


Appendix A: Executive Summary of the Benefit-Cost Analysis for Glacier Rail Park/Kalispell Core Area Development and Trail Project

Table of Contents


List of Tables


Summary and Findings

This TIGER FY2015 grant application is for Phase II construction of the rural Glacier Rail Park/Kalispell Core Area Development and Trail project (hereafter referred to as the Project). The funds will be used toward the construction of the Glacier Rail Park and the redevelopment of the core area of downtown Kalispell and a trail that will be built upon the resulting abandoned rail corridor that will connect east and west Kalispell. The project will improve both transportation choices for freight and people. The new rail yard will concentrate freight into an industrial park where it can be loaded / unloaded onto rail and moved in and out of the region on rail. This rail yard will provide shippers with cost effective transportation options that are not currently available in NW Montana. Table 1 below summarized the improvements and associated economic benefits.

Table 1: Project Matrix

Project Matrix for Glacier Rail Park/Kalispell Core Area Development and Trail Project							
Current Status/ Base line (No Build) & Problem to be Addressed	**Change to Baseline/ Alternatives**	**Type of Impacts**	**Population Affected by Impacts**	**Economic Benefit**	**Summary of Results (Mill $ 2015)**	**Reference in BCA write up**	**Tab in Spreadsheet**
Lack of Transportation options for freight and people in Kalispell,MT. This includes the lack of a centralized cost-effective/ efficient Rail loading/ unloading hub in Flathead Co. The use inefficient long haul trucking as the primarily modal option causes inefficient and costly routing of freight into and out of the region. The current rail facilities do not have the capacity to meet current and future cargo demands In addtion, a current rail line passing through the Core Area of Kalispell, bifurcates downtown. This increases the safety risk of the residents and visitors as they attempt to cross this active line on a daily basis.	Build a Rail Park to consolidate rail loading and unloading into one location (rail hub). Thus will allow the conversion of currentl long-haul truck trips to be converted to short truck trips supporting the local area and long distant rail hauls of the associated cargo.	Reduced VMT on highways and roadways	Vehicle drivers	Monetized value of reduced truck miles generating fuel savings	Estimated $7 million of fuel savings	Pages 14 Table 8	Detailed Savings Gallons & MT CO2
		Reduced pollutant emissic	Local, state, region and national populations	Monetized value of emission reductions	Estimated $1.4 million in reduced emissions	Page 14 Table 8	Detailed Savings Gallons & MT CO2
		Improved efficiency in freight modal choice by switching freigh to rail vs. truck	Freight Shippers utilizing the Rail Park	Monetized value of reduced operational costs to shippers	Estimated $7 million operational costs savings to shippers	Page 15 Table 9	Operational Savings
		Reduced road maintenace cost due to the reduction of VMT on highways	Government	Monetized value of reduced road maintenance costs to due to reduced VMT	Estimated $6 million of Road maintenance savings to states and regions	Page 16 Table 10	Road Maintenance
		Reduced potential fatalities on highways	General public	Monetized value of the reduction of potential fatalities on roadways to due to reduced VMT	Estimated $11 million of reduced fatalities from reduction of Vehicle Miles Traveled	Page 17 Table 11	Collision Costs
	Build a trail to transform Kalispell into a walkable community by connecting the isolated populations to work and daily activity centers. This will be accomplished by removing and relocating the current core area rail users to the new rail park. Post opening of the new rail park, the rail line running through the Core Area will be abandoned and replaced with a trail that connects east and west Kalispell. It will also include the closure of six at-grade rail crossings that limit safe transportation options to daily activities in Kalispell's core area.	Reduction in potential fatalities at six Downtown at-grade crossings	General public	Monetized value of the reduction of potential fatalities at six at-grade rail crossings	Estimated $10 million of reduced falaties from the closure of six at- grade crossings	Page 17 Table 12	Collision Costs

The period of analysis used in the estimation of benefits and costs corresponds to 24 years, consisting of the current year (2015), 3 years of construction and 20 years of operation after the completion of the Trail plus a residual value after the final year. Total project costs for Phase II are $21.2 million are expected to


be financed through local and federal sources. The Tiger FY2015 application requests $10 million and the local participates of this project are committed to funding $12.2 million, 59 percent of the project cost. The BCA includes all project costs from Phases I and II for a total of $23.3 million which includes initial project costs starting in 2012 such as planning, engineering and property purchase costs. A summary of relevant data as well as the Total Benefits and Total Costs used to derive the benefit costs analysis for the project are shown in Table 2.

