WEST WENDOVER
RAIL PASSENGER STATION – AMTRAK

USDOT FY2016 TIGER APPLICATION BENEFIT COST ANALYSIS

SUBMITTED BY

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EXECUTIVE SUMMARY

The proposed action considers the construction of a rail station and related platform along with associated amenities to serve Amtrak's long distance California Zephyr. The amenities include an enclosed shelter for ticketing and waiting passengers, short term parking, and pedestrian facilities to tie the facility in with the community.

The West Wendover area is located along Interstate 80 on the Nevada Utah border and has a population of approximately 7,000. The local economy is mining and tourism based providing hospitality and entertainment services. On any given weekend 30,000 visitors can be found in the community. A charter flight program brings in an additional 50,000 plus persons a year. Union Pacific Railroad operates a transcontinental rail line passing through West Wendover. Amtrak operates on this line with the California Zephyr running between Chicago, Illinois and San Francisco, California. Even though the train passes through the community twice a day the nearest stations are located 115 miles east in Salt Lake City, Utah and 115 miles west in Elko, Nevada creating a 230 mile gap in service. Access to scheduled flights is also located in these two cities making significant automobile travel a necessity for long distance trips. The proposed action is the result of many years of hard work trying to remedy this issue by gaining approval from Amtrak and Union Pacific to develop a stop in West Wendover.

The benefit-cost analysis considers the broader societal benefits of the project impacting not only the region but the nation. Several areas of benefit including: livability, economic competitiveness, safety, state of good repair, and environmental sustainability are considered.

Quality of Life/Economic Competitiveness: The location of an Amtrak stop in West Wendover will reduce the automobile travel necessary to access the national rail passenger network by allowing riders to make a local connection with rail passenger service. This will reduce the Vehicle Miles Traveled (VMT), increase accessibility to the national rail passenger network for those who may not be able to drive long distances, and lower the operating costs of travel in the form of fuel savings and vehicle wear and tear.

Quality of Life and Economic Competitiveness have been combined because the monetization of the reduction of VMT's affecting quality of life is the associated fuel savings that is also considered a factor of economic competitiveness.

The VMT's have been monetized over 20 years as fuel cost savings totaling $11,839,683.62 at 3% NPV and $7,704,436.13 at 7% NPV.

Table ES- 1- Quality of Life/Economic Competitiveness Long-Term Outcome Matrix

Current Status/ Baseline & Problem to be Addressed	Change to Baseline/ Alternatives	Type of Impacts	Population Affected by Impacts	Economic Benefit	Summary of Results	Page Reference in BCA
No local access to the National Rail passenger Network	Develop a Amtrak Stop on the rail line passing through West Wendover, Nevada	Reduce the VMT's necessary to access Amtrak stops in Salt Lake City and Elko thus reducing fuel consumption and the associated cost savings	The impacts will affect both the local population who may be traveling to other parts of the United States and long distance visitors who may chose not to utilize automobiles if the rail passenger connection is developed	Monetized value of fuel savings	Fuel cost savings totaling $11,839,683.62 at 3% NPV and $7,704,436.13 at 7% NPV.	pp. 6 to 8

Safety: As 80% of the projected passengers using West Wendover Amtrak station would likely drive to or from a point at least 115 miles away to Elko, Nevada or Salt Lake City, Utah to access scheduled rail passenger service or scheduled air service, statistically some of those trips will result in accidents. The projected savings in VMT's over a 20 year period is 21,752,113 miles. With accidents in the surrounding Counties occurring at a rate of approximately one 870,000 VMT's statistically some potential rail passengers will be involved in an accident trying to access the rail network at the current locations. While the numbers are small they still add up to a significant social cost that can be avoided. The projected value of life social savings due to a reduction in VMT traveled in Elko County and Tooele County because of modal shift to rail is calculated as $1,083,484.42 at 3% NPV and $734,941.36 at 7% NPV.

Table ES- 2 – Safety Matrix

Current Status/ Baseline & Problem to be Addressed	Change to Baseline/ Alternatives	Type of Impacts	Population Affected by Impacts	Economic Benefit	Summary of Results	Page Reference in BCA
No local access to the National Rail passenger Network. People drive 115 miles to access the rail network.	Developing an Amtrak Stop on the rail line passing through West Wendover, Nevada will reduce the VMT's driven for those utilizing the stop and thus reduce the number of accidents that statistically are bound to occur to some potential riders.	Reduce the VMT's necessary to access Amtrak stops in Salt Lake City and Elko thus reducing the potential for accidents and the associated cost savings	The impacts will affect both the local population who may be traveling to other parts of the United States and long distance visitors who may chose not to utilize automobiles if the rail passenger connection is developed	Reduction of accidents will reduce the social cost of those accidents	Value of Life social cost savings projected to be $1,083,484.42 at 3% NPV and $734,941.36 at 7% NPV.	pp. 9 to 11

State of Good Repair: The proposed facility does not currently exist. However, there will be a yearly maintenance and operational costs associated with the new facilities that must be factored into the overall cost of the proposed action.

The total Operation and Maintenance Costs over 20 years are $1,454,409.60 at 3% NPV and $1,037,348.91 at 7% NPV.

Table ES- 3 - State of Good Repair Long-Term Outcome Matrix

Current Status/ Baseline & Problem to be Addressed	Change to Baseline/ Alternatives	Type of Impacts	Population Affected by Impacts	Economic Benefit	Summary of Results	Page Reference in BCA
The proposed facility currently does not exist. Once constructed the facility will require maintenance and funds will need to be budgeted.	New Facility adds operation and maintenance costs to the City budget.	Added Maintenance and Operation al issues with an additional facility	Entire population of the Wendover region and tourists	These costs are a necessary to keep the proposed action in operation. The economic benefits are seen in other categories	Operation and Maintenance Costs totaling $1,454,409.60 at 3% NPV and $1,037,348.91 at 7% NPV.	pp. 12 to 14

Environmental Sustainability: By providing convenient opportunities for residents and visitors alike to utilize rail passenger service with a local stop the proposed action will also reduce long distance automobile travel. This in turn will reduce emissions, specifically reducing CO_2 pollution which according to EPA contributes 82% of the greenhouse gasses thought to be a key factor in global warming. It is important to note that Amtrak is already running the California Zephyr through West Wendover and therefore the emissions from the train will not appreciably change.

The resulting 20 year savings due to reduction of CO_2 emissions totals $420,520.74 at 3% NPV.

Table ES- 4 - Environmental Sustainability Matrix

Current Status/ Baseline & Problem to be Addressed	Change to Baseline/ Alternatives	Type of Impacts	Population Affected by Impacts	Economic Benefit	Summary of Results	Page Reference in BCA
Lack of reasonable access to long distance rail passenger service requiring long distance automobile travel and creating unnecessary CO_2 Emissions	Provide a local Amtrak stop.	CO_2 emissions Reduction	Region and Earth as a whole	Monetized value of reduction in CO_2 emissions	Savings due to reduction of CO_2 emissions totals $420,520.74 at 3% NPV	pp. 14 to 16

Summation of Benefit/ Cost: The proposed action provides a monetary benefit as compared with the associated cost to construct, operate and maintain the project. The following table sums up the benefits vs. the cost of the project:

Table ES- 5 Summation of Benefits vs. Cost

Long Term Outcomes	Benefits (3% NPV)	Benefits (7% NPV)	Costs (3% NPV)	Costs (7% NPV)
Quality of Life and Economic Competitiveness (VMT Reduction and Fuel Savings)	$ 11,839,683.62	$ 7,704,436.13		
Safety (Accident Reduction Value of Injuries)	$ 1,083,484.42	$ 734,941.36		
State of Good Repair (Operation and Maintenance Costs)			$ 1,454,409.60	$ 1,037,348.91
Environmental Stability (CO_2 Reduction)	$ 420,520.74	$ 420,520.74		
Construction Costs			$ 6,499,696.36	$ 6,499,696.36
Totals	**$ 13,343,688.78**	**$ 8,859,898.23**	**$ 7,954,105.96**	**$ 7,537,045.27**

Net Benefit @ 3% NPV minus Net Cost @ 3% NPV	**$ 5,389,582.82**	Ratio of Net Benefit @ 3% NPV to Net Cost @ 3% NPV	**1.68**
Net Benefit @ 7% NPV minus Net Cost @ 7% NPV	**$ 1,322,852.97**	Ratio of Net Benefit @ 7% NPV to Net Cost @ 7% NPV	**1.18**

The benefits of the proposed action will last far beyond the 20 year scope of this report. Indeed, this project will improve the quality of life for many people. The local citizens in the Wendover region as well as the nation as a whole will benefit from improved accessibility to the national rail passenger network, and associated costs savings in reduced automobile travel both in actual operational costs and emissions reductions.

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TABLES

A. INTRODUCTION

This Benefit Cost Analysis (BCA) has been developed to look at broad societal impacts of the proposed action to the Wendover region and the tax paying citizens of the United States of America who are being asked to help fund the development of an Amtrak stop in West Wendover, Nevada.

This BCA has been developed as part of a request for funding to the United States Department of Transportation TIGER Discretionary Grant Program. The analysis was tailored to fit the general topics of: livability, economic competitiveness, safety, state of good repair, and environmental sustainability as spelled out in the Notice of Funding Availability for the Department of Transportation's National Infrastructure Investments Under the Full-Year Continuing Appropriations, 2015 referred to in the Notice as "TIGER Discretionary Grants".

B. PROJECT SUMMARY

1. Description of Current Infrastructure Baseline:

Currently the City of West Wendover does not have a local connection to the national rail passenger network. A resident must travel 115 miles to Salt Lake City, Utah or Elko, Nevada to board the California Zephyr that passes through West Wendover. The current transportation options for people traveling to or from West Wendover include: private automobile, bus, or private chartered flights.

In addition to the travel by the local residential and business population of West Wendover, Salt Lake City and the surrounding Wasatch Front provide a large percentage of visitors to West Wendover due to its relative convenience for short destination trips. A majority of these visitors from the Wasatch Front travel by private automobile though many also use the charter and scheduled bus services. Visitation on weekends and for special events can easily reach over 30,000 people. Weekday visitation is lower but still substantial being part of the 3 million plus visitors annually which travel through the community (Application Attachment A-8, Community Planning Documents, West Wendover Quick Facts).

a. <u>Regional and Local Travel</u>

i. Automobile: Travel by automobile in and out of the West Wendover area primarily occurs via Interstate 80 which runs east and west from the community connecting Salt Lake City, Utah to Reno, Nevada; and to a lesser extent travel occurs via US-93A which provides connection to other communities in southern Nevada including Las Vegas.

ii. Bus - Local: Locally the main business district of the community is served by a local bus service which is supported and operated by cooperative agreement between the main business interests of the community's hospitality industry.

This service ensures ease of access along the community's main arterial corridor (Wendover Boulevard) and to points on a second arterial corridor (Pueblo Boulevard). The bus service is provided at no cost to users.

iii. Bus – Regional: Regional bus service via Le-Bus and Utah Trailways provides dedicated regional bus service between the Wasatch Front in Utah and West Wendover. This service runs several times a day and is supported by the hospitality and entertainment industry. Le-Bus averages 2,000 passengers a week with their service while Utah Trailways averages approximately 600 passengers a week. Additionally other tour bus companies make regular stops in West Wendover as part of their regional tour operations.

b. <u>National Travel</u>

From a National perspective, the West Wendover area is served by three transportation options: Automobile, bus service and private chartered air service.

i. Automobile: As with local/regional travel, at a national level West Wendover is supported by Interstate 80 which runs east and west through the community. Interstate 80 being the main east-west national interstate corridor connecting New York to San Francisco. The Interstate carries an average of 6,219 vehicles per day through the community (East and West); 5,200 of those vehicles (77%) are estimated to exit into the community east and west bound through four community interchanges (Nevada DOT AADTC 2012, Utah DOT AADTC 2012). The most recent NDOT Nevada Rural Interstate occupancy average (2003) is 2.3 persons per vehicle. This equates to 13,950 persons per day (5,091,917 person per year) passing through West Wendover each year with 9,465 persons per day (3,454,543 persons per year) entering the community via Interstate 80.

i. Bus: Nationally the community is served by Greyhound providing daily service to communities along the Interstate 80 corridor and ultimately providing national connections.

ii. Air Service: Chartered flights are offered by FLYAWAY Wendover as part of a community wide flight program headed by the Resorts at Wendover Group. This program currently operates an average of 7-10 flights per week (70 cities) with 168 passenger Boeing 737-800 aircraft operated by Xtra Airways. Those passengers stay several nights adding upwards of 450 additional visitors in the community each day. The program has seen an average annual growth rate of 11.86% since its inception in 2005.

In order to remedy the issue of ***NON-ACCESS to the National Transportation System via the National Rail Passenger Network***, The City of West Wendover has partnered with the National Railroad Passenger Corporation (Amtrak). After several years of study and related work by the partners, the City and Amtrak executed a

formal Memorandum of Understanding (MOU) on February 11, 2015. This MOU (Application Attachment A-8) provides the authority and parameters to construct and operate a rail passenger station in the community along with the related coordination and approvals of the Host Railroad (Union Pacific Railroad).

