Juneau Access Improvements Project
Final Supplemental
Environmental Impact Statement

Revised Appendix FF
User Benefit, Life-Cycle Cost, and
Total Project Life Cost Analyses

Prepared for:

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Executive Summary

The purpose of this study is to compare the economic costs and benefits of eight Juneau Access Improvements (JAI) Project alternatives. This study is part of the *JAI Final Supplemental Environmental Impact Statement* (*FSEIS*). It updates the User Benefit Analysis contained in Appendix E of the *January 2006 JAI Final Environmental Impact Statement* (*FEIS*) and the User Benefit, Life-Cycle Cost, and Total Project Life Cost Analyses contained in Appendix FF of the *JAI 2014 Draft Supplemental Environmental Impact Statement* (*DSEIS*).

The eight JAI alternatives are:

- Alternative 1 – No Action
- Alternative 1B – Enhanced Service with Existing Alaska Marine Highway System (AMHS) Assets
- Alternative 2B – East Lynn Canal Highway to Katzehin with Shuttles to Haines and Skagway
- Alternative 3 – West Lynn Canal Highway
- Alternative 4A – Fast Vehicle Ferry Shuttle Service from Auke Bay
- Alternative 4B – Fast Vehicle Ferry Shuttle Service from Berners Bay
- Alternative 4C – Conventional Monohull Shuttle Service from Auke Bay
- Alternative 4D – Conventional Monohull Shuttle Service from Berners Bay

Scope of Study

In this *FSEIS*, JAI alternatives are evaluated by looking at:

- economic efficiency: user benefit analysis; and
- cost-effectiveness:

- life-cycle costs (LCC); and
- total project life costs.

The user benefit analysis generally follows the methodology set out by the American Association of State Highway and Transportation Officials (AASHTO) for evaluation of highway transportation projects.[1] However, the AASHTO methodology has shortcomings when it comes to evaluating projects that involve modes of travel other than roads and highways, or that would cause large changes in traffic or costs of travel. The JAI project has all of these characteristics.

The user benefit analysis in this report modifies the AASHTO methodology in two ways to address its shortcomings:

1. modal adjustments to users' costs of travel that reflect the different burdens travel costs place on ferry users versus highway users, for a given amount of time or expense; and

2. a step-wise calculation of user benefits that minimizes the AASHTO methodology's inherent overestimation of user benefits, when there are large changes in traffic or user costs.

The costs and benefits of all evaluation measures are in 2016 dollars. All measures consider the costs of building and operating an alternative over State of Alaska fiscal years (FY) 2019–54.

Only user benefit analysis considers benefits to travelers. Total project life costs on a per vehicle and per user basis are included as a partial measure of efficiency.

Life-cycle costs are presented in terms of total funds. The user benefit and total project life costs analyses provide benefits or costs in terms of:

- total funds (State and federal); or, alternatively,
- State funds only.

Cost-effectiveness measures provide both:

- total costs; and
- net costs (total costs net of government revenues—namely, State and federal highway taxes and AMHS revenues).

[1] *User and Non-User Benefit Analysis for Highways*, American Association of State Highway and Transportation Officials, September 2010.

User benefit analysis deals only in net costs. Otherwise, costs paid by users, such as AMHS fares, would be double-counted.

User benefit and LCC measures are stated in present values as of July 1, 2018. Their dollar amounts of future years' benefits or costs are discounted by the time value of money. The present values represent an amount that, invested on July 1, 2018 at a specified rate of interest or return, would grow to equal the amount of the future benefits or costs, in the year they occur.

Total project life costs are unique in this report in three respects:

- they are not discounted for the time value of money;
- they are presented both with and without the residual values of capital improvements deducted from costs; and
- without residual values deducted, total project life costs are equal to the capital and operating constant dollar appropriations that would be required for the JAI Project during FY 2019–54.

Residual values are the value of capital improvements remaining at the end of the analysis in FY 2054 or when an AMHS vessel is removed from service in Lynn Canal.

Residual values are deducted from total project life costs stated on a per vehicle or per user basis, because the vehicles or users in question are those in Lynn Canal during FY 2019–54.

Risk analyses are provided by:

- identifying the year user benefit net present value (NPV) reaches breakeven;
- gauging the variation in NPV over time; and
- evaluation of three sensitivity cases, in addition to the base case.

The base case for the analyses in this report includes:

1. modal adjustments to travelers' costs, based on the relative weights, by mode (highway or ferry), of each cost in the model used to forecast traffic;
2. capital costs as estimated by the Alaska Department of Transportation & Public Facilities (DOT&PF) for highways and

ferry terminals, and by Coastwise Corporation for vessel construction; and

3. valuation of travelers' time for non-work purposes at 50 percent of average wages.

The three sensitivity cases alter, in turn, each of the above base case conditions by:

1. use of average user costs, without the modal adjustments;
2. positing 25 percent construction cost overruns; and
3. valuing travelers' non-work time at 70 percent of wages.

The base case and sensitivity cases share in common the following assumptions:

- essentially no change in traffic levels over the course of the study;
- real discount rates (net of inflation) of:
  - 7.0 percent for user benefit net present values;
  - 1.5 percent for life-cycle cost analysis of capital costs;
  - 4.7 percent for life-cycle cost analysis of operating costs; and
  - 0.0 percent for total project life costs.

User benefit analysis seeks to answer the question—Do travelers' costs for an "action" alternative decrease more than the State's additional costs to build and operate the alternative, over and above what it would spend anyway (on Alternative 1, the "no action" alternative)?

User benefit analysis tries to evaluate what alternative offers the greatest net benefit to society, either to the U.S. as a whole, or to the State of Alaska, taking account of the opportunities foregone by spending money on the project. Measurement of the opportunity cost is accomplished by discounting to present value.

The user costs included in calculating user benefits are the costs of:

- travelers' time;
- AMHS fares;
- vehicle operating, maintenance, and ownership costs; and
- vehicle accident costs.

User costs for Juneau – Haines and Skagway travel are figured to or from Auke Bay as the starting or ending point. This is the case whether arrival at, or departure from, Auke Bay is by highway or marine mode.

Cost-effectiveness measures attempt to answer the question—Which alternative will cost the least to build and operate through FY 2054?

In a life-cycle cost analysis, discounting to present value can cause alternatives with low construction costs, but high future maintenance and operating costs, to be the least costly alternative. However, if constraints on budgets or fund sources are likely to become more severe down the road, operation of such an alternative may not be sustainable in the future.

Total project life costs attempt to answer the question—Which alternative will impose the least fiscal burden over the project's life? The measure's undiscounted, non-incremental costs—equivalent to the real dollar capital and operating appropriations required over the project study period—may be more readily and intuitively judged against expected future fiscal conditions.

For all alternatives, a construction period of six years was assumed to begin July 1, 2018 (FY 2019) and be completed by the end of FY 2024. A 30-year post-construction operation period was evaluated, resulting in a 36-year analysis period (FY 2019–54) for each alternative.

Findings

Table 1 is a summary of the evaluation results for all the alternatives.

The significant findings from this study are as follows:

1. None of the "action" alternatives have user benefits greater than costs, considering all resources (State and federal) required to build and operate the project. This is true under all sensitivity cases, as well as the base case.

    a. Alternative 4D has the smallest loss in net present value (NPV) in all cases—$25.9 million in the base case.

    b. Alternative 4C has the second smallest loss.

    c. over the course of the study period, only Alternatives 2B, 3, and Alternative 4D—show increasing NPV over time,

albeit ever so slightly, in terms of total funds. All other alternatives' NPV lose ground over time. This can be seen in Chart V (the upticks in NPV in 2054 represent residual values). It appears unlikely that any of the alternatives would reach NPV breakeven in the foreseeable future, with the outside possibility of Alternative 4D.

2. In the base case and all sensitivity cases, Alternatives 2B, 3, and 4D produce benefits greater than the State resources required for the project—$82.0 million, $42.7 million, and $43.8 million, respectively, in the base case. In the 2014 *DSEIS*, only Alternative 4D showed a positive State funds NPV. Alternative 2B has the greatest NPV in all cases. Alternative 4D is unique in both producing greater benefits, and saving State dollars, compared to "no action", as shown in Table 17. Alternative 4B shows a positive NPV in two sensitivity cases.

3. The positive State funds NPV's for Alternatives 2B and 3 and the increase in such NPV for Alternative 4D stems largely from a reduction in the State "non-match" general funds (GF) to be contributed to the project and their use, in this study, for matching federal funds, to the extent required.

   a. In terms of total project life costs (i.e., undiscounted dollars), "non-match" general funds for Alternatives 2B and 3 each declined from $113 million to $21.3 million, and their total State GF capital costs declined from $174.3 million and $170.6 million to $80.9 million and $74.7 million, respectively.

   b. The reduction in State-funded capital costs for Alternative 4D was less significant: a $36.7 million reduction in "non-match" GF and a $38.9 million reduction in total GF capital costs.

   c. This study's $21.3 million "non-match" GF floor amount for acquisition costs only affects the amount of State funds devoted to capital costs for Alternatives 4C and 4D—the other alternatives' State GF is at the amount required for federal match. State-funded capital costs for Alternatives 4C and 4D are $14.2 and $11.3 million in excess of matching requirements, respectively.

TABLE 1

Evaluation Summary
Base Case
(2016 $)

Alternative	1	1B	2B	3	4A	4B	4C	4D
Net Present Value of Benefits & Costs ($ Millions)								
Total Funds	0	(134.7)	(350.8)	(330.6)	(202.5)	(211.4)	(75.0)	(25.9)
Rank	1	4	8	7	5	6	3	2
State Funds	0	(54.0)	82.0	42.7	(55.3)	(4.7)	(30.4)	43.8
Rank	4	7	1	3	8	5	6	2
Life-Cycle Costs								
Life-Cycle Costs ($ Millions)								
Total Funds								
Total Costs	441.2	703.9	867.0	836.5	930.8	1,022.8	560.9	603.8
Rank	1	4	6	5	7	8	2	3
Net Costs	298.6	507.0	691.6	629.7	710.3	749.0	397.7	350.2
Rank	1	4	6	5	7	8	3	2
Total Project Life Costs								
Total Project Life Costs ($ Millions)								
Total Funds								
Total Costs	895.4	1,372.2	1,636.6	1,601.1	1,845.5	1,963.7	1,130.9	1,216.6
Rank	1	4	6	5	7	8	2	3
Net Costs	603.2	968.4	1,260.0	1,148.1	1,364.0	1,352.3	788.5	654.6
Rank	1	4	6	5	8	7	3	2
State Funds								
Total Costs	680.3	995.2	821.2	848.9	1,189.8	1,187.3	837.5	885.0
Rank	1	6	2	4	8	7	3	5
Net Costs	388.1	591.4	450.3	400.3	708.3	576.4	495.1	323.6
Rank	2	7	4	3	8	6	5	1
Total Project Life Costs less Residual Values per Vehicle ($)								
Total Funds								
Total Costs	580	594	123	149	789	555	637	358
Rank	5	6	1	2	8	4	7	3
Net Costs	365	396	83	91	555	358	415	166
Rank	5	6	1	2	8	4	7	3
State Funds								
Total Costs	494	480	83	104	569	377	535	298
Rank	6	5	1	2	8	4	7	3
Net Costs	279	283	43	46	335	179	313	105
Rank	5	6	1	2	8	4	7	3
Traffic, User Costs per Trip (Juneau), and User Benefits								
Vehicles (FY 2019–54) (Millions)	1.4	2.0	9.4	7.8	2.1	3.1	1.5	2.9
Rank	8	6	1	2	5	3	7	4
Modal User Costs ($)	149	134	98	109	122	114	138	123
Rank	8	6	1	2	4	3	7	5
Benefits (FY 2019–54) ($ Millions)	0	24.4	128.0	70.3	38.2	53.8	10.2	35.5
Rank	8	6	1	2	4	3	7	5
Breakeven								
Total Funds	—	—	—	—	—	—	—	—
State Funds	—	—	2031	2033	—	—	—	2029

Notes:

1.Total project life cost less residual values rankings on a per user basis are similar to the rankings on a per vehicle basis See Tables 24 and 26 for per user costs and rankings.

4. Only Alternatives 2B, 3, 4B, and 4Dgain ground in terms of State-funded NPV over time. This can be seen in Charts VI and IX–XI.

    a. Alternatives 2B, 3, and 4D consistently have upward sloping NPV curves during FY 2025–54 (following the construction period), in both the base case and all sensitivity cases.

    b. Alternative 4B gains ground slightly in the average user costs and non-work time at 70 percent of wages sensitivity cases. In the base case and cost overrun case, Alternative 4B is flat.

    c. All the other alternatives slope downward. Their operating costs and recurring capital expenditures continue to outrun user benefits throughout the study period.