Table 2: Summary of Pertinent Data, Quantified Benefits and Costs

Calendar Year	Total Direct Beneficiaries (Reduction in Truck VMT)	Total Benefits (2015$)	Total Initial Costs & Residual	Maintenance Costs (2015$)	Undiscounted Net Benfits (2015$)	Discounted Net Benefits (7%)
2015		$0	($2,042,081)	$0	($2,042,081)	($2,042,081)
2016		$0	($15,469,464)	$0	($15,469,464)	($14,457,443)
2017	1,560,000	$1,970,715	($2,407,355)	$0	($436,640)	($349,561)
2018	1,560,000	$1,970,715	($3,407,355)	$0	($1,436,640)	($1,141,164)
2019	1,606,800	$1,999,919		($54,400)	$1,945,519	$1,517,133
2020	1,655,004	$2,030,000		($54,400)	$1,975,600	$1,442,824
2021	1,704,654	$2,060,983		($54,400)	$2,006,583	$1,371,991
2022	1,755,794	$2,092,896		($54,400)	$2,038,496	$1,304,392
2023	1,808,468	$2,125,766		($54,400)	$2,071,366	$1,241,817
2024	1,862,722	$2,159,622		($54,400)	$2,105,222	$1,182,036
2025	1,918,603	$2,194,493		($54,400)	$2,140,093	$1,125,521
2026	1,976,161	$2,230,411		($54,400)	$2,176,011	$1,072,085
2027	2,035,446	$2,267,407		($54,400)	$2,213,007	$1,021,551
2028	2,096,510	$2,305,512		($54,400)	$2,251,112	$974,424
2029	2,159,405	$2,344,761		($54,400)	$2,290,361	$929,205
2030	2,224,187	$2,385,186		($54,400)	$2,330,786	$886,420
2031	2,290,913	$2,426,825		($54,400)	$2,372,425	$845,929
2032	2,359,640	$2,469,713		($54,400)	$2,415,313	$806,933
2033	2,430,429	$2,513,888		($54,400)	$2,459,488	$771,324
2034	2,503,342	$2,559,387		($54,400)	$2,504,987	$736,971
2035	2,578,442	$2,606,252		($54,400)	$2,551,852	$705,112
2036	2,655,796	$2,654,523		($54,400)	$2,600,123	$674,300
2037	2,735,469	$2,704,242		($54,400)	$2,649,842	$645,783
2038	2,817,534	$2,755,452		($54,400)	$2,701,052	$618,129
2039	2,902,060	$2,808,199	$17,406,535	($54,400)	$20,160,333	$4,023,564
Total	49,197,377	$50,828,666	($5,919,720)	($1,088,000)	$26,414,411	$5,907,192

Based upon the Benefit Cost Analysis present in the remainder of this document, the project is expected to generate $24 million in discounted benefits and $18 million in discounted costs using a 7 percent real discount rate. Therefore the project generates a Net Present Value (NPV) of $5.9 million and a Benefit/ Cost Ratio of 2.5:1 at 7 percent. Table 3 below summaries the Selection Criteria calculated in this Benefit Cost Analysis.

Table 3: Summary of Benefit Cost Analysis Selection Criteria

Benefit to Cost Ratio Analysis					
Selection Criteria	Description	Inputs	Value	Monetized Value	
				Discount Rate 7%	Discount Rate 3%
Quality of Life	Converting current rail line going through Downtown to trail	Property Values/ Noise Mitigation	not calculated		
Quality of Life	Fuel savings due to reduced miles traveled by cargo using Rail Park vs. Truck	Gallons of fuel saved	2.6 million gallons of fuel saved by reducing miles traveled with modal shift to Rail	$ 2,977,469	$ 4,730,461
Economic Competiveness	Operational cost savings	Savings of rail transport vs. truck transport	249 million ton miles @$0.071 savings per mile (truck/ barge vs. rail)	$ 7,453,055	$ 11,841,059
State of Good Repair	Reduction of maintenance on US Roads & Hwys, Consistent with State and Regional Plans	Maintenance, preservation and upgrade savings of	49 million VTM reduced off the highways	$ 2,483,315	$ 3,945,373
Environmental Sustainability	Environmental Benefits from Reduced Emissions	CO_2 cost savings	22,408 metric tons of CO_2 saved	$ 920,932	$ 920,932
Safety	Closing of 6 rail crossings in Downtown Kalispell	Fatality cost savings of 1.1 fatalities	$10.7 million saved	$ 5,365,761	$ 8,131,428
Safety	Reduced fatalities from reduction of VMT	Fatality cost savings of 1.1 fatalities	$10.2 million saved	$ 5,139,806	$ 7,789,008
Total Cost				($18,433,147)	($14,652,909)
Total Benefits				$24,340,339	$ 37,358,262
Net Present Value				**$ 5,907,192**	**$ 22,705,353**
Benefit to Cost Ratio				**1.3:1**	**2.5:1**

Introduction

This document provides detailed technical information on the economic analyses conducted in support of the Grant Application for the Glacier Rail Park/Kalispell Core Area Development and Trail project.

The Methodology section, introduces the conceptual framework used in the Benefit-Cost Analysis (BCA). The Project Overview provides an overview of the project, including a brief description of existing conditions and the proposed alternative; Assumptions describes the current and future situations used in the analysis. Project Cost and Schedule provides a summary of cost estimates and schedule. Long Term Outcomes discusses the general assumptions used in the estimation of project costs and benefits, Specific data elements and assumptions pertaining to the long term outcome selection criteria are summarized in this section, Estimates of the project's Net Present Value (NPV), its Benefit/Cost ratio (BCR) and other project evaluation metrics are also discussed. Short and long term job estimates are found in the Job Creation section.


Methodology

Benefit-Cost Analysis (BCA) is a conceptual framework that quantifies in monetary terms as many of the costs and benefits of a project as possible. Benefits are broadly defined. They represent the extent to which people impacted by the project are made better-off, as measured by their own willingness-to-pay. In other words, central to BCA is the idea that people are best able to judge what is "good" for them, what improves their well-being or welfare. BCA also adopts the view that a net increase in welfare (as measured by the summation of individual welfare changes) is a good thing, even if some groups within society are made worse off. A project or proposal would be rated positively if the benefits to some are large enough to compensate the losses of others.

Finally, a BCA is typically a forward-looking exercise, seeking to anticipate the welfare impacts of a project or proposal over its entire life cycle. Future welfare changes are weighted against today's changes through discounting, which is meant to reflect society's general preference for the present, as well as broader inter-generational concerns.

