | 5,772,942 | 91,190,415 | 586,903 | 14,949,579 | 38,843,829 | 0.93 | \$14.36 | \$803,334,678 | 21.40 | \$1,561,193,935 | ( $\$ 4,480,517)$ | \$1,556,713,418 |
| 16 | [62035 |  | \$0.008 |  | \$1,990 | 0 | \$0 | 2,604,704,869 | 5,793,725 | 91,518,700 | 589,016 | 15,003,398 | 38,983,667 | 0.93 | \$14.36 | \$806,226,683 | 21.40 | \$1,566,814,233 | $(\$ 4,496,647)$ | \$1,562,317,586 |
| 17 | [ 2036 |  | \$0.008 |  | \$1,990 | 0 | \$0 | 2,614,081,807 | 5,814,582 | 91,848,167 | 591,137 | 15,057,410 | 39,124,008 | 0.93 | \$14.36 | \$809,129,099 | 21.40 | \$1,572,454,764 | ( $\$ 4,512,835)$ | \$1,567,941,929 |
| 18 | 18 2037 |  | \$0.008 |  | \$1,990 | 0 | \$0 | 2,623,492,501 | 5,835,515 | 92,178,821 | 593,265 | 15,111,617 | 39,264,855 | 0.93 | \$14.36 | \$812,041,964 | 21.40 | \$1,578,115,601 | ( $54,529,081$ ) | \$1,573,586,520 |
| 19 | 19038 |  | \$0.008 |  |  |  |  | 2,632,937,074 | 5,856,522 | 92,510,665 | 595,401 | 15,166,019 | 39,406,208 | 0.93 | \$14.36 | \$814,965,315 | 21.40 | \$1,583,796,818 | $(\$ 4,545,386)$ | \$1,579,251,432 |
| 20 | 2039 |  | \$0.008 |  |  |  |  | 2,642,415,648 | 5,877,606 | 92,843,703 | 597,544 | 15,220,616 | 39,548,071 | 0.93 | \$14.36 | \$817,899,190 | 21.40 | \$1,589,498,486 | (\$4,561,749) | \$1,584,936,737 |
| 21 | 12040 |  | \$0.008 |  |  |  |  | 2,851,535,855 | 5,898,765 | 93,177,930 | 599,695 | 15,275,409 | 42,684,556 | 0.93 | \$14.36 | \$860,829,376 | 21.40 | \$1,595,220,681 | ( $54,578,172)$ | \$1,590,642,509 |
| 22 | 2041 |  | \$0.008 |  |  |  |  | 2,861,801,384 | 5,920,001 | 93,513,371 | 601,854 | 15,330,400 | 42,838,221 | 0.93 | \$14.36 | \$863,928,362 | 21.40 | \$1,600,963,475 | ( $54,594,653)$ | \$1,596,368,822 |
| 23 | 23 2042 |  | \$0.008 |  |  |  |  | 2,872,103,869 | 5,941,313 | 93,850,019 | 604,021 | 15,385,590 | 42,992,438 | 0.93 | \$14.36 | \$867,038,504 | 21.40 | \$1,606,726,944 | ( $\$ 4,611,194)$ | \$1,602,115,750 |
| 24 | [2043 |  | \$0.008 |  |  |  |  | 2,882,443,443 | 5,962,701 | 94,187,879 | 606,195 | 15,440,978 | 43,147,211 | 0.93 | \$14.36 | \$870,159,842 | 21.40 | \$1,612,511,161 | ( $54,627,794$ ) | \$1,607,883,366 |
| 25 | 25 2044 |  | \$0.008 |  |  |  |  | 2,892,820,239 | 5,984,167 | 94,526,955 | 608,377 | 15,496,565 | 43,302,541 | 0.93 | \$14.36 | \$873,292,418 | 21.40 | \$1,618,316,201 | ( $\$ 4,644,454$ ) | \$1,613,671,747 |
| 26 | 2645 |  | \$0.008 |  |  |  |  | 2,903,234,392 | 6,005,710 | 94,867,252 | 610,568 | 15,552,353 | 43,458,430 | 0.93 | \$14.36 | \$876,436,270 | 21.40 | \$1,624,142,139 | ( $54,661,174$ ) | \$1,619,480,965 |
| 27 | 2046 |  | \$0.008 |  |  |  |  | 2,913,686,036 | 6,027,331 | 95,208,774 | 612,766 | 15,608,341 | 43,614,881 | 0.93 | \$14.36 | \$879,591,441 | 21.40 | \$1,629,989,051 | ( $54,677,955$ ) | \$1,625,311,096 |
| 28 | 28-2047 |  | \$0.008 |  |  |  |  | 2,924,175,306 | 6,049,029 | 95,551,526 | 614,972 | 15,664,531 | 43,771,894 | 0.93 | \$14.36 | \$882,757,970 | 21.40 | \$1,635,857,011 | $(54,694,795)$ | \$1,631,162,216 |
| 29 | 2048 |  | \$0.008 |  |  |  |  | 2,934,702,337 | 6,070,805 | 95,895,511 | 617,185 | 15,720,924 | 43,929,473 | 0.93 | \$14.36 | \$885,935,899 | 21.40 | \$1,641,746,097 | (\$4,711,696) | \$1,637,034,400 |
| 30 | 2049 |  | \$0.008 |  |  |  |  | 2,945,267,265 | 6,092,660 | 96,240,735 | 619,407 | 15,777,519 | 44,087,619 | 0.93 | \$14.36 | \$889,125,268 | 21.40 | \$1,647,656,383 | ( $54,728,659$ ) | \$1,642,927,724 |
| 31 | 12050 |  | \$0.008 |  |  |  |  | 2,955,870,227 | 6,114,594 | 96,587,202 | 621,637 | 15,834,318 | 44,246,335 | 0.93 | \$14.36 | \$892,326,119 | 21.40 | \$1,653,587,946 | ( $54,745,682)$ | \$1,648,842,264 |
| 32 | 2051 |  | \$0.008 |  |  |  |  | 2,966,511,360 | 6,136,606 | 96,934,916 | 623,875 | 15,891,322 | 44,405,621 | 0.93 | \$14.36 | \$895,538,493 | 21.40 | \$1,659,540,862 | ( $54,762,766$ ) | \$1,654,778,096 |
| 33 | 2052 |  | \$0.008 |  |  |  |  | 2,977,190,801 | 6,158,698 | 97,283,881 | 626,121 | 15,948,530 | 44,565,482 | 0.93 | \$14.36 | \$898,762,432 | 21.40 | \$1,665,515,209 | (\$4,779,912) | \$1,660,735,297 |
| 34 | [44 2053 |  | \$0.008 |  |  |  |  | 2,987,908,688 | 6,180,870 | 97,634,103 | 628,375 | 16,005,945 | 44,725,917 | 0.93 | \$14.36 | \$901,997,976 | 21.40 | \$1,671,511,064 | ( $\$ 4,797,120)$ | \$1,666,713,944 |