5. Alternative 4D is unique among "action" alternatives in costing less, in total project life costs, than the "no action" alternative (Alternative 1), in terms of State funds, net of State revenues, for the base case and all sensitivity cases. No other "action" alternative's total project life costs are less than Alternative 1, in either the base case or any sensitivity case. Net State total project life costs of Alternative 4D are $37.8 million less than doing nothing in the base case. Alternative 4D increases capital and operating costs compared to Alternative 1, but Alternative 4D's State revenues increase more than the increase in costs. Alternative 4D more than doubles Alternative 1's number of users.

6. Alternative 1 costs less than any "action" alternative, under any LCC or total project life costs measure, except for Alternative 4D, measured on the net State total project life cost yardstick.

7. Looking at operating costs net of State revenues, Alternatives 1, 2B, 3, and 4D's net costs are, respectively, $366.7 million, $369.3 million, $325.6 million, and $278.2 million over FY 2019–54 in 2016 dollars. These are the four alternatives with the smallest undiscounted net operating costs. They are also the only alternatives that do not have a negative NPV in terms of State funds.

8. Alternatives 4A and 4B, are the most costly alternatives. Alternatives 4A and Alternative 4B have total project life costs of $1.8 billion to $2.0 billion, in round terms, and net total project life costs of $1.4 billion. Their State funds costs are on the order of $1.2 billion in total, and $0.6 to 0.7 billion, net of revenues.

9. Alternatives 2B and 3 are the next most costly projects on a total funds basis. Alternatives 2B and 3 have total project life costs of $1.6 billion, and about $1.2 billion, net of revenues. On the basis of State funds only, the highway options cost around $0.8 billion in total and $0.4 billion, net of revenues, making Alternatives 2B and 3 the fourth and third cheapest "action" alternatives, respectively, in terms of net State costs.

10. Looking at total project life costs on a per vehicle basis, Alternative 2B is uniformly the lowest cost alternative, reflecting the more than triple number of Alternative 2B vehicles, compared to any marine alternative. Alternatives 3 and 4D have, respectively, the second and third lowest costs per vehicle.

11. Looking at the impacts only on travelers, Alternative 2B also ranks the highest, both in terms of lowest cost to users and greatest total user benefits. User benefits reflect the number of travelers, as well as the travel cost to each user.

12. Alternative 3 is a weaker road alternative than Alternative 2B in efficiency measures—NPV and total project life costs per vehicle—reflecting its 11 percent higher user costs and resulting 17 percent lower number of vehicles. Alternative 3 has a cost structure on the same order of magnitude as Alternative 2B, with lower capital costs, higher operating costs, higher AMHS revenues, and a lower net cost overall.

13. Operating costs are on the order of 60 percent of total costs, in total funds, for FVF's, 70 percent for other marine alternatives, and 50 percent for highway alternatives. State-funded operating costs, net of revenues, are at 82.0 percent, 81.3 percent, and 86.0 percent of State-funded net costs for Alternatives 2B, 3, and 4D, respectively.

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Purpose and Scope of Study

The purpose of this study is to compare the economic costs and benefits of eight Juneau Access Improvements (JAI) Project alternatives. This study is part of the *JAI Final Supplemental Environmental Impact Statement* (*FSEIS*). It updates the User Benefit Analysis contained in Appendix E of the *January 2006 JAI Final Environmental Impact Statement* (*FEIS*) and the User Benefit, Life-Cycle Cost, and Total Project Life Cost Analyses contained in Appendix FF of the *JAI 2014 Draft Supplemental Environmental Impact Statement* (*DSEIS*).

The eight JAI alternatives are:

- Alternative 1 – No Action
- Alternative 1B – Enhanced Service with Existing AMHS Assets
- Alternative 2B – East Lynn Canal Highway to Katzehin with Shuttles to Haines and Skagway
- Alternative 3 – West Lynn Canal Highway
- Alternative 4A – Fast Vehicle Ferry Shuttle Service from Auke Bay
- Alternative 4B – Fast Vehicle Ferry Shuttle Service from Berners Bay
- Alternative 4C – Conventional Monohull Shuttle Service from Auke Bay
- Alternative 4D – Conventional Monohull Shuttle Service from Berners Bay

The eight alternatives represent mutually exclusive projects. In other words, they are all ways of addressing the same transportation need. If

any one of them is chosen, the other alternatives will not be built or operated.

Thus, the alternative, if any, with the greatest net benefits (benefits minus costs) is the most economically worthwhile project. In terms of the economic measure used in this report, the most worthwhile alternative is the one with the greatest net present value (NPV).

The alternative with the greatest economic value may not be the project with the least costs. If budgets are constrained, either now or expected to be in the future, the costs, either in State funds or total funds, may be an important consideration in project selection.

Benefits and costs included in this analysis are limited to those that are relatively certain, can be quantified and valued in dollars, and for which there is an accepted methodology of calculation.

Benefits are limited to user benefits. User benefits are the reduction in travel costs for persons using a JAI alternative, compared to the "no action" alternative—Alternative 1.

Users' travel costs are the sum of the costs of travelers' time, passenger and vehicle ferry fares, vehicle operating, maintenance, and ownership costs, and vehicle accident costs.

Discretionary user costs incurred during travel—ferry stateroom accommodations and food and beverage expenditures—are not included in users' costs. These costs are not direct costs of travel. Only to the extent provided by AMHS are the costs for such services known. Comparable costs for highway travel or ferry passengers providing their own food and beverage are not known. To the extent these services are provided by AMHS, the State revenue from such sales is included in project revenues, so that net project costs reflect transportation costs as much as possible.

User costs for Juneau – Haines and Skagway travel are figured to or from Auke Bay as the starting or ending point. This is the case whether arrival at, or departure from, Auke Bay is by highway or marine mode.

Economic development benefits are not included in this study. They are addressed in the socioeconomic report.

Project costs are limited to the construction, operating, and maintenance costs of each alternative. Alternatives' impacts on AMHS capital or operating costs outside northern Lynn Canal are not part of this study.[2]

External costs, including public safety and emergency response-related service costs, pollution and global warming costs, and loss of wildlife or wilderness values are not included in this analysis. They are addressed in the socioeconomic and other *FSEIS* technical reports.

This analysis provides measuring sticks to judge the most economically valuable alternative and the least fiscally burdensome alternative. But, it does not eliminate the need to consider the other economic, socioeconomic, developmental, and environmental impacts that are outside the scope of the analysis. The benefit/cost analysis does not dictate alternative selection.

In this *FSEIS*, JAI alternatives are evaluated by looking at:

- economic efficiency: user benefit analysis; and
- cost-effectiveness:
    - life-cycle costs (LCC); and
    - total project life costs.

The user benefit analysis generally follows the methodology set out by the American Association of State Highway and Transportation Officials (AASHTO) for evaluation of highway transportation projects.[3] However, the AASHTO methodology has shortcomings when it comes to evaluating projects that involve modes of travel other than roads and highways, or that would cause large changes in traffic or costs of travel. The JAI project has all of these characteristics.

The user benefit analysis in this report modifies the AASHTO methodology in two ways to address its shortcomings:

1. modal adjustments to users' costs of travel that reflect the different burdens travel costs place on ferry users versus highway users, for a given amount of time or expense; and

[2] The crediting of residual values of marine vessels against capital costs could be considered an exception to this statement. See the report section entitled "Residual Values".

[3] *User and Non-User Benefit Analysis for Highways*, American Association of State Highway and Transportation Officials, September 2010.

2. a step-wise calculation of user benefits that minimizes the AASHTO methodology's inherent overestimation of user benefits, when there are large changes in traffic or user costs.

The costs and benefits of all evaluation measures are in 2016 dollars. All measures consider the costs of building and operating an alternative over State of Alaska fiscal years (FY) 2019–54.

Only user benefit analysis considers benefits to travelers. Total project life costs on a per vehicle and per user basis are included as a partial measure of efficiency.

The user benefit and total project life cost analyses provide benefits or costs in terms of:

- total funds (State and federal); or, alternatively,
- State funds only.

Life-cycle costs are presented in terms of total funds only.

Cost-effectiveness measures provide both:

- total costs; and
- net costs (total costs net of government revenues—namely, State and federal highway taxes and AMHS revenues).

User benefit analysis deals only in net costs. Otherwise, costs paid by users, such as AMHS fares, would be double-counted.

User benefit and LCC measures are stated in present values as of July 1, 2018. Their dollar amounts of future years' benefits or costs are discounted by the time value of money. The present values represent an amount that, invested on July 1, 2018 at a specified rate of interest or return, would grow to equal the amount of the future benefits or costs, in the year they occur.

Total project life costs are unique in this report in three respects:

- they are not discounted for the time value of money;

- they are presented both with and without the residual values of capital improvements deducted from costs; and

- without residual values deducted, total project life costs are equal to the capital and operating constant dollar appropriations that would be required for the JAI Project during FY 2019–54.

Residual values are the value of capital improvements remaining at the end of the analysis in FY 2054 or when an AMHS vessel is removed from service in Lynn Canal.

Residual values are deducted from total project life costs stated on a per vehicle or per user basis, because the vehicles or users in question are those in Lynn Canal during FY 2019–54.

Risk analyses are provided by:

- identifying the year user benefit net present value (NPV) reaches breakeven;
- gauging the variation in NPV over time; and
- evaluation of three sensitivity cases, in addition to the base case.

The base case for the analyses in this report includes:

1. modal adjustments to travelers' costs, based on the relative weights, by mode (highway or AMHS), of each cost in the model used to forecast traffic;
2. capital costs as estimated by the Alaska Department of Transportation & Public Facilities (DOT&PF) for highways and ferry terminals, and by Coastwise Corporation for vessel construction; and
3. valuation of travelers' time for non-work purposes at 50 percent of average wages.

The three sensitivity cases alter, in turn, each of the above base case conditions by:

1. use of average user costs, without the modal adjustments;
2. positing 25 percent construction cost overruns; and
3. valuing travelers' non-work time at 70 percent of wages.

The base case and sensitivity cases share the following assumptions:

- essentially no change in traffic levels over the course of the study;
- real discount rates (net of inflation) of:
    - 7.0 percent for user benefit net present values;
    - 1.5 percent for life-cycle cost analysis of capital costs;

- 4.7 percent for life-cycle cost analysis of operating costs; and
- 0.0 percent for total project life costs.

User benefit analysis seeks to answer the question—Do travelers' costs for an "action" alternative decrease more than the State's additional costs to build and operate the alternative, over and above what it would spend anyway (on Alternative 1, the "no action" alternative)?[4]

User benefit analysis tries to evaluate what alternative offers the greatest net benefit to society, either to the U.S. as a whole, or to the State of Alaska, taking account of the opportunities foregone by spending money on the project. Measurement of the opportunity cost is accomplished by discounting to present value.

Cost-effectiveness measures attempt to answer the question—Which alternative will cost the least to build and operate through FY 2054?

In a life-cycle cost analysis, discounting to present value can cause alternatives with low construction costs but high future maintenance and operating costs, to be the least costly alternative. However, if constraints on budgets or fund sources are likely to become more severe down the road, operation of such an alternative may not be sustainable in the future.

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[4] It should be noted that user benefit analysis, unlike the cost-effectiveness measures, is incremental:

- user benefits are measured as the difference (presumably reduction) between an alternative's users costs and what user costs would be under the no action alternative—Alternative 1;

- the same is true of project costs in user benefit analysis: they are the additional capital and operating costs that would be required for an alternative, compared to what would be spent anyway if nothing is done (Alternative 1).

Because of the incremental analysis, as well as present value discounting, project costs shown for user benefit analysis will not be the same as the project costs shown for the total project life cost measures.

Similarly, because of the incremental analysis, as well as use of different discount rates, project costs shown for user benefit analysis will not be the same as the costs shown for LCC analysis.

Total project life costs attempt to answer the question—Which alternative will impose the least fiscal burden over the project's life? The measure's undiscounted, non-incremental costs—equivalent to the real dollar capital and operating appropriations required over the project study period—may be more readily and intuitively compared to current or expected future levels of appropriations or revenues.

For all alternatives, a construction period of six years was assumed to begin July 1, 2018 (FY 2019) and be completed by the end of FY 2024. A 30-year post-construction operation period was evaluated, resulting in a 36-year analysis period (FY 2019–54) for each alternative.