As part of the overall work to ensure complete National Transportation Network access, the City has acquired the West Wendover Welcome Center from the Nevada Department of Transportation. The Welcome Center is located a half mile away from the proposed rail passenger station site. It is located immediately adjacent to a main interchange (Exit 410) on Interstate 80. The City has been operating the facility for 15 years as a tourism-transportation center. With the acquisition of the facility from NDOT the City will begin conversion of the Welcome Center into a Multi-Modal facility providing a hub for local, regional and national bus service to connect. A key component will linking local busses with the Amtrak trains to provide seamless connections between various modes of transportation both in the community, regionally and nationally.

2. Proposed Project Description

The proposed action provides the necessary facilities for Amtrak's California Zephyr to make bi-directional daily stops in West Wendover. The facilities as required by Amtrak and the Host Railroad (Union Pacific) include: the construction of a 1,900 foot long pocket track, a 1,200 foot long track side platform, electronic ticketing services, shelter with seating, ADA accommodations, short term parking, connections to the local transportation system and pedestrian facilities.

See Table 1 for a summary of project costs. A detailed engineer's estimate and conceptual drawings for the proposed project have been included in the project application.

Table 1 - Summary of Project Costs

WEST WENDOVER RAIL PASSENGER STATION PROJECT

Summary of Construction Costs and Project Funding		
Project Costs	**Amount ($)**	
Construction Total	$5,062,263	
Contingency (10%)	$506,226	
Legal and Administrative (2%)	$101,245	
Environmental	$20,000	
Engineering Design (6%)	$303,736	
Construction Management (10%)	$506,226	
Total	**$6,499,696**	
Project Funding	**Amount ($)**	**Percent (%)**
Community Contribution (Cash)	$2,274,894	35%
USDOT/FY 2016 TIGER	$4,224,803	65%
Total Funding	**$6,499,696**	**100%**

3. Description of Users

The proposed West Wendover Amtrak station will serve local residents and visiting tourists. Each group is characterized below:

Local Residents: The West Wendover area is home to population of approximately 7,000 permanent residents. Roughly 70% of the jobs in the region are tourism related jobs. These jobs require little education or experience and offer little opportunity for advancement. Thus, the low to moderate (LMI) (those living below 80% of the local median income) for West Wendover is 63% LMI. When combined with Wendover, Utah the percentage of LMI residents is 64%. Many of the LMI population live in trailers, apartments and employer subsidized housing.

Demographic data for the California Zephyr provided by Amtrak shows that 46% of the current ridership utilizes rail passenger service to visit family and friends. Most of the residents of West Wendover originate from other locations. As word spread about the process of requesting a passenger stop and as a result of the 2013 community needs assessment by the City West Wendover, local residents have expressed interest in being able to board a train to visit family and friends in other states. The ability to utilize the national rail network will greatly benefit the local residents.

Long Distance Visitors: According to the current demographic data for the California Zephyr, 70% of the riders are 55 years and older. 40% of those riding the California

Zephyr are taking 1 week plus vacations or riding for recreation and leisure. These demographics match well with the typical weekday visitors to West Wendover.

Amtrak Ridership in Nevada: Amtrak currently has three stops in Nevada, including: Reno, Winnemucca and Elko. In 2014 Amtrak Nevada station usage was 84,638 people. Reno accounted for 70,142 people, Elko 9,436, and Winnemucca 5,060. As happened with the current private charter flight program, resort owners and the local community on whole will undoubtedly partner with Amtrak to aggressively market rail travel packages to the demographic served by those riding the California Zephyr.

C. BASIS OF CALCULATIONS

Ridership projections begin with a first year ridership of 2,900 this number has been derived by an internal feasibility study conducted by Amtrak. Projections take into consideration similar startup results that the City experienced with the introduction of a private charter flight program and the growth in revenue in the local businesses and tourism to derive potential growth rates for ridership once the Amtrak station is placed in operation in West Wendover.

Table 2 - Projected Ridership

West Wendover Amtrak Stop Ridership Projections					
Year	**% Growth**	**Total**	**Year**	**% Growth**	**Total**
2020		2,900	2030	3.00%	12,741
2021	75.00%	5,075	2031	3.00%	13,123
2022	50.00%	7,613	2032	3.00%	13,517
2023	25.00%	9,516	2033	3.00%	13,922
2024	10.00%	10,467	2034	3.00%	14,340
2025	5.00%	10,991	2035	3.00%	14,770
2026	3.00%	11,320	2036	3.00%	15,213
2027	3.00%	11,660	2037	3.00%	15,670
2028	3.00%	12,010	2038	3.00%	16,140
2029	3.00%	12,370	2039	3.00%	16,624

Amtrak has derived a first year ridership of 2,900 from an internal feasibility study conducted for the proposed passenger station. Growth is calculated on a sliding scale beginning at 70% for the and settling at 3% by the 6th year of operation. The rapid initial growth is based upon an aggressive marketing program by the resorts. The charter flight program increased 192.71% in the second year due to similar resort marketing programs.

A conservative 3% year over year growth rate is used for projections beyond initial 5 year period. The local charter flight service average enplanement has averaged growth of 11.86% a year from 2006 to 2014. From 1997 to 2015 gaming revenues in the West Wendover Market average 5.65% growth per year.

The proposed action will introduce a new mode of transportation into the West Wendover market. In order to develop a reasonable calculation with which to compare the benefits and costs with current transportation options the following assumptions have been applied:

- The demographic characteristics of ridership visiting and traveling from West Wendover will remain the same as for the overall 2014 demographic characteristics for the California Zephyr. Specifically, the age ratios, the economic characteristics, and the reasons for travel will remain the same. The City planning staff noticed a general similarity in the characteristics of the California Zephyr demographic in comparison with the observed characteristics of visitors to the local resorts in West Wendover.

- For simplification in calculation 80% of the potential rail passengers are assumed to currently travel by automobile to and from West Wendover 115 miles to either Elko, Nevada or Salt Lake City, Utah where scheduled air service and rail passenger service to distant destinations are readily available. The remaining 20% represents new visitors, or visitors transferred from the buses and flights already serving the community and thus will have a neutral effect on benefit and costs.

  A figure of 2.03 people per car will be used to determine the number of vehicles making the 100 plus mile trip to the larger population centers. The 2.03 persons per vehicle came from 2003 Nevada Department of Transportation Vehicle Occupancy Monitoring Program (Average Vehicle Occupancy from 2001 to 2003, page 11, East Elko Interchange to NV/UT Stateline).

D. TYPES OF BENEFITS

1. Quality of Life/Economic Competitiveness:

While the current route of the California Zephyr passes through West Wendover, the nearest stops are located almost 115 miles to the east and west in Salt Lake City, Utah and Elko, Nevada. This is also the case for access to scheduled air service. Thus those who would choose to utilize rail passenger service for long distance travel must drive a long distance to access the service. Likewise visitors to West Wendover that ride the train must stop in either Salt Lake City, Utah or Elko, Nevada and change travel modes to reach their intended destination. The options to complete the trip are bus, rental care or hired driver. The location of a stop in West Wendover will reduce the vehicle miles traveled in automobiles along Interstate 80 for those passengers desiring to travel by rail. The reduction in Vehicle Miles Traveled (VMT), also lowers the operating costs of travel in the form of fuel savings and vehicle wear and tear.

The base line consideration for those who might chose rail travel would be continued use of automobile to travel 100 plus miles to the nearest metropolitan area where rail passenger and other forms of scheduled transportation services are available. The calculation targets the estimated 80% of the projected rail passenger ridership that

would utilize automobiles to travel to and from metropolitan centers with available transportation alternatives. The 80% automobile use is a conservative number loosely based upon review of numerous studies of modal share covering the western United States. A specific single number was not chosen for use because the studies typically modeled areas in which either short commutes were being addressed, alternate modes were abundant or population and density are greater. Studies of modal share in truly rural parts of the western United States seem to be non-existent. Such areas typically have limited transportation options and thus the use of an automobile is most likely near 100% of the modal share. West Wendover does have the options of limited long distance bus service, dedicated private bus service to points in the Salt Lake City area for resort patrons, and chartered private flights for resort patrons. With this in mind 20% of the potential rail passengers were considered to utilize these other modes or chose not to travel to West Wendover at all.

Since the rail service already passes through West Wendover and the number of riders is quite small compared to the 360,000 + yearly riders of the California Zephyr. It is assumed that operational costs for the additional passengers on the train will be negligible for the next 20 years and thus no attempt has been made to make comparative costs of the rail service to the VMT and fuel savings of the reduced automobile use. See Table 3- Estimated Fuel Savings Due to Reduction in VMT's for the VMT of potential rail passengers to reach metropolitan areas where alternative modes of travel including rail passenger service are available (Column 3 titled Baseline Vehicle VMT Annually), and reduction of operating costs due to lower VMT's, calculated as fuel savings in column 11 titled Baseline Vehicle Annual Fuel Benefits ($), column 12 titled 3% NPV Fuel Benefits and column 13 titled 7% NPV Fuel Benefits.

Quality of Life and Economic Competitiveness have been combined because the monetization of the reduction of VMT's affecting quality of life is the associated fuel savings that is also considered a factor of economic competitiveness. The monetized value of fuel savings due to the reduction of VMT's over a 20 year period totals $11,839,683.62 at 3% NPV and $7,704,436.13 at 7% NPV.

Table 3 Estimated Fuel Savings Due to Reduction in VMT's

1	2	3	4	5	6	7	8	9	10	11	12	13
Year	**Annual Ridership Projections (Growth Rate =75%, 50%, 25%, 10%, and 5% Sliding Scale for first 5 years and 3% after year 2026)**	**Baseline Vehicle VMT (Annually)**	**Average Occupancy per vehicle**	**Baseline Vehicle Person-Miles of Travel (PMT) (Annually)**	**Baseline Vehicle Annual CO_2 (metric tons)**	**Baseline Vehicle Annual 3% CO_2 Cost ($)**	**3% NPV CO_2 Benefits**	**Baseline Vehicle gallons per year**	**Average Cost per Gallon (Increase 5.766% yearly based on average inflation from years 1999 to 2015)**	**Baseline Vehicle Annual Fuel Benefits ($)**	**3% NPV Fuel Benefits**	**7% NPV Fuel Benefits**
2020*	2,900	262,857	2.03	533,600	110	$ 5,745	$ 5,745	31,168	$ 3.390	$ 105,657	$ 105,657	$ 105,657
2021	5,075	460,000	2.03	933,800	193	$ 10,054	$ 9,761	54,544	$ 3.585	$ 195,560	$ 189,864	$ 182,766
2022	7,613	690,000	2.03	1,400,700	290	$ 15,661	$ 14,762	81,817	$ 3.792	$ 310,252	$ 292,442	$ 270,986
2023	9,516	862,500	2.03	1,750,875	363	$ 19,939	$ 18,247	102,271	$ 4.011	$ 410,175	$ 375,368	$ 334,825
2024	10,467	948,750	2.03	1,925,963	399	$ 22,332	$ 19,842	112,498	$ 4.242	$ 477,206	$ 423,991	$ 364,058
2025	10,991	996,188	2.03	2,022,261	419	$ 23,867	$ 20,588	118,123	$ 4.486	$ 529,955	$ 457,144	$ 377,851
2026	11,320	1,026,073	2.03	2,082,928	431	$ 25,014	$ 20,949	121,666	$ 4.745	$ 577,325	$ 483,501	$ 384,696
2027	11,660	1,056,855	2.03	2,145,416	444	$ 26,653	$ 21,672	125,316	$ 5.019	$ 628,929	$ 511,377	$ 391,665
2028	12,010	1,088,561	2.03	2,209,779	458	$ 27,910	$ 22,033	129,076	$ 5.308	$ 685,146	$ 540,860	$ 398,761
2029	12,370	1,121,218	2.03	2,276,072	471	$ 29,219	$ 22,394	132,948	$ 5.614	$ 746,387	$ 572,044	$ 405,985
2030	12,741	1,154,854	2.03	2,344,354	485	$ 30,581	$ 22,755	136,937	$ 5.938	$ 813,103	$ 605,025	$ 413,340
2031	13,123	1,189,500	2.03	2,414,685	500	$ 31,498	$ 22,755	141,045	$ 6.280	$ 885,782	$ 639,908	$ 420,829
2032	13,517	1,225,185	2.03	2,487,125	515	$ 33,473	$ 23,478	145,276	$ 6.642	$ 964,958	$ 676,802	$ 428,453
2033	13,922	1,261,941	2.03	2,561,739	530	$ 35,008	$ 23,839	149,634	$ 7.025	$ 1,051,210	$ 715,823	$ 436,215
2034	14,340	1,299,799	2.03	2,638,591	546	$ 36,605	$ 24,200	154,123	$ 7.430	$ 1,145,172	$ 757,094	$ 444,118
2035	14,770	1,338,793	2.03	2,717,749	563	$ 38,265	$ 24,561	158,747	$ 7.859	$ 1,247,533	$ 800,744	$ 452,163
2036	15,213	1,378,956	2.03	2,799,282	580	$ 39,993	$ 24,922	163,509	$ 8.312	$ 1,359,044	$ 846,911	$ 460,355
2037	15,670	1,420,325	2.03	2,883,260	597	$ 42,387	$ 25,645	168,415	$ 8.791	$ 1,480,522	$ 895,740	$ 468,695
2038	16,140	1,462,935	2.03	2,969,758	615	$ 44,273	$ 26,006	173,467	$ 9.298	$ 1,612,858	$ 947,384	$ 477,186
2039	16,624	1,506,823	2.03	3,058,851	633	$ 46,235	$ 26,367	178,671	$ 9.834	$ 1,757,023	$ 1,002,005	$ 485,831
					Totals	**$ 538,480**	**$ 420,521**			**$ 16,983,795**	**$ 11,839,684**	**$ 7,704,436**

* Note: Construction is anticipated to be complete by the year 2020; therefore, cost savings and reductions will begin at this time and are projected 20 years into the future.

