MONTANA CONNECTIONS
BUSINESS DEVELOPMENT PARK

PORT OF MONTANA
Connecting Rail and Road

Butte-Silver Bow, MT

BENEFIT COST ANALYSIS NARRATIVE

May 2020

The Beckett Group

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Summary and Findings

The City-County of Butte-Silver Bow (BSB) and the Port of Montana are requesting $6.4M to complete funding necessary for Phase I and II expansion at Montana Connections Business Development Park (Montana Connections), a mega industrial park located 6 miles west of Butte, Montana. Montana Connections is in Butte's Tax Increment Financing District (TFID)[1], a special economic development zone. Montana Connections is home to the Port of Montana and a number of local, regional, and international companies including but not limited to, FedEx, REC Silicon, Old Dominion Freight Line, Montana Craft Malt, and Montana Precision Products.

A federal contribution of $6.4M in BUILD funds will be leveraged by $2.4M of local match toward future eligible costs of $8.8M in 2018 dollars.

Due to the immediate need to expand rail capacity, Phase I and II expansion activities will begin at Montana Connections upon obligation of BUILD FY2020 funds. To date, $50M in tax-increment funds have been invested, resulting in over $625M of private and public investment by companies locating operations at Montana Connections--clearly demonstrating that an investment of public funds in infrastructure development can pay huge dividends.

Montana Connections is a 2400-acre site. Nine-hundred acres are currently available for development. Montana Connections is ideally located at the intersection of Interstates 90 and 15 and is the only industrial park in Montana offering immediate access to two Class I railroads: Union Pacific and BNSF Railway. Montana Connections tenants are able to take advantage of this unique road and rail infrastructure to access national and international markets.

The Port of Montana is an anchor tenant of the Park providing a multi-user transload and distribution facility that efficiently, safely, and securely handles customer cargo.

Updates to BCA Model since FY19

The model has been adjusted to reflect feedback that the previous analysis overstated operating cost savings because new customers (additional users) were not accurately reflected. As noted in the BCA guidance " *For additional users, standard practice in BCA is to calculate the value of the benefits they receive as one-half the product of the reduction in the average user cost and the difference in volumes between the build and no-build cases, reflecting the fact that additional users attracted by the improvement are unwilling to incur the higher cost to use it in its*

[1] Montana law enables local governments to use tax revenue in designated districts (Tax Increment Financing Districts, or TIFDs) for development and redevelopment activities and to pay for public infrastructure needs of projects. The Butte Tax Increment Financing District (TIFD) focuses on the Montana Connections Business Development Park, providing financial support to help with adding capacity, building facilities, and site development.

unimproved condition" . Although we have some concerns with this approach, the model has been adjusted to reflect this guidance.

Operating costs have also been updated to reflect a vehicle operating cost per mile. The values are noted in the BCA Guidance on Table A-5 Vehicle Operating Costs. In previous analysis, a estimated value representing the fully loaded point to point operating cost was used to ensure all terminal charges, loading/ unloading, equipment charges, etc. were all included in the operating cost estimates. Please note that when only the vehicle operating cost per mile is used (as recommended in the BCA guidance), the full cost of the operation of the mode is not accurately reflected. The vehicle cost per mile value only accounts for vehicle operating cost. It does not reflect the full cost of operating the facilities required within the full supply chain. Accordingly, previous analysis used an operating cost per ton to compare modal moves instead of only a vehicle cost value per mile. However, this analysis adheres to the recent BCA guidance.

There has also been an update to the CO_2 calculation to reflect guidance on Table A-7: Social Cost of Carbon (SCC) per metric ton of CO_2. In prior models Metric Tons were calculated based upon lbs. per gallon. This calculation has been updated to calculate CO_2 based upon grams per gallon. The difference in results are not material but have been updated to reflect the guidance.

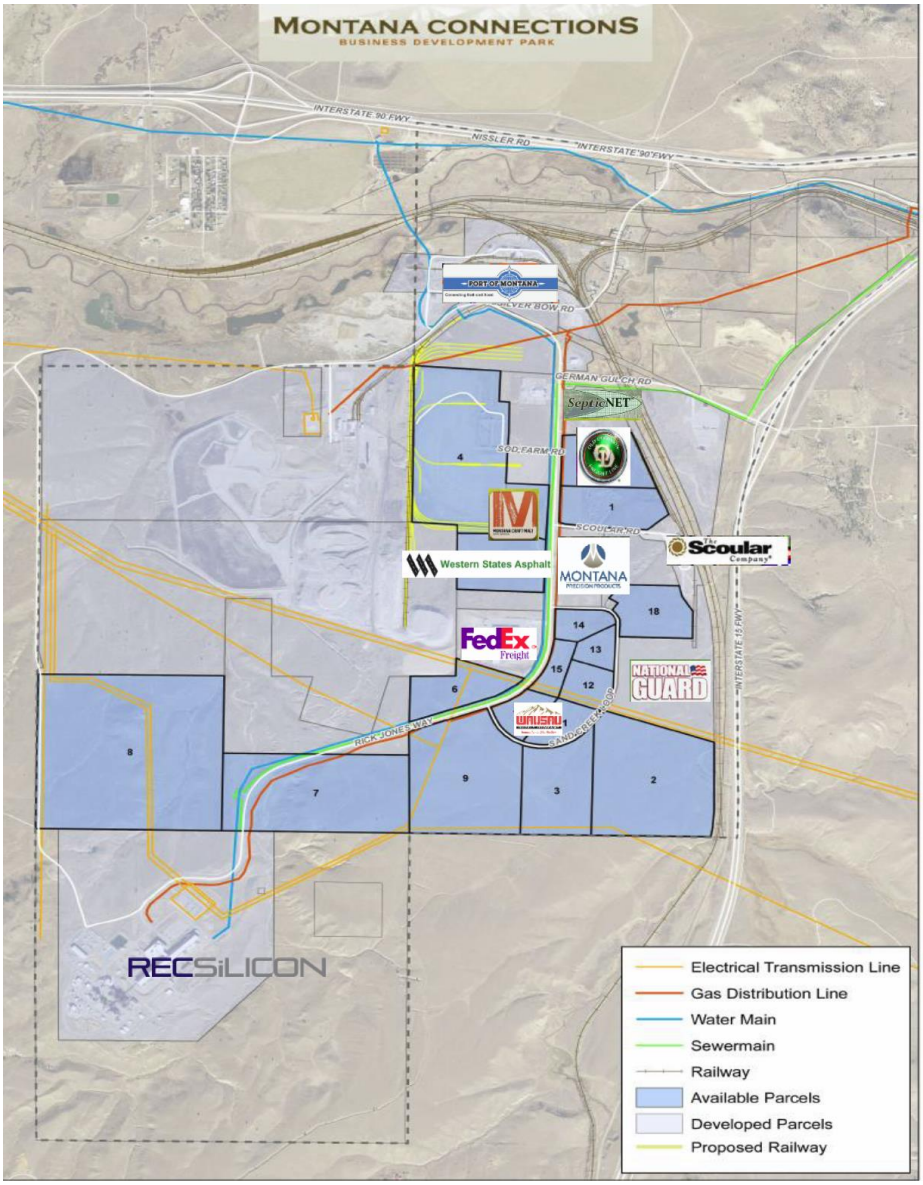
FY2020 Build Request

The Port of Montana and BSB's FY2020 BUILD request consists of two expansions: Phase I and Phase II. See Exhibit 3 below.

The Port of Montana will begin the transload expansion portion of Phase I as soon as the funds are obligated. The Port can move forward as soon as Spring 2021 with expanding transload capacity at the Port--resulting in the addition of approximately 4,800 feet of transloading tracks north of the Port's facility. Phase I also includes the addition of three interchange storage tracks (total of 10,000 linear feet) in Montana Connections.

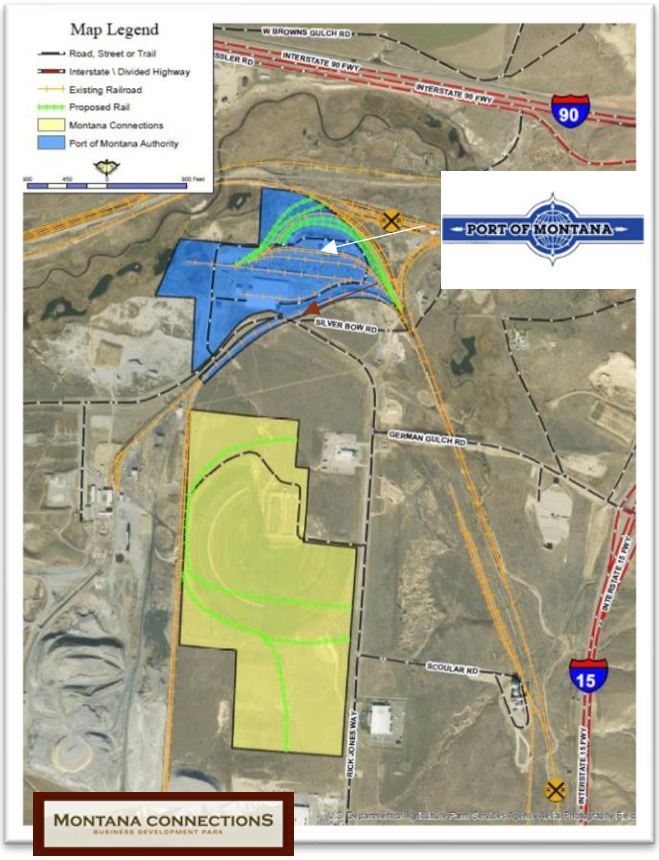
BSB is preparing for Phase II activities, consisting of the construction of an additional 6,157 linear feet of track. The added track consists of a set of ladder tracks at the south end of the interchange's storage tracks. These tracks will allow for storage of longer trains and more efficient switching of unit trains. Phase II also includes construction of a lead track into the Solvay Property to create three rail -served industrial sites ready for development. In addition, approximately four cul-d-sacs will be constructed consisting of 3,600 feet of roadway. Utilities and high-speed fiber connections will be concurrently installed and tied into the Park's existing utility corridor.