Alternatives

Alternative 1 – No Action

This alternative is based on the most likely AMHS operations in the absence of any capital improvements specific to the JAI Project. AMHS would continue to be the National Highway System (NHS) route from Juneau to Haines and Skagway.

Alternative 1 includes:

1. a continuation of mainline ferry service in Lynn Canal;
2. two Day Boat Alaska Class Ferries (ACF);
3. improved vehicle and passenger staging areas at the Auke Bay and Haines ferry terminals to optimize traffic flow on and off the Day Boat ACF's; and
4. expansion of the Haines Ferry Terminal to include two new bow berths to accommodate the Day Boat ACF's.

No new roads or ferry terminals would be built.

During the summer,

- one Day Boat ACF would make one round-trip between Auke Bay and Haines six days per week; and
- a second Day Boat ACF would make 2 round-trips per day between Haines and Skagway six days per week.

The Day Boat ACF's schedules are curtailed on the seventh day because the mainliner is on a similar schedule.

In the winter,

- one Day Boat ACF would make one round-trip between Auke Bay and Haines three days per week; and
- a second Day Boat ACF would make 2 roundtrips per day between Haines and Skagway on the same three days.

Mainline service would include:

- two round-trips per week in the summer; and
- one round-trip per week in the winter,

with Auke Bay – Haines – Skagway – Haines – Auke Bay routing.

The *M/V Malaspina* would no longer operate as a summer day boat in Lynn Canal after FY 2018.

Alternative 1B – Enhanced Service with Existing AMHS Assets

Alternative 1B includes all of the components of Alternative 1, but enhances service using existing AMHS assets, without major initial capital expenditures. The additional components of Alternative 1B are:

1. the *M/V Malaspina* remains in service as a Lynn Canal summer shuttle, to provide additional capacity in Lynn Canal;
2. the Day Boat ACF making a round-trip between Auke Bay and Haines would operate seven, instead of six, days per week; and
3. a 20 percent reduction in fares for trips in Lynn Canal.

During the summer, the *M/V Malaspina* would make one round-trip per day five days per week on a Skagway – Auke Bay – Skagway route and one round-trip per day two days per week on a Skagway – Haines – Auke Bay – Skagway route. The addition of the *M/V Malaspina* and the increase in Day Boat ACF service in Lynn Canal increases the capacity and frequency provided. Otherwise, Alternative 1B's scheduled service remains the same as Alternative 1.

Alternative 2B – East Lynn Canal Highway to Katzehin with Shuttles to Haines and Skagway

Alternative 2B would provide ferry service to Haines and Skagway from a new ferry terminal two miles north of the Katzehin River. A new East Lynn Canal Highway would run around Berners Bay and connect the terminal to Echo Cove.

This alternative would construct:

1. 50.8 miles of road, including 47.9 miles of new highway and widening of 2.9 miles of the existing Glacier Highway;
2. the Katzehin Ferry Terminal;
3. a new end berth at the Skagway Ferry Terminal; and
4. a new conventional monohull ferry to operate between Haines and Skagway.

Mainline ferry service would end at Auke Bay after FY 2024.

This alternative assumes the Alternative 1 improvements will have been made independent of the JAI Project before Alternative 2B comes on-line. This includes termination of the *M/V Malaspina* summer day boat service after FY 2018.

During the summer months,

- one Day Boat ACF would make 8 round-trips per day between Haines and Katzehin;
- a second Day Boat ACF would make 6 round-trips per day between Skagway and Katzehin; and
- the Haines – Skagway shuttle ferry would make 2 round-trips per day.

During the winter,

- one Day Boat ACF would make 6 round-trips per day between Haines and Katzehin;
- a second Day Boat ACF would make 4 round-trips per day between Skagway and Katzehin; and
- the Haines – Skagway shuttle would not operate; travelers going between Haines and Skagway would travel to Katzehin and transfer ferries.

Alternative 3 – West Lynn Canal Highway

Alternative 3 would construct:

1. 5.2 miles of road from Echo Cove to Sawmill Cove in Berners bay (2.3 miles of new highway and widening of 2.9 miles of existing Glacier Highway);
2. new ferry terminals at Sawmill Cove in Berners Bay and at William Henry Bay on the west shore of Lynn Canal;
3. a new end berth at the Skagway Ferry Terminal;
4. a new 38.9-mile highway from the William Henry Bay Ferry Terminal to Haines with a bridge across the Chilkat River/Inlet connecting to Mud Bay Road; and
5. a new conventional monohull ferry that would operate between Haines and Skagway.

Mainline ferry service ends at Auke Bay after FY 2024.

This alternative assumes the Alternative 1 improvements will have been made independent of the JAI Project before Alternative 3 comes on-line. This includes termination of the *M/V Malaspina* summer day boat service after FY 2018.

During the summer months,

- two Day Boat ACF's would each make 6 round-trips per day between Sawmill Cove and William Henry Bay (a total of 12 trips each direction); and
- the Haines – Skagway shuttle ferry would make 6 round-trips per day.

During the winter,

- one Day Boat ACF would make 4 round-trips per day between Sawmill Cove and William Henry Bay; and
- the Haines – Skagway shuttle would make 4 round-trips per day.

Marine Alternatives 4A through 4D

Marine Alternatives 4A through 4D would generally provide increased ferry service in Lynn Canal, compared to alternatives 1 and 1B. There would be daily direct ferry service between all Lynn Canal communities in the summer, though not in the winter.

Table 2 compares the weekly service schedules between Juneau and Haines and Skagway.

TABLE 2

AMHS Weekly Round-Trips Connecting with Juneau[1]

	Haines		Skagway	
Alternative	Summer	Winter	Summer	Winter
1 - No Action	8.0	4.0	8.0	4.0
1B - Enhanced Service[2]	10.0	4.0	16.0	4.0
2B - East Lynn Highway	56.0	42.0	42.0	28.0
3 - West Lynn Highway[3]	84.0	28.0	35.0	21.0
4A - Fast Ferry Auke Bay	16.0	8.0	16.0	8.0
4B - Fast Ferry Berners Bay	16.0	8.0	16.0	8.0
4C - Monohull Auke Bay	9.0	4.5	9.0	4.5
4D - Monohull Berners Bay	16.0	4.5	16.0	4.5

Notes:

1. Includes mainline service.
2. *M/V Malaspina*, homeported in Skagway, would provide one round-trip per day in the summer, 5 days a week, direct between Juneau and Skagway. On two days a week in summer, the Malaspina would stop in Haines on the southbound leg of a round-trip to Juneau.
3. Juneau to Skagway travelers will be unable to make the first and last legs of 6 summer round-trips or 4 winter round-trips per day on the Haines - Skagway shuttle. The same result holds for Skagway to Juneau travelers in regards to the William Henry Bay to Sawmill Cove shuttles. The result is 5.0 possible summer round-trips and 3 winter round-trips per day for Juneau - Skagway travel.

Marine alternatives 4A through 4D each include a new conventional monohull shuttle that would make:

- 2 round-trips per day between Haines and Skagway 6 days a week in the summer; and
- three round-trips per week between Haines and Skagway in the winter.

Marine Alternatives 4A through 4D would continue the mainline ferry service in Lynn Canal provided under Alternatives 1 and 1B. These marine "build" alternatives assume the Alternative 1 improvements will have been made independent of the JAI Project before the marine "build" alternatives come on-line. The AMHS would continue to be the NHS route from Juneau to Haines and Skagway.

Alternative 4A – Fast Vehicle Ferry Shuttle Service from Auke Bay

Alternative 4A would construct:

1. two new fast vehicle ferries (FVF's);
2. two new stern berths at the Auke Bay Ferry Terminal; and
3. a new conventional monohull ferry that would operate between Haines and Skagway.

No new roads would be built for this alternative.

The *M/V Malaspina* would no longer operate as a summer day boat in Lynn Canal after FY 2018, and the Day Boat ACF's would no longer operate in Lynn Canal after FY 2024. The new monohull ferry would replace the Day Boat ACF on the Haines – Skagway shuttle run in 2025.

Each day in the summer, the FVF's would make:

- 2 round-trips between Auke Bay and Haines; and
- 2 round-trips between Auke Bay and Skagway.

Each day during the winter, one FVF would make:

- one round-trip between Auke Bay and Haines; and
- one round-trip between Auke Bay and Skagway.

Mainline service would be as scheduled under Alternative 1. Haines – Skagway shuttle service would be as described under the preceding "Marine Alternatives 4A through 4D" heading.

Alternative 4B – Fast Vehicle Ferry Shuttle Service from Berners Bay

Alternative 4B would construct:

1. 5.2 miles of road from Echo Cove to Sawmill Cove in Berners Bay (2.3 miles of new highway and widening of 2.9 miles of existing Glacier Highway);
2. a new Sawmill Cove Ferry Terminal;
3. two new FVF's;
4. two new stern berths at the Auke Bay Ferry Terminal; and
5. a new conventional monohull ferry that would operate between Haines and Skagway.

The *M/V Malaspina* would no longer operate as a summer day boat in Lynn Canal after FY 2018, and the Day Boat ACF's would no longer operate in Lynn Canal after FY 2024. The new monohull ferry would replace the Day Boat ACF on the Haines – Skagway shuttle run in 2025.

Each day in the summer[5], the FVF's would make:

- 2 round-trips between Sawmill Cove and Haines; and
- 2 round-trips between Sawmill Cove and Skagway.

Each day during the winter, one FVF would make:

- one round-trip between Auke Bay and Haines; and
- one round-trip between Auke Bay and Skagway.

Mainline service would be as scheduled under Alternative 1, out of Auke Bay. Haines – Skagway shuttle service would be as described under the preceding "Marine Alternatives 4A through 4D" heading.

Alternative 4C – Conventional Monohull Shuttle Service from Auke Bay

Alternative 4C would construct:

1. two new stern berths at the Auke Bay Ferry Terminal;
2. a new end berth at the Skagway Ferry Terminal; and

[5] Due to environmental concerns in Berners Bay during the spring herring and eulachon spawning, as well as humpback whale and Stellar sea lion concentrations, the summer schedule for Alternatives 4B and 4D would start on May 15, rather than May 1.

3. a new conventional monohull ferry that would operate between Haines and Skagway.

No new roads would be built for this alternative.

The *M/V Malaspina* would no longer operate as a summer day boat in Lynn Canal after FY 2018. The new monohull ferry would replace the Day Boat ACF on the Haines – Skagway shuttle run in 2025, allowing the Day Boat ACF to begin Auke Bay – Skagway service.

Each day in the summer, the Day Boat ACF's would make:

- one round-trip between Auke Bay and Haines; and
- one round-trip between Auke Bay and Skagway.

During the winter, one Day Boat ACF would alternate between:

- one round-trip between Auke Bay and Haines one day; and
- one round-trip between Auke Bay and Skagway, the next day.

Mainline service would be as scheduled under Alternative 1. Haines – Skagway shuttle service would be as described under the preceding "Marine Alternatives 4A through 4D" heading.

Alternative 4D – Conventional Monohull Shuttle Service from Berners Bay

Alternative 4D would construct:

1. 5.2 miles of road from Echo Cove to Sawmill Cove in Berners Bay (2.3 miles of new highway and widening of 2.9 miles of existing Glacier Highway);
2. a new Sawmill Cove Ferry Terminal;
3. a new end berth at the Skagway Ferry Terminal;
4. two new stern berths at the Auke Bay Ferry Terminal; and
5. a new conventional monohull ferry that would operate between Haines and Skagway.

The *M/V Malaspina* would no longer operate as a summer day boat in Lynn Canal after FY 2018. The new monohull ferry would replace the Day Boat ACF on the Haines – Skagway shuttle run in 2025, allowing the Day Boat ACF to begin Sawmill Cove – Skagway service.

Each day in the summer[5], the Day Boat ACF's would make:

- 2 round-trips between Sawmill Cove and Haines; and
- 2 round-trips between Sawmill Cove and Skagway.

During the winter, one Day Boat ACF would alternate between:

- one round-trip between Auke Bay and Haines one day; and
- one round-trip between Auke Bay and Skagway, the next day.

Mainline service would be as scheduled under Alternative 1. Haines – Skagway shuttle service would be as described under the preceding "Marine Alternatives 4A through 4D" heading.

State Funds

Reducing State costs is one of the five elements of the "Purpose and Need" for the JAI Project in this *JAI FSEIS*. The State's fiscal duress may make evaluation based on State costs, both operating and capital, one of the more important considerations in alternative selection.