The specific methodology developed for this application was developed using the above BCA principles and is consistent with the TIGER guidelines. In particular, the methodology involves:

- Establishing existing and future conditions under the build and no-build scenarios;
- Assessing benefits with respect to each of the five long-term outcomes identified in the Notice of Funding Availability (NOFA);
- Measuring benefits in dollar terms, whenever possible, and expressing benefits and costs in a common unit of measurement;
- Using DOT guidance for the valuation of travel time savings, safety benefits and reductions in air emissions, while relying on industry best practice for the valuation of other effects;
- Discounting future benefits and costs with the real discount rates recommended by the DOT (7 percent, and 3 percent).

Project Overview

Requested funds will complete a new industrial rail park serving northwest Montana and all ports served by BNSF Railway on the West Coast, Great Lakes Region, and Canada. Primary port connections include the Ports of Seattle, Tacoma, and Vancouver in Washington; Portland, Oregon; Minneapolis, Minnesota; North Dakota and Lethbridge/Raymond in Alberta, Canada. Following the opening of the new industrial park, the current rail line through downtown Kalispell will be remove, allowing the development of the Core Area , the removal of six at-grade rail crossings and completion of the east-west trail.


Project comparison is with most likely alternative, a "no build" scenario

Base Case- "no build scenario"

The base case in the BCA represents the current state of an example freight movement from the Flathead region to an export terminal in Portland, OR. Due to the complexity of the potential commodity movements and volumes that will be generate in the future from businesses locating in the new rail park, a representative supply chain has been selected for the project comparison of the BCA.

This example cargo movement is based upon CHS grain facility that is currently located on a site in downtown Kalispell that does not have adequate rail service. Thus, all export grain movements must be trucked to Lewiston, where the grain is barged to the Port of Portland for export. The base case is developed upon the actual 2014 grain export volume from the CHS facility in Kalispell to the Port of Portland.

Build Alternative

This alternative measures the grain movement when this same grain exporter, CHS, re-locates from their current downtown Kalispell site and becomes the anchor tenant at the rail park upon its opening in 2017.

To be conservative in the analysis, it is assumed that the relocation of this grain facility will induce shipper to convert the current grain volume from a truck/ barge model movement between Kalispell and Portland, OR. to a train only movement between these two end points.

Last year, CHS transported 77,500 tons of grain to the Port of Portland export terminal. To be conservative, this analysis starts with 2015 as the basis of 77,500 tons and holds the volume constant until the opening of the new larger facility in 2017 which will provide CHS with the ability to increase their grain export tonnage capacity.

Assumptions

For the purposes of this analysis, the proposed project is compared with a no build alternative. The analysis included the total project costs to date and upcoming construction (Phases I and II) for a total project cost of $23.3 million. These costs are included in the cost basis for the BCA but the federal funds to be used to fund the assessment and mitigation is not shown in the project funding for Phase II as these funds cannot be count in the match calculations so have been separated. The BCA was run for the period of 24 years beginning with the base year of 2015 including a residual calculated in 2039 of combined $17.4 million for remaining estimated life of the Rail Park and Trail at that time. Phase I costs of $2 million are shown in year -2 (2012/2013), year -1 (2014) and year 0 (2015)

This funding request is for Phase II construction. A project cost analysis recently completed by project engineers indicates the cost to complete this phase of the project is $21.2 million in 2015 dollars.


Estimation of costs and benefits are limited to the 2015 to 2039 period. The analysis incorporates assumptions based upon one grain shipper that is committed to move into the Rail Park and use the rail service once it opens in 2017. This shipper is CHS, who has committed to relocate from its current facility downtown Kalispell to the new Rail Park in December 2016. To assure that the BCA presents a conservative estimate of the benefits, the BCA assume the first shipments from the Rail Park will occur in January 2017. The movements related to this example are based upon conversion their grain that currently is routed in a truck /barge movement to primarily a rail only movement. To be conservative the volumes were held constant at 2014 levels until after the Rail Park opens in 2017, then the tonnage is projected to grow at a conservative 3% per year. These assumptions are detailed below.

Estimated loads were developed based upon the conversion of the current 77,600 tons annual grain movement. There were 3,000 total truck loads in 2014 from the current production at CHS facility in Kalispell to Lewiston, ID where the grain was loaded on to a barge to be delivered down river to an export grain terminal in Portland, OR.

Current Situation

The current movement of the grain requires a 280 mile dray to Lewiston, ID. There it is loaded on to a barge for transport 465 miles downriver to an export grain terminal at the Port of Portland. This is a 560 mile round trip for the trucks. It must be noted that the trucks return empty back to their origin in the Flathead region. It also includes a round trip grain barge movement of 930 miles.

Future Situation

The proposed improvements will open a Rail Park in Kalispell, MT enabling the local shippers to move their cargo by rail versus truck. This will save the example company millions of dollars per year in transportation costs due to the ability to more efficiently route the cargo using on-site rail as well as the cost per ton differential of rail versus truck along the supply chain.

Upon completion of Phase II, the new routing would be by truck from the local farm to a grain silo at the Rail Park in Kalispell. This trip is estimated to be an average of 26 miles each way, followed by a 646 mile rail move to the Port of Portland's export grain terminal. This conversion is estimated to eliminate over 1.5 million truck miles in the first year of operation.

Project Cost and Schedule

Project Costs

Table 4: Total Project Phase II Budget

Glacier Rail Park/Kalispell Core Area Development and Trail Project		
Project Budget Phase II	**in Millions**	
CN	**$19.5**	**92%**
FE/ CN Engineering	**$1.1**	**5%**
Management and Inspection	**$0.6**	**3%**
Total Cost	**$21.2**	**100%**

Table 5, shows the break out of the project funding. The TIGER 2015 project application requests $10 million in Federal support and a local investment of $12.5 million. The local investment of $12.5 million (59%) is comprised of committed funds primarily from the FCEDA and the City of Kalispell.