Exhibit 1: Montana Connections Site



Source: Butte-Silver Bow

Exhibit 2: Map of Port of Montana and Montana Connections Properties



With funding and quick obligation, construction of Phase II is anticipated to be completed by December 2022. The Port's rail infrastructure is currently at capacity and must be expanded to increase transloading and distribution operations.

The project location is unique – Montana Connections Park is at the intersection of two mainline railroads (BNSF and UP) that connect the industrial park to markets throughout the United States, Canada, and Mexico. Further, the project is at the intersection of I-15, running north-south, and I-90, running east-west.

Montana Connections is located in a designated tax increment financing district created to foster economic growth and bring new business into the state. It has been successful in attracting anchor tenants into the Park. These tenants include the Port of Montana, REC Silicon, FedEx Freight, Scoular Grain and Montana Precision Products. More than 600 jobs have been directly created and more than 1,000 jobs have been supported throughout Montana due to the economic activity at Montana Connections.

The **Port of Montana** is a Port Authority formed by BSB local government to enhance economic development and jobs in the transportation industry. The Port of Montana is an anchor tenant of Montana Connections. This 55-acre transload and distribution facility has served customers for over 30 years. The Port's facility provides distribution, storage and transload services (moving freight from one mode of transportation to another) for freight moving through Western Montana. The Port is a point of transfer for freight movements using rail and/or truck transport. Like Montana, the Port of Montana is diverse in the commodities and types of companies it serves. It has the facilities and equipment to assist smaller rural businesses in addition to large international firms. The Port currently serves as a transload and/or distribution point for a variety of companies and commodities: lumber, steel, autos, magnesium chloride, and asphalt to name a few. The Port uses as GP38 locomotive is used to move railcars and has multiple forklifts, with capabilities to lift-up to 86,000 lb., for handling cargo within the facility.

With more than 700 acres available for industrial development within Montana Connections, there is room to grow and attract more business development. The full build-out of this project will bring rail access to 130 acres of the industrial lands—filling an immediate market need.

The State of Montana lacks large industrial sites (20 acres or larger) with direct rail access. Agricultural industries, manufacturers and various natural resource industries are looking for large, rail connected sites. Today, only two companies have direct rail access within the park. Additionally, current track space at the Port limits transloading by restricting the number of rail cars that it can handle at one time.

This BUILD FY2020 grant will complete the funding necessary to expand rail infrastructure at the Montana Connections by adding 20,000 feet of additional transloading, interchange/ storage and lead track. This is in addition to the 9,000 feet of track added during the Pre-Build phase.

The Montana Connections Summer 2020 Project will add running trackage to connect the Port of Montana to 130 acres of vacant, industrial lands in Montana Connections. This improved connection between the facilities will create superb rail-served sites at Montana Connections. These sites are currently available for new business development. Some of the parcels already have infrastructure such as industrial water, wastewater, power, roads, and bridges. The road and utility construction in Phase II will bring these services to the all sites within the Montana Connections complex.

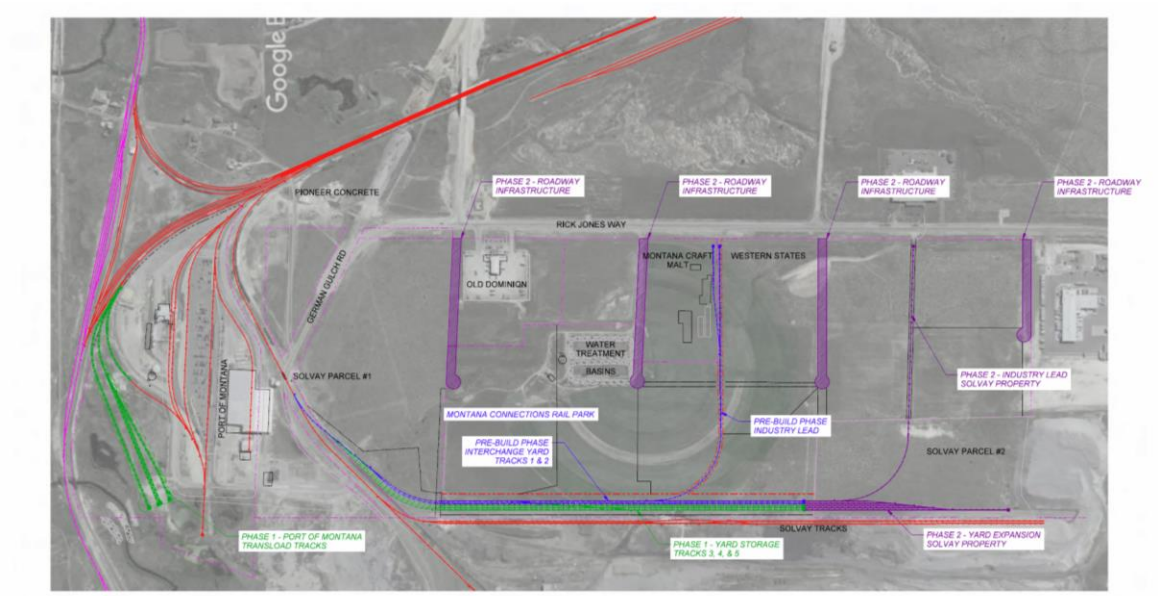
Finally, the Montana Connections Rail and Road Expansion Project will utilize the area's tax increment funding provision to leverage local dollars with BUILD funds. This tax-increment authority will expire in June 2022. After this date, the Port of Montana and Butte-Silver Bow will no longer have the resources to undertake large capital expansion projects at Montana Connections.

This Project has:

- Completed Engineering, design and environmental review for all Phases.
- Secured funds for Pre-Build expansion activities constructing 9,155 track feet to connect the Port of Montana to the undeveloped parcels (totaling 130 acres) within Montana Connections. This project is estimated to be completed November 2020.

An expanded industrial rail yard will serve southwest Montana and all ports served by the UP Railroad (UPRR) and BNSF Railway. It will connect to rail facilities on the West Coast, East Coast, Gulf Region, Great Lakes Region, Mexico and Canada. Primary port connections include the Ports of Seattle, Tacoma, and Vancouver in Washington State; Portland, Oregon; Minneapolis, Minnesota; North Dakota, ports on the eastern seaboard, Mexican ports and Lethbridge/Raymond in Alberta, Canada.

Exhibit 3: Montana Connections and Port of Montana Expansion Schematic



Note: Page sized map can be found on Page 31 attached to this Narrative

Phases I and II are ready to move into final design and construction pending BUILD funding. This Project is truly shovel ready and can quickly proceed to Obligation and Construction. The Port and UPRR have an operating agreement in place that will cover this expansion.

The Current Operating Plan, known as a Switching Service Agreement, was entered into in June 1989 and covers the following rail movements within the Montana Connections and the Port:

- UPRR drops inbound cars onto the UPRR tracks near Montana Connections
- The Port of Montana, as Agent for UPRR, performs all switching of loaded and empty inbound or outbound cars
- The Port leaves outbound cars on the UPRR Yard Tracks
- For Montana Craft Malt cargo, the Port switches inbound and outbound cars for Montana Craft Malt onto Track G using the Lead Track F. The Port then places outbound cars onto the UPRR Yard Tracks (per the Agreement).

Phase I - this phase will allow for the continued growth in transload activities at the Port of Montana and interchange storage tracks to support additional rail serviced businesses in Montana Connections. This phase will construct a total of 14,852 linear feet of track consisting of

approximately 4,800 linear feet of transload tracks at the Port and the addition of three storage tracks (10,000 linear feet) at Montana Connections.

Phase II - this phase extends the interchange storage tract on the south end by adding a switch ladder to allow for a full unit-length train (up to 110 cars) to be delivered and departed from multiple interchange tracks A new lead track will be constructed into the Solvay property that will create addition rail served parcels within the park.