The user benefit analysis and total project life costs are presented in terms of both total funds and State funds.

The difference is that:

- capital costs on a State funds basis do not include federal aid to highways for construction costs; and
- State revenues do not include the federal highway tax on gasoline (estimated at the current rate of 18.4 cents per gallon).

State-funded project costs for each alternative consist of:

1. operating costs (100 percent State-funded);
2. non-match State general funds (GF) for capital costs; and
3. the State's matching GF share of capital costs, net of non-match GF. The State's matching GF is equal to 9.03 percent of capital costs.

State non-match general funds will be used only for acquisition costs. Acquisition costs include highway, AMHS terminal, and AMHS new vessel construction during the initial six-year construction period. Residual values and AMHS vessel refurbishment and replacement costs are not included.

State non-match general funds available for various alternatives are shown in Table 3. No State non-match general funds will be used for Alternatives 1 and 1B, because these alternatives entail no acquisition costs.

Available or anticipated State non-match general funds include:

2007 State appropriation	$33 million
2014 State appropriation	$10 million
2015 State appropriation	$5 million
Total appropriated	$48 million
2017 State re-appropriations to other projects	($26.7 million)
Total available	$21.3 million

We assume all capital costs, including road construction, new vessel construction, vessel refurbishment, and ferry terminal construction are eligible for federal aid reimbursement at 90.97 percent. DOT&PF expects federal aid to come from the National Highway Performance Program (NHPP) (USC Title 23, section 119) and the Ferry Boat Program (USC Title 23, section 147), and existing appropriations from other past federal highway aid programs. [6]

[6] Section 2.5 Funding Considerations, Chapter 2 Project Alternatives, *Juneau Access Improvements Project Draft SEIS*, July 2014.

TABLE 3

State General Fund
Non-Match Capital Expenditures
for Acquisition Costs[1]
(2016 $000)

Fiscal Year	Acquisition Costs[1]	State Non-Match General Funds Expenditures	Cumulative Expenditures	Available	Acquisition Costs[1]	State Non-Match General Funds Expenditures	Cumulative Expenditures	Available
	Alternative 2B				**Alternative 3**			
				21,285				21,285
2019	67,074	2,099	2,099	19,186	55,548	1,984	1,984	19,301
2020	130,748	4,091	6,190	15,095	108,097	3,861	5,845	15,440
2021	130,748	4,091	10,281	11,004	108,097	3,861	9,707	11,578
2022	130,748	4,091	14,372	6,913	108,097	3,861	13,568	7,717
2023	143,156	4,479	18,851	2,434	135,050	4,824	18,392	2,893
2024	77,782	2,434	21,285	0	81,001	2,893	21,285	0
Total	680,255	21,285			595,889	21,285		
	Alternative 4A				**Alternative 4B**			
				21,285				21,285
2019	4,410	374	374	20,911	7,595	508	508	20,777
2020	8,819	748	1,122	20,163	15,189	1,015	1,523	19,762
2021	8,819	748	1,871	19,414	15,189	1,015	2,539	18,746
2022	8,819	748	2,619	18,666	15,189	1,015	3,554	17,731
2023	112,207	9,520	12,139	9,146	136,402	9,119	12,673	8,612
2024	107,798	9,146	21,285	0	128,808	8,612	21,285	0
Total	250,871	21,285			318,373	21,285		
	Alternative 4C				**Alternative 4D**			
				21,285				21,285
2019	5,372	1,456	1,456	19,829	8,558	1,650	1,650	19,635
2020	10,745	2,912	4,368	16,917	17,115	3,300	4,950	16,335
2021	10,745	2,912	7,280	14,005	17,115	3,300	8,250	13,035
2022	10,745	2,912	10,192	11,093	17,115	3,300	11,550	9,735
2023	23,153	6,275	16,466	4,819	29,524	5,692	17,243	4,042
2024	17,781	4,819	21,285	0	20,966	4,042	21,285	0
Total	78,541	21,285			110,393	21,285		

Notes:

1. Acquisition costs include highway, AMHS terminal, and AMHS new vessel construction during the initial six-year construction period. Residual values and AMHS vessel refurbishment and replacement costs are not included.

Economic Efficiency

User benefit analysis measures the increase in benefits and costs of each of the seven "action" alternatives compared to Alternative 1—the "no action" alternative. If the incremental benefits of an "action" alternative exceed its incremental costs, the project is economically worth doing.

Benefits and costs are estimated for each year of a 36-year study period, from FY 2019 to FY 2054. We then compute the present value of each year's benefits and each year's costs. The total of the present values of an alternative's benefits and costs for all years is the net present value (NPV) of an alternative.

Present value is a value at a particular point in time. It is the amount of money that, invested at that point in time at a specified rate of return, would compound to the amount of the benefit or cost in the year in which the benefit or cost occurs. The rate of return is called the discount rate. All present values in this study are as of July 1, 2018.

For example, the present value of total project costs is the amount of money needed on July 1, 2018 to fund all of the project expenditures, both capital and operating, over the entire construction period and project life. It assumes unspent balances are invested at the discount rate.

The discount rate for benefit-cost analysis represents the costs to society as a whole for the funds used. Specifically, the rate is the marginal pre-tax real return on private sector investments. It is the opportunity cost—the income or benefits foregone—of money spent, in this case, on JAI.

Net Present Value (NPV) of User Benefits

Generally, the present value of user benefits minus project costs is the best measure of economic efficiency.

If there are no budgetary constraints, the optimal alternative is the one with the highest net present value. The optimal alternative, in comparison with any other alternative, will provide more incremental benefits than it costs (incrementally).

For example, consider alternatives A, B, and C in Table 4 below. Is B optimal? B provides more benefits than A. But, to get an additional $5 in benefits, you have to spend an additional $10. Thus, B has a lower

net present value than A. One would be better off doing A and putting B's extra $10 for costs in your pocket. Your total worth would then be $85.

Does this make A optimal? Well, C has a higher NPV. And our logical test indicates it must be a better choice than A. C only costs an additional $10, but provides $15 more in return. So clearly, C would be the best choice, if you have or can raise the $60 it would cost.

TABLE 4

Alternative Ranking
Net Present Value vs. Benefit Cost Ratio
Hypothetical Example

Alternative	Costs	Benefits	NPV	B/C
A	50	125	75	2.50
B	60	130	70	2.17
B-A	10	5	(5)	
C	60	140	80	2.33
C-A	10	15	5	

Benefit/Cost (B/C) Ratios

The ratio of benefits to cost (both measured incrementally from the no action alternative) provides a measure of the bang for the buck. As such, it may be of interest. But, it is a fallible guide to project selection because it is a relative measure of benefits and costs, not an absolute measure.

In our example above, optimal project C does not have the highest benefit/cost ratio. C has a lower benefit/cost ratio—2.33—than A—2.50. But, C is still optimal because its additional cost more than pays for itself in terms of additional benefits. As long as there are no limits on funding, it makes sense to allocate whatever additional funds are required to achieve the additional benefits.

One reason B/C ratios can fail as a project selection guide is that they are insensitive to scale. For example, if A in our example were 20 percent larger, costs and benefits would be 60 and 150, respectively, and NPV would be 90. Thus, scaling A up to the size of C (in costs) makes A optimal, and its choice consistent with the B/C ratio ranking.

Another way B/C ratios can be a false guide to project selection is that they can be sensitive to whether amounts are included as benefits in the numerator or as costs in the denominator. An example would be if a decrease in operating costs were treated as an increased benefit, rather than as a decrease in project costs. This might be done in looking at a rate of return on a project's capital costs.

This study includes AMHS fares in the tabulation of both user benefits and net project costs. From a broad perspective, user fees and charges, such as AMHS fares, are just a transfer price that shifts who pays for project costs.

For example, a decrease in AMHS fares increases user benefits, but also increases net project costs. As a result, there may be little change in NPV.

In reality, including user charges, such as AMHS fares, does change NPV and B/C ratios for two reasons:

1. the effect on traffic projections of including user charges as user costs; the elasticity of demand with respect to user costs will determine how much traffic changes; and

2. the change in consumer surplus is not equal to the change in revenue; the difference is aggravated by the linearity of the AASHTO user benefit formula.

To use B/C ratios as a proper guide for project selection, a second order incremental calculation of the B/C ratios is needed.

Mutually Exclusive Alternative Selection

When selecting among alternatives that are mutually exclusive, as is the case with JAI, one procedure employing B/C ratios would be to:

1. rank the projects in ascending order of project cost;
2. select the first efficient alternative (that fits within the budget if funds are limited); an alternative is efficient if its:

a. B/C ratio ≥ 1, and its numerator and denominator are positive (increase in benefits exceeds increase in costs);

b. B/C ratio ≤ 1, and its numerator and denominator are negative (decrease in benefits is less than decrease in costs); or,

c. numerator is positive and the denominator is negative (more benefits for less money);

3. calculate a second order B/C ratio for the next highest cost alternative—the incremental benefits divided by the incremental cost of the next highest cost alternative, in comparison with the selected alternative;

4. if the next higher cost alternative:

   a. is efficient, according to the criteria in step 2 applied to its second order B/C ratio; and

   b. the alternative fits within the budget,

   replace the selected alternative with the next highest cost alternative;

5. continue testing all higher cost alternatives against the selected one until all alternatives have been tested or the budget limit has been reached.

Second-order B/C ratios employed to select among mutually exclusive alternatives will produce the same result as selecting among them on the basis of NPV.

If in fact, budgets are constrained, NPV may still work as the criterion for project selection. If the constraint were on funds that would only be used for JAI, the optimal alternative could still be determined by net present value. An example would be an appropriation of federal highway aid specifically for JAI. In such a case, the best alternative would be the one with the highest NPV whose federal costs do not exceed the appropriation.

Non-Mutually Exclusive Project Selection

If the constraint were on funds—such as State general funds—that could be used for both JAI and other projects, B/C ratios could be needed. A "bang per buck" concept only becomes a deciding issue when the amount of funds is limited and has alternative uses.

In that case, the best JAI alternative, and the other projects, would all be selected according to second order B/C ratios.[7] The entire constellations of selected projects would have to fit within the specified budget.

In this study, neither the limits on funds nor the B/C ratios of competing non-JAI transportation projects are known. Therefore, no substantial use is made of B/C ratios in this report for project evaluation.

B/C ratios are reported in this study as:

- first order ratios, only for informational purposes, should they be needed in evaluations against other projects the State might undertake; and

- second order ratios as part of a demonstration that project selection among JAI alternatives would be the same as using NPV. This demonstration is contained in Appendix Tables A-1 and A-2. Note that Table A-2's second order NPV shows that, in

[7] The project selection procedure can become rather complex, but basically proceeds similarly to selecting mutually exclusive alternatives, as follows:

1. rank all projects and alternatives in descending order of B/C ratios;
2. select projects in rank order until the budget is exhausted;
3. upon selection of any JAI alternative, calculate an incremental B/C ratio for the next highest cost JAI alternative, as in step 3 of the mutually exclusive alternative selection process;
4. if:
    a. the incremental B/C ratio is:
        i. efficient according to the criteria in step 2 of the mutually exclusive alternative selection process; and
        ii. greater than the B/C ratio for any unselected non-JAI projects; and
    b. the alternative fits within the budget,

    replace the selected JAI alternative with the next highest cost JAI alternative;
5. continue testing all higher cost JAI alternatives against the selected one until all higher cost JAI alternatives have been tested or the budget has been exhausted.

terms of State funds, Alternative 2B is a better deal than Alternative 4D, even though Alternative 4D has a better B/C ratio[8] in Table 17.

Cost-Effectiveness

This report provides two measures of cost-effectiveness:

- life-cycle costs (LCC); and
- total project life costs.

Both measures are evaluated in terms of total costs and net costs. Total project life costs are provided on a total funds and State funds basis. Total project life costs are also provided on a per vehicle and a per user basis, as a measure of efficiency.

Life-Cycle Costs (LCC)

The study presents each alternative's life-cycle costs. These are the project costs standing alone—i.e., without benefits. This is one way of evaluating the alternatives from the standpoint of the State's budgetary constraints. Aside from the benefits, the State may want to pick an alternative that costs less, for purely budgetary reasons.

The purpose of life-cycle cost analysis is different than benefit-cost analysis. Benefit-cost analysis is done to determine if a project is worth doing. It is a comprehensive evaluation of not only project costs, but also benefits and the opportunity costs to society.