| 35 | 2054 |  | \$0.008 |  |  |  |  | 2,998,665,159 | 6,203,121 | 97,985,586 | 630,637 | 16,063,567 | 44,886,931 | 0.93 | \$14.36 | \$905,245,169 | 21.40 | \$1,677,528,504 | ( $54,814,389)$ | \$1,672,714,114 |
| 36 | [6055 |  | \$0.008 |  |  |  |  | 3,009,460,354 | 6,225,452 | 98,338,334 | 632,907 | 16,121,395 | 45,048,524 | 0.93 | \$14.36 | \$908,504,052 | 21.40 | \$1,683,567,607 | ( $54,831,721$ ) | \$1,678,735,885 |
| 37 | 2056 |  | \$0.008 |  |  |  |  | 3,020,294,411 | 6,247,864 | 98,692,352 | 635,186 | 16,179,432 | 45,210,698 | 0.93 | \$14.36 | \$911,774,666 | 21.40 | \$1,689,628,450 | $(\$ 4,849,115)$ | \$1,684,779,334 |
| 38 | 石 |  | \$0.008 |  |  |  |  | 3,031,167,471 | 6,270,356 | 99,047,645 | 637,473 | 16,237,678 | 45,373,457 | 0.93 | \$14.36 | \$915,057,055 | 21.40 | \$1,695,711,112 | ( $54,866,572)$ | \$1,690,844,540 |
| 39 | 2058 |  | \$0.008 |  |  |  |  | 3,042,079,674 | 6,292,929 | 99,404,216 | 639,768 | 16,296,134 | 45,536,801 | 0.93 | \$14.36 | \$918,351,261 | 21.40 | \$1,701,815,672 | $(54,884,092)$ | \$1,696,931,580 |
| 40 | 2059 |  | \$0.008 |  |  |  |  | 3,053,031,161 | 6,315,584 | 99,762,071 | 642,071 | 16,354,800 | 45,700,734 | 0.93 | \$14.36 | \$921,657,325 | 21.40 | \$1,707,942,209 | ( $54,901,675$ ) | \$1,703,040,534 |
| 41 | 12060 |  | \$0.008 |  |  |  |  | 3,064,022,073 | 6,338,320 | 100,121,215 | 644,382 | 16,413,677 | 45,865,256 | 0.93 | \$14.36 | \$924,975,291 | 21.40 | \$1,714,090,801 | ( $\$ 4,919,321$ ) | \$1,709,171,480 |
|  | Dtals | \$0 |  | S0 |  | 0 | 50 |  |  |  | 24,609,729 | 626,858,079 | 1,693,971,957 |  |  | \$34,555,649,325 |  |  |  | \$65,275,310,819 |
|  | Discount | \$0 |  | \$0 |  |  | \$0 |  |  |  |  |  |  |  |  | \$19,308,630,666 |  |  |  |  |
|  | \% Discount | \$0 |  | \$0 |  |  | \$0 |  |  |  |  |  |  |  |  | \$14,083,027,956 |  |  |  |  |
|  | Discount | \$0 |  | \$0 |  |  | \$0 |  |  |  |  |  |  |  |  | \$10,787,621,784 |  |  |  |  |


| $\stackrel{\text { ¢ }}{ }$ | $\begin{gathered} \text { Calendar } \\ \text { Year } \end{gathered}$ | $\begin{gathered} \text { Proportio } \\ \text { n Heary } \\ \mathrm{Tk} \end{gathered}$ | Time Value (per hr) | Heavy Truck Travel Time Benefits ${ }^{17}$ | Heavy Truck MPG | Truck VHT Alternate Benefits using Rule of Half Methodology: Trips Retained | Truck VHT Alternate Benefits using Rule of Half Methodology: Trips Forgone | Truck VHT Alternate Benefits using Rule of Half Methodology | $\begin{gathered} \text { Accidents No- } \\ \text { build } \end{gathered}$ | Reduced Acidents - 290 Corridor | $\begin{gathered} \text { 1-290 induced } \\ \text { Accididnt sind } \\ \text { Opporticung } \\ \text { Opporty Costs } \end{gathered}$ | Increased Accidents | $\begin{gathered} \text { Value of } \\ \text { Statistical Life } \end{gathered}$ | Death/ Crash Ratio | $\begin{aligned} & \text { Deaths } \\ & \text { Increased } \end{aligned}$ | Deaths Project, Induced Traffic and No Pricing Opportunity Costs ${ }^{18}$ | No Injury AIS 0 0.43676 * | Minor AIS 1 0.41739 * \$2,144 | Moderate AIS 2 0.08872 * \$38,078 | Serious AIS 0.04817 * \$84,718 |  | $\begin{gathered} \text { Critical } \\ \text { AIS5 } \\ 0.00279 * \\ \$ 423,999 \\ \$ 9 \end{gathered}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | 2020 | 0.07 | \$27.80 | \$111,314,778 | 6.50 | \$367,894,442 | (\$2,176,411) | \$365,718,031 | 184,393 | -275 |  | -275 | \$9,780,000 | 0.003354 | -0.92 | \$9,005,130 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 2 | 2021 | 0.07 | \$27.80 | \$111,715,511 | 6.50 | \$369,218,862 | (\$2,184,246) | \$367,034,616 | 185,057 | -276 |  | -276 | \$9,780,000 | 0.003354 | -1 | \$9,037,549 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 3 | 2022 | 0.07 | \$27.80 | \$112,117,687 | 6.50 | \$370,548,050 | ( $\$ 2,192,109)$ | \$368,355,941 | 185,723 | -277 |  | -277 | \$9,780,000 | 0.003354 | -1 | \$9,070,084 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 4 | 2023 | 0.07 | \$27.80 | \$112,521,311 | 6.50 | \$371,882,023 | ( $\$ 2,200,001$ ) | \$369,682,022 | 186,391 | -278 |  | -278 | \$9,780,000 | 0.003354 | -1 | \$9,102,736 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 5 | 2024 | 0.07 | \$27.80 | \$112,926,388 | 6.50 | \$373,220,798 | ( $52,207,921$ ) | \$371,012,877 | 187,063 | -279 |  | -279 | \$9,780,000 | 0.003354 | -1 | \$9,135,506 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