See Appendix A. Basis of Calculations For Select Tables

2. **Safety**:

While rail passenger accidents tend to be dramatic and receive a great deal of media attention rail travel is still much safer than automobile travel. As 80% of the projected passengers using West Wendover Amtrak station would likely drive to or from a point at least 115 miles away to Elko, Nevada or Salt Lake City, Utah where Amtrak stations currently reside and scheduled air service is available, statistically some of those trips will result in accidents.

To analyze the potential for accidents and their cost to society accident data was collected for Elko County, Nevada and Tooele County, Utah. A driver entering or leaving West Wendover must drive the bulk of the miles east or west to Elko or Salt Lake City through one or both of these counties. Both counties are lightly populated along the Interstate 80 corridor. The accident data for Elko County correlating with VMT's is from 2010 and does not have specific information detailing injury crashes. The data from Tooele County is 2014 data and includes state wide percentages of accidents with injuries in the KABCO format. The accident data from both Counties when calculated as percentage of the total accidents in the County by the categories of Property Damage Only (PDO) and injury were within 5% of each other, and less than 1% difference in the death category.

As the Tooele County data is more current and complete it has been used to calculate the statistical number of accidents that may be prevented as passengers utilize the West Wendover Amtrak station and no longer have to drive 115 miles to access the rail passenger network. The analysis is found in Table 4 and Table 5 The projected value of a statistical life and injuries savings due to a reduction in VMT traveled in Elko County and Tooele County because of modal shift to rail is calculated as $1,083,484.42 at 3% NPV and $734,941.36 at 7% NPV.

Table 4 Projected Yearly Reduction of Accidents and Associated Value of a Statistical Life and Injuries Savings

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Year	**Annual Ridership Projections (Growth Rate =75%, 50%, 25%, 10%, and 5% Sliding Scale for first 5 years and 3% after year 2026)**	**Baseline Vehicle VMT Reduction (Annually)**	**Running Total of VMT**	**Statistical Occurrence of PDO Accidents (1 Per 1,149,425 VMT)**	**Statistical Occurrence of Injury Accidents (1 Per 2,967,359 VMT)**	**Statistical Occurrence of Fatal Accidents (1 Per 74,626,865 VMT)**	**Conversion of PDO Accidents To KABCO Scale (No Injury 69.2% of Total Accidents [25])**	**Conversion of Injury Accidents to KABCO Scale* (Possible Injury 17.5% of Total accidents [25]) Randomly Placed**	**Conversion of Injury Accidents to KABCO Scale* (Non Incapacitating Injury 10.7% of Total Accidents [25]) Randomly Placed**	**Conversion of Injury Accidents to KABCO Scale* (Incapacitating Injury 2.2% of Total Accidents [25]) Randomly Placed**	**Conversion of Injury Accidents to KABCO Scale* (Death 0.4% of Total Accidents [25]) Randomly Placed**	**Calculation of No Injury Accidents as AIS Values $2015**	**Calculation of No Injury Accidents as AIS Values $2015**	**Calculation of No Injury Accidents as AIS Values $2015**	**Calculation of No Injury Accidents as AIS Values $2015**	**Calculation of No Injury Accidents as AIS Values $2015**	**Total Value of Injuries $2015**	**Total Value of Injuries Accounting for Inflation (3% per Year)**	**3% NPV Value 0f Injuries**	**7% NPV Value of Injuries**
2020*	2,900	262,857										$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
2021	5,075	460,000	722,857									$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
2022	7,613	690,000	1,412,857	1			1					$ 3,234.82	$ -	$ -	$ -	$ -	$ 3,234.82	$ 3,431.82	$ 3,234.82	$ 3,049.12
2023	9,516	862,500	2,275,357		1			1				$ -	$ 63,854.50	$ -	$ -	$ -	$ 63,854.50	$ 69,775.53	$ 63,854.50	$ 58,435.91
2024	10,467	948,750	3,224,107	1			1					$ 3,234.82	$ -	$ -	$ -	$ -	$ 3,234.82	$ 3,640.81	$ 3,234.82	$ 2,874.09
2025	10,991	996,188	4,220,295	1			1					$ 3,234.82	$ -	$ -	$ -	$ -	$ 3,234.82	$ 3,750.04	$ 3,234.82	$ 2,790.38
2026	11,320	1,026,073	5,246,368	1	1		1	1				$ 3,234.82	$ 63,854.50	$ -	$ -	$ -	$ 67,089.31	$ 80,108.15	$ 67,089.31	$ 56,186.24
2027	11,660	1,056,855	6,303,223	1			1					$ 3,234.82	$ -	$ -	$ -	$ -	$ 3,234.82	$ 3,978.42	$ 3,234.82	$ 2,630.20
2028	12,010	1,088,561	7,391,784	1	1		1		1			$ 3,234.82	$ -	$ 125,049.89	$ -	$ -	$ 128,284.70	$ 162,507.22	$ 128,284.70	$ 101,269.13
2029	12,370	1,121,218	8,513,002	1								$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
2030	12,741	1,154,854	9,667,856	1			1					$ 3,234.82	$ -	$ -	$ -	$ -	$ 3,234.82	$ 4,347.32	$ 3,234.82	$ 2,407.01
2031	13,123	1,189,500	10,857,356	1	1		1	1				$ 3,234.82	$ 63,854.50	$ -	$ -	$ -	$ 67,089.31	$ 92,867.30	$ 67,089.31	$ 48,466.75
2032	13,517	1,225,185	12,082,541	1			1					$ 3,234.82	$ -	$ -	$ -	$ -	$ 3,234.82	$ 4,612.07	$ 3,234.82	$ 2,268.83
2033	13,922	1,261,941	13,344,482	1	1		1	1				$ 3,234.82	$ 63,854.50	$ -	$ -	$ -	$ 67,089.31	$ 98,522.92	$ 67,089.31	$ 45,684.56
2034	14,340	1,299,799	14,644,280	1			1					$ 3,234.82	$ -	$ -	$ -	$ -	$ 3,234.82	$ 4,892.95	$ 3,234.82	$ 2,138.59
2035	14,770	1,338,793	15,983,073	1			1					$ 3,234.82	$ -	$ -	$ -	$ -	$ 3,234.82	$ 5,039.74	$ 3,234.82	$ 2,076.31
2036	15,213	1,378,956	17,362,030	2	1		2			1		$ 6,469.63	$ -	$ -	$ 459,120.29	$ -	$ 465,589.92	$ 747,135.14	$ 465,589.92	$ 290,140.25
2037	15,670	1,420,325	18,782,355	1			1					$ 3,234.82	$ -	$ -	$ -	$ -	$ 3,234.82	$ 5,346.66	$ 3,234.82	$ 1,957.12
2038	16,140	1,462,935	20,245,290	1			1	1				$ 3,234.82	$ 63,854.50	$ -	$ -	$ -	$ 67,089.31	$ 114,215.06	$ 67,089.31	$ 39,407.90
2039	16,624	1,506,823	21,752,113	1	1		1		1			$ 3,234.82	$ -	$ 125,049.89	$ -	$ -	$ 128,284.70	$ 224,948.00	$ 128,284.70	$ 73,158.97
			Totals	18	7	0	17	5	2	1	0	$ 54,991.87	$ 319,272.48	$ 250,099.78	$ 459,120.29	$ -	$ 1,083,484.42	$ 1,629,119.15	**$ 1,083,484.42**	**$ 734,941.36**

See Appendix A. Basis of Calculations For Select Tables

Table 5. AIS Value of a Statistical Life and Injuries Matrix

1	2	3	4	5	6	7	8	9	10	11	12	13	14	14	16
	O	**C**	**B**	**A**	**K**	**U**	**# Non-fatal Accidents**								
	No Injury	**Possible Injury**	**Non-incapacitating**	**Incapacitating**	**Killed**	**Injured Severity Unknown**	**Unknown if Injured**	**Dollar Value AIS Scale ($2015)**	**Dollar Value Single Accident No Injury ($2015)**	**Dollar Value Single Accident Possible Injury ($2015)**	**Dollar Value Single Accident Non-incapacitating ($2015)**	**Dollar Value Single Accident Incapacitating ($2015)**	**Dollar Value Single Accident Killed ($2015)**	**Dollar Value Single Accident Injured Severity Unknown ($2015)**	**Dollar Value Single Accident Unknown If Injured ($2015)**
AIS 0	0.92534	0.23437	0.08347	0.03437	0	0.21538	0.43676	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
AIS 1	0.07257	0.68946	0.76843	0.55449	0	0.62728	0.41739	$ 28,800.00	$ 2,090.02	$ 19,856.45	$ 22,130.78	$ 15,969.31	$ -	$ 18,065.66	$ 12,020.83
AIS 2	0.00198	0.06391	0.10898	0.20908	0	0.104	0.08872	$ 451,200.00	$ 893.38	$ 28,836.19	$ 49,171.78	$ 94,336.90	$ -	$ 46,924.80	$ 40,030.46
AIS 3	0.00008	0.01071	0.03191	0.14437	0	0.03858	0.04817	$ 1,008,000.00	$ 80.64	$ 10,795.68	$ 32,165.28	$ 145,524.96	$ -	$ 38,888.64	$ 48,555.36
AIS 4	0	0.00142	0.0062	0.03986	0	0.00442	0.00617	$ 2,553,600.00	$ -	$ 3,626.11	$ 15,832.32	$ 101,786.50	$ -	$ 11,286.91	$ 15,755.71
AIS 5	0.00003	0.00013	0.00101	0.01783	0	0.01034	0.00279	$ 5,692,800.00	$ 170.78	$ 740.06	$ 5,749.73	$ 101,502.62	$ -	$ 58,863.55	$ 15,882.91
AIS 6 (Fatality)	0	0	0	0	1	0	0	$ 9,600,000.00	$ -	$ -	$ -	$ -	$ 9,600,000.00	$ -	$ -
Sum (Prob)	1	1	1	1	1	1	1								
								TOTAL	**$ 3,234.82**	**$ 63,854.50**	**$ 125,049.89**	**$ 459,120.29**	**$ 9,600,000.00**	**$ 174,029.57**	**$ 132,245.28**

See Appendix A. Basis of Calculations For Select Tables

3. **State of Good Repair**:

The proposed facility does not currently exist and the baseline does not include rail passenger service and thus potential users would use alternate modes of transportation with at least 80% very likely to drive automobiles

There will be a yearly maintenance cost associated with the new facilities that must be factored into the overall cost of the proposed action. This cost includes regular maintenance of normal wear items such as paint, HVAC equipment, lighting, door hardware, safety and pavement markings, and landscaping. The costs of repair due to vandalism must also be taken into account.

Longer term structural maintenance such as pavement replacement, stucco repair, roof replacement and concrete repair must be budgeted for though many of these items fall outside the 20 year window used for this analysis. A regular application of protective coatings and vigilant inspection and repair of small problems as they arise can greatly prolong the replacement of the large structural items well beyond their standard lives.

The cleaning of the facility is also factored in with the maintenance costs as is the operational cost of power, water and communications.

The rail and platform require a monthly inspection by Amtrak and will also require periodic maintenance.

While the maintenance costs for the may fluctuate from year to year it is important that the overall cost is budgeted for and money set aside during years of minimal maintenance costs for years when the costs exceed what is budgeted in a given year. The City will set up an exclusive fund for the Amtrak station operation and maintenance. Please see Table 6 and Table 7 for the projected yearly operation and maintenance costs detailing current, inflated and net present value costs. The total Operation and Maintenance Costs over 20 years are $1,454,409.60 at 3% NPV and $1,037,348.19 at 7% NPV.