Project Funding

Table 5: Phase II Funding Sources

Funding Sources	Amount in Millions	Status	Purpose
BNSF	**$ 0.5**	**Committed**	Construction
FCEDA	**$ 7.5**	**Committed**	Construction
City of Kalispell	**$ 4.5**	**Committed**	Construction
TIGER VII Request	**$ 10.0**	**Requested**	Construction
Total Project Funding for Phase II	**$ 21.2**		

	Total Project Cost	
Total Federal	**$10.0**	**47%**
Total Local	**$12.5**	**59%**
Total Project Funding for Phase II	**$21.2**	**100%**

The City and FCEDA are requesting a TIGER FY2015 federal investment of $10 million to complete the project's Phase II construction.

Project Schedule

Table 6: Phase II Project Schedule

Glacier Rail Park/Kalispell Core Area Development and Trail Phase II Project Schedule	
Rail Park- Trail Project Schedule and Task Details	**Approved/Complete**
REVIEW-Rail Park Categorical Exclusion Worksheet (FRA)	April 2015
APPROVAL-Preliminary Rail Design & Operation Plan (BNSF)	April 2015
APPROVAL-Traffic Design Concept and Location (Montana DOT)	April 2015
COMPLETED-Construction Documents for Rail Park	June 2015
SUBMITTED-Trail Categorical Exclusion Worksheet (USDOT)	September 2015
Approval-Water Design (City of Kalispell and Montana DEQ)	June 2015
Approval-Sewer and Storm Water Design (City of Kalispell and Montana DEQ)	September 2015
APPROVAL-Traffic Design Construction Documents (Montana DOT)	September 2015
BID-Construction of Rail Park	September 2015
RECEIVE- Notice of Award from the US DOT	September 2015
SIGN- Lease with CHS	September 2015
BEGIN- Rail Abandonment and Rail Banking Process	September 2015
RECEIVE- TIGER VII funds from US DOT	January 2016
SIGNED-Rail Park Construction Contract	February 2016
BEGIN-Rail Park Construction	March 2016
BEGIN-CHS Facility Construction	March 2016
COMPLETE- Environmental Site Assessments for Trail	July 2016
COMPLETE-Construction of Rail Park	December 2016
COMPLETE-CHS Facility Construction and Relocation	December 2016
COMPLETE- Rail Abandonment and Rail Banking Process	January 2017
COMPLETE-Trail Property Acquisition	February 2017
COMPLETE-Final Design and Construction Documents for Trail	February 2017
BID-Construction Costs of Trail	March 2017
AWARD- Contract for Trail Construction	May 2017
OBLIGATED- All TIGER Funds	June 2017
REMOVE Track	June 2017
TRAIL Construction (180 days over a 12 month period due to weather)	July 2017 – June 2018
COMPLETE- Complete Street Extensions and Upgrade Pedestrian Crossings	June 2018

Phase II Project Completion

Federal grant funds received from the TIGER FY2015 request will enable the applicants to complete the new industrial rail park. Due to limited funding options, the project will otherwise be delayed if these funds are not awarded under TIGER FY2015 until the final funding becomes available in another federal

funding source. With the successful award of this TIGER FY2015 grant, construction for Phase II can begin spring 2016 and the rail park could be completed and opened by January 2018.

This project will be 100 percent ready to start construction in spring 2016. This project is ready to go. The NEPA environmental process categorical exclusion checklist has been completed; thirty relevant agency responses indicate no negative impacts as a result of the project. We have been informed by the Federal Railroad Administration that upon award of TIGER FY2015 funding the agency would at that time finalize their NEPA review. Preliminary design was prepared by professional design engineers working closely with BNSF Railway, Watco/Mission Mountain Rail, and our first expected tenant, Cenex Harvest States (CHS) and has received approval of all three entities. We are currently completing our final design and engineer in preparation for final project funding in early 2016. The design team foresees no complicating or project ending factors. Although to mitigate any unforeseen risk, a $1 million contingency fund has been budgeted and established for the project. The project site is owned by one of the co-applicants. It is flat, locally owned, with no significant environmental features or complicating features. The southern edge of the site is buffered by a hillside.

The Glacier Rail Park/Kalispell Core Area Development and Trail project has met all local requirements for approvals and permits. State and federal requirements will be met by fall 2015, so that if funded by TIGER FY2015 it would allow USDOT to obligate funding well in advance of September 30, 2017. Project risks have been identified and mitigation strategies incorporated. The project schedule illustrates that all contract bid documents will be finalized with the project ready for bid by spring 2016.

With TIGER FY2015 funding, the full project can be completed by December 2018.

Long Term Outcomes

Summary of the Benefit Cost Analysis

Table 7 displays the summary of the BCA. Quantified benefits include the transportation cost savings of modal conversion to rail, reduced emissions due to reduced truck miles, better fuel efficiency, and improved safety due to the reduction of potential accidents due to the reduction of truck vehicle miles traveled when this project is completed.

This benefit-cost analysis (BCA) follows guidance set forth in the Notice of Funding Availability for Department of Transportation's National Infrastructure Investments under the Consolidated and Further Continuing Appropriations Act, 2015.