It is anticipated that Phase I can start construction as early as May 2021 pending federal obligation of final funding under this BUILD FY20 request. It is anticipated that Phase I construction can be completed in December 2021. Phase II will follow Phase I with completion estimated to be December 2022.

The BCA model was tested for sensitivity to volumes and truck miles using two example routes. Details of each route are described in the No-Build versus Build scenarios.

Exhibit-4 is a summary of the Sensitivity Analysis run on this Project. The two variables tested were annual rail volumes and the distance of dray from the Project location to destination. Both the rail volume and dray distance were tested for two Example Routes, Ex 1. and Ex 2.

The results of the Sensitivity Analysis varied from a low of 1.3 BCR at 96 rail cars per year (equaling an additional 12 cars per month) using the route under Example 1 to a high of 2.5 BCR using an additional 16 railcars per month (or 192 railcars per year) on the routing under Example 2. This technical memo uses 144 cars per year as the base for the analysis.

In every case, the BCR exceeded 1. Thus, this Project is a good choice for public investment.

To be conservative, this narrative compares the No-Build to the Build results using an additional 144 railcars per year using the Project on the route under Example 1 (from Decatur, AL to Belgrade, MT). This scenario yields a BCR of 1.89. This confirms that this Project is a good public investment, every $1 invested will return at least $1.89 in benefits to society.

Exhibit 4: Results of the Sensitivity Analysis

Sensitivity Analysis					
Potential Railcar Loads per year	Total Tons	Added Rail Miles	Highway VMT Saved	BCR	
144	12960	8,554,717	18,578,635	1.89	Ex 1
144	12960	8,554,717	20,609,540	2.10	Ex 2
variance		-	2,030,905	0.21	
96	8640	5,702,751	12,385,757	1.31	Ex 1
96	8640	5,702,751	13,739,694	1.45	Ex 2
variance		-	1,353,937	0.14	
120	10800	7,128,476	15,482,196	1.60	Ex 1
120	10800	7,128,476	17,174,617	1.77	Ex 2
variance		-	1,692,421	0.17	
192	17280	11,405,562	24,771,513	2.47	Ex 1
192	17280	11,405,562	27,479,386	2.75	Ex 2
variance		-	2,707,873	0.28	

Exhibit 5: Project Matrix

Project Matrix for the Port of Montana / Butte-Silver Bow Industrial Park Improvements 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 $ 2018)**	**Tab in Spreadsheet**
Lack of Transportation options for freight in the Butte Silver Bow region. This includes the lack of a centralized cost-effective/ efficient Rail loading/ unloading hub in Butte Silver-Bow Co. The use of 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.	Expand rail facilities to meet cargo demands for rail transportation including rail loading and unloading facilities, support track, etc. Thus, converting long-haul truck trips into short truck trips with a long distance rail haul.	Reduced VMT on highways and roadways	Vehicle drivers	Monetized value of reduced truck miles generating fuel savings	Estimated 1.4 million gallons of fuel saved	Detailed Savings Gallons & MT CO_2
		Reduced pollutant emissions	Local, state, region and national populations	Monetized value of emission reductions	14,000 MT of CO_2 saved 1.6 ST of VOCs 17.2 ST of NOX 1.0 ST of $PM_{2.5}$	Detailed Savings Gallons & MT CO_2
		Increase transportation options by providing rail as a cost effective option vs Truck only routes	Freight Shippers utilizing the Rail Park	Monetized value of reduced operational costs to shippers	Estimated savings of 10.8 million miles equaling $16.2 million in operational costs savings to shippers	Operational Savings
		Reduced Travel Time by Truck Drivers when Rail/ Truck Route used vs. Truck only deliveries	Truck Drivers / Rail Engineers	Monetized value of reduced Travel Time	366,000 net hours saved	Time Value Savings
		Reduced road maintenance cost due to the reduction of VMT on highways	Government	Monetized value of reduced road maintenance costs to due to reduced VMT	Estimated 12.9 million miles in VMT equaling $1.5 million of Road maintenance savings to states and regions	Road Maintenance
		Improve Road Safety by removing freight from the highways potentially reducing fatalities on highways	General public	Monetized value of the reduction of potential fatalities on roadways due to reduced VMT	Estimated $2.2 million in reduced accident cost from .22 fatalities and .75 severe injuries from reduction of Vehicle Miles Traveled on the roads and highways	Collision Costs

The analysis period used in the estimation of benefits and costs is 26 years starting in 2018. This includes 3 years of design and environmental clearance, 2 years of construction and 20 years of operation with a residual value in the final year. Total project costs of $8.8 million (FY2020) are expected to be funded through local and federal sources. The BUILD FY2020 application requests $6.4M and the applicants are committed to funding $2.4M, 27% percent of the project cost. The BCA includes all project costs for a total of $8.7M in 2018 dollars. Total Benefits including Maintenance and Residual total $37.4M in 2018 dollars. Net Benefits in 2018 dollars are estimated to be $28.7M. 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 Exhibit 6.

Exhibit 6: Summary of Pertinent Data, Quantified Benefits and Costs

Calendar Year	Total Direct Beneficiaries (Reduction in VMT)	Total Initial Costs	Total Public Benefits (2018$)	Maintenance Costs (2018$)	Residual Value	Total Benefits + Main & Residual	Undiscounted Net Benfits ($2018)	NVP (7%)
2018		($94,000)	$0	$0		$0	($94,000)	($94,000)
2019		($67,267)	$0	$0		$0	($67,267)	($62,867)
2020	-	($454,573)	$0			$0	($454,573)	($397,041)
2021	-	($4,493,787)	$0			$0	($4,493,787)	($3,668,269)
2022	-	($3,623,700)	$0			$0	($3,623,700)	($2,764,503)
2023	425,043		$1,322,753	($36,700)		$1,286,053	$1,286,053	$916,938
2024	432,268		$1,345,240	($36,700)		$1,308,540	$1,308,540	$871,936
2025	439,617		$1,368,109	($36,700)		$1,331,409	$1,331,409	$829,135
2026	447,090		$1,391,367	($36,700)		$1,354,667	$1,354,667	$788,429
2027	454,691		$1,415,020	($36,700)		$1,378,320	$1,378,320	$749,715
2028	462,421		$1,439,076	($36,700)		$1,402,376	$1,402,376	$712,897
2029	470,282		$1,463,540	($36,700)		$1,426,840	$1,426,840	$677,881
2030	478,276		$1,488,420	($36,700)		$1,451,720	$1,451,720	$644,581
2031	486,407		$1,513,723	($36,700)		$1,477,023	$1,477,023	$612,912
2032	494,676		$1,539,457	($36,700)		$1,502,757	$1,502,757	$582,795
2033	503,086		$1,565,627	($36,700)		$1,528,927	$1,528,927	$554,154
2034	511,638		$1,592,243	($36,700)		$1,555,543	$1,555,543	$526,916
2035	520,336		$1,620,036	($36,700)		$1,583,336	$1,583,336	$501,244
2036	529,182		$1,647,577	($36,700)		$1,610,877	$1,610,877	$476,600
2037	538,178		$1,676,577	($36,700)		$1,639,877	$1,639,877	$453,440
2038	547,327		$1,705,079	($36,700)		$1,668,379	$1,668,379	$431,141
2039	556,631		$1,734,065	($36,700)		$1,697,365	$1,697,365	$409,936
2040	566,094		$1,763,544	($36,700)		$1,726,844	$1,726,844	$389,771
2041	575,718		$1,793,951	($36,700)		$1,757,251	$1,757,251	$370,687
2042	585,505		$1,824,448	($36,700)	$6,958,047	$8,745,795	$8,745,795	$1,724,204
Total	10,024,464	(8,733,327)	$31,209,853	($734,000)	$6,958,047	$37,433,900	$28,700,573	$6,238,630

Based upon the Benefit Cost Analysis presented in the remainder of this document, the project is expected to generate $13.2M in discounted benefits and $7.0M in discounted costs using a 7 percent real discount rate. Therefore, the project generates a Net Present Value (NPV) of $6.2M and a Benefit/ Cost Ratio of 1.9:1 at 7 percent. Exhibit 7 below summarizes the Selection Criteria calculated in this Benefit Cost Analysis using updated tonnage totaling 13,180 tons in the first year of operation. This equates to approximately 145 rail cars traveling a combined rail/ truck route of 2,578 miles from origin to destination.

At the 7 percent discount rate, $6.2M in benefits are from operational cost savings generated by the reduction of 10.8 million total miles of truck usage due to the greater loading and energy efficiencies of rail vs. truck. This accounts for 52 percent of the total benefits. The reduction VMT on roads also produces a Travel Times Saving estimated at a $4.0M or 33 percent of the total benefit. The reduction of truck miles traveled on the roadways also generates a reduction of 0.96 fatalities and other severe injuries that equate to $0.9M of benefit (7 percent of benefits). The reduction of 1.4 million gallons of fuel usage generates a fuel costs savings of approximately $1.3M. This is included in operating cost savings. This fuel savings generates Emission Reduction Savings totaling $0.2M. State of Good Repair Savings is calculated based upon the reduced road maintenance and preservation costs resulting from the reduction of 18.6 million VMT on roads and highways. This accounts for $0.9M of the total societal benefits.