|  | 2025 | 0.07 | \$27.80 | \$113,332,923 | 6.50 | \$374,564,393 | ( $\$ 2,215,869$ ) | \$372,348,524 | 187,736 | -280 |  | -280 | \$9,780,000 | 0.003354 | -1 | \$9,168,394 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 7 | 2026 | 0.07 | \$27.80 | \$113,740,921 | 6.50 | \$375,912,825 | ( $\$ 2,223,846$ ) | \$373,688,979 | 188,412 | -281 |  | -281 | \$9,780,000 | 0.003354 | -1 | \$9,201,400 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 8 | 2027 | 0.07 | \$27.80 | \$114,150,388 | 6.50 | \$377,266,111 | ( $\$ 2,231,852)$ | \$375,034,259 | 189,090 | -282 |  | -282 | \$9,780,000 | 0.003354 | -1 | \$9,234,525 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
|  | 2028 | 0.07 | \$27.80 | \$114,561,330 | 6.50 | \$378,624,269 | (\$2,239,887) | \$376,384,382 | 189,771 | -283 |  | -283 | \$9,780,000 | 0.003354 | -1 | \$9,267,770 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 10 | 2029 | 0.07 | \$27.80 | \$114,973,751 | 6.50 | \$379,987,316 | ( $\$ 2,247,950)$ | \$377,739,366 | 190,454 | -284 |  | -284 | \$9,780,000 | 0.003354 | -1 | \$9,301,133 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 11 | 2030 | 0.07 | \$27.80 | \$115,387,656 | 6.50 | \$381,355,271 | ( $\$ 2,256,043)$ | \$379,099,228 | 191,140 | -285 |  | -285 | \$9,780,000 | 0.003354 | -1 | \$9,334,618 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 12 | 2031 | 0.07 | \$27.80 | \$115,803,052 | 6.50 | \$382,728,150 | ( $\$ 2,264,165$ ) | \$380,463,985 | 191,828 | -286 |  | -286 | \$9,780,000 | 0.003354 | -1 | \$9,368,222 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 13 | 2032 | 0.07 | \$27.80 | \$116,219,943 | 6.50 | \$384,105,971 | $(\$ 2,272,316)$ | \$381,833,655 | 192,518 | -287 |  | -287 | \$9,780,000 | 0.003354 | -1 | \$9,401,948 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 14 | 2033 | 0.07 | \$27.80 | \$116,638,335 | 6.50 | \$385,488,752 | ( $\$ 2,280,496$ ) | \$383,208,256 | 193,211 | -288 |  | -288 | \$9,780,000 | 0.003354 | -1 | \$9,435,795 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 15 | 2034 | 0.07 | \$27.80 | \$117,058,233 | 6.50 | \$386,876,512 | ( $\$ 2,288,706$ ) | \$384,587,806 | 193,907 | -289 |  | -289 | \$9,780,000 | 0.003354 | -1 | \$9,469,764 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 16 | 2035 | 0.07 | \$27.80 | \$117,479,642 | 6.50 | \$388,269,267 | (\$2,296,945) | \$385,972,322 | 194,605 | -290 |  | -290 | \$9,780,000 | 0.003354 | -1 | \$9,503,855 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 17 | 2036 | 0.07 | \$27.80 | \$117,902,569 | 6.50 | \$389,667,037 | ( $\$ 2,305,214)$ | \$387,361,823 | 195,306 | -291 |  | -291 | \$9,780,000 | 0.003354 | -1 | \$9,538,069 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 18 | 2037 | 0.07 | \$27.80 | \$118,327,018 | 6.50 | \$391,069,838 | ( $\$ 2,313,513$ ) | \$388,756,325 | 196,009 | -292 |  | -292 | \$9,780,000 | 0.003354 | -1 | \$9,572,406 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 19 | 2038 | 0.07 | \$27.80 | \$118,752,995 | 6.50 | \$392,477,689 | ( $\$ 2,321,842)$ | \$390,155,848 | 196,714 | -293 |  | -293 | \$9,780,000 | 0.003354 | -1 | \$9,606,866 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 20 | 2039 | 0.07 | \$27.80 | \$119,180,506 | 6.50 | \$393,890,609 | ( $\$ 2,330,200)$ | \$391,560,409 | 197,422 | -294 |  | -294 | \$9,780,000 | 0.003354 | -1 | \$9,641,451 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 21 | 2040 | 0.07 | \$27.80 | \$125,436,095 | 6.50 | \$395,308,615 | ( $\$ 2,338,589)$ | \$392,970,026 | 198,133 | -295 |  | -295 | \$9,780,000 | 0.003354 | -1 | \$9,669,892 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 22 | 2041 | 0.07 | \$27.80 | \$125,887,665 | 6.50 | \$396,731,726 | ( $\$ 2,347,008)$ | \$394,384,719 | 198,846 | -296 |  | -296 | \$9,780,000 | 0.003354 | -1 | \$9,704,704 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 23 | 2042 | 0.07 | \$27.80 | \$126,340,861 | 6.50 | \$398,159,961 | $(\$ 2,355,457)$ | \$395,804,503 | 199,562 | -297 |  | -297 | \$9,780,000 | 0.003354 | -1 | \$9,739,641 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 24 | 2043 | 0.07 | \$27.80 | \$126,795,688 | 6.50 | \$399,593,336 | ( $52,363,937)$ | \$397,229,400 | 200,281 | -298 |  | -298 | \$9,780,000 | 0.003354 | 1 | \$9,774,704 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 25 | 