A **discount rate of 3 percent** was used, following the TIGER BCA Resource Guide updated 3/27/2015. Bottom line, the present value (PV) of costs in 2015 dollars is $14.7 million and the PV of benefits is $37.4 million. This rate yields conservative estimates of NPV and benefit cost ratio, but per the NOFA

guidance, it is appropriate because funds are public and would be spent on other public projects. This analysis yields a NPV of $22.7 million and a benefit-cost ratio of 2.5:1. The greatest share of benefits is Quality of Life from fuel savings as a result of the modal change from truck/barge to rail the forecasted grain shipments.

Table 7: Project Benefit to Cost Ratio Analysis Summary

Benefit to Cost Ratio Analysis					
Selection Criteria	Description	Inputs	Value	Monetized Value	
				Discount Rate 7%	Discount Rate 3%
Quality of Life	Converting current rail line going through Downtown to trail	Property Values/ Noise Mitigation	not calculated		
Quality of Life	Fuel savings due to reduced miles traveled by cargo using Rail Park vs. Truck	Gallons of fuel saved	2.6 million gallons of fuel saved by reducing miles traveled with modal shift to Rail	$ 2,977,469	$ 4,730,461
Economic Competiveness	Operational cost savings	Savings of rail transport vs. truck transport	249 million ton miles @$0.071 savings per mile (truck/ barge vs. rail)	$ 7,453,055	$ 11,841,059
State of Good Repair	Reduction of maintenance on US Roads & Hwys, Consistent with State and Regional Plans	Maintenance, preservation and upgrade savings of	49 million VTM reduced off the highways	$ 2,483,315	$ 3,945,373
Environmental Sustainability	Environmental Benefits from Reduced Emissions	CO_2 cost savings	22,408 metric tons of CO_2 saved	$ 920,932	$ 920,932
Safety	Closing of 6 rail crossings in Downtown Kalispell	Fatality cost savings of 1.1 fatalities	$10.7 million saved	$ 5,365,761	$ 8,131,428
Safety	Reduced fatalities from reduction of VMT	Fatality cost savings of 1.1 fatalities	$10.2 million saved	$ 5,139,806	$ 7,789,008
Total Cost				($18,433,147)	($14,652,909)
Total Benefits				$24,340,339	$ 37,358,262
Net Present Value				**$ 5,907,192**	**$ 22,705,353**
Benefit to Cost Ratio				**1.3:1**	**2.5:1**

When a **discount rate of 7 percent was used**, the PV of costs in 2015 dollars is $18.4 million and the PV of benefits is $24.3 million. This rate also yields conservative estimates of NPV and benefit cost ratio per the NOFA guidance. This analysis yields a NPV of $5.9 million generating a benefit-cost ratio of 1.3:1 over the analysis. The greatest share of benefits is again from the Economic Competiveness Category from the fuel cost savings by moving the cargo on rail vs. truck/ barge as is currently done.

The use of rail service for the grain shipments instead of the current route of trucking the grain to Lewiston, ID where it is put on a barge to Portland, OR will elimination at least 49 million commercial truck miles off of the local roads and highways. This reduction in commercial vehicle miles will reduce the probability of 1.1 fatality accidents from occurring on the related roads and highways. This results in a monetized safety value of $5.3 million at 7 percent discount rate. In addition the removal of the six downtown at-grade crossings monetize to a $5.1 million safety benefit at 7 percent.


Affected Populations and Types of Impacts

The benefiting populations include three main groups: personal vehicle users, commercial carriers, and local residents that will now have access to a new employment center as well as improved connectivity by non- motorized means such as bicycle/pedestrian. The following description and tables attempt to present costs and benefits for each type of impact that could be monetized.

Quantified benefits include:

- Improved economic competitiveness based upon the reduction of transportation costs for the Flathead Valley grain producers
- Reduction of gallons of fuel used to transport the grain.
- Improved state of repair of the roads and highways, due to the reduction of truck miles
- Reduced emissions due to lower Vehicle miles traveled by the commercial truck
- Improved safety, resulting in reduced economic costs of potential fatalities on the highway due to the reduced VMT of the trucks as well as the reduced economic cost of potential fatalities prevented with the closure of the six downtown rail crossings.
- Costs include construction and lifecycle costs. Construction costs are best available estimates at the 90% design level as of April 2015. This analysis anticipates general operations and maintenance costs.

Unquantified benefits include:

- Downtown benefits from reduced truck congestion
- Benefits to the local community to increase job opportunities at the Rail Park and the improved availability of transportation choices for area residence for their daily activities such as work, education and other services.
- The increase in land value as the rail in downtown is converted to a trail.
- Benefits to the area citizen of the increased connectivity across town for non- motorized modes of transportation that will provide access to work centers, educational sites, and daily services.

Quantified Costs and Benefits Measurement of Long-Term Outcomes

The largest positive benefits at 7 percent discount rate are from the economic competiveness improvement based upon the reduction of highway miles which generates an annual operating savings of approximately $7 million due to the lower ton/mile transportation costs generated by the energy efficiency of rail versus trucks. This benefit alone accounts for 32 percent of the total benefits. The fuel savings generates an additional 13 percent. Total Safety benefits account for 43 percent of the benefits. Reduced emissions and saving in road maintenance from the improvements account for the remainder.

Quality of Life

This project provides wonderful benefits to the local residents through increased access to the new employment center at the Rail Park as well as the benefits they will receive from the reduction of the grain trucks being removed from the downtown corridor. The completion of the project will allow the addition of paths that will connect the east and west sides of Kalispell for non-motorized travel. The project will improve the quality of life in Kalispell and along the I-90 Corridor, as it supports the core livability principles established by the Partnership for Sustainable Communities that are being used by the federal agencies as guidance for project selection. The project's purpose is to provide a safer transportation of freight from the City of Kalispell to their respective markets.