Table 6 - Projected Yearly Operation and Maintenance Costs ($2015)

Item	Cost ($ 2015)	Interval (Every Years)	O&M Costs per Year ($ 2015)
One New Employee (Half of their time spent on maintenance and cleaning) [1]	$ 25,000.00	1.00	$ 25,000.00
Paving [2]	$ 54,409.60	20.00	$ 2,720.48
Repaint Building [2]	$ 3,000.00	3.00	$ 1,000.00
Pavement and Platform Markings [2]	$ 2,000.00	1.00	$ 2,000.00
HVAC Repair/Replacement [2]	$ 10,000.00	5.00	$ 2,000.00
Crack Repair on Platform	$ 1,000.00	1.00	$ 1,000.00
General Building Maintenance	$ 8,000.00	1.00	$ 8,000.00
Energy Costs	$ 6,000.00	1.00	$ 6,000.00
Pocket Track Maintenance and Monthly Inspection	$ 25,000.00	1.00	$ 25,000.00
		Total	**$ 72,720.48**

[1] Public Works Technician II including total pay and benefits.

[2] Based on Construction Costs.
Pavement cost based upon construction cost of pavement 6.60/Sq.Ft. minus $1.00/Sq.Ft. for base course as the base course will not need replacement.

[3] These are estimated costs based similar O&M costs from similar sized buildings.

Table 7- Projected Yearly Operation and Maintenance Costs Factored for Inflation and Net Present Value

Year	O&M Costs	3% NPV Costs	7% NPV Costs
2019	$ -	$ -	$ -
2020	$ 72,720.48	$ 72,720.48	$ 72,720.48
2021	$ 74,902.09	$ 72,720.48	$ 70,001.96
2022	$ 77,149.16	$ 72,720.48	$ 67,385.06
2023	$ 79,463.63	$ 72,720.48	$ 64,865.99
2024	$ 81,847.54	$ 72,720.48	$ 62,441.10
2025	$ 84,302.97	$ 72,720.48	$ 60,106.85
2026	$ 86,832.06	$ 72,720.48	$ 57,859.87
2027	$ 89,437.02	$ 72,720.48	$ 55,696.88
2028	$ 92,120.13	$ 72,720.48	$ 53,614.75
2029	$ 94,883.73	$ 72,720.48	$ 51,610.46
2030	$ 97,730.24	$ 72,720.48	$ 49,681.10
2031	$ 100,662.15	$ 72,720.48	$ 47,823.86
2032	$ 103,682.02	$ 72,720.48	$ 46,036.06
2033	$ 106,792.48	$ 72,720.48	$ 44,315.08
2034	$ 109,996.25	$ 72,720.48	$ 42,658.44
2035	$ 113,296.14	$ 72,720.48	$ 41,063.73
2036	$ 116,695.02	$ 72,720.48	$ 39,528.64
2037	$ 120,195.87	$ 72,720.48	$ 38,050.94
2038	$ 123,801.75	$ 72,720.48	$ 36,628.47
2039	$ 127,515.80	$ 72,720.48	$ 35,259.18
Total	**$ 1,954,026.53**	**$ 1,454,409.60**	**$ 1,037,348.91**

Note: O&M Costs were inflated 3% yearly.

4. **Environmental Sustainability**:

By providing convenient opportunities for residents and visitors alike to utilize rail passenger service with a local stop the proposed action will also reduce environmental impacts. Currently some residents and visitors must travel an average of 115 miles east or west to reach a city with scheduled air or rail passenger service. While there is bus service available it is not convenient with the scheduled rail passenger service. Bus service runs during the day. The California Zephyr runs through Elko and Salt Lake City between 9:30 pm and 3:00 am depending on location and direction. Most people who use this service choose to drive their personal car, rent a car or have someone else drive them to the station thus requiring two round trips by the driver.

The reduction in long distance automobile travel will reduce the emissions, specifically reducing CO_2 pollution which according to EPA contributes 82% of the greenhouse gasses thought to be a key factor in global warming. It is important to

note that Amtrak is already running the California Zephyr through West Wendover and therefore the emissions from the train will not appreciably change. The emissions of the automobile travel in the region will be slightly reduced.

The following table details the projected reduction in CO_2 emissions due to the lower VMT's if a rail passenger stop is constructed in West Wendover. The benefits of the projected CO_2 reduction has been monetized for 20 years and expressed as a 3% NPV. See Table 8 CO_2 Reduction Due to Reduced VMT's for calculation of CO_2 reduction due to reduced VMT's column 6 titled Baseline Vehicle Annual CO_2 (metric tons), column 7 titled Baseline Vehicle Annual 3% CO_2 Cost ($) and column 8 3% NVP CO_2 Benefits. The resulting 20 year savings due to reduction of CO_2 emissions totals $420,520.74 at 3% NPV.

Table 8 CO_2 Reduction Due to Reduced VMT's												
1	2	3	4	5	6	7	8	9	10	11	12	13
Year	**Annual Ridership Projections (Growth Rate =75%, 50%, 25%, 10%, and 5% Sliding Scale for first 5 years and 3% after year 2026)**	**Baseline Vehicle VMT (Annually)**	**Average Occupancy per vehicle**	**Baseline Vehicle Person-Miles of Travel (PMT) (Annually)**	**Baseline Vehicle Annual CO_2 (metric tons)**	**Baseline Vehicle Annual 3% CO_2 Cost ($)**	**3% NPV CO_2 Benefits**	**Baseline Vehicle gallons per year**	**Average Cost per Gallon (Increase 5.766% yearly based on average inflation from years 1999 to 2015)**	**Baseline Vehicle Annual Fuel Benefits ($)**	**3% NPV Fuel Benefits**	**7% NPV Fuel Benefits**
2020*	2,900	262,857	2.03	533,600	110	$ 5,745	$ 5,745	31,168	$ 3.390	$ 105,657	$ 105,657	$ 105,657
2021	5,075	460,000	2.03	933,800	193	$ 10,054	$ 9,761	54,544	$ 3.585	$ 195,560	$ 189,864	$ 182,766
2022	7,613	690,000	2.03	1,400,700	290	$ 15,661	$ 14,762	81,817	$ 3.792	$ 310,252	$ 292,442	$ 270,986
2023	9,516	862,500	2.03	1,750,875	363	$ 19,939	$ 18,247	102,271	$ 4.011	$ 410,175	$ 375,368	$ 334,825
2024	10,467	948,750	2.03	1,925,963	399	$ 22,332	$ 19,842	112,498	$ 4.242	$ 477,206	$ 423,991	$ 364,058
2025	10,991	996,188	2.03	2,022,261	419	$ 23,867	$ 20,588	118,123	$ 4.486	$ 529,955	$ 457,144	$ 377,851
2026	11,320	1,026,073	2.03	2,082,928	431	$ 25,014	$ 20,949	121,666	$ 4.745	$ 577,325	$ 483,501	$ 384,696
2027	11,660	1,056,855	2.03	2,145,416	444	$ 26,653	$ 21,672	125,316	$ 5.019	$ 628,929	$ 511,377	$ 391,665
2028	12,010	1,088,561	2.03	2,209,779	458	$ 27,910	$ 22,033	129,076	$ 5.308	$ 685,146	$ 540,860	$ 398,761
2029	12,370	1,121,218	2.03	2,276,072	471	$ 29,219	$ 22,394	132,948	$ 5.614	$ 746,387	$ 572,044	$ 405,985
2030	12,741	1,154,854	2.03	2,344,354	485	$ 30,581	$ 22,755	136,937	$ 5.938	$ 813,103	$ 605,025	$ 413,340
2031	13,123	1,189,500	2.03	2,414,685	500	$ 31,498	$ 22,755	141,045	$ 6.280	$ 885,782	$ 639,908	$ 420,829
2032	13,517	1,225,185	2.03	2,487,125	515	$ 33,473	$ 23,478	145,276	$ 6.642	$ 964,958	$ 676,802	$ 428,453
2033	13,922	1,261,941	2.03	2,561,739	530	$ 35,008	$ 23,839	149,634	$ 7.025	$ 1,051,210	$ 715,823	$ 436,215
2034	14,340	1,299,799	2.03	2,638,591	546	$ 36,605	$ 24,200	154,123	$ 7.430	$ 1,145,172	$ 757,094	$ 444,118
2035	14,770	1,338,793	2.03	2,717,749	563	$ 38,265	$ 24,561	158,747	$ 7.859	$ 1,247,533	$ 800,744	$ 452,163
2036	15,213	1,378,956	2.03	2,799,282	580	$ 39,993	$ 24,922	163,509	$ 8.312	$ 1,359,044	$ 846,911	$ 460,355
2037	15,670	1,420,325	2.03	2,883,260	597	$ 42,387	$ 25,645	168,415	$ 8.791	$ 1,480,522	$ 895,740	$ 468,695
2038	16,140	1,462,935	2.03	2,969,758	615	$ 44,273	$ 26,006	173,467	$ 9.298	$ 1,612,858	$ 947,384	$ 477,186
2039	16,624	1,506,823	2.03	3,058,851	633	$ 46,235	$ 26,367	178,671	$ 9.834	$ 1,757,023	$ 1,002,005	$ 485,831
					Totals	**$ 538,480**	**$ 420,521**			**$ 16,983,795**	**$ 11,839,684**	**$ 7,704,436**

* Note: Construction is anticipated to be complete by the year 2020; therefore, cost savings and reductions will begin at this time and are projected 20 years into the future.

See Appendix A. Basis of Calculations For Select Tables

5. Summation of Cost/ Benefit:

The West Wendover Rail Passenger Service - Amtrak Station Project provides benefits over 20 years equal to or greater than the associated cost to construct and maintain the project. The net benefit at 3% NPV is $5,389,582.82. At 7% NPV the net benefit is $1,322,852.97. Table 9 provides a Summation of Benefits and Costs.

Table 9 – Summation of Benefits and Costs

Long Term Outcomes	Benefits (3% NPV)	Benefits (7% NPV)	Costs (3% NPV)	Costs (7% NPV)
Quality of Life and Economic Competitiveness (VMT Reduction and Fuel Savings)	$ 11,839,683.62	$ 7,704,436.13		
Safety (Accident Reduction Value of Injuries)	$ 1,083,484.42	$ 734,941.36		
State of Good Repair (Operation and Maintenance Costs)			$ 1,454,409.60	$ 1,037,348.91
Environmental Stability (CO_2 Reduction)	$ 420,520.74	$ 420,520.74		
Construction Costs			$ 6,499,696.36	$ 6,499,696.36
Totals	**$ 13,343,688.78**	**$ 8,859,898.23**	**$ 7,954,105.96**	**$ 7,537,045.27**

Net Benefit @ 3% NPV minus Net Cost @ 3% NPV	$ 5,389,582.82	Ratio of Net Benefit @ 3% NPV to Net Cost @ 3% NPV	1.68
Net Benefit @ 7% NPV minus Net Cost @ 7% NPV	$ 1,322,852.97	Ratio of Net Benefit @ 7% NPV to Net Cost @ 7% NPV	1.18

WEST WENDOVER
RAIL PASSENGER STATION – AMTRAK

USDOT FY2016 TIGER APPLICATION BENEFIT COST ANALYSIS

Appendix A. Basis of Calculations for Select Tables

Basis of Calculations for Table 3 Estimated Fuel Savings Due to Reduction in VMT's and Table 8 CO2 Reduction Due to Reduced VMT's

West Coast less California Gasoline and Diesel Retail Prices

(This data has been provided because data at link updates weekly)

Basis of Calculations for Fuel and CO2 Projections

Basis of Calculations for Table 4 Projected Yearly Reduction of Accidents and Associated Value of a Statistical Life and Injuries Savings

Basis of Calculations for Table 5 AIS Value of a Statistical Life and Injuries Matrix