Exhibit 7: Summary of Benefit Cost Analysis Selection Criteria

Benefit to Cost Ratio Analysis				
Selection Criteria	Description	Inputs	Value	Monetized Value Discount Rate 7%
Safety	Reduced fatalities due to reduction of VMT	Safety cost savings of road accidents	A total of 1 potential crash resulting in reduction of .22 potential fatalities and .75 severe injuries	$ 856,237
State of Good Repair	Reduction of maintenance on US Roads & Hwys, consistent with State and Regional Plans	Maintenance, preservation and upgrade savings of Highways	18.6 million VMT reduced off the highways	$ 868,073
Economic Competiveness	Operational cost savings	Savings of rail transport vs. truck transport	Net savings per mile (truck/ rail vs. truck only) saving 10.6 million VMT (net road and rail)	$ 6,243,969
Economic Competiveness	Time Value savings	Savings in Operator time rail vs. truck route	366,000 hours of Truck driver savings less RR engineer time	$ 3,963,596
Environmental Sustainability	Environmental Benefits from Reduced Emissions	CO_2 cost savings	14,000 metric tons of CO_2 saved	$ 218,294
Quality of Life	Fuel savings due to reduced truck miles traveled by cargo using new facility	Gallons of fuel saved	1.4 million gallons of fuel saved by reducing miles traveled with modal shift to Rail	N/A
			Benefits before Maintenance and Residual	$ 12,150,169
Maint and Residual Value			Adjustment to Social Benefits	$ 1,075,142
			Total Benefits	$ 13,225,310
			Total Cost	($6,986,680)
			Net Present Value	$ 6,238,630
			Benefit to Cost Ratio	1.89

Introduction

This document provides detailed technical information on the economic analyses conducted in support of the grant Application for the rail and road expansion project at the Port of Montana and Montana Connections Business Development Park.

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'- 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 USDOT's Discretionary Grant Benefit Cost Analysis guidelines issued in January 2020. 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 as of January 2020 guidance).

Project Overview

The requested funds will build 21,000 feet of new rail lines and 3,600 feet of roadway within the Montana Connection Park to increase the efficiency of current transload operations, access industrial lands ready for business development, and provide rail access to 130 acres of developable lands. The project will build new transload tracks at the Port of Montana and expand the support tracks that serve customers at the Port of Montana and Montana Connections. The additional transload tracks, storage and lead tracks will improve the capacity and fluidity of the rail facilities at the Butte-Silver Bow complex.

Base Case- "No Build scenario"

The base case in the BCA represents the current state of two example freight movements from Decatur, AL through the Butte-Silver Bow region to project sites in Montana and Idaho. Due to the complexity of the potential commodity movements and volumes that will be generated in the future from businesses locating in the Montana Connections, these two representative supply chain examples have been selected for comparison in the BCA.

Currently, both example products are trucked to the destination from Alabama production facilities.

Build Alternative

Estimation of costs and benefits are limited to the 2018 to 2042 period. The analysis incorporates assumptions based upon an additional 12 rail cars per month of project and other cargos moving through the expanded rail service at Montana Connections once it opens after construction is completed in December 2022. To be conservative, the cargo volumes for this analysis start in 2023 and grows at 1.7% per year. This is considered a very conservative approach compared to the expected volume upon opening of three additional sites. In reality, the

volumes are projected to increase in a "step-wise" fashion as each site comes online. By year 10, monthly railcar volume is projected to increase by at least 100 cars per month to 1200 railcars a year. This stepped projection confirms that the modeled volume of approximately a total of 170 cars in year 10 using a 1.7% annual increase are ultra conservative.

The assumptions used in the model are detailed below:

Estimated loads were developed based upon the current interest in the Montana Connections for rail served properties and additional requests for transloading at the Port of Montana. The analysis presented in this report assumes 12,960 additional tons of cargo in 2022. It is anticipated that this volume will approximate 12 additional railcars per month in 2023, equal to 439 truckloads or an addition 144 -145 railcars per year in 2023 when the Project is fully operational.

Exhibit 8: 250 "First/ Last Mile" Catchment Area Around MONTANA CONNECTIONS

Currently, the Port experiences customer moves within a 250- mile catchment area around Montana Connections. This is due to the fact that there is not another rail hub within Montana or Idaho that can offer dual rail services from both BNSF and UPRR. This puts the Port and Montana Connections in a unique position to offer efficient cost-effective rail transportation for customers and projects in this catchment area.

Assumptions

Current Situation- "No Build"

Two current examples have been used in the analysis:

Example 1: Pipe from Decatur, AL to Belgrade, MT along I-90.

The current movement requires a truck movement of 1843 miles from Decatur, AL to Belgrade, MT.

Example 2: Steel from Decatur, AL to Raft River, ID

This requires a truck movement of 2039 miles

Impact of Industrial Park Improvements

Reduced gas consumption and emissions as well as improved economic competitiveness, safety, and road conditions!

Future Situation

Upon completion of the project, the new routing would be by rail from Decatur, AL to the Montana Connections Park and then transloaded onto a truck to be driven the destination.

Example 1: Rail miles will be 2496 miles (estimated at 1.2 times distance by road) from the plant in Alabama to the Industrial Park. The product would be transloaded onto trucks in the Park and trucked 82 miles to the final destination in Belgrade, MT. The conversion is estimated to save over 787,000 truck miles the first year.

Example 2: Rail miles will also be 2496 one-way from Alabama to the Industrial Park. The product would be transloaded onto trucks in the Park and trucked 293 miles to Raft River, ID.

Example used in this Narrative: For this narrative, the volume chosen to be used in the spreadsheet model was chosen based upon results of the Sensitivity Analysis presented later in this document. The results of the BCA spreadsheet are based upon the **Example 1 route. This leads to a volume of 145 additional railcars or approximately 13,180 tons of cargo moved from truck to rail. This yields a reduction of more than 787,000 truck miles in the first year.** Based on the analysis of Example 1, these parameters were chosen for use in calculating the BCA because they are easily obtainable by the Port of Montana and Montana Connections in the first full year of operation after construction.

Project Cost and Schedule

Project Costs

Exhibit 9: Total Project Budget

Montana Connections Business Development Park Project		
Project Budget	**in Millions**	**USE %**
Construction	**$7.9**	**90%**
FE/ CN Engineering	**$0.9**	**10%**
Other non construction costs	**$0.0**	**0%**
Total Cost	**$8.8**	**100%**

The cost analysis completed by project engineers indicates the cost to complete the project is $8.8 million in 2020 dollars. This total project cost includes $1.1 million in standard contingencies built into the construction estimate.

Project Funding

Exhibit 10: Funding Sources

	Total Project
Total Federal	**$6.4**
Total Local	**$2.4**
Total Project Funding	**$8.8**

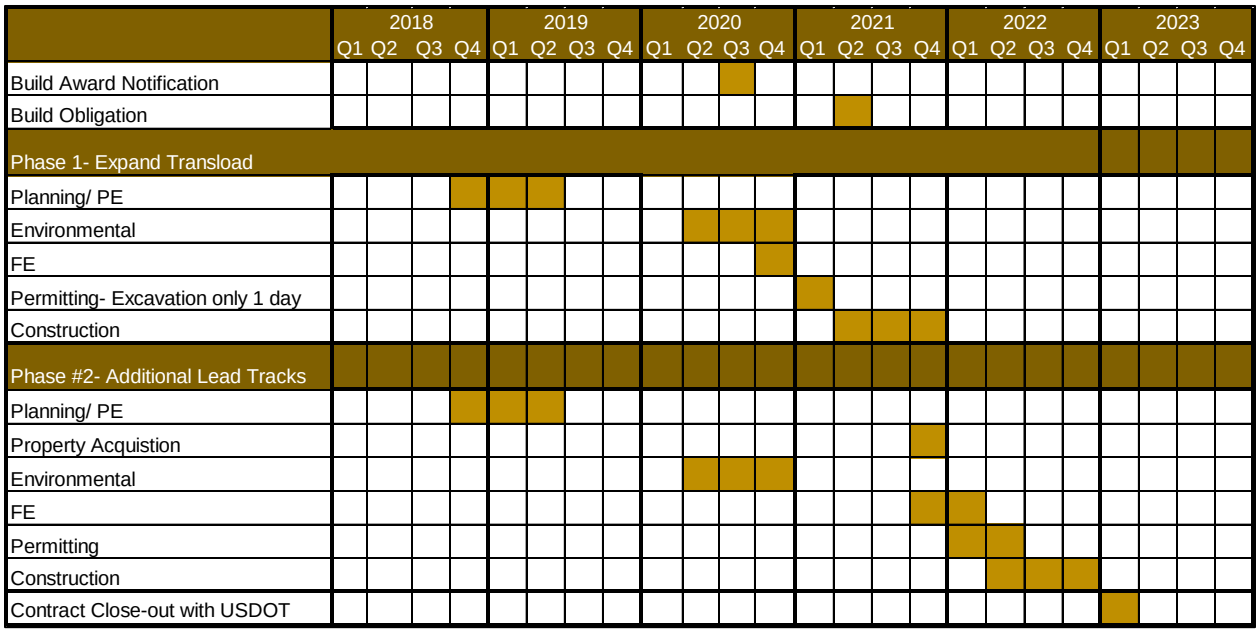
BSB and the Port of Montana are requesting a BUILD FY2020 federal investment of $6.4M (73 percent) to complete project construction.