Table 8: Gallons of Fuel and CO2 Saved

Gallons and CO2 MT Saved due to shift in mode			
Year	Total gallons save by reduction in modal shift	Fuel savings due to reduced VMT @$2.731 / gal	CO2 Reduced (Metric Tons)
2015	-	$0	
2016	-	$0	
2017	-	$0	
2018	82,186	$224,451	734
2019	84,652	$231,184	756
2020	87,191	$238,120	778
2021	89,807	$245,263	802
2022	92,501	$252,621	826
2023	95,276	$260,200	851
2024	98,135	$268,006	876
2025	101,079	$276,046	902
2026	104,111	$284,328	930
2027	107,234	$292,857	957
2028	110,452	$301,643	986
2029	113,765	$310,692	1,016
2030	117,178	$320,013	1,046
2031	120,693	$329,614	1,078
2032	124,314	$339,502	1,110
2033	128,044	$349,687	1,143
2034	131,885	$360,178	1,178
2035	135,841	$370,983	1,213
2036	139,917	$382,112	1,249
2037	144,114	$393,576	1,287
2038	148,438	$405,383	1,325
2039	152,891	$417,545	1,365
Total	2,509,705	$6,854,005	22,408

Quality of life benefits of the trail have not been monetized in the BCA due to the difficulty to fully articulate and model the community benefits. See more detail on this criteria under the section below on **Qualitative Benefits not Quantified.**

The Quality of Life Benefit that can be monetized is the Fuel saving based upon the energy efficiency of rail transportation compared to truck transportation.

Fuel savings due to the use of the more energy effective rail mode to transport the cargo to Portland, OR. Fuel savings are anticipated as the cargo is moved directly to Port of Portland by rail versus the current multi-modal method. Table 8 shows the estimated number of gallons of fuel saved by converting the current transportation method to rail. The construction of the Rail Park will reduce fuel usage by over 2.5 million gallons of fuel during the analysis period, which will save shipper over $7 million at today's average fuel prices of $2.731/ gallon as of April 27, 2015.

Environmental Sustainability Benefits

The project is also expected to save 22,408 Metric Tons of greenhouse gas emissions over analysis period as shown in Table 8. This is calculated based on the reduced emissions in CO2 due to the reduction of fuel usage of rail transportation vs. trucking.


Economic Competitiveness Benefits

The Economic Competitiveness Benefits of the project have been monetized through the decreased operational costs to the shipper being achieved based upon rail transportation being more cost effective than trucking. Table 9 below shows the operational savings to the shippers of the new rail routing vs. the base case routing.

Table 9: Decrease Operational transportation costs:

Decreased Operational Costs due to construction of Phase II and coversion to rail in Kalispell, MT			
Year	Total ton miles on rail after opening of rail park	saving / mile	Reduction in operation cost based upon differential rate/ mile rail vs truck
	Portland, OR	$ 0.071	
2014		$ 0.071	
2015		$ 0.071	
2016		$ 0.071	
2017	7,913,160	$ 0.071	$ 561,834
2018	7,913,160	$ 0.071	$ 561,834
2019	8,150,555	$ 0.071	$ 578,689
2020	8,395,071	$ 0.071	$ 596,050
2021	8,646,924	$ 0.071	$ 613,932
2022	8,906,331	$ 0.071	$ 632,350
2023	9,173,521	$ 0.071	$ 651,320
2024	9,448,727	$ 0.071	$ 670,860
2025	9,732,189	$ 0.071	$ 690,985
2026	10,024,154	$ 0.071	$ 711,715
2027	10,324,879	$ 0.071	$ 733,066
2028	10,634,625	$ 0.071	$ 755,058
2029	10,953,664	$ 0.071	$ 777,710
2030	11,282,274	$ 0.071	$ 801,041
2031	11,620,742	$ 0.071	$ 825,073
2032	11,969,365	$ 0.071	$ 849,825
2033	12,328,445	$ 0.071	$ 875,320
2034	12,698,299	$ 0.071	$ 901,579
2035	13,079,248	$ 0.071	$ 928,627
2036	13,471,625	$ 0.071	$ 956,485
2037	13,875,774	$ 0.071	$ 985,180
2038	14,292,047	$ 0.071	$ 1,014,735
2039	14,720,809	$ 0.071	$ 1,045,177
	249,555,588		$ 17,718,447

This chart shows the estimated operational cost saving based upon the differential cost of $0.071 per ton savings which will total almost $18 million over the analysis period. This is anticipated to be achieved by the grain shipper when the grain is moved from the Rail Park by rail to Port of Portland versus the current route by truck and barge to the same destination.