Basis of Calculations for Table 3 Estimated Fuel Savings Due to Reduction in VMT's and Table 8 CO_2 Reduction Due to Reduced VMT's			
	Purpose	**Equation**	**Data**
Column 1	Year	No Equation	20 Years Beginning at Completion of Construction of the Project
Column 2	Annual Ridership Projections	[Previous Years Projected Ridership x (1+Projected Percentage)] Projected Percentages Years 1 through 5: 75%, 50%, 25%, 10%, 5%, and 3% for the remaining 15 years.	Data carried over form Table 2 Projected Ridership.
Column 3	Projected Vehicle Miles Traveled (VMT's)	VMT=Annual Ridership x 0.80 (80% of Projected Rail Passengers Use Private Automobile to Visit or Travel From West Wendover 115 Miles to Nearest Rail and Commercial Airport) x Segment Length (230 Miles)	See BCA Section C. Basis of Calculations for explanation for 80% private automobile use. Segment Length (230 Miles) = Roundtrip travel length between West Wendover, Nevada Elko Nevada, or Salt Lake City, Utah, the nearest locations with access to rail passenger service and scheduled air service.
Column 4	Average Vehicle Occupancy	No Equation	2.03 persons per vehicle found in the 2003 Nevada Department of Transportation Vehicle Occupancy Monitoring Program (Average Vehicle Occupancy from 2001 to 2003, Page 11, East Elko Interchange to NV/UT Stateline).
Column 5	Annual Vehicle Person-Miles of Travel (PMT)	PMT= VMT (Column 3) x Average Vehicle Occupancy (Column 4)	Multiplication of data found in Spreadsheet.
Column 6	CO_2 emissions (metric tons CO_2E / year)	Tons/Year = 8.887*10-3 metric tons CO_2/gallon gasoline x VMT car/truck average (Row 3) * 1/21.4 miles per gallon car/truck average * 1 CO_2, CH_4, and N2O/0.988 CO_2	Equation Found in GHG Equivalencies Calculator-Calculations and References - Energy and the Environment - US EPA: Miles driven by the average passenger vehicle: Calculation https://www.epa.gov/energy/ghg-equivalencies-calculator-calculations-and-references
Column 7	3% Social Cost of CO_2	$ = tons of CO_2 x CO_2 cost per metric ton	TIGER and FASTLANE Benefit Cost Analysis (BCA) Resource Guide 2016, 3% Social Cost of CO_2 Table Page 7. https://www.transportation.gov/sites/dot.gov/files/docs/BCA%20Resource%20Guide%202016.pdf
Column 8	3% Net Present Value (NPV) of 3% Social Cost of Carbon	3% NPV = Social Cost of CO_2 / ((1+0.03) x number of years)	Standard Net Present Value equation applied to Social Cost of Carbon
Column 9	Vehicle Fuel Gallons Saved Per Year	Gallons = 1/21.4 miles per gallon car/truck average x 230 miles traveled x ridership projection (Column 2)	US Department of Transportation, Federal Highway Administration, Annual Vehicle Distance Traveled in Miles and Related Data - 2014 (1) by Highway Category and Vehicle Type Table VM-1 Second to bottom Row 2014 Average Miles Traveled per Gallon of Fuel Consumed Column 9 All Light Duty Vehicles http://www.fhwa.dot.gov/policyinformation/statistics/2014/vm1.cfm
Column 10	Average Fuel Cost Per Gallon	$/Gallon = Previous years fuel price + (Previous years fuel price x average inflation price for fuel (5.766%))	The fuel prices used to determine the average inflation price for fuel come from the annual West Coast Less California Regular Gasoline Prices, year over year percentage change averaged for years 1999 to 2015. Prices found at eia US Energy Information Administration: http://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_r5xca_w.htm Download Series History XLS File button top of table on left hand side. Attached spreadsheet used for calculations in Appendix A. as data updates weekly. See Attached tables for Average Yearly Fuel Price Inflation 1999 to 2015 and Fuel Price Projection
Column 11	Annual Fuel Savings Benefit	$ = Vehicle Fuel Gallons Saved Per Year (Column 9) x Average Fuel Cost Per Gallon for Same Year (Column 10)	Multiplication of data found in Spreadsheet.
Column 12	3% Net Present Value (NPV) of Fuel Savings	3% NPV = Fuel Savings $ (Column 11) / ((1+0.03) x number of years)	Standard Net Present Value equation applied to Fuel Savings
Column 13	7% Net Present Value (NPV) of Fuel Savings	7% NPV = Fuel Savings $ (Column 11) / ((1+0.07) x number of years)	Standard Net Present Value equation applied to Fuel Savings

Workbook Contents

West Coast less California Gasoline and Diesel Retail Prices

Click worksheet name or tab at bottom for data

Worksheet Name	Description	# Of Series	Frequency	Latest Data for
Data 1	West Coast less California Gasoline and Diesel Retail Prices	14	Weekly	4/11/2016

Release Date: 4/11/2016
Next Release Date: 4/18/2016

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Data 1: West Coast less California Gasoline and Diesel Retail Prices

Sourcekey	EMM_EPM0_PTE_R5XCA_DPG		
Date	Weekly West Coast (PADD 5) Except California All Grades All Formulations Retail Gasoline Prices (Dollars per Gallon)	Calculated Average Yearly Price (Dollars per Gallon)	Calculated Percent Change Year over Year (Percent)
May 18, 1998	1.2		
May 25, 1998	1.208		
Jun 01, 1998	1.205		
Jun 08, 1998	1.2		
Jun 15, 1998	1.199		
Jun 22, 1998	1.198		
Jun 29, 1998	1.195		
Jul 06, 1998	1.191		
Jul 13, 1998	1.19		
Jul 20, 1998	1.188		
Jul 27, 1998	1.185		
Aug 03, 1998	1.178		
Aug 10, 1998	1.177		
Aug 17, 1998	1.176		
Aug 24, 1998	1.175		
Aug 31, 1998	1.172		
Sep 07, 1998	1.167		
Sep 14, 1998	1.163		
Sep 21, 1998	1.163		
Sep 28, 1998	1.166		
Oct 05, 1998	1.164		
Oct 12, 1998	1.161		
Oct 19, 1998	1.157		
Oct 26, 1998	1.156		
Nov 02, 1998	1.153		
Nov 09, 1998	1.15		
Nov 16, 1998	1.15		
Nov 23, 1998	1.146		
Nov 30, 1998	1.139		
Dec 07, 1998	1.135		
Dec 14, 1998	1.128		
Dec 21, 1998	1.118		
Dec 28, 1998	1.115	Not Use Incomplete Data	
Jan 04, 1999	1.115		
Jan 11, 1999	1.108		
Jan 18, 1999	1.102		
Jan 25, 1999	1.099		
Feb 01, 1999	1.088		
Feb 08, 1999	1.079		
Feb 15, 1999	1.071		
Feb 22, 1999	1.064		
Mar 01, 1999	1.065		
Mar 08, 1999	1.098		
Mar 15, 1999	1.133		
Mar 22, 1999	1.169		
Mar 29, 1999	1.289		
Apr 05, 1999	1.39		
Apr 12, 1999	1.444		
Apr 19, 1999	1.44		
Apr 26, 1999	1.427		
May 03, 1999	1.412		
May 10, 1999	1.399		
May 17, 1999	1.387		
May 24, 1999	1.364		
May 31, 1999	1.343		
Jun 07, 1999	1.329		
Jun 14, 1999	1.332		
Jun 21, 1999	1.355		
Jun 28, 1999	1.36		
Jul 05, 1999	1.359		
Jul 12, 1999	1.371		
Jul 19, 1999	1.4		
Jul 26, 1999	1.423		
Aug 02, 1999	1.43		
Aug 09, 1999	1.443		
Aug 16, 1999	1.449		
Aug 23, 1999	1.448		
Aug 30, 1999	1.443		
Sep 06, 1999	1.434		
Sep 13, 1999	1.428		
Sep 20, 1999	1.418		
Sep 27, 1999	1.407		
Oct 04, 1999	1.4		
Oct 11, 1999	1.4		
Oct 18, 1999	1.397		
Oct 25, 1999	1.39		
Nov 01, 1999	1.385		
Nov 08, 1999	1.376		
Nov 15, 1999	1.376		
Nov 22, 1999	1.381		

Nov 29, 1999	1.387		
Dec 06, 1999	1.397		
Dec 13, 1999	1.394		
Dec 20, 1999	1.39		
Dec 27, 1999	1.389	1.326480769	
Jan 03, 2000	1.389		
Jan 10, 2000	1.386		
Jan 17, 2000	1.385		
Jan 24, 2000	1.391		
Jan 31, 2000	1.408		
Feb 07, 2000	1.413		
Feb 14, 2000	1.419		
Feb 21, 2000	1.448		
Feb 28, 2000	1.5		
Mar 06, 2000	1.561		
Mar 13, 2000	1.623		
Mar 20, 2000	1.691		
Mar 27, 2000	1.704		
Apr 03, 2000	1.703		
Apr 10, 2000	1.688		
Apr 17, 2000	1.671		
Apr 24, 2000	1.655		
May 01, 2000	1.636		
May 08, 2000	1.624		
May 15, 2000	1.61		
May 22, 2000	1.604		
May 29, 2000	1.596		
Jun 05, 2000	1.591		
Jun 12, 2000	1.591		
Jun 19, 2000	1.591		
Jun 26, 2000	1.608		
Jul 03, 2000	1.643		
Jul 10, 2000	1.664		
Jul 17, 2000	1.668		
Jul 24, 2000	1.665		
Jul 31, 2000	1.658		
Aug 07, 2000	1.652		
Aug 14, 2000	1.653		
Aug 21, 2000	1.662		
Aug 28, 2000	1.68		
Sep 04, 2000	1.714		
Sep 11, 2000	1.738		
Sep 18, 2000	1.742		
Sep 25, 2000	1.744		
Oct 02, 2000	1.741		
Oct 09, 2000	1.742		
Oct 16, 2000	1.738		
Oct 23, 2000	1.733		
Oct 30, 2000	1.733		
Nov 06, 2000	1.725		
Nov 13, 2000	1.715		
Nov 20, 2000	1.702		
Nov 27, 2000	1.694		
Dec 04, 2000	1.683		
Dec 11, 2000	1.665		
Dec 18, 2000	1.641		
Dec 25, 2000	1.623	1.625076923	1.225104
Jan 01, 2001	1.602		
Jan 08, 2001	1.588		
Jan 15, 2001	1.569		
Jan 22, 2001	1.553		
Jan 29, 2001	1.542		
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Feb 19, 2001	1.578		
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Mar 05, 2001	1.588		
Mar 12, 2001	1.587		
Mar 19, 2001	1.585		
Mar 26, 2001	1.581		
Apr 02, 2001	1.58		
Apr 09, 2001	1.586		
Apr 16, 2001	1.593		
Apr 23, 2001	1.598		
Apr 30, 2001	1.612		
May 07, 2001	1.626		
May 14, 2001	1.636		
May 21, 2001	1.644		
May 28, 2001	1.663		
Jun 04, 2001	1.666		
Jun 11, 2001	1.667		
Jun 18, 2001	1.658		
Jun 25, 2001	1.646		
Jul 02, 2001	1.63		
Jul 09, 2001	1.609		
Jul 16, 2001	1.585		
Jul 23, 2001	1.549		
Jul 30, 2001	1.526		
Aug 06, 2001	1.505		
Aug 13, 2001	1.504		

Aug 20, 2001	1.505		
Aug 27, 2001	1.536		
Sep 03, 2001	1.623		
Sep 10, 2001	1.658		
Sep 17, 2001	1.686		
Sep 24, 2001	1.674		
Oct 01, 2001	1.637		
Oct 08, 2001	1.61		
Oct 15, 2001	1.575		
Oct 22, 2001	1.546		
Oct 29, 2001	1.52		
Nov 05, 2001	1.491		
Nov 12, 2001	1.455		
Nov 19, 2001	1.409		
Nov 26, 2001	1.368		
Dec 03, 2001	1.32		
Dec 10, 2001	1.278		
Dec 17, 2001	1.244		
Dec 24, 2001	1.224		
Dec 31, 2001	1.224	1.549660377	0.953592
Jan 07, 2002	1.229		
Jan 14, 2002	1.229		
Jan 21, 2002	1.225		
Jan 28, 2002	1.228		
Feb 04, 2002	1.227		
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Feb 18, 2002	1.218		
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Mar 11, 2002	1.272		
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Mar 25, 2002	1.379		
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Jul 08, 2002	1.501		
Jul 15, 2002	1.498		
Jul 22, 2002	1.498		
Jul 29, 2002	1.495		
Aug 05, 2002	1.496		
Aug 12, 2002	1.494		
Aug 19, 2002	1.487		
Aug 26, 2002	1.484		
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Sep 09, 2002	1.476		
Sep 16, 2002	1.472		
Sep 23, 2002	1.465		
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Nov 04, 2002	1.436		
Nov 11, 2002	1.445		
Nov 18, 2002	1.446		
Nov 25, 2002	1.434		
Dec 02, 2002	1.428		
Dec 09, 2002	1.419		
Dec 16, 2002	1.404		
Dec 23, 2002	1.4		
Dec 30, 2002	1.408	1.411211538	0.9106586
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Jan 13, 2003	1.435		
Jan 20, 2003	1.448		
Jan 27, 2003	1.478		
Feb 03, 2003	1.527		
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Feb 24, 2003	1.76		
Mar 03, 2003	1.836		
Mar 10, 2003	1.88		
Mar 17, 2003	1.909		
Mar 24, 2003	1.903		
Mar 31, 2003	1.881		
Apr 07, 2003	1.86		
Apr 14, 2003	1.827		
Apr 21, 2003	1.793		
Apr 28, 2003	1.764		
May 05, 2003	1.729		