The objective of LCC analysis is to identify the least cost alternative for achieving some purpose. It treats the decision to undertake a project as a done deal, and seeks to find the least cost method of achieving it.

Different discount rates are used for LCC analysis than for user benefit analysis. The discount rates for life-cycle costs represent the costs to the State government for the funds used. Specifically, the State's cost of capital is used for construction costs and the State's return on invested funds is used for operating and maintenance costs.

[8] Alternative 4D's negative B/C ratio of 4.27 indicates that it produces greater benefits at less cost than "no action"—specifically, 4.27 dollars of benefits for every dollar of costs saved. This is a better B/C ratio than Alternative 2B's 2.78 ratio, which produces 2.78 dollars of benefits for every dollar spent.

Life-cycle costs are shown as total costs for each alternative, rather than as incremental costs in comparison to the "no action" alternative—Alternative 1. They could be shown as incremental costs from the "no action" alternative. Doing so would produce the same project ranking as using non-incremental costs. But, showing the non-incremental costs may make the figures more useful for judging their fiscal burden.

Total Project Life Costs

Total project life costs are sometimes referred to as "costs of ownership". In this study, total project life costs are the total capital and operating costs of an alternative over FY 2019–54.

Total project life costs are undiscounted 2016 dollars. They also are not the incremental costs of building and operating the project, in comparison to the "no action" alternative. Rather, they are the total costs during the FY 2019–54period of building and operating the project.

The undiscounted total project life cost measure may be more useful than life-cycle costs in gauging fiscal burden when there are expectations that:

- future budgets will be more constrained as time goes by, than they are in the near-term; or,

- the State will have little or no savings, which provide a demonstrable opportunity cost to the expenditure of funds on the project.

Alaska has been facing tightening budgets as oil production declines, in the midst of oil price stagnation. Budget reserve funds have been or will be drawn upon in FY 2014–18, leading to their rapid decline. But, the Alaska Permanent Fund may be around for a long time, if not permanently.

Judging JAI alternatives on the basis of total project life costs could be a hallmark of prudence, in terms of avoiding fiscal risks to the State. But, by ignoring the time value of money, it could shortchange the State's future, either in terms of the JAI alternative selected, or in other projects or programs foregone.

Discount Rates

This study uses different discount rates for benefit-cost analysis and LCC analysis. The discount rate for benefit-cost analysis represents the opportunity cost of funds to society as a whole. The rates for LCC analysis represent the cost of funds to State government.
In addition, the discount rates used in LCC analysis differ for capital costs and operating costs. They both represent opportunity cost to State government. But, the federal tax-exemption of interest on state debt offers the State a lower, subsidized opportunity cost for capital projects funded with State debt. The State of Alaska Constitution permits issuance of State and municipal debt only for capital improvement projects.

User Benefit Analysis

For purposes of benefit-cost analysis, this study uses a discount rate of 7.0 percent per annum to calculate net present values and B/C ratios. OMB Circular No. A-94[9] establishes this rate as a guideline for evaluating federal programs whose benefits and costs are distributed over time.

The 7.0 percent rate applies to benefit-cost analyses of public investments that are done in constant dollars. In other words, the rate is a real rate of return that bears no premium for inflation. It is to be used in analyses that do not increase future costs and benefits for general inflation. This analysis is done with constant 2016 dollars.

The 7.0 percent rate approximates the marginal pre-tax rate of return on an average investment in the private sector. It represents the opportunity costs in real dollars of spending money on a public project.

The 7.0 percent rate includes a risk premium. If all the costs and benefits of JAI alternatives were known with certainty, a real risk-free rate of return would be an appropriate discount rate. As of May 2017, this would be around 1.0 percent, as reflected by yields on inflation-indexed long-term U.S. Treasury bonds.

But, the JAI Project entails great uncertainties. The magnitude of the costs and traffic changes, the concentration of demand in personal travel, especially of a recreational and tourist nature, the predominance

[9] OMB Circular No. A-94 Revised, U.S. Office of Management and Budget, October 29, 1992.

of induced traffic, particularly for the road alternatives, and the more general uncertainties about population, employment, average wages, and economic growth in the region and nationally all argue for a significant risk premium in the discount rate.

Life-Cycle Costs

For life-cycle costs, this study uses discount rates of 1.5 percent for capital costs and 4.7 percent for operating costs and revenues.

The discount rates distinguish between capital and operating costs because of the different funding sources for each. 90.97 percent of capital project costs, over and above State non-match general funds expended for capital costs, are assumed to be paid with federal funds. The least cost source of State funds for the remaining capital costs is State general obligation (GO) bonds, because of the federal income tax exemption on their interest paid. Operating costs are entirely State-funded.

The 1.5 percent rate for capital costs reflects:

- the State of Alaska's real borrowing cost for capital improvement projects; and

- federal guidelines for a discount rate to be used for life-cycle cost analyses of federal programs over an analysis period of 30 years or more.

For the State, the 1.5 percent is an estimate of the expected interest rate on State tax-exempt GO bonds, net of inflation. It is also a measure of the opportunity cost of using federal funds on JAI, given that the amount of federal funds is fixed. In other words, any State highway projects displaced by funding JAI with federal funds might have to be funded with GO bonds at a cost of 1.5 percent.

The current federal guideline[10] for an LCC discount rate is their forecasted 0.7 percent real rate of interest on 30-year U.S. Treasury bonds for 2017, down from the 1.5 percent guideline for 2016. In May 2017, the yields on inflation-indexed 30-year U.S. Treasury bonds stood

[10] Appendix C (Revised December 2012), OMB Circular A-94 at http://www.whitehouse.gov/sites/default/files/omb/memoranda/2013/m-13-04.pdf.

at 1.0 percent, and are expected to rise further as the Federal Reserve continues raising interest rates in an expanding economy.

As seen in Table 5, since about a year before the June 1977 onset of North Slope production of crude oil, the State of Alaska has typically issued GO bonds with average maturities of 10 years or less. This has reflected a policy of scheduling maturities within the productive life of its major oil fields.

State of Alaska GO bonds have had a AA or better rating since 1980, in part due to the tailoring of average life to prime years of oil production. The State had AAA ratings from one or more of the three major credit rating agencies—Moody's, Standard & Poor's, and Fitch—on bonds issued from December 2010 through March 2016. By June 2016, all three agencies had downgraded the State's credit to AA1/AA+, because of its continuing fiscal imbalances.

From its February 2012 bond issue to June 2016's, the State's interest cost averaged 2.07 percent. Net of 1.07 percent inflation in the U.S. Consumer Price Index (CPI) during 2012–16, the real cost to the State of additional GO debt issuance was 1.0 percent per annum.

TABLE 5

State of Alaska
Tax-Exempt
General Obligation Bond Sales

Date	Average Life	True Interest Rate	Ratings (Moody's/S&P/Fitch)
1-Feb-75	14.60		
1-May-75	15.10		
1-Oct-75	12.50		
1-Mar-76	9.50		
1-Jul-76	9.50		
1-Feb-77	9.50		
1-Oct-77	7.00		
1-Apr-78	7.00		
1-Jan-79	5.50		
1-May-79	5.50		
1-Jul-80	5.50		
1-Apr-82	5.00		
1-Nov-82	5.00		
1-Oct-83	5.00		
1-May-94	2.30		
1-Apr-03	9.09	3.84%	Aa2/AA/AA
14-Apr-09	12.22	4.06%	Aa2/AA+/AA
7-Dec-10	16.07	2.77%	Aaa/AA+/AA+
8-Feb-12	5.87	1.21%	Aaa/AAA/AA+
15-Jan-14	8.99	1.00%	Aaa/AAA/AAA
9-Apr-15	10.20	2.38%	Aaa/AAA/AAA
17-Mar-16	11.14	3.02%	Aa1/AA+/AAA
30-Jun-16	11.37	2.76%	Aa1/AA+/AA+

Sources: *Alaska Public Debt 2015-2016* and *2016-2017*, State of Alaska, Department of Revenue, January 2016 and 2017.

A somewhat higher estimate of 1.5 percent is used as the real discount for State capital costs in recognition of the facts that:

- interest rates have recently been at historic lows, but have been moving upward and are expected to continue to do so as the economy continues to expand;

- production from the State's oil fields is forecast to continue to decline, from 538,600 barrels per day in FY 2017 to 334,300 in FY 2026;[11]

- credit ratings could go down further for the State, and might do so, depending on how the State resolves its budget crisis and manages its finances in the future; the three major credit rating agencies all currently have a negative outlook attached to the State's rating;[12]

- declining oil production or budget duress could cause the State to stretch out maturities on its GO bonds; longer maturities would bear higher interest rates.

The 4.7 percent discount rate for operating costs and revenues represents the opportunity cost to the State of spending its own money or revenues, as opposed to federal or borrowed funds. 4.7 percent is the projected total real return on Alaska Permanent Fund investments over the long-term.[13]

If State funds were not spent on State programs, they could earn 4.7 percent (net of inflation), invested in the Permanent Fund. Presumably, if they were spent on programs other than JAI, rather than invested, they would be worth at least 4.7 percent to the State, if not more.

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[11] *Revenue Sources Book, Spring 2017*, Alaska Department of Revenue, Tax Division, April 14, 2017.

[12] *RatingsDirect, Alaska; Appropriations; General Obligation, Moral Obligation*, S&P Global Ratings, June 9, 2016; *Credit Opinion, Alaska (State of)*, Moody's Investors Service, June 14, 2016; and *Public Finance, State of Alaska, Full Rating Report*, FitchRatings, June 17, 2016.

[13] "Alaska Permanent Fund, Fund Financial History & Projections as of January 31, 2017", Alaska Permanent Fund Corporation.

Excess Burden

OMB Circular No. A-94 also calls for public investments that have social benefits apart from decreased federal costs to bear an excess burden for their justification. Taxes generally distort relative prices, thereby causing inefficient allocation of resources and less than optimal economic production.

According to the Circular, "Recent studies of the U.S. tax system suggest a range of values for the marginal excess burden, of which a reasonable estimate is 25 cents per dollar of revenue".

Thus, the Circular advises, "public investments that are not justified on cost-saving grounds should include a supplementary analysis with a 25 percent excess burden. Thus, in such analyses, costs in the form of public expenditures should be multiplied by a factor of 1.25 and the net present value recomputed."

To the extent the choice of a JAI alternative is dictated by life-cycle costs or total project life costs, this excess burden would not be relevant. But, if user benefits enter into the choice, a supplementary analysis of excess burden would be appropriate.

User Benefits

User benefits are measured by the aggregate reduction in user costs of each alternative, from the "no action" alternative. User benefits reflect both the reduction in costs per user and the change in the volume of users.

User costs consist of travel time, including delays in the case of ferries; AMHS fares; and vehicle operating, maintenance, ownership, and accident costs.

User costs for Juneau – Haines and Skagway travel are figured to or from Auke Bay as the starting or ending point. This is the case whether arrival at, or departure from, Auke Bay is by highway or marine mode.

Modal User Costs

User costs for Juneau – Haines and Skagway traffic have been adjusted in this study to reflect the different values users have for different modes of travel. The adjustments are the relative weights of user costs, by mode, in the model used to produce the traffic estimates for each alternative.

Table 6 shows average user costs for Juneau – Haines and Skagway traffic.

The costs in Table 6 treat ferry travel the same as if it were highway travel. The Table 6 user costs reflect blanket application of the AASHTO approach, which has been designed for highway project evaluation.

User costs in Table 6 are what the costs would be in users' eyes if they were literally at the wheel, driving down the Alaska Marine Highway in a car. They do not reflect any of the amenities of being on a ferry, such as the ability to use a restroom while underway.

TABLE 6

Average Cost per User
Juneau - Haines & Skagway

Alternative	Ferry Delay Time	Ferry Travel Time	Ferry Fare	Highway Travel Time	Highway Vehicle Cost	Total
Existing Service	$27.09	$55.00	$74.81	$ 0.64	$ 0.84	$158.37
1 - No Action	$20.62	$53.51	$74.35	$ 0.52	$ 0.69	$149.69
1B - Enhanced Service	$18.65	$53.71	$61.00	$ 0.56	$ 0.74	$134.68
2B - East Lynn Highway	$11.57	$ 7.33	$15.25	$18.23	$35.94	$88.32
3 - West Lynn Highway	$13.85	$11.21	$23.27	$17.05	$33.66	$99.04
4A - Fast Ferry Auke Bay	$15.84	$30.77	$76.05	$ 0.58	$ 0.76	$123.99
4B - Fast Ferry Berners Bay	$16.29	$22.64	$58.82	$ 5.24	$ 7.22	$110.21
4C - Monohull Auke Bay	$15.66	$52.68	$75.79	$ 0.59	$ 0.77	$145.49
4D - Monohull Berners Bay	$14.90	$38.75	$57.14	$ 5.67	$ 7.81	$124.27

This user benefit analysis makes modal adjustments for:

- ferry travel delay at 224.4 percent of the average dollar value of time;
- ferry travel time at 79.5 percent of the average dollar value of time; and
- ferry fares at 79.1 percent of the dollar fare costs;

The average user costs in Table 6 use an average value of time, across both highway and ferry modes, and average values of other costs (AMHS fares and highway vehicle costs), at their dollar cost, regardless of mode.