State of Good Repair of the local Highways

Table 10: Decrease in Road Maintenance

Decreased road maintenance due to construction of Phase II and conversion to rail						
Year	Truck Miles saved	Maintenance rate/ mile	Total savings	No Build Total Miles	No Build Total Maintenance Cost	Decrease in Maintenance Costs with full conversation to rail of the grain shipments
		$ 0.12				
2014	-	$ 0.12	-	1,872,000	$ 224,640	$ -
2015	-	$ 0.12	-	1,872,000	$ 224,640	
2016	-	$ 0.12	-	1,872,000	$ 224,640	
2017	1,560,000	$ 0.12	187,200	1,872,000	$ 224,640	$ 187,200
2018	1,560,000	$ 0.12	$ 187,200	1,872,000	$ 224,640	$ 187,200
2019	1,606,800	$ 0.12	$ 192,816	1,928,160	$ 231,379	$ 192,816
2020	1,655,004	$ 0.12	$ 198,600	1,986,005	$ 238,321	$ 198,600
2021	1,704,654	$ 0.12	$ 204,558	2,045,585	$ 245,470	$ 204,558
2022	1,755,794	$ 0.12	$ 210,695	2,106,952	$ 252,834	$ 210,695
2023	1,808,468	$ 0.12	$ 217,016	2,170,161	$ 260,419	$ 217,016
2024	1,862,722	$ 0.12	$ 223,527	2,235,266	$ 268,232	$ 223,527
2025	1,918,603	$ 0.12	$ 230,232	2,302,324	$ 276,279	$ 230,232
2026	1,976,161	$ 0.12	$ 237,139	2,371,394	$ 284,567	$ 237,139
2027	2,035,446	$ 0.12	$ 244,254	2,442,535	$ 293,104	$ 244,254
2028	2,096,510	$ 0.12	$ 251,581	2,515,811	$ 301,897	$ 251,581
2029	2,159,405	$ 0.12	$ 259,129	2,591,286	$ 310,954	$ 259,129
2030	2,224,187	$ 0.12	$ 266,902	2,669,024	$ 320,283	$ 266,902
2031	2,290,913	$ 0.12	$ 274,910	2,749,095	$ 329,891	$ 274,910
2032	2,359,640	$ 0.12	$ 283,157	2,831,568	$ 339,788	$ 283,157
2033	2,430,429	$ 0.12	$ 291,652	2,916,515	$ 349,982	$ 291,652
2034	2,503,342	$ 0.12	$ 300,401	3,004,010	$ 360,481	$ 300,401
2035	2,578,442	$ 0.12	$ 309,413	3,094,131	$ 371,296	$ 309,413
2036	2,655,796	$ 0.12	$ 318,695	3,186,955	$ 382,435	$ 318,695
2037	2,735,469	$ 0.12	$ 328,256	3,282,563	$ 393,908	$ 328,256
2038	2,817,534	$ 0.12	$ 338,104	3,381,040	$ 405,725	$ 338,104
2039	2,902,060	$ 0.12	$ 348,247	3,482,471	$ 417,897	$ 348,247
	49,197,377		$ 5,903,685			$ 5,903,685

It is anticipated that there will be almost 49 million truck miles saved with the opening of the Rail Park just with the current grain converting to rail to Portland, OR. This is a total savings in road maintenance of $6 million over the entire analysis period.


Safety benefits

Table 11: Conversion of Collision Statistics

Conversion of Collision statistics based upon 100 Million miles travel by truck								
Collision Type					Annual Average	Current est. accident costs	Effect on Accidents with conversion to rail	
AIS Level	Severity	Fraction of VSL	Unit value ($2013)*	Conversation of Montana Traffic	Accident Count by KABCO	Current Annual social cost of Accidents	Estimated reduction in injuries by 70 % per Insurance	Estimated Annual accident costs savings
AIS 0	no injury					$0	$0	
AIS 1	Minor	0.003	$28,200			$0	$0	$0
AIS 2	Moderate	0.047	$441,800			$0	$0	$0
AIS 3	Serious	0.105	$987,000			$0	$0	$0
AIS 4	Severe	0.266	$2,500,400			$0	$0	$0
AIS 5	Critical	0.593	$5,574,200			$0	$0	$0
AIS 6 reduction VMT	Unsurvivable	1.000	$9,400,000	0.051903	0	$487,890	$341,523	$487,890
AIS 6 due to crossing closure	Unsurvivable	1.000	$9,400,000	0.054185	0	$509,339	$356,537	$509,339
Property Damage Only			$3,285			$0	$0	$0
						$997,229	$698,061	$997,229
*TIGER BENEFIT-COST ANALYSIS (BCA) RESOURCE GUIDE updated 3/27/2015							annual savings	

Conversion of Collision statistics based upon 100 Million miles travel by truck			
Montana Traffic Fatalities Per 100 Million miles traveled on Roads	2.11		Annual
Total Truck miles reduced over the 22 years	49,197,377	/22	2,459,869
Total Truck miles divided by 100 million miles	0.491973773		0.024598689
Estimated Fatalities Per 100 miles travel based upon Montana's experience	1.04		0.051903233
2013 Unsurvivable value $9,400,000			
Annual life savings based upon reduced truck mileage			$487,890.39
		Total lives saved over 22 years	1.14
		Dollars saved	$10,733,589

Safety benefits are estimated at $10.4 million in total social benefit of 1.1 lives being saved over 22 years after the completion of the Rail Park based upon the reduction of fatalities due to the reduction of truck miles between Kalispell and Lewiston.

Table 12: Predictive accidents on Rail crossings

RAILROAD CROSSING SAFETY										
Crossing	MP	Road	City	County	Rank within County with 33 crossings	Predictive Collision	Train Speed	# Tracks	AADT	Lanes
059375E	1226.70	Meridian Rd	Kalispell	Flathead	22	0.009105	10 mph	1 Main	10482	2
059374X	1226.30	5th Ave NW	Kalispell	Flathead	21	0.008358	10 mph	1 Main	7611	2
059373R	1226.10	Main St ((US 93)	Kalispell	Flathead	4	0.021198	5 mph	1 Main	25833	5
099099N	1225.93	1st Ave E (US723)	Kalispell	Flathead	33	0.000145	10 mph	2 Main	6409	3
059372J	1225.79	3rd Ave NE	Kalispell	Flathead	23	0.007626	10 mph	1 Main + 1	5422	4
059371C	1225.70	4th Ave NE	Kalispell	Flathead	24	0.007753	10 mph	1 Main	5761	2
		Six crossings have an annual predictive collision rate of				0.054185				
		Total Predictive Collisions	0.054185		20 yrs			1.0837	20 yrs	post abandment and trail construction
							$	10,186,780		

Source: http://safetydata.fra.dot.gov U.S. DOT-Crossing inventory information as of 4/28/2015

The closing of the six at-grade crossings will save approximately 1.1 lives over the 20 years after the removal of the rail line through the core area of Kalispell. This analysis estimates a saving the public social benefits of $10.2 million in reduced fatalities.