2044 | 0.07 | \$27.80 | \$127,252,152 | 6.50 | \$401,031,872 | $(\$ 2,372,447)$ | \$398,659,426 | 201,002 | -299 |  | -299 | \$9,780,000 | 0.003354 | -1 | \$9,809,893 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 26 | 2045 | 0.07 | \$27.80 | \$127,710,260 | 6.50 | \$402,475,587 | ( $\$ 2,380,988)$ | \$400,094,599 | 201,725 | -300 |  | -300 | \$9,780,000 | 0.003354 | -1 | \$9,845,208 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 27 | 2046 | 0.07 | \$27.80 | \$128,170,017 | 6.50 | \$403,924,499 | ( $\$ 2,389,559)$ | \$401,534,940 | 202,452 | -301 |  | -301 | \$9,780,000 | 0.003354 | -1 | \$9,880,651 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 28 | 2047 | 0.07 | \$27.80 | \$128,631,429 | 6.50 | \$405,378,627 | ( $\$ 2,398,162)$ | \$402,980,466 | 203,180 | -302 |  | -302 | \$9,780,000 | 0.003354 | -1 | \$9,916,221 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 29 | 2048 | 0.07 | \$27.80 | \$129,094,502 | 6.50 | \$406,837,991 | $(\$ 2,406,795)$ | \$404,431,196 | 203,912 | -303 |  | -303 | \$9,780,000 | 0.003354 | -1 | \$9,951,920 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 30 | 2049 | 0.07 | \$27.80 | \$129,559,243 | 6.50 | \$408,302,607 | ( $\$ 2,415,460)$ | \$405,887,148 | 204,646 | -304 |  | -304 | \$9,780,000 | 0.003354 | -1 | \$9,987,747 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 31 | 2050 | 0.07 | \$27.80 | \$130,025,656 | 6.50 | \$409,772,497 | (\$2,424,155) | \$407,348,342 | 205,383 | -306 |  | -306 | \$9,780,000 | 0.003354 | 1 | \$10,023,703 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 32 | 2051 | 0.07 | \$27.80 | \$130,493,748 | 6.50 | \$411,247,678 | ( $\$ 2,432,882)$ | \$408,814,796 | 206,122 | -307 |  | -307 | \$9,780,000 | 0.003354 | -1 | \$10,059,788 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 33 | 2052 | 0.07 | \$27.80 | \$130,963,526 | 6.50 | \$412,728,169 | ( $\$ 2,441,641$ ) | \$410,286,529 | 206,864 | -308 |  | -308 | \$9,780,000 | 0.003354 | -1 | \$10,096,003 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 34 | 2053 | 0.07 | \$27.80 | \$131,434,994 | 6.50 | \$414,213,991 | ( $\$ 2,450,430)$ | \$411,763,560 | 207,609 | -309 |  | -309 | \$9,780,000 | 0.003354 | -1 | \$10,132,349 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 35 | 2054 | 0.07 | \$27.80 | \$131,908,160 | 6.50 | \$415,705,161 | ( $\$ 2,459,252)$ | \$413,245,909 | 208,356 | -310 |  | -310 | \$9,780,000 | 0.003354 | -1 | \$10,168,825 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 36 | 2055 | 0.07 | \$27.80 | \$132,383,030 | 6.50 | \$417,201,700 | ( $52,468,105$ ) | \$414,733,594 | 209,106 | -311 |  | -311 | \$9,780,000 | 0.003354 | -1 | \$10,205,433 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 37 | 2056 | 0.07 | \$27.80 | \$132,859,609 | 6.50 | \$418,703,626 | $(\$ 2,476,990)$ | \$416,226,635 | 209,859 | -312 |  | -312 | \$9,780,000 | 0.003354 | -1 | \$10,242,172 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 38 | 2057 | 0.07 | \$27.80 | \$133,337,903 | 6.50 | \$420,210,959 | $(\$ 2,485,908)$ | \$417,725,051 | 210,615 | -313 |  | -313 | \$9,780,000 | 0.003354 | -1 | \$10,279,044 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 39 | 2058 | 0.07 | \$27.80 | \$133,817,920 | 6.50 | \$421,723,718 | (\$2,494,857) | \$419,228,861 | 211,373 | -315 |  | -315 | \$9,780,000 | 0.003354 | -1 | \$10,316,049 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 40 | 2059 | 0.07 | \$27.80 | \$134,299,664 | 6.50 | \$423,241,924 | ( $\$ 2,503,838)$ | \$420,738,085 | 212,134 | -316 |  | -316 | \$9,780,000 | 0.003354 | -1 | \$10,353,187 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
| 41 | 2060 | 0.07 | \$27.80 | \$134,783,143 | 6.50 | \$424,765,595 | ( $52,512,852$ ) | \$422,252,742 | 212,897 | -317 |  | -317 | \$9,780,000 | 0.003354 | -1 | \$10,390,458 | \$0 | \$895 | \$3,378 | \$4,081 | \$1,177 | \$1,183 |
|  | TALS |  |  | \$5,035,290,202 |  |  |  | \$16,126,339,182 | 8,130,805 | -12,102 | 0 | -10,841 |  |  | -41 | \$396,944,812 |  |  |  |  |  |  |
|  | Discount |  |  | \$2,813,564,806 |  |  |  |  |  |  |  |  |  |  |  | \$223,401,656 |  |  |  |  |  |  |
|  | Discount |  |  | \$2,052,114,027 |  |  |  |  |  |  |  |  |  |  |  | \$163,633,190 |  |  |  |  |  |  |
|  | Discount |  |  | \$1,571,922,604 |  |  |  |  |  |  |  |  |  |  |  | \$125,790,553 |  |  |  |  |  |  |