In fact, or at least according to the *Revised Traffic Forecast Report (Appendix AA* of this *FSEIS)*, a minute spent waiting for a ferry is not the same thing to a user as a minute spent riding on a ferry, even if the two are of the same temporal duration and could be costed out at the same average value of time. Transportation economic research has generally found wait times to be more costly to travelers than time spent underway. For example, AASHTO's user benefit guidelines recommend

valuing wait time for buses at twice the cost of time in transit on the bus.[14]

Time spent traveling on a ferry may be seen by users as less costly than time in a car because of greater opportunities to engage in other activities—e.g., reading, eating, walking about, etc.—particularly for a driver. Similarly, a dollar for an AMHS fare may not be the same to a user as a dollar spent on gas if there is greater aesthetic enjoyment or, as the *Revised Traffic Forecast Report* states, less stress associated with ferry travel.[15]

Modal adjustments for the user benefit analysis are derived from the *Revised Traffic Forecast Report's* formula for the utility of JAI alternatives. The *Report's* formula coefficients (the weights for each user cost) are based on:

1. the Puget Sound Regional Council (PSRC) travel demand forecasting model; the PSRC model is one of the few U.S. travel demand models that incorporates a substantial amount of ferry travel; and

2. Washington State Ferries choice model parameters.

The coefficients were calibrated in the *Revised Traffic Forecast Report* to match observed travel patterns in Lynn Canal.

The modal percentage adjustments are the ratios of the formula's weights for each user cost shown in Table 7, to the weights for the corresponding category of highway costs, i.e.,

- the weights for ferry delay and travel times to that for highway travel time; and

- the weight for ferry fares to the weight for vehicle operating and maintenance dollar costs.

The percentage adjustments are calculated against highway costs as the base because:

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[14] Table 5-1: Guidelines for Assigning Values of Time in Highway Project Analysis, *User and Non-User Benefit Analysis for Highways*, American Association of State Highway and Transportation Officials, September 2010.
[15] *Memorandum, Juneau Access Improvements, Appendix D: Choice Models*, Donald Samdahl and Daniel Dye, Fehr & Peers, January 5, 2017, page 9.

- the hypothetical All-Road Alternative is the reference point in the traffic estimates—the alternative with the greatest utility and traffic, against which all other alternatives are calibrated as some fraction of the All-Road Alternative; and

- AASHTO's guidelines for user benefit analysis, such as the percentage of wages or compensation to be used to value time, are formulated for highway projects.

Table 7 shows the calculation of the adjustments and the resulting modal user costs.

With these adjustments, user benefits more accurately reflect the actual values to users of reductions in user costs. The adjustments allow user benefit analysis to capture the differences in utility or disutility users attach to specific costs associated with particular modes of travel. The analysis then provides a more accurate assessment of user benefits, when an alternative reduces user costs.

The modal adjustments are akin to the variations in AASHTO's guidelines for valuing travelers' time.[16] AASHTO's guidelines range, for example, from 40 percent to 100 percent of average wages, depending on the mode of highway conveyance (automobile, bus, or truck), wait time vs. travel time, passenger vs. driver status, etc.

The AASHTO guidelines all pertain to road travel.

No modal adjustments have been made to Haines – Skagway local traffic. The *Revised Traffic Forecast Report's* utility formula coefficients were not tailored with the Haines – Skagway traffic in mind, nor used to forecast it.

[16] See Table 5-1: Guidelines for Assigning Values of Time in Highway Project Analysis contained in *User and Non-User Benefit Analysis for Highways*, American Association of State Highway and Transportation Officials, September 2010.

TABLE 7

Modal Cost per User
Juneau - Haines & Skagway

	User Cost Weights in Traffic Model					
	Ferry Delay Time	Ferry Travel Time	Ferry Fare	Highway Travel Time	Highway Vehicle Cost	
Weight	-0.0028500	-0.0010100	-0.0000973	-0.0012700	-0.0001230	
Ratio of Weight to						
Highway Travel Time Weight	224.4%	79.5%		100.0%		
Highway Vehicle Cost Weight			79.1%		100.0%	
	Modal Cost per User					
Alternative	Ferry Delay Time	Ferry Travel Time	Ferry Fare	Highway Travel Time	Highway Vehicle Cost	Total
Existing Service	$60.78	$43.74	$59.18	$ 0.64	$ 0.84	$165.17
1 - No Action	$46.27	$42.55	$58.81	$ 0.52	$ 0.69	$148.85
1B - Enhanced Service	$41.86	$42.72	$48.26	$ 0.56	$ 0.74	$134.14
2B - East Lynn Highway	$25.97	$ 5.83	$12.06	$18.23	$35.94	$98.04
3 - West Lynn Highway	$31.08	$ 8.91	$18.41	$17.05	$33.66	$109.11
4A - Fast Ferry Auke Bay	$35.54	$24.47	$60.16	$ 0.58	$ 0.76	$121.51
4B - Fast Ferry Berners Bay	$36.56	$18.01	$46.53	$ 5.24	$ 7.22	$113.56
4C - Monohull Auke Bay	$35.13	$41.89	$59.96	$ 0.59	$ 0.77	$138.34
4D - Monohull Berners Bay	$33.45	$30.82	$45.20	$ 5.67	$ 7.81	$122.94

Modified AASHTO Methodology

This study computes user benefits in a step-wise fashion, starting with the highest user cost "action" alternative.

User benefits for the highest cost "action" alternative are computed by comparison to Alternative 1, the "no action" alternative. In succession, each alternative is compared to the next lower user cost alternative to compute the incremental user benefits for that next lower cost alternative. The total user benefits for an alternative are the sum of:

1. the incremental benefits for that alternative; plus,

2. the cumulative amount of incremental benefits for all higher cost "action" alternatives.

The incremental user benefits for each alternative, in comparison to the next higher user cost alternative, are computed according to the AASHTO methodology.[17] The AASHTO calculation of user benefits for a highway improvement project is:

$$(U_0 - U_1) \times (V_0 + V_1)/2$$

where,

U_0 is the user cost per person, vehicle, or trip without the improvement;

U_1 is the user cost per person, vehicle, or trip with the improvement;

V_0 is the traffic volume in persons, vehicles, or trips without the improvement; and

V_1 is the traffic volume in persons, vehicle, or trips with the improvement.

The AASHTO formula computes user benefits as the cost savings per user, due to an improvement, times the average number of users, with and without, the improvement.

The AASHTO formula was designed primarily for evaluating highway projects that make marginal changes to existing highways or highway networks. Such projects include additional lanes, traffic signalization, ramp metering, geometric improvements, access control, etc. Most of the improvements cause only small changes in costs and traffic.

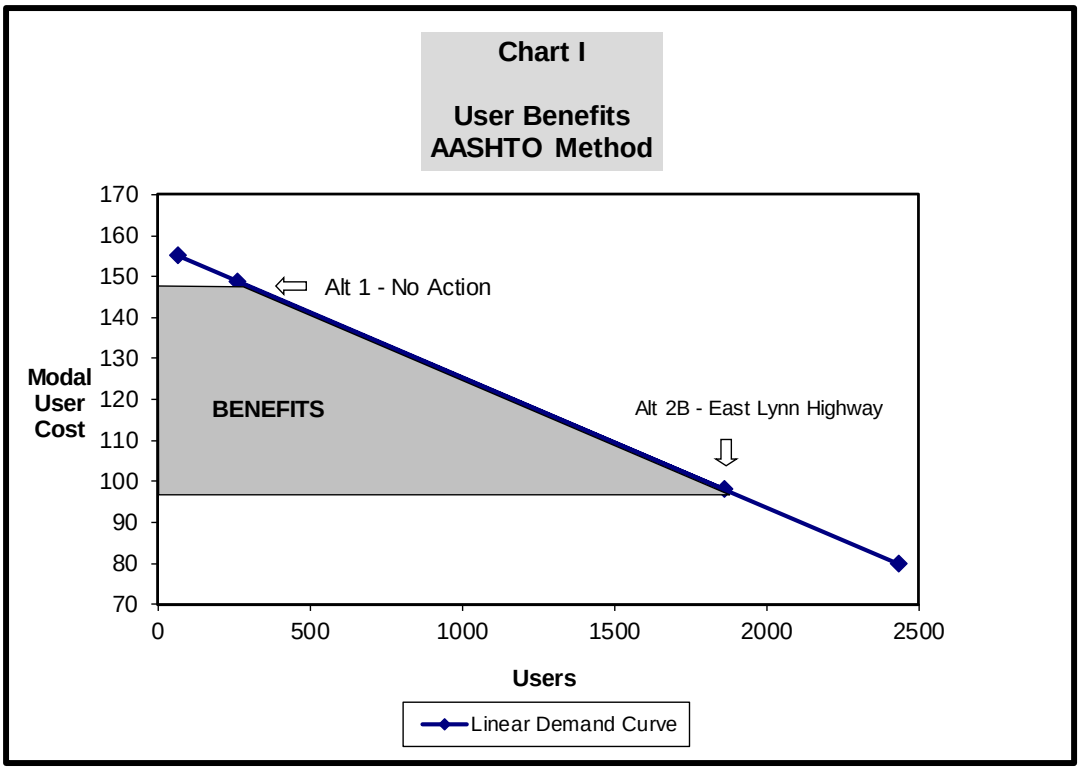
JAI Alternative 2B on the other hand, would drop user costs as much as 34 percent and increase use to over 5.0 times the levels expected under the "no action" alternative. Other alternatives would cause lesser, but still large, changes in costs and traffic.

[17] *User and Non-User Benefit Analysis for Highways*, American Association of State Highway and Transportation Officials, September 2010.

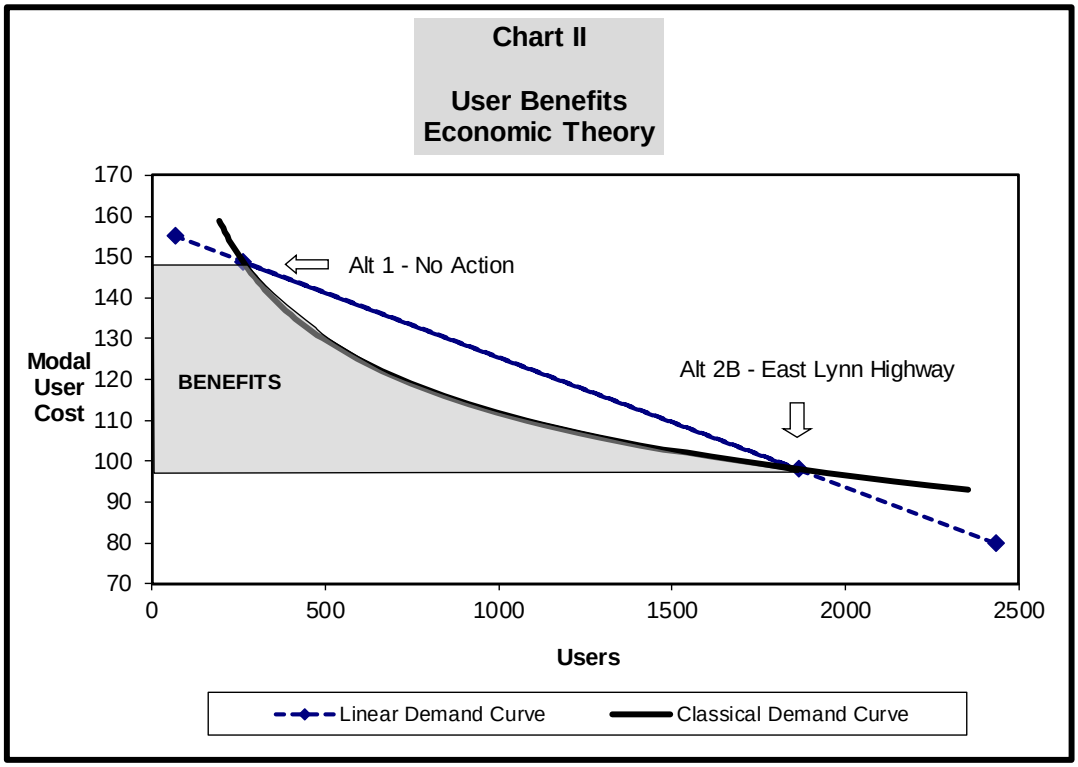
For changes of the magnitude of JAI, the AASHTO formula overestimates user benefits. The greater the savings in user costs and the greater the induced traffic, the more severe the overestimation is. The step-wise calculation procedure used in this study minimizes the overestimation of user benefits.