May 12, 2003	1.691		
May 19, 2003	1.657		
May 26, 2003	1.63		
Jun 02, 2003	1.624		
Jun 09, 2003	1.631		
Jun 16, 2003	1.696		
Jun 23, 2003	1.702		
Jun 30, 2003	1.69		
Jul 07, 2003	1.693		
Jul 14, 2003	1.68		
Jul 21, 2003	1.663		
Jul 28, 2003	1.649		
Aug 04, 2003	1.657		
Aug 11, 2003	1.701		
Aug 18, 2003	1.866		
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Sep 08, 2003	1.967		
Sep 15, 2003	1.922		
Sep 22, 2003	1.856		
Sep 29, 2003	1.813		
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Oct 13, 2003	1.733		
Oct 20, 2003	1.703		
Oct 27, 2003	1.681		
Nov 03, 2003	1.671		
Nov 10, 2003	1.661		
Nov 17, 2003	1.669		
Nov 24, 2003	1.669		
Dec 01, 2003	1.657		
Dec 08, 2003	1.633		
Dec 15, 2003	1.611		
Dec 22, 2003	1.597		
Dec 29, 2003	1.593	1.71475	1.2150907
Jan 05, 2004	1.61		
Jan 12, 2004	1.647		
Jan 19, 2004	1.682		
Jan 26, 2004	1.703		
Feb 02, 2004	1.717		
Feb 09, 2004	1.739		
Feb 16, 2004	1.759		
Feb 23, 2004	1.847		
Mar 01, 2004	1.911		
Mar 08, 2004	1.919		
Mar 15, 2004	1.916		
Mar 22, 2004	1.91		
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May 24, 2004	2.267		
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Jun 07, 2004	2.245		
Jun 14, 2004	2.201		
Jun 21, 2004	2.139		
Jun 28, 2004	2.108		
Jul 05, 2004	2.06		
Jul 12, 2004	2.046		
Jul 19, 2004	2.029		
Jul 26, 2004	2.011		
Aug 02, 2004	1.99		
Aug 09, 2004	1.978		
Aug 16, 2004	1.972		
Aug 23, 2004	2.007		
Aug 30, 2004	2.031		
Sep 06, 2004	2.026		
Sep 13, 2004	2.018		
Sep 20, 2004	2.034		
Sep 27, 2004	2.057		
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Oct 11, 2004	2.133		
Oct 18, 2004	2.151		
Oct 25, 2004	2.154		
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Nov 08, 2004	2.13		
Nov 15, 2004	2.111		
Nov 22, 2004	2.087		
Nov 29, 2004	2.065		
Dec 06, 2004	2.04		
Dec 13, 2004	1.989		
Dec 20, 2004	1.939		
Dec 27, 2004	1.908	2.004057692	1.1687171
Jan 03, 2005	1.882		
Jan 10, 2005	1.858		
Jan 17, 2005	1.863		
Jan 24, 2005	1.891		

Jan 31, 2005	1.944		
Feb 07, 2005	1.966		
Feb 14, 2005	1.995		
Feb 21, 2005	2.046		
Feb 28, 2005	2.073		
Mar 07, 2005	2.119		
Mar 14, 2005	2.167		
Mar 21, 2005	2.204		
Mar 28, 2005	2.258		
Apr 04, 2005	2.325		
Apr 11, 2005	2.456		
Apr 18, 2005	2.476		
Apr 25, 2005	2.476		
May 02, 2005	2.472		
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May 16, 2005	2.414		
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Jun 13, 2005	2.298		
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Sep 19, 2005	2.978		
Sep 26, 2005	2.935		
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Oct 17, 2005	2.866		
Oct 24, 2005	2.788		
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Nov 21, 2005	2.439		
Nov 28, 2005	2.388		
Dec 05, 2005	2.329		
Dec 12, 2005	2.26		
Dec 19, 2005	2.242		
Dec 26, 2005	2.228	2.409288462	1.2022051
Jan 02, 2006	2.231		
Jan 09, 2006	2.305		
Jan 16, 2006	2.337		
Jan 23, 2006	2.365		
Jan 30, 2006	2.401		
Feb 06, 2006	2.408		
Feb 13, 2006	2.387		
Feb 20, 2006	2.346		
Feb 27, 2006	2.329		
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Mar 13, 2006	2.423		
Mar 20, 2006	2.503		
Mar 27, 2006	2.548		
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Apr 17, 2006	2.786		
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Jun 05, 2006	3.125		
Jun 12, 2006	3.095		
Jun 19, 2006	3.057		
Jun 26, 2006	3.019		
Jul 03, 2006	3.011		
Jul 10, 2006	3.023		
Jul 17, 2006	3.034		
Jul 24, 2006	3.036		
Jul 31, 2006	3.031		
Aug 07, 2006	3.033		
Aug 14, 2006	3.051		
Aug 21, 2006	3.029		
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Sep 04, 2006	2.931		
Sep 11, 2006	2.872		
Sep 18, 2006	2.774		
Sep 25, 2006	2.686		
Oct 02, 2006	2.616		
Oct 09, 2006	2.55		
Oct 16, 2006	2.497		

Oct 23, 2006	2.464		
Oct 30, 2006	2.421		
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Nov 13, 2006	2.437		
Nov 20, 2006	2.478		
Nov 27, 2006	2.486		
Dec 04, 2006	2.506		
Dec 11, 2006	2.525		
Dec 18, 2006	2.549		
Dec 25, 2006	2.571	2.709173077	1.1244702
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Jan 08, 2007	2.572		
Jan 15, 2007	2.548		
Jan 22, 2007	2.503		
Jan 29, 2007	2.453		
Feb 05, 2007	2.422		
Feb 12, 2007	2.417		
Feb 19, 2007	2.444		
Feb 26, 2007	2.481		
Mar 05, 2007	2.579		
Mar 12, 2007	2.707		
Mar 19, 2007	2.771		
Mar 26, 2007	2.824		
Apr 02, 2007	2.91		
Apr 09, 2007	2.982		
Apr 16, 2007	3.045		
Apr 23, 2007	3.088		
Apr 30, 2007	3.177		
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Jun 18, 2007	3.146		
Jun 25, 2007	3.107		
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Jul 09, 2007	3.025		
Jul 16, 2007	3.013		
Jul 23, 2007	2.976		
Jul 30, 2007	2.932		
Aug 06, 2007	2.892		
Aug 13, 2007	2.838		
Aug 20, 2007	2.798		
Aug 27, 2007	2.771		
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Sep 10, 2007	2.821		
Sep 17, 2007	2.829		
Sep 24, 2007	2.861		
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Oct 15, 2007	2.894		
Oct 22, 2007	2.975		
Oct 29, 2007	3.017		
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Nov 12, 2007	3.172		
Nov 19, 2007	3.187		
Nov 26, 2007	3.189		
Dec 03, 2007	3.171		
Dec 10, 2007	3.141		
Dec 17, 2007	3.113		
Dec 24, 2007	3.092		
Dec 31, 2007	3.124	2.922377358	1.0786972
Jan 07, 2008	3.152		
Jan 14, 2008	3.128		
Jan 21, 2008	3.077		
Jan 28, 2008	3.025		
Feb 04, 2008	3.013		
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May 26, 2008	3.95		
Jun 02, 2008	4.078		
Jun 09, 2008	4.181		
Jun 16, 2008	4.26		
Jun 23, 2008	4.287		
Jun 30, 2008	4.296		
Jul 07, 2008	4.295		

Jul 14, 2008	4.277		
Jul 21, 2008	4.241		
Jul 28, 2008	4.164		
Aug 04, 2008	4.074		
Aug 11, 2008	3.999		
Aug 18, 2008	3.929		
Aug 25, 2008	3.869		
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Sep 08, 2008	3.781		
Sep 15, 2008	3.757		
Sep 22, 2008	3.686		
Sep 29, 2008	3.642		
Oct 06, 2008	3.559		
Oct 13, 2008	3.381		
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Nov 24, 2008	2.173		
Dec 01, 2008	2.049		
Dec 08, 2008	1.919		
Dec 15, 2008	1.824		
Dec 22, 2008	1.812		
Dec 29, 2008	1.805	3.382788462	1.1575468
Jan 05, 2009	1.848		
Jan 12, 2009	1.944		
Jan 19, 2009	2.014		
Jan 26, 2009	2.036		
Feb 02, 2009	2.072		
Feb 09, 2009	2.151		
Feb 16, 2009	2.206		
Feb 23, 2009	2.196		
Mar 02, 2009	2.18		
Mar 09, 2009	2.163		
Mar 16, 2009	2.132		
Mar 23, 2009	2.135		
Mar 30, 2009	2.182		
Apr 06, 2009	2.193		
Apr 13, 2009	2.209		
Apr 20, 2009	2.211		
Apr 27, 2009	2.211		
May 04, 2009	2.232		
May 11, 2009	2.315		
May 18, 2009	2.386		
May 25, 2009	2.514		
Jun 01, 2009	2.598		
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Jun 22, 2009	2.855		
Jun 29, 2009	2.826		
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Jul 27, 2009	2.713		
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Aug 10, 2009	2.851		
Aug 17, 2009	2.86		
Aug 24, 2009	2.855		
Aug 31, 2009	2.868		
Sep 07, 2009	2.883		
Sep 14, 2009	2.899		
Sep 21, 2009	2.887		
Sep 28, 2009	2.834		
Oct 05, 2009	2.778		
Oct 12, 2009	2.733		
Oct 19, 2009	2.716		
Oct 26, 2009	2.765		
Nov 02, 2009	2.82		
Nov 09, 2009	2.823		
Nov 16, 2009	2.823		
Nov 23, 2009	2.828		
Nov 30, 2009	2.817		
Dec 07, 2009	2.819		
Dec 14, 2009	2.8		
Dec 21, 2009	2.782		
Dec 28, 2009	2.781	2.544134615	0.7520821
Jan 04, 2010	2.797		
Jan 11, 2010	2.875		
Jan 18, 2010	2.875		
Jan 25, 2010	2.87		
Feb 01, 2010	2.848		
Feb 08, 2010	2.828		
Feb 15, 2010	2.805		
Feb 22, 2010	2.825		
Mar 01, 2010	2.877		
Mar 08, 2010	2.925		
Mar 15, 2010	2.955		
Mar 22, 2010	2.98		
Mar 29, 2010	2.996		

Apr 05, 2010	3.004		
Apr 12, 2010	3.044		
Apr 19, 2010	3.05		
Apr 26, 2010	3.047		
May 03, 2010	3.059		
May 10, 2010	3.069		
May 17, 2010	3.036		
May 24, 2010	2.988		
May 31, 2010	2.941		
Jun 07, 2010	2.949		
Jun 14, 2010	2.935		
Jun 21, 2010	2.967		
Jun 28, 2010	2.978		
Jul 05, 2010	2.982		
Jul 12, 2010	2.971		
Jul 19, 2010	2.991		
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Aug 09, 2010	3.049		
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Nov 15, 2010	3.047		
Nov 22, 2010	3.059		
Nov 29, 2010	3.041		
Dec 06, 2010	3.091		
Dec 13, 2010	3.125		
Dec 20, 2010	3.129		
Dec 27, 2010	3.148	2.980269231	1.1714275
Jan 03, 2011	3.16		
Jan 10, 2011	3.186		
Jan 17, 2011	3.223		
Jan 24, 2011	3.231		
Jan 31, 2011	3.234		
Feb 07, 2011	3.265		
Feb 14, 2011	3.314		
Feb 21, 2011	3.398		
Feb 28, 2011	3.504		
Mar 07, 2011	3.63		
Mar 14, 2011	3.692		
Mar 21, 2011	3.716		
Mar 28, 2011	3.772		
Apr 04, 2011	3.818		
Apr 11, 2011	3.868		
Apr 18, 2011	3.917		
Apr 25, 2011	3.942		
May 02, 2011	3.987		
May 09, 2011	4.017		
May 16, 2011	3.99		
May 23, 2011	3.933		
May 30, 2011	3.893		
Jun 06, 2011	3.869		
Jun 13, 2011	3.838		
Jun 20, 2011	3.807		
Jun 27, 2011	3.759		
Jul 04, 2011	3.705		
Jul 11, 2011	3.692		
Jul 18, 2011	3.697		
Jul 25, 2011	3.694		
Aug 01, 2011	3.702		
Aug 08, 2011	3.701		
Aug 15, 2011	3.674		
Aug 22, 2011	3.663		
Aug 29, 2011	3.693		
Sep 05, 2011	3.771		
Sep 12, 2011	3.784		
Sep 19, 2011	3.789		
Sep 26, 2011	3.772		
Oct 03, 2011	3.726		
Oct 10, 2011	3.698		
Oct 17, 2011	3.716		
Oct 24, 2011	3.727		
Oct 31, 2011	3.705		
Nov 07, 2011	3.677		
Nov 14, 2011	3.669		
Nov 21, 2011	3.622		
Nov 28, 2011	3.578		
Dec 05, 2011	3.531		
Dec 12, 2011	3.489		
Dec 19, 2011	3.425		