| - | $\begin{array}{c\|c\|} \text { Calendar } \\ \text { Year } \end{array}$ |  | Property Damage Only \$3547 per Accident Opportunity Costs ${ }^{18}$ | Total Accident Death/ Injury/PDO Opportunity Costs ${ }^{18}$ |  | $\begin{array}{\|c\|c\|} \substack{\text { Discount } \\ \text { Factor } \\ \text { (3\%\%) }} \end{array}$ | $\begin{gathered} \text { Discount } \\ \text { Factor }(5 \%) \end{gathered}$ | $\begin{array}{\|c\|c\|c\|c\|c\|c\|c\|ccc\|c} \substack{\text { Factor } \\ (7 \% \%)} \end{array}$ | NPV Costs (3\% Discount) | NPV Benefits (3\% Discount) | NPV Costs (5\% Discount) | NpV Benefits (5\% Discount) | NPV Costs (7\% Discount) | NPV Benefits (7\% Discount) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 2020 | \$2,941,481 | \$973,793 | \$12,920,405 |  | 0.9709 | 0.9524 | 0.9346 | ( $5384,049,365$ ) | \$863,260,897 | ( $5376,731,502$ ) | \$846,811,905 | ( $5369,690,531$ ) | \$830,985,308 |
|  | 2021 | \$2,952,071 | \$977,299 | \$12,966,918 |  | 0.9426 | 0.9070 | 0.8734 | $(\$ 373,267,835)$ | \$841,112,212 | ( $\$ 359,170,302$ ) | \$809,345,192 | ( $\$ 345,864,765$ ) | \$779,362,836 |
|  | 2022 | \$2,962,698 | \$980,817 | \$13,013,599 |  | 0.9151 | 0.8638 | 0.8163 | ( $\$ 362,522,598)$ | \$819,509,515 | ( $\$ 342,199,782)$ | \$773,568,267 | ( $\$ 323,382,359)$ | \$731,030,074 |
|  | 2023 | \$2,973,364 | \$984,348 | \$13,060,448 |  | 0.8885 | 0.8227 | 0.7629 | ( $\$ 352,046,508$ ) | \$798,549,468 | $(\$ 325,974,859)$ | \$739,410,973 | $(\$ 302,280,564)$ | \$685,665,047 |
|  | 2024 | \$2,984,068 | \$987,892 | \$13,107,466 |  | 0.8626 | 0.7835 | 0.7130 | ( $\$ 341,769,833)$ | \$778,059,482 | ( $\$ 310,429,706$ ) | \$706,711,811 | ( $\$ 282,496,975)$ | \$643,121,281 |
|  | 2025 | \$2,994,811 | \$991,448 | \$13,154,653 |  | 0.8375 | 0.7462 | 0.6663 | ( $\$ 331,740,966$ ) | \$758,136,004 | $(\$ 295,576,250)$ | \$675,487,868 | ( $\$ 263,927,171$ ) | \$603,159,434 |
|  | 2026 | \$3,005,592 | \$995,018 | \$13,202,010 |  | 0.8131 | 0.7107 | 0.6227 | ( $56,784,832)$ | \$738,695,125 | $(\$ 5,930,366)$ | \$645,665,514 | ( $\$ 5,196,058)$ | \$565,718,192 |
|  | 2027 | \$3,016,412 | \$998,600 | \$13,249,537 |  | 0.7894 | 0.6768 | 0.5820 | ( $\$ 6,607,868)$ | \$719,742,861 | $(55,665,322)$ | \$617,078,759 | ( $\$ 4,871,775)$ | \$530,643,975 |
|  | 2028 | \$3,027,271 | \$1,002,195 | \$13,297,235 |  | 0.7664 | 0.6446 | 0.5439 | $(\$ 6,435,605)$ | \$701,285,271 | $(\$ 5,412,828)$ | \$589,833,626 | ( $\$ 4,567,231$ ) | \$497,689,285 |
|  | 102029 | \$3,038,169 | \$1,005,802 | \$13,345,105 |  | 0.7441 | 0.6139 | 0.5083 | $(\$ 6,268,094)$ | \$683,328,461 | (\$5,171,325) | \$563,762,059 | $(\$ 4,281,780)$ | \$466,786,543 |
| 11 | 112030 | \$3,049,107 | \$1,009,423 | \$13,393,148 |  | 0.7224 | 0.5847 | 0.4751 | ( $56,104,538$ ) | \$665,786,420 | ( $54,940,924$ ) | \$538,877,804 | $(\$ 4,014,765)$ | \$437,867,024 |
| 12 | $12 \quad 2031$ | \$3,060,083 | \$1,013,057 | \$13,441,363 |  | 0.7014 | 0.5568 | 0.4440 | ( $55,945,828$ ) | \$648,756,844 | $(\$ 4,720,041)$ | \$515,009,719 | ( $\$ 3,763,826)$ | \$410,675,861 |
| 13 | 132032 | \$3,071,100 | \$1,016,704 | \$13,489,752 |  | 0.6810 | 0.5303 | 0.4150 | ( $55,791,162)$ | \$632,153,148 | ( $\$ 4,509,623$ ) | \$492,262,585 | (\$3,529,122) | \$385,232,844 |
| 14 | 14.2033 | \$3,082,156 | \$1,020,364 | \$13,538,315 |  | 0.6611 | 0.5051 | 0.3878 | ( $55,639,732$ ) | \$615,887,455 | $(\$ 4,308,922)$ | \$470,556,284 | ( $53,308,256$ ) | \$361,278,423 |
| 15 | $15 \quad 2034$ | \$3,093,251 | \$1,024,038 | \$13,587,053 |  | 0.6419 | 0.4810 | 0.3624 | $(55,493,283)$ | \$600,151,077 | $(\$ 4,116,325)$ | \$449,715,959 | ( $\$ 3,101,364)$ | \$338,829,663 |
| 16 | $\begin{array}{ll}16 & 2035\end{array}$ | \$3,104,387 | \$1,027,724 | \$13,635,966 |  | 0.6232 | 0.4581 | 0.3387 | ( $55,350,149$ ) | \$584,762,721 | $(\$ 3,932,72)$ | \$429,845,649 | ( $\$ 2,907,727)$ | \$317,809,923 |
|  | $\begin{array}{ll}7 & 2036\end{array}$ | \$3,115,563 | \$1,031,424 | \$13,685,056 |  | 0.6050 | 0.4363 | 0.3166 | ( $55,210,366$ ) | \$569,726,780 | $(\$ 3,757,492)$ | \$410,862,480 | ( $\$ 2,726,615$ ) | \$298,141,337 |
| 18 | $18 \quad 2037$ | \$3,126,779 | \$1,035,137 | \$13,734,322 |  | 0.5874 | 0.4155 | 0.2959 | ( $55,074,834$ ) | \$555,142,187 | ( $\$ 3,589,707)$ | \$392,682,304 | ( $\$ 2,556,424$ ) | \$279,650,296 |