There is a 27 percent, or $2.4M, local match committed for this $8.8Mproject. This non-federal investment is comprised of committed local funds from BSB through the tax increment financing industrial district funds.

Project Schedule

As detailed above, the Project has been broken into two Phases:
Phases I can start construction in Q2 2021 if the funding can be obligated quickly. Phase II can be initiated by Q2 2022. Both phases are important to meet current customer demands for rail service.

Exhibit 11: Project Schedule



All pre-construction activities including the NEPA process, other permits and approvals, and engineering/design are included in the project schedule and will be completed prior to beginning of construction in Spring, 2021. The area that is reserved for rail expansion had a 'Cultural Assessment' completed in 2005 with no adverse findings; the assessment will be updated for this project as needed. Several parcel-specific environmental studies have been conducted in the area with no adverse findings. The project is feasible, the design and investigation into the site shows no complicating or project-ending factors. The City-County of BSB is a certified local government with a fully staffed Finance and Budget office with numerous financial controls in place to assist with the management of grant funding. Butte-Silver Bow completes a Comprehensive Audited Financial Report (CAFR) annually and has not been found to have any significant process errors.

The financial feasibility of this project is extremely strong. The matching funds committed to this project have been budgeted, are on hand and immediately available for use. The City-County of BSB's funds are derived from Tax Increment Financing, which is available for use due to Montana Connections Park's status as a TIFD. The Port of Montana is financially sound and has the ability to perform on-going maintenance (life-cycle costs) of the facilities built utilizing asset management activities included in the project.

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 no later than March 2021.

Federal grant funds received from the BUILD FY2020 request will enable the Montana Connections and the Port of Montana Board to complete the project. The project cannot move forward without federal funding. With the successful award of this BUILD FY2020 grant, construction for the project can begin in spring 2021 and the project can be completed and opened in late 2022.

Long Term Outcomes

Summary of the Benefit Cost Analysis

Project Comparison Is Most Likely Alternative versus a "No Build" Scenario

For purposes of this analysis, the proposed project is compared with a "no build" alternative. The analysis compares the "no build" scenario with the project costs of $8.8M and is for the period of 20 years post-construction. The analysis begins with the base year 2018 and includes a residual value in 2042 of $6.9M in 2018 dollars.

A **discount rate of 7 percent** was used, following the USDOT Discretionary BCA Guidance. When discounted at 7 percent, the PV of costs rounds to $7.0 M and the PV of Total Benefits is $13.2M. This rate yields conservative estimates of NPV and benefit cost ratio per the NOFO guidance. This analysis yields a NPV of $6.2M with a benefit-cost ratio of 1.9:1 over the 20-year analysis post-construction.

Exhibit 12 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 resulting from the reduction of truck vehicle miles traveled when this project is completed.

The proposed improvements will increase rail capacity at the Port of Montana and Montana Connections. This project provides shippers with expanded rail capacity at this rural rail transloading hub. This provides shippers with an alternative transportation option to a truck-only route for moving cargo to, from, and through southwest Montana.

The greatest share of benefits is within the Economic Competitiveness Criteria with a savings in Operational Costs to the shippers and Travel Savings to Operators. Together these two metrics account for 84 percent of the benefits (totaling $26M in 2018 dollars). Significantly, this Project will help bridge the service gap currently experienced by this rural region of the country. The additional rail serving the industrial parcels will allow Montana Connections to capture more rail cargo into the Port of Montana rail yard with its expanded rail transloading capacity.

Exhibit 12: Benefit Cost Analysis

Benefit to Cost Ratio Analysis				
Selection Criteria	Description	Inputs	Value	Monetized Value Discount Rate 7%
Safety	Reduced fatalities due to reduction of VMT	Safety cost savings of road accidents	A total of 1 potential crash resulting in reduction of .22 potential fatalities and .75 severe injuries	$ 856,237
State of Good Repair	Reduction of maintenance on US Roads & Hwys, consistent with State and Regional Plans	Maintenance, preservation and upgrade savings of Highways	18.6 million VMT reduced off the highways	$ 868,073
Economic Competiveness	Operational cost savings	Savings of rail transport vs. truck transport	Net savings per mile (truck/ rail vs. truck only) saving 10.6 million VMT (net road and rail)	$ 6,243,969
Economic Competiveness	Time Value savings	Savings in Operator time rail vs. truck route	366,000 hours of Truck driver savings less RR engineer time	$ 3,963,596
Environmental Sustainability	Environmental Benefits from Reduced Emissions	CO_2 cost savings	14,000 metric tons of CO_2 saved	$ 218,294
Quality of Life	Fuel savings due to reduced truck miles traveled by cargo using new facility	Gallons of fuel saved	1.4 million gallons of fuel saved by reducing miles traveled with modal shift to Rail	N/A
			Benefits before Maintenance and Residual	$ 12,150,169
Maint and Residual Value			Adjustment to Social Benefits	$ 1,075,142
			Total Benefits	$ 13,225,310
			Total Cost	($6,986,680)
			Net Present Value	$ 6,238,630
			Benefit to Cost Ratio	1.89

The Safety category achieves $0.9M in societal savings of moving the cargo on rail/truck vs. truck only. Environmental Sustainability is calculated though the reduction in use of fuel which contributes to Carbon Savings and reductions in other emissions.

This expanded facility will save users millions of dollars per year in transportation costs due to the more cost-effective routing of a blended, and less expensive movement by rail/truck versus truck only move.

Additionally, the project will bring rail access to industrial lands available for development, creating new jobs and economic growth for the region.

The specific benefits achieved by completing this Project include:

Safety — reduced fatalities due to the removal of VMTs from local roads and highways. The use of rail versus truck will reduce 0.22 fatalities and 0.75 serious injuries equaling-$0.9M at a discounted rate of 7 % over the 20-year analysis period.

State of Good Repair — savings in maintenance, preservation, and roadway upgrades.

The reduction of 18.6 million VMT off the nation's roads is estimated to save $0.9M (discounted at 7%) in preservation, maintenance and repair costs to the local roads and highways over the 20 years following the opening of the Project.

Economic Competitiveness — reduction in transportation costs and time savings

The conversion of freight traffic from Truck only to a Rail/Truck route will save an estimated $6.2M in transportation costs in discounted (at 7%) savings over the 20-years post construction period. The reduction of 366,000 hours in truck driver time, although partially offset by an increase in rail engineer hours, is estimated to save $4.0M in discounted societal costs. Combined, these two metrics result in a total discounted savings of $10.2Mfor the shippers and operators when using this route.

Environmental Sustainability — emission reduction

Emission reductions result from the reduction in fuel usage by using rail/truck route verses truck only to move cargo. Additionally, CO_2 will be reduced by 14,000 MT. Other emissions such as VOC and NOX will also be reduced yielding discounted savings of $0.2M.

Quality of Life — reduction in fuel usage

This project is estimated to save 1.4 million gallons of fuel by converting freight from a truck only route to rail/truck transportation during the 20 years of the project.

Affected Populations and Types of Impacts

The benefiting populations include three main groups: personal vehicle users, commercial carriers, and local residents who will now have access to an expanded employment center. The following tables presents 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 Montana producers.
- Reduction of gallons of fuel used to transport the cargo to export terminals on the coast.
- Improved state of repair of the roads and highways, due to the reduction of truck miles.
- Reduced emissions due to lower VMT by commercial trucks.
- Improved safety, resulting in reduced economic costs from potential fatalities on the highway due to the reduced VMT of the trucks.

- Costs include construction and lifecycle costs. Construction costs are best available estimates as of April 2020. This analysis anticipates general operations and maintenance costs.
- Unquantified benefits include:
  - Reduced in-town truck congestion.
  - Increased job opportunities for the local community at Montana Connections.

Quantified Cost and Benefits Measurement of Long-Term Outcomes

Quality of Life (Livability)

This project provides wonderful benefits to local residents and southwest Montana communities. Individuals will have expanded employment opportunities at Montana Connections, and they will benefit from a reduction of commercial vehicles moving on the Interstates through their communities. The project will improve the quality of life in Butte and along the I-90 / I-15 Corridors because it supports the core livability principles established by the Partnership for Sustainable Communities. Those principles provide guidance for project criteria.