Dec 26, 2011	3.428	3.659442308	1.2278898
Jan 02, 2012	3.443		
Jan 09, 2012	3.477		
Jan 16, 2012	3.498		
Jan 23, 2012	3.516		
Jan 30, 2012	3.543		
Feb 06, 2012	3.566		
Feb 13, 2012	3.593		
Feb 20, 2012	3.705		
Feb 27, 2012	3.882		
Mar 05, 2012	3.963		
Mar 12, 2012	3.994		
Mar 19, 2012	4.038		
Mar 26, 2012	4.086		
Apr 02, 2012	4.121		
Apr 09, 2012	4.12		
Apr 16, 2012	4.111		
Apr 23, 2012	4.088		
Apr 30, 2012	4.058		
May 07, 2012	4.049		
May 14, 2012	4.11		
May 21, 2012	4.127		
May 28, 2012	4.127		
Jun 04, 2012	4.103		
Jun 11, 2012	4.02		
Jun 18, 2012	3.901		
Jun 25, 2012	3.762		
Jul 02, 2012	3.666		
Jul 09, 2012	3.618		
Jul 16, 2012	3.589		
Jul 23, 2012	3.605		
Jul 30, 2012	3.595		
Aug 06, 2012	3.618		
Aug 13, 2012	3.742		
Aug 20, 2012	3.83		
Aug 27, 2012	3.886		
Sep 03, 2012	3.944		
Sep 10, 2012	3.966		
Sep 17, 2012	3.984		
Sep 24, 2012	3.966		
Oct 01, 2012	3.966		
Oct 08, 2012	4.025		
Oct 15, 2012	4.039		
Oct 22, 2012	3.97		
Oct 29, 2012	3.881		
Nov 05, 2012	3.78		
Nov 12, 2012	3.703		
Nov 19, 2012	3.626		
Nov 26, 2012	3.581		
Dec 03, 2012	3.527		
Dec 10, 2012	3.467		
Dec 17, 2012	3.393		
Dec 24, 2012	3.343		
Dec 31, 2012	3.339	3.804716981	1.0396986
Jan 07, 2013	3.338		
Jan 14, 2013	3.33		
Jan 21, 2013	3.337		
Jan 28, 2013	3.37		
Feb 04, 2013	3.502		
Feb 11, 2013	3.612		
Feb 18, 2013	3.713		
Feb 25, 2013	3.83		
Mar 04, 2013	3.874		
Mar 11, 2013	3.885		
Mar 18, 2013	3.864		
Mar 25, 2013	3.829		
Apr 01, 2013	3.808		
Apr 08, 2013	3.797		
Apr 15, 2013	3.76		
Apr 22, 2013	3.718		
Apr 29, 2013	3.671		
May 06, 2013	3.689		
May 13, 2013	3.809		
May 20, 2013	3.835		
May 27, 2013	3.829		
Jun 03, 2013	3.789		
Jun 10, 2013	3.771		
Jun 17, 2013	3.766		
Jun 24, 2013	3.781		
Jul 01, 2013	3.753		
Jul 08, 2013	3.737		
Jul 15, 2013	3.823		
Jul 22, 2013	3.865		
Jul 29, 2013	3.858		
Aug 05, 2013	3.829		
Aug 12, 2013	3.787		
Aug 19, 2013	3.739		
Aug 26, 2013	3.698		
Sep 02, 2013	3.678		
Sep 09, 2013	3.673		

Sep 16, 2013	3.693		
Sep 23, 2013	3.677		
Sep 30, 2013	3.632		
Oct 07, 2013	3.594		
Oct 14, 2013	3.551		
Oct 21, 2013	3.517		
Oct 28, 2013	3.474		
Nov 04, 2013	3.441		
Nov 11, 2013	3.395		
Nov 18, 2013	3.357		
Nov 25, 2013	3.354		
Dec 02, 2013	3.352		
Dec 09, 2013	3.35		
Dec 16, 2013	3.348		
Dec 23, 2013	3.344		
Dec 30, 2013	3.369	3.642211538	0.9572884
Jan 06, 2014	3.393		
Jan 13, 2014	3.392		
Jan 20, 2014	3.378		
Jan 27, 2014	3.375		
Feb 03, 2014	3.378		
Feb 10, 2014	3.383		
Feb 17, 2014	3.411		
Feb 24, 2014	3.458		
Mar 03, 2014	3.509		
Mar 10, 2014	3.562		
Mar 17, 2014	3.609		
Mar 24, 2014	3.622		
Mar 31, 2014	3.657		
Apr 07, 2014	3.68		
Apr 14, 2014	3.724		
Apr 21, 2014	3.773		
Apr 28, 2014	3.814		
May 05, 2014	3.818		
May 12, 2014	3.821		
May 19, 2014	3.821		
May 26, 2014	3.831		
Jun 02, 2014	3.851		
Jun 09, 2014	3.856		
Jun 16, 2014	3.872		
Jun 23, 2014	3.907		
Jun 30, 2014	3.923		
Jul 07, 2014	3.933		
Jul 14, 2014	3.9		
Jul 21, 2014	3.875		
Jul 28, 2014	3.854		
Aug 04, 2014	3.843		
Aug 11, 2014	3.826		
Aug 18, 2014	3.806		
Aug 25, 2014	3.787		
Sep 01, 2014	3.768		
Sep 08, 2014	3.755		
Sep 15, 2014	3.716		
Sep 22, 2014	3.658		
Sep 29, 2014	3.616		
Oct 06, 2014	3.567		
Oct 13, 2014	3.483		
Oct 20, 2014	3.367		
Oct 27, 2014	3.267		
Nov 03, 2014	3.184		
Nov 10, 2014	3.141		
Nov 17, 2014	3.106		
Nov 24, 2014	3.062		
Dec 01, 2014	3.018		
Dec 08, 2014	2.927		
Dec 15, 2014	2.81		
Dec 22, 2014	2.667		
Dec 29, 2014	2.566	3.544615385	0.9732042
Jan 05, 2015	2.484		
Jan 12, 2015	2.369		
Jan 19, 2015	2.265		
Jan 26, 2015	2.197		
Feb 02, 2015	2.192		
Feb 09, 2015	2.268		
Feb 16, 2015	2.374		
Feb 23, 2015	2.466		
Mar 02, 2015	2.686		
Mar 09, 2015	2.792		
Mar 16, 2015	2.756		
Mar 23, 2015	2.722		
Mar 30, 2015	2.694		
Apr 06, 2015	2.677		
Apr 13, 2015	2.666		
Apr 20, 2015	2.695		
Apr 27, 2015	2.802		
May 04, 2015	2.962		
May 11, 2015	3.001		
May 18, 2015	3.058		
May 25, 2015	3.075		
Jun 01, 2015	3.067		

Jun 08, 2015	3.065		
Jun 15, 2015	3.087		
Jun 22, 2015	3.124		
Jun 29, 2015	3.121		
Jul 06, 2015	3.121		
Jul 13, 2015	3.142		
Jul 20, 2015	3.156		
Jul 27, 2015	3.143		
Aug 03, 2015	3.119		
Aug 10, 2015	3.067		
Aug 17, 2015	3.04		
Aug 24, 2015	3		
Aug 31, 2015	2.915		
Sep 07, 2015	2.853		
Sep 14, 2015	2.775		
Sep 21, 2015	2.697		
Sep 28, 2015	2.625		
Oct 05, 2015	2.568		
Oct 12, 2015	2.526		
Oct 19, 2015	2.487		
Oct 26, 2015	2.45		
Nov 02, 2015	2.419		
Nov 09, 2015	2.464		
Nov 16, 2015	2.453		
Nov 23, 2015	2.41		
Nov 30, 2015	2.375		
Dec 07, 2015	2.357		
Dec 14, 2015	2.337		
Dec 21, 2015	2.348		
Dec 28, 2015	2.36	2.709076923	0.7642795
Jan 04, 2016	2.361		
Jan 11, 2016	2.329		
Jan 18, 2016	2.264		
Jan 25, 2016	2.209		
Feb 01, 2016	2.142		
Feb 08, 2016	2.082		
Feb 15, 2016	2.009		
Feb 22, 2016	1.945		
Feb 29, 2016	1.935		
Mar 07, 2016	1.974		
Mar 14, 2016	2.114		
Mar 21, 2016	2.2		
Mar 28, 2016	2.274		
Apr 04, 2016	2.309		
Apr 11, 2016	2.31		

Fuel and CO_2 Price Projection

Year	Fuel Prices Dollars per Gallon (Inflated) 5.766% based on average yearly inflation for years 1999 to 2015	CO_2 Price/ Metric Ton (Inflation) Provided in TIGER 2016 BCA Guidance Document Page 7.
2015	$ 2.7090	45
2016	$ 2.8652	46
2017	$ 3.0304	47.00
2018	$ 3.2051	49.00
2019	$ 3.3899	51.00
2020	$ 3.5853	52.00
2021	$ 3.7920	52.00
2022	$ 4.0107	54.00
2023	$ 4.2419	55.00
2024	$ 4.4865	56.00
2025	$ 4.7451	57.00
2026	$ 5.0187	58.00
2027	$ 5.3081	60.00
2028	$ 5.6141	61.00
2029	$ 5.9378	62.00
2030	$ 6.2802	63.00
2031	$ 6.6422	63.00
2032	$ 7.0252	65.00
2033	$ 7.4302	66.00
2034	$ 7.8586	67.00
2035	$ 8.3117	68.00
2036	$ 8.7909	69.00
2037	$ 9.2978	71.00
2038	$ 9.8338	72.00
2039	$ 10.4008	73.00

Average Yearly Fuel Price Inflation 1999 to 2015

Year	West Coast Less California Regular Gasoline Prices Annually (Dollars per Gallon)	Inflation Rate (Percent)
1999	$ 1.326	0.00%
2000	$ 1.625	22.549%
2001	$ 1.550	-4.615%
2002	$ 1.411	-8.968%
2003	$ 1.715	21.545%
2004	$ 2.004	16.851%
2005	$ 2.409	20.210%
2006	$ 2.709	12.453%
2007	$ 2.922	7.863%
2008	$ 3.383	15.777%
2009	$ 2.544	-24.800%
2010	$ 2.980	17.138%
2011	$ 3.659	22.785%
2012	$ 3.805	3.990%
2013	$ 3.642	-4.284%
2014	$ 3.545	-2.663%
2015	$ 2.709	-23.583%
average yearly inflation		5.766%