| 19 | 192038 | \$3,138,035 | \$1,038,864 | \$13,783,765 |  | 0.5703 | 0.3957 | 0.2765 | ( $54,942,730)$ | \$540,919,576 | $(\$ 3,429,490)$ | \$375,314,540 | ( $\$ 2,396,396)$ | \$262,255,433 |
| 20 | 202039 | \$3,149,332 | \$1,042,604 | \$13,833,387 |  | 0.5537 | 0.3769 | 0.2584 | $(\$ 4,814,091)$ | \$527,063,441 | ( $53,276,920$ ) | \$358,768,679 | (\$2,246,634) | \$245,969,304 |
| 21 | 12040 | \$3,158,622 | \$1,045,679 | \$13,874,194 |  | 0.5375 | 0.3589 | 0.2415 | $(\$ 4,688,080)$ | \$538,102,055 | ( $\$ 3,130,329)$ | \$359,302,016 | ( $\$ 2,106,365)$ | \$241,770,524 |
| 22 | 22041 | \$3,169,994 | \$1,049,444 | \$13,924,141 |  | 0.5219 | 0.3418 | 0.2257 | $(\$ 4,566,476)$ | \$524,363,684 | (\$2,990,653) | \$343,413,515 | (\$1,974,811) | \$226,765,460 |
| 23 | 3 2042 | \$3,181,406 | \$1,053,222 | \$13,974,268 |  | 0.5067 | 0.3256 | 0.2109 | $(54,447,570)$ | \$510,922,874 | ( $\$ 2,857,961$ ) | \$328,313,586 | (\$1,851,179) | \$212,657,675 |
| 24 | [4 2043 | \$3,192,859 | \$1,057,013 | \$14,024,575 |  | 0.4919 | 0.3101 | 0.1971 | ( $54,331,389)$ | \$497,783,392 | (\$2,730,563) | \$313,808,977 | (\$1,735,550) | \$199,457,443 |
| 25 | 25 2044 | \$3,204,353 | \$1,060,818 | \$14,075,064 |  | 0.4776 | 0.2953 | 0.1842 | ( $54,218,848$ ) | \$485,050,596 | ( $\$ 2,608,513$ ) | \$299,906,715 | (\$1,627,118) | \$187,073,554 |
| 26 | 26 2045 | \$3,215,889 | \$1,064,637 | \$14,125,734 |  | 0.4637 | 0.2812 | 0.1722 | $(\$ 4,109,096)$ | \$472,627,480 | ( $\mathbf{\$ 2 , 4 9 1 , 8 6 5 \text { ) }}$ | \$286,613,874 | ( $\$ 1,525,957)$ | \$175,515,336 |
| 27 | 27 2046 | \$3,227,466 | \$1,068,470 | \$14,176,587 |  | 0.4502 | 0.2678 | 0.1609 | (\$4,002,165) | \$460,517,903 | ( $\$ 2,380,675$ ) | \$273,937,584 | (\$1,430,361) | \$164,587,605 |
| 28 | 28 2047 | \$3,239,085 | \$1,072,317 | \$14,227,623 |  | 0.4371 | 0.2551 | 0.1504 | $(53,898,083)$ | \$448,725,752 | $(\$ 2,274,997)$ | \$261,885,026 | ( $\$ 1,341,276)$ | \$154,400,279 |
| 29 | 29 2048 | \$3,250,745 | \$1,076,177 | \$14,278,842 |  | 0.4243 | 0.2429 | 0.1406 | $(\$ 3,795,987)$ | \$437,151,914 | ( $\$ 2,173,098)$ | \$250,257,378 | (\$1,257,874) | \$144,858,751 |
| 30 | 30 2049 | \$3,262,448 | \$1,080,051 | \$14,330,246 |  | 0.4120 | 0.2314 | 0.1314 | $(\$ 3,697,693)$ | \$426,006,023 | ( $\$ 2,076,811$ ) | \$239,266,503 | (\$1,179,313) | \$135,866,990 |
| 31 | 312050 | \$3,274,193 | \$1,083,939 | \$14,381,835 |  | 0.4000 | 0.2204 | 0.1228 | $(\$ 3,601,440)$ | \$415,085,622 | $(\$ 1,984,394)$ | \$228,712,191 | $(\$ 1,105,642)$ | \$127,431,307 |
| 32 | 322051 | \$3,285,980 | \$1,087,842 | \$14,433,609 |  | 0.3883 | 0.2099 | 0.1147 | ( $\$ 3,507,250)$ | \$404,393,597 | ( $\$ 1,895,884)$ | \$218,599,591 | $(\$ 1,036,007)$ | \$119,453,911 |
| 33 | 32052 | \$3,297,809 | \$1,091,758 | \$14,485,570 |  | 0.3770 | 0.1999 | 0.1072 | ( $53,416,051$ ) | \$394,037,375 | ( $\$ 1,811,323)$ | \$208,933,889 | $(\$ 971,355)$ | \$112,044,600 |
| 34 | 34 2053 | \$3,309,682 | \$1,095,688 | \$14,537,718 |  | 0.3660 | 0.1904 | 0.1002 | ( $53,326,966$ ) | \$383,916,117 | (\$1,730,749) | \$199,720,310 | $(\$ 910,825)$ | \$105,104,925 |
| 35 | 5 2054 | \$3,321,596 | \$1,099,633 | \$14,590,054 |  | 0.3545 | 0.1813 | 0.0937 | $(53,233,086)$ | \$373,232,708 | $(\$ 1,653,293)$ | \$190,858,845 | $(\$ 854,460)$ | \$98,640,244 |
| 36 | $\begin{array}{ll}36 & 2055\end{array}$ | \$3,333,554 | \$1,103,591 | \$14,642,578 |  | 0.3450 | 0.1727 | 0.0875 | ( $\$ 3,156,142)$ | \$364,495,988 | (\$1,579,900) | \$182,459,310 | ( $\$ 800,471$ ) | \$92,444,655 |
| 37 | 3 2056 | \$3,345,555 | \$1,107,564 | \$14,695,292 |  | 0.3350 | 0.1644 | 0.0818 | $(\$ 3,074,455)$ | \$355,203,856 | ( $\$ 1,508,777)$ | \$174,314,981 | (\$750,718) | \$86,733,380 |
| 38 | 382057 | \$3,357,599 | \$1,111,551 | \$14,748,195 |  | 0.3252 | 0.1566 | 0.0765 | ( $\$ 2,994,059)$ | \$346,052,997 | ( $\$ 1,441,788)$ | \$166,641,770 | (\$704,322) | \$81,405,476 |
| 39 | 39 2058 | \$3,369,686 | \$1,115,553 | \$14,801,288 |  | 0.3158 | 0.1491 | 0.0715 | ( $(\mathbf{2}, 916,815)$ | \$337,258,901 | (\$1,377,128) | \$159,231,496 | (\$660,394) | \$76,358,511 |
| 40 | 4 2059 | \$3,381,817 | \$1,119,569 | \$14,854,573 |  | 0.3066 | 0.1420 | 0.0668 | ( $\$ 2,840,904$ ) | \$328,611,432 | ( $\$ 1,315,748$ ) | \$152,194,480 | $(\$ 618,958)$ | \$71,595,727 |