The project's purpose is to provide jobs and economic activity by improving rail and transloading operations at the Port of Montana and by increasing the availability of land for commercial development that has rail access. The project will also provide safer transportation of freight from the Port of Montana and Montana Connections' tenants to their customers' respective markets. Quality of Life benefits have been quantified using the metric of the fuel savings based upon the energy efficiency of rail over truck. Exhibit 14 shows the estimated number of gallons of fuel saved by converting the current truck transportation method to rail. The construction of the project will reduce fuel usage by over 1.4 million gallons of fuel during the 20-year period after the project completion.

The fuel savings shown in Exhibit 14 is calculated based upon the use of the more energy efficient rail mode to transport the cargo long distances within a transportation route. Trucks will be used for the "last mile" route to the destination from the rail hub.

Safety on the Highways also benefits Quality of Life.

Exhibit 13: Assumptions for Calculating Fuel Savings

Assumption	Value	Unit	Source
Diesel price: average Rocky Mountains week of 6/18/2019 (all grades)	$3.07	per gallon	http://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_r40_w.htm

Exhibit 14: Fuel Savings

Gallons and CO2 MT Saved due to shift in mode			
Year	Total gallons save by reduction in modal shift	CO2 Reduced (Metric Tons)	Fuel Savings- information only
			$ 2.47
2023	58,184	592	$143,772
2024	59,173	602	$146,216
2025	60,179	613	$148,702
2026	61,202	623	$151,230
2027	62,242	634	$153,801
2028	63,300	644	$156,415
2029	64,377	655	$159,074
2030	65,471	666	$161,779
2031	66,584	678	$164,529
2032	67,716	689	$167,326
2033	68,867	701	$170,171
2034	70,038	713	$173,063
2035	71,228	725	$176,005
2036	72,439	737	$178,998
2037	73,671	750	$182,041
2038	74,923	763	$185,135
2039	76,197	776	$188,283
2040	77,492	789	$191,483
2041	78,810	802	$194,739
2042	80,149	816	$198,049
Total	1,372,242	13,969	$3,390,811

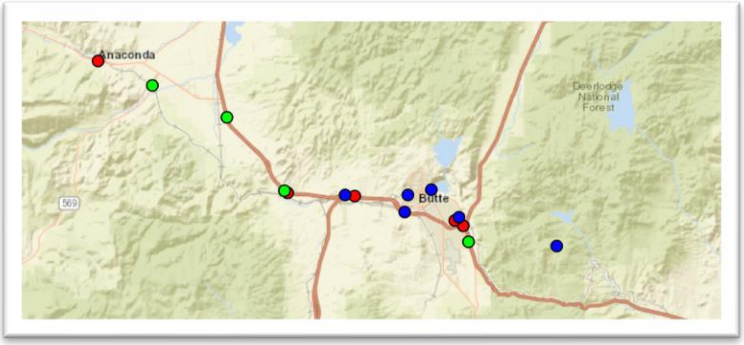
Exhibit 15: Traffic Fatalities for Montana 2008-2017

Core Outcome Measures		Year									
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Traffic Fatalities	Total (C-1)	229	221	189	209	205	229	192	224	190	186
	Rural	211	203	177	179	191	224	178	200	170	167
	Urban	18	18	12	29	14	5	14	24	19	19
	Unknown	0	0	0	1	0	0	0	0	1	0
Fatalities Per 100 Million Vehicle Miles Driven**	Total (C-3)	2.12	2.01	1.69	1.79	1.72	1.90	1.58	1.81	1.51	1.47
	Rural	2.57	2.44	2.11	2.05	2.15	2.68	2.11	2.34	1.95	1.91
	Urban	0.69	0.67	0.43	0.99	0.47	0.14	0.38	0.63	0.49	0.49

Although Montana experienced a lower fatality rate on its roads in 2017 than in 2018, Exhibit 15 shows that rural areas continue to be more dangerous with a 1.91 fatality rate per 100 million miles driven compared to 0.49 in urban areas. The results show that every truck that is taken off the road in Montana will lead to safer driving conditions for residents. For example, I-90

continues to be the most likely location for fatalities among Butte residents. This project will remove trucks from I-90.

Exhibit 16: Location of Fatal Crashes 2015-2017



Although these two savings have been quantified, other Quality of Life benefits have not been monetized in the BCA due to the difficulty of fully quantifying these community benefits. See more detail on this criteria under the section below, Qualitative Benefits Not Quantified.

Detailed Benefits (before discounting):

Safety

As mention above, Montana has an overall fatality rate of 1.47 fatalities per 100 million miles traveled. An effort to reduce VMTs on Montana roads and Highways will help make Montana travelers safer. Since the VMT for the route is crossing multiple states, a national fatality rate of 1.16 fatalities per 100 million miles traveled was used in the analysis.

Exhibit 17: Assumptions Used in the Safety Benefit

Fatality and Injury Rates per 100 Million VMT				
Type		Rate	Value	Source
Fatality		1.16	$ 9,600,000	NHTSA
Injury- Severity Unknown		4.0252	$ 174,000	

Exhibit 18: Reduction of Potential Collisions

Preventions of Collisions						
Year	Reduction of Truck VMT	Highway Fatalities Prevented	Value	Highway Injuries Prevented	Value of Injuries Prevented	Total Value of Accidents Prevented
	in 100 Million Miles	1.16	$9,600,000	4.0252	$174,000	
2023	0.008	0.01	$87,723	0.03	$5,517	$93,240
2024	0.008	0.01	$89,214	0.03	$5,611	$94,825
2025	0.008	0.01	$90,731	0.03	$5,706	$96,438
2026	0.008	0.01	$92,274	0.03	$5,803	$98,077
2027	0.008	0.01	$93,842	0.03	$5,902	$99,744
2028	0.009	0.01	$95,437	0.03	$6,002	$101,440
2029	0.009	0.01	$97,060	0.04	$6,104	$103,164
2030	0.009	0.01	$98,710	0.04	$6,208	$104,918
2031	0.009	0.01	$100,388	0.04	$6,314	$106,702
2032	0.009	0.01	$102,095	0.04	$6,421	$108,516
2033	0.009	0.01	$103,830	0.04	$6,530	$110,360
2034	0.009	0.01	$105,595	0.04	$6,641	$112,237
2035	0.010	0.01	$107,390	0.04	$6,754	$114,145
2036	0.010	0.01	$109,216	0.04	$6,869	$116,085
2037	0.010	0.01	$111,073	0.04	$6,986	$118,059
2038	0.010	0.01	$112,961	0.04	$7,105	$120,066
2039	0.010	0.01	$114,881	0.04	$7,225	$122,107
2040	0.010	0.01	$116,834	0.04	$7,348	$124,182
2041	0.011	0.01	$118,821	0.04	$7,473	$126,294
2042	0.011	0.01	$120,840	0.04	$7,600	$128,441
Total	0.186	0.22	$2,068,917	0.75	$130,122	$2,199,039

Removing 18.6 million miles or 0.186 100 million miles off the road will save approximately 0.22 lives and 0.75 severe accidents over the 20-year analysis period. The reduction of accidents is estimated to yield $2.2M of savings in 2018 dollars.

State of Good Repair of Highways and Roadways

Exhibit 19:Assumptions used to Calculate State of Good Repair

Assumption	Assumption Value	Unit	Source:
Pavement Maintenance Cost	$0.12	per truck mile	WSDOT

The Project will reduce truck miles by at least 18.6 million miles. This calculation is based upon the Example 1 routing that shows an increase in rail volume by 13,180 tons (or 144 railcars per year) to the Montana Connections' facilities starting in year 2023. The removal of these miles

off the nation's road network is estimated to yield a total savings of $2.2M in road preservation, maintenance, and repair cost over the 20-year period of this analysis.

Exhibit 20: Decrease in Road Maintenance

Decreased road maintenance due to conversion to rail					
Year	No-Build Road Miles	Build Road Miles	Truck Miles saved	Maintenance rate/ mile	Total savings
				$0.12	
2023	809,711	21,967	787,744	$0.12	$94,529
2024	823,476	22,341	801,135	$0.12	$96,136
2025	837,475	22,720	814,755	$0.12	$97,771
2026	851,712	23,107	828,606	$0.12	$99,433
2027	866,191	23,499	842,692	$0.12	$101,123
2028	880,917	23,899	857,018	$0.12	$102,842
2029	895,892	24,305	871,587	$0.12	$104,590
2030	911,122	24,718	886,404	$0.12	$106,368
2031	926,611	25,139	901,473	$0.12	$108,177
2032	942,364	25,566	916,798	$0.12	$110,016
2033	958,384	26,001	932,383	$0.12	$111,886
2034	974,677	26,443	948,234	$0.12	$113,788
2035	991,246	26,892	964,354	$0.12	$115,722
2036	1,008,097	27,349	980,748	$0.12	$117,690
2037	1,025,235	27,814	997,421	$0.12	$119,690
2038	1,042,664	28,287	1,014,377	$0.12	$121,725
2039	1,060,389	28,768	1,031,621	$0.12	$123,795
2040	1,078,416	29,257	1,049,159	$0.12	$125,899
2041	1,096,749	29,754	1,066,994	$0.12	$128,039
2042	1,115,394	30,260	1,085,133	$0.12	$130,216
	19,096,723	518,088	18,578,635		$2,229,436

Economic Competitiveness

Economic Competitiveness has two metrics: Operating Cost Savings and Travel Time Value Savings.