Basis of Calculations for Table 4 Projected Yearly Reduction of Accidents and Associated Value of a Statistical Life and Injuries Savings			
	Purpose	**Equation**	**Data**
Column 1	Year	No Equation	
Column 2	Annual Ridership Projections	[Previous Years Projected Ridership x (1+Projected Percentage)] Projected Percentages Years 1 through 5: 75%, 50%, 25%, 10%, 5%, and 3% for the remaining 15 years.	Data carried over form Table 2 Projected Ridership
Column 3	Projected Vehicle Miles Traveled (VMT's)	VMT=Annual Ridership x 0.80 (80% of Projected Rail Passengers Use Private Automobile to Visit or Travel From West Wendover 115 Miles to Nearest Rail and Commercial Airport) x Segment Length (230 Miles)	See BCA Section C. Basis of Calculations for explanation for 80% private automobile use. Segment Length (230 Miles) = Roundtrip travel length between West Wendover, Nevada Elko Nevada, or Salt Lake City, Utah, the nearest locations with access to rail passenger service and scheduled air service.
Column 4	Running Total of Annual VMT's	Total VMT's = Yearly VMT's (Column 3) + Previous Years Total VMT's (Column 4)	Totaling of VMT's Year over Year
Column 5	Statistical Occurrence of PDO Accidents	VMT/PDO Accident = (100,000,000 (VMT) / 87 accidents) One accident is placed in the cell for each year (Column 5) as 1,149,425 VMT is reached in the running total (Column 4) over previous accident.	1 accident per 1,149,425 VMT is derived from Utah Department of Public Safety, Utah Crash Summary 2014, Crashes by County Page 45. Table Titled Crashes, Column PDO Crashes Rate Per 100 mill. VMT, Row Tooele County, 87. The Utah Crash Summary is found at: http://highwaysafety.utah.gov/wp-content/uploads/sites/22/2015/02/Utah-Crash-Summary-2014-website.pdf See BCA Section D. Types of Benefits Subsection 2. for explanation of how accident data was chosen.
Column 6	Statistical Occurrence of Injury Accidents	VMT/Injury Accident = (100,000,000 (VMT) / 33.7 accidents) One accident is placed in the cell for each year (Column 6) as 2,967,359 VMT is reached in the running total (Column 4) over previous accident.	1 accident per 2,967,359 VMT is derived from Utah Department of Public Safety, Utah Crash Summary 2014, Crashes by County Page 45. Table Titled Crashes, Column Injury Crashes Rate Per 100 mill. VMT, Row Tooele County, 33.7. The Utah Crash Summary is found at: http://highwaysafety.utah.gov/wp-content/uploads/sites/22/2015/02/Utah-Crash-Summary-2014-website.pdf See BCA Section D. Types of Benefits Subsection 2. for explanation of how accident data was chosen.
Column 7	Statistical Occurrence of Fatal Accidents	VMT/Injury Accident = (100,000,000 (VMT) / 1.34 accidents) One accident is placed in the cell for each year (Column 7) as 74,626,865 VMT is reached in the running total (Column 4) over previous accident.	1 accident per 74,626,865 VMT is derived from Utah Department of Public Safety, Utah Crash Summary 2014, Crashes by County Page 45. Table Titled Crashes, Column Fatal Crashes Rate Per 100 mill. VMT, Row Tooele County, 1.34. The Utah Crash Summary is found at: http://highwaysafety.utah.gov/wp-content/uploads/sites/22/2015/02/Utah-Crash-Summary-2014-website.pdf See BCA Section D. Types of Benefits Subsection 2. for explanation of how accident data was chosen.
Column 8	Conversion of PDO Accidents to KABCO Scale (No Injury 69.2% of Total Accidents)	No. PDO Accidents (No Injury) =Total Number of Accidents from (Columns 5 + 6 + 7) x 69.2% The accidents are then placed randomly through the years (Column 8) matching up with PDO Accidents in (Column 5).	69.2% of total accidents is a state wide calculation that is found in the Utah Department of Public Safety, Utah Crash Summary 2014, Crash Conditions Page 42. Pie Chart Titled Crash Severity, No Injury The Utah Crash Summary is found at: http://highwaysafety.utah.gov/wp-content/uploads/sites/22/2015/02/Utah-Crash-Summary-2014-website.pdf See BCA Section D. Types of Benefits Subsection 2. for explanation of how accident data was chosen.
Column 9	Conversion of Injury Accidents to KABCO Scale (Possible Injury 17.2% of Total Accidents)	No. Injury Accidents (Possible Injury) = Total Number of Accidents from (Columns 5 + 6 + 7) x 17.5% The number of accidents calculated are then placed randomly through the years (Column 9) matching up with Injury Accidents in (Column 6) making sure that they do not double up with other Injury Accidents in (Columns 10 and 11).	17.5% of total accidents is a state wide calculation that is found in the Utah Department of Public Safety, Utah Crash Summary 2014, Crash Conditions Page 42. Pie Chart Titled Crash Severity, Possible Injury The Utah Crash Summary is found at: http://highwaysafety.utah.gov/wp-content/uploads/sites/22/2015/02/Utah-Crash-Summary-2014-website.pdf See BCA Section D. Types of Benefits Subsection 2. for explanation of how accident data was chosen.
Column 10	Conversion of Injury Accidents to KABCO Scale (Non-incapacitating Injury 10.7% of Total Accidents)	No. Injury Accidents (Non-incapacitating Injury) = Total Number of Accidents from (Columns 5 + 6 + 7) x 10.7% The number of accidents calculated are then placed randomly through the years (Column 10) matching up with Injury Accidents in (Column 6) making sure that they do not double up with other Injury Accidents in (Columns 10 and 11).	10.7% of total accidents is a state wide calculation that is found in the Utah Department of Public Safety, Utah Crash Summary 2014, Crash Conditions Page 42. Pie Chart Titled Crash Severity, Non-incapacitating Injury The Utah Crash Summary is found at: http://highwaysafety.utah.gov/wp-content/uploads/sites/22/2015/02/Utah-Crash-Summary-2014-website.pdf See BCA Section D. Types of Benefits Subsection 2. for explanation of how accident data was chosen.
Column 11	Conversion of Injury Accidents to KABCO Scale (Incapacitating Injury 2.2% of Total Accidents)	No. Injury Accidents (Incapacitating Injury) = Total Number of Accidents from (Columns 5 + 6 + 7) x 2.2% The number of accidents calculated are then placed randomly through the years (Column 11) matching up with Injury Accidents in (Column 6) making sure that they do not double up with other Injury Accidents in (Columns 9 and 10).	2.2% of total accidents is a state wide calculation that is found in the Utah Department of Public Safety, Utah Crash Summary 2014, Crash Conditions Page 42. Pie Chart Titled Crash Severity, Incapacitating Injury The Utah Crash Summary is found at: http://highwaysafety.utah.gov/wp-content/uploads/sites/22/2015/02/Utah-Crash-Summary-2014-website.pdf See BCA Section D. Types of Benefits Subsection 2. for explanation of how accident data was chosen.
Column 12	Conversion of Injury Accidents to KABCO Scale (Death 0.4% of Total Accidents)	No. Fatal Accidents (Death) = Total Number of Accidents from (Columns 5 + 6 + 7) x 0.4% The number of accidents calculated are then placed randomly through the years (Column 12) matching up with Fatal Accidents in (Column 7).	0.4% of total accidents is a state wide calculation that is found in the Utah Department of Public Safety, Utah Crash Summary 2014, Crash Conditions Page 42. Pie Chart Titled Crash Severity, Death The Utah Crash Summary is found at: http://highwaysafety.utah.gov/wp-content/uploads/sites/22/2015/02/Utah-Crash-Summary-2014-website.pdf See BCA Section D. Types of Benefits Subsection 2. for explanation of how accident data was chosen.
Column 13	Calculation of No Injury Accidents as AIS Values $2015	$ No Injury = No Injury Accidents (Column 8) x $3,234.82.	Multiplication of data found in Spreadsheet. The $3,234.82 comes from Table 5 AIS Value of a Statistical Life and Injuries Matrix Column 10 Dollar Value Single Accident No Injury $2015, bottom Row Total.
Column 14	Calculation of Possible Injury Accidents as AIS Values $2015	$ Possible Injury = Possible Injury Accidents (Column 9) x $63,854.50.	Multiplication of data found in Spreadsheet. The $63,854.50 comes from Table 5 AIS Value of a Statistical Life and Injuries Matrix Column 11 Dollar Value of a Single Accident Possible Injury, bottom Row Total.
Column 15	Calculation of Non-incapacitating Injury Accidents as AIS Values $2015	$ Non-incapacitating Injury = Non-incapacitating Injury Accidents (Column 10) x $125,049.89.	Multiplication of data found in Spreadsheet. The $125,049.89 comes from Table 5 AIS Value of a Statistical Life and Injuries Matrix Column 12 Dollar Value of a Single Accident Non-incapacitating Injury, bottom Row Total.
Column 16	Calculation of Incapacitating Injury Accidents as AIS Values $2015	$ Incapacitating Injury = Incapacitating Injury Accidents (Column 11) x $459,120.29.	Multiplication of data found in Spreadsheet. The $459,120.29 comes from Table 5 AIS Value of a Statistical Life and Injuries Matrix Column 13 Dollar Value of a Single Accident Incapacitating Injury, bottom Row Total.
Column 17	Calculation of Fatal Accidents as AIS Values $2015	$ Fatal = Fatal Accidents (Column 12) x $9,600,000.00.	Multiplication of data found in Spreadsheet. The $9,600,000.00 comes from Table 5 AIS Value of a Statistical Life and Injuries Matrix Column 14 Dollar Value of a Single Accident Killed, bottom Row Total.
Column 18	Total Value of Injuries $2015	Total $ = (Column 14) + (Column 15) + (Column 16) + (Column 17)	Addition of Columns in Spreadsheet
Column 19	Total Value of Injuries Accounting for Inflation	3% Inflation Value of Injuries = Total Value of Injuries (Column 18) x (1+0.03) x number of years number of years Calculated by (current year of row - 2020)	Standard inflation equation applied to Total Value of Injuries.
Column 20	3% Net Present Value (NPV) of Injuries	3% NPV = Injuries $ (Column 19) / ((1+0.03) x number of years)	Standard Net Present Value equation applied to Value of Injuries
Column 21	7% Net Present Value (NPV) of Injuries	7% NPV = Injuries $ (Column 19) / ((1+0.07) x number of years)	Standard Net Present Value equation applied to Value of Injuries

Basis of Calculations for Table 5 AIS Value of a Statistical Life and Injuries Matrix			
	Purpose	**Equation**	**Data**
Column 1	AIS Scale	No Equation	AIS Scale comes directly from Table 4. found in TIGER and FASTLANE Benefit Cost Analysis (BCA) Resource Guide 2016, Page 13. Table 4 KABCO/ Unknown - AIS DATA Conversion Matrix (Column 1) AIS https://www.transportation.gov/sites/dot.gov/files/docs/BCA%20Resource%20Guide%202016.pdf
Column 2	KABCO No Injury Probability across AIS Scale	No Equation	AIS conversion probabilities come directly from Table 4. found in TIGER and FASTLANE Benefit Cost Analysis (BCA) Resource Guide 2016, Page 13. Table 4 KABCO/ Unknown - AIS DATA Conversion Matrix (Column 2) No Injury https://www.transportation.gov/sites/dot.gov/files/docs/BCA%20Resource%20Guide%202016.pdf
Column 3	KABCO Possible Injury Probability across AIS Scale	No Equation	AIS conversion probabilities come directly from Table 4. found in TIGER and FASTLANE Benefit Cost Analysis (BCA) Resource Guide 2016, Page 13. Table 4 KABCO/ Unknown - AIS DATA Conversion Matrix (Column 3) Possible Injury https://www.transportation.gov/sites/dot.gov/files/docs/BCA%20Resource%20Guide%202016.pdf
Column 4	KABCO Non-incapacitating Injury Probability across AIS Scale	No Equation	AIS conversion probabilities come directly from Table 4. found in TIGER and FASTLANE Benefit Cost Analysis (BCA) Resource Guide 2016, Page 13. Table 4 KABCO/ Unknown - AIS DATA Conversion Matrix (Column 4) Non-incapacitating Injury https://www.transportation.gov/sites/dot.gov/files/docs/BCA%20Resource%20Guide%202016.pdf
Column 5	KABCO Incapacitating Injury Probability across AIS Scale	No Equation	AIS conversion probabilities come directly from Table 4. found in TIGER and FASTLANE Benefit Cost Analysis (BCA) Resource Guide 2016, Page 13. Table 4 KABCO/ Unknown - AIS DATA Conversion Matrix (Column 5) Incapacitating Injury https://www.transportation.gov/sites/dot.gov/files/docs/BCA%20Resource%20Guide%202016.pdf
Column 6	KABCO Killed Probability across AIS Scale	No Equation	AIS conversion probabilities come directly from Table 4. found in TIGER and FASTLANE Benefit Cost Analysis (BCA) Resource Guide 2016, Page 13. Table 4 KABCO/ Unknown - AIS DATA Conversion Matrix (Column 6) Killed https://www.transportation.gov/sites/dot.gov/files/docs/BCA%20Resource%20Guide%202016.pdf
Column 7	Injury Severity Unknown Probability across AIS Scale	No Equation	AIS conversion probabilities come directly from Table 4. found in TIGER and FASTLANE Benefit Cost Analysis (BCA) Resource Guide 2016, Page 13. Table 4 KABCO/ Unknown - AIS DATA Conversion Matrix (Column 7) Injury Severity Unknown https://www.transportation.gov/sites/dot.gov/files/docs/BCA%20Resource%20Guide%202016.pdf
Column 8	# Non-fatal Accidents Unknown if Injured Probability across AIS Scale	No Equation	AIS conversion probabilities come directly from Table 4. found in TIGER and FASTLANE Benefit Cost Analysis (BCA) Resource Guide 2016, Page 13. Table 4 KABCO/ Unknown - AIS DATA Conversion Matrix (Column 8) # Non-fatal Accidents Unknown if Injured https://www.transportation.gov/sites/dot.gov/files/docs/BCA%20Resource%20Guide%202016.pdf
Column 9	Dollar Value of AIS Scale ($2015)	No Equation	Dollar Value of AIS Scale comes directly from Table 5. found in TIGER and FASTLANE Benefit Cost Analysis (BCA) Resource Guide 2016, Page 13. Table 5 KABCO - AIS Data Conversion for KABCO "O" Accident (Column 3) AIS Dollar Values ($2015) https://www.transportation.gov/sites/dot.gov/files/docs/BCA%20Resource%20Guide%202016.pdf
Column 10	Dollar Value Single Accident No Injury ($2015)	$ = AIS Probability No Injury (Column 2) x Dollar Value AIS Scale (Column 9) multiplied row by row and then summed up as Total Value bottom Row of (Column 10)	Data derived from multiplication of values in spreadsheet.
Column 11	Dollar Value Single Accident Possible Injury ($2015)	$ = AIS Probability Possible Injury (Column 3) x Dollar Value AIS Scale (Column 9) multiplied row by row and then summed up as Total Value bottom Row of (Column 11)	Data derived from multiplication of values in spreadsheet.
Column 12	Dollar Value Single Accident Non-incapacitating Injury ($2015)	$ = AIS Probability Non-incapacitating Injury (Column 4) x Dollar Value AIS Scale (Column 9) multiplied row by row and then summed up as Total Value bottom Row of (Column 12)	Data derived from multiplication of values in spreadsheet.
Column 13	Dollar Value Single Accident Incapacitating Injury ($2015)	$ = AIS Probability Incapacitating Injury (Column 5) x Dollar Value AIS Scale (Column 9) multiplied row by row and then summed up as Total Value bottom Row of (Column 13)	Data derived from multiplication of values in spreadsheet.
Column 14	Dollar Value Single Accident Killed ($2015)	$ = AIS Probability Killed (Column 6) x Dollar Value AIS Scale (Column 9) multiplied row by row and then summed up as Total Value bottom Row of (Column 14)	Data derived from multiplication of values in spreadsheet.
Column 15	Dollar Value Single Accident Injury Severity Unknown ($2015)	$ = AIS Probability Injury Severity Unknown (Column 7) x Dollar Value AIS Scale (Column 9) multiplied row by row and then summed up as Total Value bottom Row of (Column 15)	Data derived from multiplication of values in spreadsheet.
Column 16	Dollar Value Single Accident # Non-fatal Accidents Unknown if Injured ($2015)	$ = AIS Probability # Non-fatal Accidents Unknown if Injured (Column 8) x Dollar Value AIS Scale (Column 9) multiplied row by row and then summed up as Total Value bottom Row of (Column 16)	Data derived from multiplication of values in spreadsheet.