| 41 | 12060 | \$3,393,992 | \$1,123,599 | \$14,908,049 | \$917,865,815 | 0.2976 | 0.1366 | 0.0624 | ( $\$ 2,766,339)$ | \$593,269,396 | ( $\$ 1,269,765$ ) | \$272,313,856 | ( $\$ 5880,039)$ | \$124,395,216 |
|  | OTALS | \$129,660,058 | \$42,924,668 | \$569,529,537 | \$917,865,815 |  |  |  | (\$2,302,449,114) | \$22,738,838,608 | ( $\$ 2,116,128,670)$ | \$16,512,257,870 | (\$ $\$ 1,962,133,331)$ | \$12,610,433,654 |
|  | \% Discount | \$72,973,045 | \$24,158,124 |  | \$273,156,867 |  | 2,436,389,95 |  | B/C Ratio: | 9.88 | B/C Ratio: | 7.80 | B/C Ratio: | 6.43 |
|  | \% Discount | \$53,449,971 | \$17,694,904 |  | \$125,380,470 |  | ,396,129,200 |  | NPV: | \$20,436,389,495 | NPV: | \$14,396,129,200 | NPV: | \$10,648,300,323 |
|  | \% Discount | \$41,088,861 | \$13,602,691 |  | \$57,274,827 |  | ,648,30, ${ }^{\text {a }}$, |  |  |  |  |  |  |  |



| \% | Calendar Year |  | $\underset{\substack{\text {-290 Hot } 3+\text { Alt } \\ \text { AVMT Increase in }}}{\text { in }}$ Region | I-290 Induced AVMT Excluding Project Opportunity Cost | UZA Pricing (+\$0.50 or <br> +20\% per gal.) AVMT Opportunity Cost ${ }^{5}$ | Chicago UZA Estitated Per Capita VMT W/no Project, 1 nucued \& W/Pricing | Average Annual Daily Traffic per Fwy Lane Reduced | Violent Crime Reduction per 100,000 Population | Chicago MSA Violent Crime Reduction | Murder value | Rape Value | Robbery Value | Aggravated Assault Value | Total Annual Crime Reduction Opportunity Cost $^{6}$ | $\begin{aligned} & \text { Proportio } \\ & \text { Ponto } \\ & \text { Thato } \\ & \text { Trafic } \end{aligned}$ | Auto VMT Net Change | vmt Value | Auto VMT Project and Opportunity Cost' |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
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| - | $\begin{gathered} \text { Calendar } \\ \text { year } \end{gathered}$ | $\underset{\substack{\text { Proportio } \\ \text { n Heauy } \\ \text { Tk }}}{ }$ | Heavy Truck VMT Net <br> Change | vmivalue | Heavy Truck VMT Project and Opportunity Cost ${ }^{7}$ | Auto Noise Value (per vmт) | Auto Noise Project and Opportunity Costs ${ }^{8}$ | Truck Noise Value (per VMT) | Truck Noise and Project Opportunity Costs ${ }^{8}$ |  | $1-290$ Project $\mathrm{CO}_{2}$ Decrease (MT) | Opportunity Costs $\mathrm{CO}_{2}$ Increase (MT) | $\begin{gathered} \mathrm{cop}_{\substack{\text { (per alue } \\ \text { MT }}} \end{gathered}$ | Undiscounted $\mathrm{CO}_{2}$ Costs @ 3\% Avg SCC | NPV CO ${ }_{2}$ Project and Opportunity Costs @ $3 \%$ Avg SCC ${ }^{9}$ [Undisc/(1.03^A)] | Project $\mathrm{NO}_{x}$ Decrease (MT) | Opportunit y Costs $\mathrm{NO}_{x}$ Increase (MT) | $\begin{gathered} \mathrm{No}_{\mathrm{No} \text { Value }}^{\text {(per MT) }} \end{gathered}$ | $\mathrm{NO}_{\mathrm{x}}$ Project and Opportunity Costs ${ }^{10}$ | 1-290 Project PM PM Decrease (per MT) | Opportuni ty Costs PM PM Increse (per MT) |
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| 㐫 | $\underset{\substack{\text { Calendar } \\ \text { vear }}}{ }$ |  | $\begin{aligned} & \text { Opporturi } \\ & \text { ty Cost } \\ & \text { PM25 } \\ & \text { Poraeas } \\ & \text { (per MT) } \end{aligned}$ | PM Value (per MT) | PM Project and Opportunity Costs ${ }^{10}$ | $\begin{array}{\|c\|c} \text { 1-290 } \\ \text { Project } \\ \text { Vocs } \\ \text { Decrese e } \\ \text { (MT) } \end{array}$ | $\begin{array}{\|l\|l\|} \hline \text { Opporturitit } \\ \text { ypcosts } \\ \text { y Cocs } \\ \text { vncrease } \\ \text { (MT) } \end{array}$ | $\begin{gathered} \begin{array}{c} \text { vocs Value } \\ \text { (per MT) } \end{array} \end{gathered}$ | VOCs Project and Opportunity Costs ${ }^{10}$ | $\begin{aligned} & \text { Resource } \\ & \text { Externalities } \\ & \text { Value-Car } \end{aligned}$ | Resource Value-Hvy Tk | Resource Consumption Project and Opportunity Costs ${ }^{11}$ | $\begin{gathered} \text { Parking IIterala } \\ \text { ETxernal Costs } \\ \text { value } \end{gathered}$ | Total Parking Project and Opportunity Costs ${ }^{12}$ | $\begin{array}{\|c\|c\|} \hline \text { Annual } \\ \text { Anctivity } \\ \text { Hetelt } \\ \text { Here Costs } \\ \text { Per Capita } \end{array}$ | $\left\lvert\, \begin{gathered} \text { Chicago UZA } \\ \text { Per capita } \\ \text { venT Project } \\ \& \\ \begin{array}{c} \text { Opportunity } \\ \text { cost } \end{array} \\ \hline \end{gathered}\right.$ | Per Capita VMT <br> Proportion <br> Reduction <br> Project \& Opp <br> Cost | Health Care Project and Opportunity Costs (Not Not used in final calculations as covered in adjacent columns) ${ }^{13}$ | Health Value Internal | Health Internal Project and Opportunity Costs Reduced Cardivascular Activity ${ }^{13}$ | Heath Value. |  | Barrier Effect <br> Valuecar | Barrier Effect Value-Heavy Truck |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