Operating Cost Savings

The ability to offer a rail option as a transportation choice to customers will reduce Operating Costs. The use of a rail/truck route to move cargo instead of a truck only route will save shippers an estimate 10°million operating miles. Conservatively, and in accordance with USDOT BCA Guidance (January 2020), operating costs have been updated in this analysis as vehicle operating costs on a per mile basis instead of vehicle ton miles that was used in an earlier analysis. This BCA adheres to the USDOT BCA Guidance; however, we remain concerned that it potentially understates the transportation cost for the entire supply chain because it only accounts for the cost of the truck from point to point on a mileage basis.

Exhibit 21: Assumptions used in Operating Cost Savings

Assumptions	Assumption Value	Unit	Source
Value of Truck Driver Travel time per hour	$ 29.50	per hour	Benefit -Cost Analysis Guidance for Discretionary Grant Programs, Jan 2020Table A-3: Value of Travel Time Savings
Average Drivers per Truck	1.00		Benefit -Cost Analysis Guidance for Discretionary Grant Programs, Dec 2018 Table A-4: Average Vehicle Occupancy
Average Speed of Truck	50	mph	
Tons per Truck	30	Short Tons	BNSF
	27	Metric Tons	Calculated
Tons per Rail Car	90	Short Tons	BNSF
	81.6	Metric Tons	Calculated
Operating cost per Rail Mile	$0.2103	$2018 Cost / Mile	USDOT National Transportation Statistics, Table 3-21 Average Freight Revenue per Ton Mile. Converted to $2018 using ratio of cost per ton mile to cost per mile of Commercial Trucks
Operating cost per Truck Mile	$0.9600	$2018 Cost / Mile	USDOT BCA Guidance Table A-4 Vehicle Op Costs
Average Truck Trip Distance- No-Build	1,843	OW Trip miles	Port of Montana
Average Truck Trip Distance- Build	82	OW Trip miles	Port of Montana
Truck to Rail Distance Factor	1.2	Rail mile / Truck mile	National Cooperative Highway Research Program (NCHRP) Report 388. " A Guidebook for Forecasting Freight Transportation Demand". 1997. It is assumed that this factor includes drayage distances. This factor is used to adjust truck miles to rail miles as it is assumed that truck shipping distances are generally shorter than rail shipping distances. The model assumes that for every mile of trucking avoided, 1.20 miles of rail travel is added.
Average Number of Miles per Railcar	2496	miles	Calculated using truck miles per rail mile

Exhibit 22: Operating Cost Savings

Decreased Operational Costs										
	No-Build Route			Build						
Year	Truck VMT	No-Build Ton Miles Truck Only Route (ST)- info only	Operating Cost Truck only	Truck VMT	Build Ton Miles Truck Route- info only	Operating Cost Truck portion	Railcar VMT	Ton Miles Rail Only Route (ST)- info only	Rail operational cost of switching to Rail from Truck	Reduction in operation cost No-Build vs. Build
		30	$0.9600		30	$0.9600		90	$0.2103	
2023	809,711	24,291,331	$777,323	21,967	659,016	$21,089	362,701	32,643,120	$76,294	$679,940
2024	823,476	24,704,284	$790,537	22,341	670,219	$21,447	368,867	33,198,053	$77,591	$691,499
2025	837,475	25,124,256	$803,976	22,720	681,613	$21,812	375,138	33,762,420	$78,910	$703,255
2026	851,712	25,551,369	$817,644	23,107	693,200	$22,182	381,515	34,336,381	$80,251	$715,210
2027	866,191	25,985,742	$831,544	23,499	704,985	$22,560	388,001	34,920,099	$81,615	$727,369
2028	880,917	26,427,500	$845,680	23,899	716,970	$22,943	394,597	35,513,741	$83,003	$739,734
2029	895,892	26,876,767	$860,057	24,305	729,158	$23,333	401,305	36,117,475	$84,414	$752,310
2030	911,122	27,333,672	$874,678	24,718	741,554	$23,730	408,127	36,731,472	$85,849	$765,099
2031	926,611	27,798,345	$889,547	25,139	754,160	$24,133	415,066	37,355,907	$87,308	$778,105
2032	942,364	28,270,916	$904,669	25,566	766,981	$24,543	422,122	37,990,957	$88,793	$791,333
2033	958,384	28,751,522	$920,049	26,001	780,020	$24,961	429,298	38,636,803	$90,302	$804,786
2034	974,677	29,240,298	$935,690	26,443	793,280	$25,385	436,596	39,293,629	$91,837	$818,467
2035	991,246	29,737,383	$951,596	26,892	806,766	$25,817	444,018	39,961,621	$93,399	$832,381
2036	1,008,097	30,242,919	$967,773	27,349	820,481	$26,255	451,566	40,640,968	$94,986	$846,532
2037	1,025,235	30,757,048	$984,226	27,814	834,429	$26,702	459,243	41,331,865	$96,601	$860,923
2038	1,042,664	31,279,918	$1,000,957	28,287	848,614	$27,156	467,050	42,034,506	$98,243	$875,558
2039	1,060,389	31,811,677	$1,017,974	28,768	863,041	$27,617	474,990	42,749,093	$99,913	$890,443
2040	1,078,416	32,352,475	$1,035,279	29,257	877,712	$28,087	483,065	43,475,828	$101,612	$905,580
2041	1,096,749	32,902,467	$1,052,879	29,754	892,633	$28,564	491,277	44,214,917	$103,339	$920,975
2042	1,115,394	33,461,809	$1,070,778	30,260	907,808	$29,050	499,629	44,966,570	$105,096	$936,632
	19,096,723	572,901,697	$18,332,854	518,088	15,542,640	$497,364	8,554,171	769,875,422	$1,799,357	$16,036,133

The Economic Competitiveness Benefits of the project have been monetized based on the differential cost of rail transportation versus truck. Exhibit 22 shows the estimated saving of $16.0M when the Example 1 cargo is hauled by rail from the production plant in Decatur, AL to Montana Connections and then transloaded and trucked its final destination (82 miles). Each truck trip from Decatur entails 1843 miles to final destination.

The analysis is based upon the net reduction of $17.8M in truck operating costs between the No-Build and Build scenario. These savings are partially offset by an increase of $1.8M in rail operating costs under the Build scenario, netting an operational savings of $16.0M under the Project.

Travel Time Value Savings

Exhibit 23: Assumptions Used to Calculate Travel Time Savings

Assumption	Assumption Value	Unit	Source:
Truck Driver Hourly Value of Travel Time Savings	$ 29.50	$/ hr	Source: USDOT BCA GuidanceTable A-3
Average Drivers per Truck	1.00		Benefit -Cost Analysis Guideance for Discretionary Grant Programs, Jan 2020 Table A-4: Average Vehicle Occupancy
Average Speed of Truck	50	mph	
Miles per Train	2496	miles	Port of Montana
Train Engineer Hours Value of Travel Time	$ 45.70		Source: USDOT BCA GuidanceTable A-3
Average Engineers per Train	3.00		BNSF
Average Speed of Train	25	mph	American Association of Railroads
Average number of cars per train	60	train	American Association of Railroads

The Travel Time Savings have been calculated based upon the above assumptions. Multiplying the Estimated No-Build Truck Driver hours based upon distance and speed of travel by $29.50.

Total Travel Times Savings for the Build scenario uses the same formula based upon estimated Truck Driver hours subtracted from the estimated Train Engineer hours. Train Engineer hours are based on the average of 3 engineers and a train speed of 25 mph. Total Travel Savings equals the No-Build Travel Hours saved reduced by the Travel Hours required under the Build Scenario for both truck and rail operators.

As both the Build and No-Build Scenarios reflect new users, the model has been designed to reflect USDOT guidance about new users (pages 18 and 37 of the January 2020 Guidance). In that guidance the calculation for new users is to be the ½ (new user volume times the change in travel time cost between the no-build route and the build route).