For example, under the AASHTO formula, user benefits for Alternative 2B for FY 2025 are 37.9 percent greater than computed according to economic theory. But, using the step-wise calculation, they are overestimated by only 4.3 percent.

The AASHTO formula assumes that demand is a linear function of user cost. Graphically, it would look like Chart I, below.



Generally, demand is more closely related to the percentage change in user cost. This gives rise to a classically-shaped demand curve, such as Chart II, below.



The *Revised Traffic Forecast Report's* traffic estimates, paired with the modal user costs, still provide a close approximation to a classical demand curve, as Chart III shows.

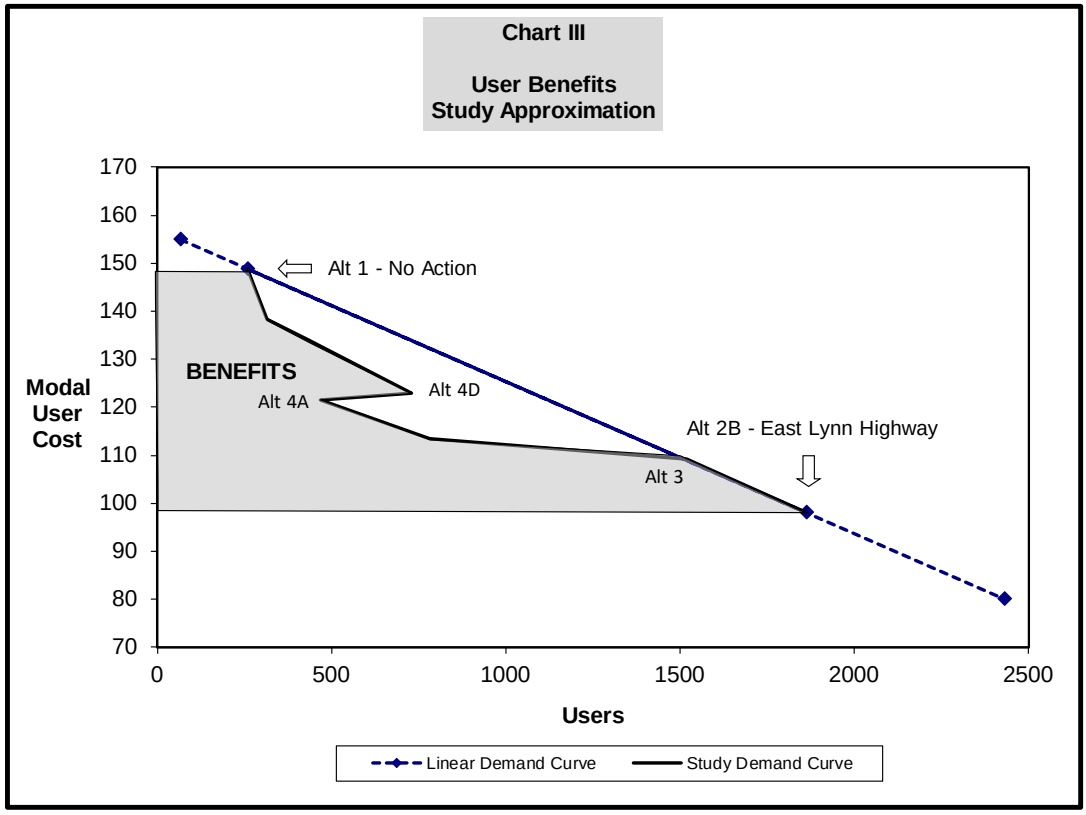
Chart III does not show a monotonically declining user cost curve. That is, one point (Alternative 4D) with a greater number of users has a higher modal cost than another point (Alternative 4A), with a lesser modal cost. Alternative 4A, with lower costs, should have the greater number of users.

Alternative 4A doesn't have a greater number of users than 4D because the *Revised Traffic Forecast Report's* utility formula produces total utility costs for Alternative 4D that are less than the costs for Alternative 4A. See Appendix Table A-3. The *Revised Traffic Forecast Report* contains two variables that AASHTO user costs do not include. These are a service index and a modal constant. In the *Revised Traffic Forecast Report's* tabulation of utilities, alternatives with lower total utility costs do have greater numbers of users.

The *Report's* service indices and modal constants cannot readily be assigned a dollar value. Otherwise, they could be incorporated into AASHTO's user benefit calculation.

Chart III shows that the change in benefits between Alternatives 3 and 2B closely follows the AASHTO formula. The slope of the benefit line between Alternatives 3 and 2B mirrors the slope of the theoretical AASHTO benefit change for each alternative from the "no action" Alternative 1.

Charts I–III use actual estimates contained in this report. The charts accurately portray in graphical form the different approaches to estimation of user benefits for an average day in FY 2025.



User Costs

This report's user costs are based to a great extent on the user costs developed by Fehr & Peers for the *Revised Traffic Forecast Report*.[18] The differences between this analysis' user costs and those from the *Revised Traffic Forecast Report* are:

1. vehicle ownership and accident costs are included in this analysis, but not the *Revised Traffic Forecast Report*;

2. vehicle costs are on a per user basis;[19] the *Revised Traffic Forecast Report's* vehicle costs are per vehicle;

3. vehicle costs are updated from 2015 to 2016 in this analysis;

4. gasoline prices specific to Lynn Canal (Juneau, Haines, and Skagway), rather than an Alaska average, are used to adjust national data on vehicle fuel costs;

5. travel time costs are in dollars, whereas the *Revised Traffic Forecast Report's* time costs were in hours and minutes;

6. the *Revised Traffic Forecast Report* provided user times and costs only for summer Juneau – Haines and Skagway traffic; this analysis developed winter user costs for the same origins and destinations, based on the *Revised Traffic Forecast Report's* costs and methodology;[20]

7. user costs for origin-destination traffic between Haines and Skagway are included in this report, again based on the *Revised Traffic Forecast Report's* costs and methodology. Haines – Skagway traffic, user costs, and benefits are estimated independently of the Juneau traffic. The *Juneau Access Haines/Skagway Traffic Forecast*, McDowell Group, December 2016 study addressed Haines – Skagway local traffic, but did not estimate the user costs.

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[18] Fehr & Peers' user costs are contained in Appendix Table A-13, except that highway vehicle costs have been revised. Table A-13 contains only Juneau – Haines and Skagway summer season user costs.

[19] Costs per vehicle are divided by the 3.3 or 2.3 persons per vehicle assumed in the *Revised Traffic Forecast Report*.

[20] Weighted average delay and travel times were developed to reflect different wintertime vessels and schedules, using average daily round-trip capacities as weights.

This study uses the traffic estimates from the *Revised Traffic Forecast Report*. Differences between this study's user costs and those of the *Revised Traffic Forecast Report* should not make a material difference in the forecasted traffic.

Ferry travel, load, and unload times in this report and the *Revised Traffic Forecast Report* are generally the same as those in Coastwise Corporation's Attachment C – Revision A to their 2017 *JAI Marine Segments Technical Report*

User costs by alternative, route, season, marine and road segment, and vessel for Juneau to Haines and Skagway are contained in Appendix Tables A-4 through A-14.

User costs by alternative, season, marine and road segment, and vessel for Haines and Skagway local traffic are contained in Appendix Tables A-15 through A-22.

User costs are calculated as follows:

Time

Time per user for road legs of travel is estimated as the road mileage divided by an average vehicle speed of 45 miles per hour.

Ferry time per user is the sum of check-in time for marine alternatives (Alternatives 1, 1B, and 4A–4D) or frequency delay and load time for road alternatives (Alternatives 2B and 3), plus travel time and unload time. This is the breakdown of ferry user time contained in the *Revised Traffic Forecast Report*.[21] The *Revised Traffic Forecast Report* provided user times only for summer Juneau – Haines and Skagway traffic. The *Revised Traffic Forecast Report's* times were used to estimate Juneau – Haines and Skagway winter user times, as well as Haines – Skagway summer and winter user times.

[21] Coastwise Corporation's Attachment C – Revision A to their 2017 *JAI Marine Segments Technical Report* does not include or address frequency delay or check-in times, because their report is only concerned with AMHS's costs, not users'. Coastwise' "time underway" corresponds to the *Revised Traffic Forecast Report's* "travel time". Time underway is further broken down by Coastwise into maneuver (both outbound and inbound) and cruise at speed times. Coastwise' "transit time" equals time underway plus load and unload times.

The *Revised Traffic Forecast Report* measured user time costs in hours and minutes and did not estimate a dollar value for user time. Time is valued in this report at an average of $10.42 per hour. The average values for time used in the *2006 FEIS* and 2014 *DSEIS* were $8.02 and 9.65, respectively.

The estimation of the average time value is shown in Table 8. It is based on the following assumptions:

1. Alaska residents comprise 55.7 percent of traffic on all alternatives. This is their percentage of AMHS Lynn Canal traffic in 2011, as presented in Table 6, Appendix B of the *Revised Traffic Forecast Report*. Non-residents comprised 44.3 percent.

2. May 2015 mean hourly wages for Alaska and the U.S. are used as the time value, respectively, for Alaska residents and non-residents. These hourly wages of $26.81 and $23.23, respectively, are from the U.S. Department of Labor, Bureau of Labor Statistics, Occupational Employment Statistics (OES). They correspond to mean annual wages of $55,760 and $48,320, respectively.

3. The 2015 wages for Alaska residents and non-residents are adjusted to 2016 dollars using the Anchorage and U.S. CPI, respectively. On an hourly basis, 2016 average wages would be $26.92 and $23.52, respectively. On an annual basis, they would be $55,997 and $48,930.

4. The June 2016 U.S. average employer cost for total benefits as a percentage of total compensation for all civilian workers, 31.4 percent, is used to estimate average total compensation of Alaska residents and non-residents of $39.25 and $34.29 an hour, respectively. The ratio is from the U.S. Department of Labor, Bureau of Labor Statistics data series, "Employer Cost for Employee Compensation".

5. The after-tax cost of average total compensation and average wages is estimated by deducting 25 percent. This produces after-tax total compensation for Alaska residents and non-residents of $29.44 and $25.72 per hour, respectively, and after-tax wage costs of $20.19 and $17.64 per hour, respectively.

TABLE 8

Average Time Value

	Alaska Residents		Nonresidents (U.S. Averages)		
	$	Persons	$	Persons	All Travelers
All Travelers		55.7%		44.3%	100.0%
Average Hourly Wage					
2015	26.81		23.23		
2016 dollars	26.92		23.52		
Benefits/Total Compensation					
2016 U.S. Average	31.4%		31.4%		
Average Total Compensation, 2016	39.25		34.29		
Marginal Tax Rate	25.0%		25.0%		
After-Tax Opportunity Cost					
Work-Related Travel (based on Total Compensation)	29.44	20.0%	25.72	5.0%	
Non-Work Travel (based on Hourly Wage)	20.19	80.0%	17.64	95.0%	
Non-Work Travel @ 50% of Value	10.10		8.82		
Adults	10.10	80.0%	8.82	80.0%	
Children	0.00	20.0%	0.00	20.0%	
All Non-Work Travelers	8.08		7.06		
Average Work & Non-Work Travel	12.35		7.99		10.42

After-tax costs to employers for work-related travel would have to reflect an amalgam of individual (proprietorship, partnership, etc.) and corporate tax schedules, as well as the considerable tax-exempt non-profit and government employment in Lynn Canal. 2016 individual and corporate federal tax rates range up to 39.6 percent and 39 percent, respectively. We have not attempted to directly estimate the marginal rate for work-related travel. We use a 25 percent tax cost as a reasonable approximation.