Qualitative Benefits not Quantified.

The project does not permit economic quantification of some factors. Unquantified factors include general vitality of downtown Kalispell due to improved accessibility and attractiveness to consumers and investors with the truck and rail traffic moving out of downtown to the Rail Park. The main benefits not quantified are summarized below. These factors are expected to be positive benefits to the community.

The project team did not try to monetize the benefits of the closings of the six at-grade crossing accept for an estimate of accidents that will be prevented when the current rail through downtown Kalispell is converted to rail as those closing will be part of Phase II of the project. It is believed that there will be additional savings to the community that cannot easily be monetized. Examples of these non -quantified Benefits that could be monetized under economic competitiveness and Environmental Sustainability categories but have not been in this analysis include:

- **Travel time savings to the school district** due to the reduction of school bus crossing of the railroad in the downtown area. It is currently estimated that there are almost 2100 Head Start pre-school bus crossing of the six at-grade downtown crossings. These are in addition to the 42,900 annual bus crossings by the School District 5 and Eagle.
- **Travel time savings to local citizens** due to reduction of six at-grade crossing in downtown Kalispell.
- **Decreased emission** due the reduction of idling time at these removed crossings

Quality of Life: A benefit not quantified in this calculation of the BCA from the trail improvement is the enhanced livability of downtown Kalispell, which is expected to benefit the area and its many users. The project's primary livability goal is to foster a livable community through the application of existing policies and new investments to increase transportation choices and improve access to transportation services. The livability investments included in this project will deliver transportation benefits and are designed and planned in such a way that they will have a positive impact on the qualitative measures of community life.

The project will generally enhance the community's economic competitiveness by improving accessibility and transportation service for economically disadvantaged populations, non-drivers, senior citizens, active citizen that like to travel by non- motorized modes to work and school, and persons with disabilities that may now be able to use the proposed path to get to services such as stores and doctors. The improved access to downtown and the Rail Park will provide reliable and safe access to this new employment center. The improved connectivity that the path will bring for the community will provide transportation choices to access job opportunities, educational, services to meeting other basic needs of community members.

The project will also support the existing community through land renewal and redevelopment to increase community revitalization and improve the efficiency of public works investments. The proposed transportation improvements will support infill, mixed-use development, rehabilitation, and

redevelopment of the downtown area to further reduce the need for automobiles, encourage walking / biking, and save energy.

The project may also stimulate new opportunities to rehabilitate or redevelop existing structures to accommodate a higher density or intensity of use. Redevelopment often occurs where a property location can support more intense development, such as areas where street improvements can accommodate increased traffic flow.

- **Increase in Downtown Property Values**: Additionally, the project adds value to communities and neighborhoods. It will enhance the unique characteristics of the downtown community and adjacent neighborhoods by investing in healthy, safe, and walkable transportation infrastructure. Studies have shown an eight to twelve percent increase in residential and commercial values where alternative transportation means—such as bike lanes and sidewalks—are located within ½ mile compared to areas without these amenities. And an improved level of service may create new opportunities for businesses to locate, expand or build in this area, adding further value to downtown Kalispell and adjacent neighborhoods.
- **Noise mitigation:** The project also includes landscaping and other noise mitigation features allowed by the closure of the at-grade rail crossings in the downtown area. This will positively affect nearby neighborhoods and businesses by reducing potential health costs and improving property values. These external costs and benefits are not quantified in the BCA.

Job Creation

Table 13: Construction Jobs Created by the Total Project

Direct Jobs by Calendar Quarter			
	2016	2017	2018
Q1	201	0	44
Q2	201	0	44
Q3	201	31	0
Q4	201	31	0

Short-Term Impacts on Employment: Job creation impacts from the total project are estimated in Table 10. The construction of this Phase II of the project will generate 276 short-term family wage jobs at $76,900 per job year in the years spanning 2016-2018. This includes investment that covers the final design, final approvals, and construction period of both the rail park and the trail. Positive economic impacts resulting from these jobs are not included in the benefit-cost ratio.

The project team used the administration's jobs formula to calculate short-term employment impacts of Phase II. It is estimated that the construction of the Rail Park will generate 201 job years in 2016. An estimated additional 75 job years will be generated for the construction of the trail.

Other private investment generated by the Rail Park development will include an estimated $18 million in capital improvement in the Rail Park as well as $7 million investment in the downtown area. This construction will generate an additional 325 short term jobs.

Long-Term Job Creation: In addition to the short-term construction jobs, it is anticipated that the Rail Park at full build out will generate 11.75 [1]jobs per acre on the 32.4 acres of transload facilities located on site. This calculates to more than 380 long-term direct, indirect and induced jobs related to the completion of this project. The annual economic impact is estimated to exceed $16.6 million in wages and benefits for the local community.

Sources

All sources and additional notes have been cited in the Benefit Cost Analysis excel workbook that can be found at the project website:
http://www.kalispell.com/community_economic_development/Tiger2015.php

[1] http://cdn.laedc.org/wp-content/uploads/2012/04/CalCartage_REVISED_November9.pdf