Exhibit 24: Travel Time Savings Benefits

Truck Driver Travel Time Savings							Engineer Travel Time Increase									
		No Build	Build						No Build	Build						
Year	Calendar Year	Truck Route-VMT	Truck Route-VMT Saved	Driver Hours Saved	Truck travel Time cost saved by switching to Rail from Truck	Total Truck Travel Time Cost Savings	Year	Calendar Year	Rail Route-VMT	Trains	Number of Trains * miles per train	Engineer Hours Increased	Engineer travel Time Increase by switching to Rail from Truck	Total Engineer Travel Time Cost Increase	Net Decrease in Travel Time	Adjustment for BCA Guidance based upon new users
				at 50 mph	$ 29.50						2496	at 25 mph	$ 137.10			0.5
2	2023	809,711	787,744	15,755	$29.50	$464,769	2	2023	362,701	2	6,045	242	$ 137.10	$33,151	$431,618	$215,809
3	2024	823,476	801,135	16,023	$29.50	$472,670	3	2024	368,867	2	6,148	246	$ 137.10	$33,714	$438,955	$219,478
4	2025	837,475	814,755	16,295	$29.50	$480,705	4	2025	375,138	3	6,252	250	$137.10	$34,288	$446,418	$223,209
5	2026	851,712	828,606	16,572	$29.50	$488,877	5	2026	381,515	3	6,359	254	$137.10	$34,871	$454,007	$227,003
6	2027	866,191	842,692	16,854	$29.50	$497,188	6	2027	388,001	3	6,467	259	$137.10	$35,463	$461,725	$230,862
7	2028	880,917	857,018	17,140	$29.50	$505,640	7	2028	394,597	3	6,577	263	$137.10	$36,066	$469,574	$234,787
8	2029	895,892	871,587	17,432	$29.50	$514,236	8	2029	401,305	3	6,688	268	$137.10	$36,679	$477,557	$238,779
9	2030	911,122	886,404	17,728	$29.50	$522,978	9	2030	408,127	3	6,802	272	$137.10	$37,303	$485,675	$242,838
10	2031	926,611	901,473	18,029	$29.50	$531,869	10	2031	415,066	3	6,918	277	$137.10	$37,937	$493,932	$246,966
11	2032	942,364	916,798	18,336	$29.50	$540,911	11	2032	422,122	3	7,035	281	$137.10	$38,582	$502,329	$251,164
12	2033	958,384	932,383	18,648	$29.50	$550,106	12	2033	429,298	3	7,155	286	$137.10	$39,238	$510,868	$255,434
13	2034	974,677	948,234	18,965	$29.50	$559,458	13	2034	436,596	3	7,277	291	$137.10	$39,905	$519,553	$259,777
14	2035	991,246	964,354	19,287	$29.50	$568,969	14	2035	444,018	3	7,400	296	$137.10	$40,583	$528,386	$264,193
15	2036	1,008,097	980,748	19,615	$29.50	$578,641	15	2036	451,566	3	7,526	301	$137.10	$41,273	$537,368	$268,684
16	2037	1,025,235	997,421	19,948	$29.50	$588,478	16	2037	459,243	3	7,654	306	$137.10	$41,975	$546,503	$273,252
17	2038	1,042,664	1,014,377	20,288	$29.50	$598,482	17	2038	467,050	3	7,784	311	$137.10	$42,688	$555,794	$277,897
18	2039	1,060,389	1,031,621	20,632	$29.50	$608,657	18	2039	474,990	3	7,916	317	$137.10	$43,414	$565,242	$282,621
19	2040	1,078,416	1,049,159	20,983	$29.50	$619,004	19	2040	483,065	3	8,051	322	$137.10	$44,152	$574,852	$287,426
20	2041	1,096,749	1,066,994	21,340	$29.50	$629,527	20	2041	491,277	3	8,188	328	$137.10	$44,903	$584,624	$292,312
21	2042	1,115,394	1,085,133	21,703	$29.50	$640,229	21	2042	499,629	3	8,327	333	$137.10	$45,666	$594,563	$297,281
		19,096,723	18,578,635	371,573		10,961,395			8,554,171	57	142,570	5,703		$781,851	$10,179,544	$5,089,772

The results equate to $5.1M of travel time saved if the Project is built and is based on the example route of a combination of rail/ road is used versus a road-only route as seen in the No-Build scenario.

Environmental Sustainability Benefits

Exhibit 26 shows the project is expected to save 14,000 metric tons of greenhouse gas emissions over 20 years after the project completion. The analysis showed reduced emissions equating to $0.2 million in CO_2 and other emissions due to the reduction in fuel usage by using a combination of rail/truck transportation vs. trucking only.

Exhibit 25: Assumptions Used to Calculate Environmental Sustainability Benefits

Assumption	Unit	Truck	Rail	Source
Volatile Organic Compounds (VOCs)	grams per	0.08	0.0128	TTI: A Modal Comparison of Domestic Freight Transportation Effects on the General Public. January 2017
Nitrogen Oxides (Nox)	grams per	0.94	0.283	
Particulate Matter (PM)	grams per	0.05	0.0075	
Carbon dioxide (CO_2)	grams/ gal	10,180	10,180	Reference in Table A-7: Social Cost of Carbon, January 2020

Exhibit 26: Emissions Savings

Total Value in Dollars of Emissions								Total Emissions Savings					
	CO2		NOX emissions	PM10 emissions	VOC emissions	SOX emissions	Total Emissions	Factor	CO2 emissions	NOX emissions	PM2.5 emissions	VOC emissions	SOX emissions
	cost per MT							Source	USDOT	TTI 2018			
	MT		ST	ST	ST	ST		Units	MT	ST	ST	ST	ST
	$/ MT	$	$ 8,600	$ 387,300	$ 2,100	$ 50,100		ST					
2023	$ 1	$592	$6,034	$16,664	$135	$0	$23,425	2023	592	0.7016	0.0430	0.0642	
2024	$ 1	$602	$6,136	$16,948	$137	$0	$23,824	2024	602	0.7135	0.0438	0.0653	
2025	$ 1	$613	$6,241	$17,236	$139	$0	$24,229	2025	613	0.7257	0.0445	0.0664	
2026	$ 1	$623	$6,347	$17,529	$142	$0	$24,640	2026	623	0.7380	0.0453	0.0675	
2027	$ 1	$634	$6,455	$17,827	$144	$0	$25,059	2027	634	0.7506	0.0460	0.0687	
2028	$ 1	$644	$6,565	$18,130	$147	$0	$25,485	2028	644	0.7633	0.0468	0.0699	
2029	$ 1	$655	$6,676	$18,438	$149	$0	$25,919	2029	655	0.7763	0.0476	0.0710	
2030	$ 1	$666	$6,790	$18,751	$152	$0	$26,359	2030	666	0.7895	0.0484	0.0723	
2031	$ 1	$678	$6,905	$19,070	$154	$0	$26,807	2031	678	0.8029	0.0492	0.0735	
2032	$ 1	$689	$7,022	$19,394	$157	$0	$27,263	2032	689	0.8166	0.0501	0.0747	
2033	$ 1	$701	$7,142	$19,724	$160	$0	$27,726	2033	701	0.8304	0.0509	0.0760	
2034	$ 1	$713	$7,263	$20,059	$162	$0	$28,198	2034	713	0.8446	0.0518	0.0773	
2035	$ 2	$1,450	$7,387	$20,400	$165	$0	$29,402	2035	725	0.8589	0.0527	0.0786	
2036	$ 2	$1,475	$7,512	$20,747	$168	$0	$29,902	2036	737	0.8735	0.0536	0.0799	
2037	$ 2	$1,500	$7,902	$21,823	$177	$0	$31,402	2037	750	0.9188	0.0563	0.0841	
2038	$ 2	$1,525	$8,036	$22,194	$180	$0	$31,936	2038	763	0.9345	0.0573	0.0855	
2039	$ 2	$1,551	$8,173	$22,572	$183	$0	$32,479	2039	776	0.9503	0.0583	0.0870	
2040	$ 2	$1,578	$8,312	$22,955	$186	$0	$33,031	2040	789	0.9665	0.0593	0.0885	
2041	$ 2	$1,605	$9,488	$22,729	$197	$0	$34,018	2041	802	1.1033	0.0587	0.0939	
2042	$ 2	$1,632	$9,649	$23,115	$201	$0	$34,597	2042	816	1.1220	0.0597	0.0955	
		$20,127	$146,035	$396,305	$3,234	$0	$565,701		13,969	16.98	1.02	1.54	0.00

Qualitative Benefits

This analysis does not monetize the additional economic activity that will be generated when the additional building sites get rail access and become developed after the completion of this project.

There are also other factors that will benefit the community which are not easy to assign an economic quantification. Such unquantified factors include the general vitality of Butte-Silver Bow economy due to improved rail access and the increased attractiveness of Montana Connections' industrial parcels. The main benefits are summarized below. These factors are expected to be positive benefits to the community.

Quality of Life: Although fuel savings has been quantified as an improvement to the Community and Region's Quality of Life, this is not the only livability improvement that will be achieved with the completion of this project. As mentioned above, removing truck miles off the nation's road network will also save lives as well as reduce severe accidents related to vehicles miles traveled on the road system.

An additional benefit not fully quantified from this improvement is the enhanced livability of Butte and neighboring communities, which are expected to benefit from the expansion of rail service at the Montana Connections. 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 also support the existing community through land renewal and redevelopment to increase community revitalization and improve the efficiency of public works investments. These investments will increase job opportunities in the community as Montana Connections' parcels are built out with new industrial activities.

Sources

All sources for all the information used in the BCA are referenced under each benefit and are noted accordingly in the BCA excel spreadsheet on the specific worksheet where the calculation occurs.

The BCA excel spreadsheet can be found on the project website at:
https://www.co.silverbow.mt.us/2146/Build-Grants-2020

Exhibit 27: Page Size Map of Exhibit 3