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| ¢ | $\begin{gathered} \text { calendar } \\ \text { Year } \end{gathered}$ | Barrier Effect Project and Opportunity Costs ${ }^{14}$ | $\begin{gathered} \text { Transport } \\ \text { Diversity Value } \end{gathered}$ | Transport Diversity Project and Opportunity Costs | Uncompensate d Movin costs Value per thH | $\begin{gathered} \text { Number of } \\ \mathrm{HHs} \end{gathered}$ | Uncompensated HH Displacement Moving Costs ${ }^{16}$ | Annual Region Base WHT Excluding Corididor | CHANGED TO REGION AS WHOLE! Region VHT Reduction Outside Corridor w/l-290 Project | Annual Corridor VHT Base | Project Corridor <br> AVHT Reduction w/I-290 Project | 1-290 Removal <br> Additional Travel <br> Time (opportunity <br> Cost of Removal is <br> Project Benefit) | Chicago UZA 20\% Pricing Increase \& VHT Additional Travel Time Opportunity Cost Reduction Reduction | Proportion Auto Trafic | $\begin{aligned} & \text { Time Value } \\ & \text { (per hr) } \end{aligned}$ | Auto VHT Benefits of 1290 Project and Additional Benefits from Opportunity Costs of Removal/Pricing ${ }^{17}$ | Auto MPG | Auto VHT Alternate Benefits using Rule of Half Methodology: Trips Retained | Auto VHT Alternate Benefits using Rule of Half Methodology: Trips Forgone | Auto VHT Alternate Benefits using Rule of Half Methodology |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
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| - | $\underset{\substack{\text { Calendar } \\ \text { Year }}}{ }$ | $\begin{gathered} \text { Proportio } \\ \text { n Heany } \\ \text { Tk } \end{gathered}$ | $\underset{\substack{\text { Time Value } \\ \text { (ear hr) }}}{\substack{\text { an }}}$ | Heavy Truck Travel Time Benefits ${ }^{17}$ | $\begin{gathered} \text { e Heary } \\ \text { Truck MPG } \end{gathered}$ | Truck VHT Alternate Benefits using Rule of Half Methodology: Trips Retained | Truck VHT Alternate Benefits using Rule of Half Methodology: Trips Forgone | Truck VHT Alternate Benefits using Rule of Half Methodology | $\begin{aligned} & \text { Accidents No- } \\ & \text { build } \end{aligned}$ | $\begin{gathered} \text { Reduced } \\ \text { Accidents 1- } \\ 290 \text { Corridor } \\ \text { HoT } 3+\text { Alt. } \end{gathered}$ | $\begin{gathered} 1-290 \text { Induced } \\ \text { Accidentan and } \\ \text { Opporicing } \\ \text { Opporunity Costs } \end{gathered}$ | Increased | $\begin{array}{\|c\|c\|} \hline \text { Value of } \\ \text { Statistical Life } \end{array}$ | $\begin{aligned} & \text { Death/ Crash } \\ & \text { Ratio } \end{aligned}$ | Deaths Increased | Deaths Project, Induced Traffic and No Pricing Opportunity Costs ${ }^{18}$ | $\begin{gathered} \text { No Injury } \\ \text { Als } \\ 0.43670^{*} \\ 50 \end{gathered}$ | Minor AIS 1 $0.41739^{*}$ \$2,144 | Moderate AIS 2 0.08872 * \$38,078 | Serious AIS 3 0.04817 * 84,718 | $\begin{gathered} \text { Severe } \\ \text { Al54 } \\ 0.00617 * \\ \text { \$ } \$ 190,799 \end{gathered}$ | $\begin{gathered} \text { Critical } \\ \text { A1s } \\ \text { A.0027, } \\ \$ 423,999 \end{gathered}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
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[^0]:    Reggie Arkell
    SNHU - ECO 675; January 28, 2018

[^1]:    Reggie Arkell
    SNHU - ECO 675; January 28, 2018

[^2]:    Reggie Arkell
    SNHU - ECO 675; January 28, 2018

[^3]:    Reggie Arkell
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[^4]:    Reggie Arkell
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[^5]:    Reggie Arkell
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[^6]:    Reggie Arkell
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