We use a 25 percent tax cost for non-work travel because the 2016-dollar mean annual wages—$55,997 and $48,930 for Alaska and the U.S., respectively—generally fall within the 25 percent tax brackets. The 2016 U.S. individual income tax 25 percent brackets are:

single : $37,651 – $91,150

married filing jointly: $75,301 – $151,900

married filing separately:	$37,651 – $75,950
head of household:	$50,401 – $130,150

In the case of the higher bracket amounts for married filing jointly, 25 percent may still be a reasonable estimate, given the prevalence of two-income families. No attempt is made to estimate an average state income tax marginal rate for non-resident wages.

6. The *Alaska Visitor Statistics Program VI: Summer 2011* report indicates 4 percent of summer 2011 non-resident ferry travelers were traveling for business or business and pleasure. The Fall/Winter 2011–12 report indicates 20 percent of non-resident ferry travel was business-related.

   Table 9 shows an 85.6 percent/14.4 percent summer/winter split of non-Alaska resident ferry travel. Weighting the summer/winter business travel percentages by these seasonal shares of non-resident traffic produces a 6.3 percent work-related travel share for non-Alaska residents on a year-round basis. This is rounded down to 5 percent in recognition of non-paid "business" travel, e.g., travel to/from work being included in the survey statistics' definition of "business" travel, as well as the inclusion of pleasure in the business/pleasure category of the survey statistics.

TABLE 9

2011 AMHS Lynn Canal Passengers
by Alaska Residency

	Passengers[1]				Seasonal Shares	
	Summer	Winter	Total	% of Total	Summer	Winter
Total	86,379	35,151	121,530	100.0%	71.1%	28.9%
Other US Residents	27,338	4,409	31,747	26.1%	86.1%	13.9%
Other Country Residents	18,775	3,328	22,103	18.2%	84.9%	15.1%
Non-Alaska Residents	46,113	7,737	53,850	44.3%	85.6%	14.4%
Alaska Residents	40,266	27,414	67,680	55.7%	59.5%	40.5%

Note:

1. Summed from Table 6, Appendix B, "Lynn Canal Ferry Market Segments", Northern Economics, September 11, 2012, *Juneau Access Improvements Project SEIS, Traffic Forecast Report, Rev. 4*, Fehr & Peers, July 2013.

Table 10 estimates that 22.6 percent of AMHS Lynn Canal Alaska resident passengers are traveling on work-related business, as defined in surveys undertaken as part of the *2000 Alaska Marine Highway System Marketing and Pricing Study*. The *Study* published only seasonal (spring, summer, and winter) statistics on business travel. The 22.6 percent year-round business travel percentage is calculated from Alaska residents' summer/winter seasonal shares, shown in Table 9, and a further breakdown of summer travel into the *Study's* spring and summer periods using monthly Southeast AMHS traffic from 2011 (for both Alaska residents and nonresidents).

The 22.6 percent year-round business travel percentage is rounded down to 20 percent to estimate average time value (Table 8). Again, this is in recognition of non-paid "business" travel, e.g., travel to/from work being included in the survey statistics' definition of "business" travel, as well as the inclusion of pleasure in the business/pleasure category of the survey statistics.

TABLE 10

Lynn Canal Alaska Resident Work-Related Travel

	Spring (May)	Summer (Jun - Sep)	Spring & Summer (May - Sep)	Winter (Oct - Apr)	Total
Southeast Passengers 2011[1]	22,700	134,889	157,589	95,965	253,554
Spring & Summer Proportions	14.4%	85.6%	100.0%		
Lynn Canal Passengers 2011					
Alaska Residents					
Table 9			40,266	27,414	67,680
Estimated	5,800	34,466			
Alaska Residents Work-Related Travel[2]					
Business Only	13.0%	10.0%		15.0%	
Business Meeting or Event		1.0%		0.0%	
Business and Pleasure	4.0%	9.0%		12.0%	
Total	17.0%	20.0%		27.0%	
Lynn Canal Alaska Resident Work-Related Travel					
Year-Round Weighted Average					22.6%

Notes:

1. *2011 Annual Traffic Volume Report* , Alaska Marine Highway System.
2. *Alaska Marine Highway System Marketing and Pricing Study, Volume 2* , McDowell Group, September 2000.

7. We assume the value of time for adults traveling for non-work purposes is 50 percent of the after-tax wage cost. This is generally consistent with AASHTO's user benefit analysis guidelines.[22] The recommendations are based on revealed preference studies by transportation economists. The 50 percent discount produces estimated after-tax non-work time values of $10.10 and $8.82 for adult Alaska residents and non-residents, respectively.

[22] Table 5–1: Guidelines for Assigning Values of Time in Highway Project Analysis, *User and Non-User Benefit Analysis for Highways*, American Association of State Highway and Transportation Officials, September 2010.

8. We assume that there is no opportunity cost for children's time and that children make up 20 percent of non-work travelers. The 20 percent estimate is based on:

    a. 9.97 percent of 2015 AMHS passenger tickets were for 12 and under; and

    b. in 2016, a minority of the civilian population under age 20 were employed (only 29.7 percent of persons ages 16 to 19 were employed in 2016). Roughly speaking, we double the 10 percent proportion of travelers under age 12 to account for all travelers under age 20.

These assumptions produce estimated average time values of $8.08 and $7.06 for Alaska residents' and non-residents' non-work travel, respectively.

The weighted average time value of all Alaska travelers would be $12.35 an hour. This is the product of 80.0% non-work travel @ $8.08 per hour and 20.0% work-related travel @ $29.44 per hour. Similarly, non-residents time would be valued at $7.99 an hour—95.0% non-work travel @ $7.06 an hour and 5.0% work-related travel @ $25.72 per hour.

The weighted average time value of all travelers would be $10.42 per hour. This is the product of 55.7% Alaska residents @ $12.35 per hour and 44.3% non-residents @ $7.99 per hour. See Table 8.

AMHS Fares

AMHS fares are the fares used in the *Revised Traffic Forecast Report*. See Appendix Tables A–13, A–14, and A–21. Fares are based on a 16–19-foot vehicle. The fares are updated from the *2006 FEIS and 2014 DSEIS*.

Vehicle Costs

Vehicle operating, maintenance, and ownership costs are calculated at 90.25 cents per mile, as shown in Table 11.

Table 11

Vehicle Operating & Ownership Costs[1]

	Small Sedan	Medium Sedan	Large Sedan	4WD SUV	Minivan	Fleet Average
Operating Costs per Mile (cents)						
US Fuel Cost @ $2.139 per gallon	6.88	8.06	10.40	10.90	10.04	
Lynn Canal Fuel Cost @ $4.122 per gallon[2]	13.26	15.53	20.04	21.01	19.35	18.12
Maintenance Cost	4.81	5.39	5.63	5.92	5.32	
Tires Cost	0.70	1.25	1.04	1.30	0.88	
Subtotal	18.77	22.17	26.71	28.23	25.55	
Dollars per Year @ 10,000 Mile	1,877	2,217	2,671	2,823	2,555	
Ownership Costs per Year (dollars)						
Full-Coverage Insurance	1,169	1,208	1,288	1,212	1,128	
License, Registration, Taxes	502	701	857	838	732	
Depreciation	2,348	3,502	4,593	4,336	3,999	
Finance Charge	481	698	869	848	731	
Subtotal	4,500	6,109	7,607	7,234	6,590	
Total Cost per Year	6,377	8,326	10,278	10,057	9,145	
Cents per Mile @ 10,000 Miles/Year	63.77	83.26	102.78	100.57	91.45	90.25
Lynn Canal Fleet Mix[3]	15%	25%	20%	30%	10%	

Notes:

1. All costs are U.S. data from AAA's "Your Driving Costs, 2016 Edition", except Lynn Canal fuel cost.
2. $4.122 was the average monthly price of regular gasoline in Juneau, Haines, and Skagway for October 2012 through October 2013 from GasPriceData.com. The $4.122 price reflects a 43.8 percent increase in real gas prices from the $2.866 weighted average price of unleaded gasoline in Juneau, Haines, and Skagway in 2016 (weighted by sales counts) from Oil Price Information Service (OPIS). The Alaska Department of Revenue's (DOR's) *Revenue Sources Book, Spring 2017* projects a commensurate 43.9 percent increase in real Alaska North Slope (ANS) crude oil prices between FY 2017 and FY 2026. AMHS fuel costs in this analysis are based on a price of $3.34 per gallon for #2 low sulfur marine diesel, which was AMHS' average annual price for each of fiscal years 2013, 2014, and 2015. The $3.34 price was 43.7 percent above OPIS's average FY 2015 Seattle price of $2.33 per gallon for low sulfur and ultra-low sulfur #2 marine diesel. Thus, fuel costs for both vehicles and ferries reflect similar real price increases, commensurate with DOR's forecast of real price increases for ANS crude oil.
3. Table 7, Appendix A, *JAIP, SEIS, Traffic Forecast Report DRAFT*, Fehr & Peers, July 2013, Revision 4.

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Vehicle costs are based on AAA 2016 data, assuming 10,000 average vehicle miles traveled per year. In 2015, cars, light trucks, vans, and SUV's as a group averaged 11,443 miles per vehicle. All motor vehicles, including motorcycles, trucks, and buses averaged 11,742 miles for the year.[23]

[23] Table VM–1, *Highway Statistics 2015*, Federal Highway Administration, January 2017 at https://www.fhwa.dot.gov/policyinformation/statistics/2015/vm1.cfm.

Accident Cost

Accident costs are calculated at 14.8 cents per statute mile. This is the average cents per mile accident cost, net of insurance reimbursement, for all vehicles in 2016 dollars from AASHTO's user benefit analysis guidebook.[24]

Total Average User Cost

This is a total one-way trip cost per user. For each alternative, the average user cost is:

$$UC_i = T_i \times V + PF_i + (VF_i + (VC + AC) \times M_i)/PPV_i$$

where,

- UC_i = average total user cost for the *i*th alternative;
- T_i = average total time for the *i*th alternative;
- V = average time value—$10.42 per hour in the base case;
- PF_i = total AMHS passenger fares per person for the *i*th alternative;
- PPV_i = average number of persons per vehicle for the *i*th alternative;
- VF_i = total AMHS vehicle fares for the *i*th alternative;
- VC = vehicle operating, maintenance, and ownership cost per mile—90.3 cents per mile;
- AC = accident cost per mile—14.8 cents per mile; and
- M_i = total statute road miles for the *i*th alternative.

Total Modal User Cost

The total one-way modal user cost per trip for each alternative is:

$$MUC_i = T_i \times V + 0.791\ PF_i + (0.791\ VF_i + (VC + AC) \times M_i)/PPV_i$$

where,

[24] Table 5–7, *User and Non-User Benefit Analysis for Highways*, American Association of State Highway and Transportation Officials, September 2010.

- MUC_i = average total modal user cost for the *i*th alternative;
- T_i, the average total time for the *i*th alternative,

  = 2.244 FDTi + 0.795 FTT_i + VTTi;
- FDT_i = average ferry delay time for the *i*th alternative;
- FTT_i = average ferry travel time for the *i*th alternative;
- VTT_i = average vehicle travel time for the *i*th alternative; and

other variables are the same as for total average user cost.

User Benefit Calculations

User benefit calculations were performed separately for Juneau traffic and Haines – Skagway local traffic. The two estimated amounts of user benefits were summed to produce total user benefits for a given alternative. User benefits for both Juneau traffic and Haines – Skagway traffic were calculated according to the same methodology described below.

Appendix Tables A–23 through A–29 show the calculation of each "action" alternative's user benefits for Juneau traffic. Appendix Tables A–30 through A–36 show the calculations for Haines – Skagway local traffic.

User benefits for each "action" alternative are calculated as follows. The specific calculation steps, for each year from FY 2019 through FY 2054, as shown in the tables, are:

- The modal costs per user for Juneau traffic are from Table 7. Average costs per user for Haines – Skagway local traffic are from Appendix Table A–15.

- AADT is average annual daily traffic. It is a count of the number of vehicles per day going in either direction between origin and destination city pairs.

  AADT for Juneau traffic is from the *Revised Traffic Forecast Report's* 2015 estimates.

  Juneau traffic for FY 2019–54 is calculated using the following annual rates of growth, which are equivalent to those in the

Revised Traffic Forecast Report, without its overlapping periods of years:

- 2015–25: 0.429 percent; and
- 2025–55: 0.024 percent.[25]

2015 local traffic between Haines and Skagway is estimated in Appendix Table A–17. The estimates are based on the *Juneau Access Haines/Skagway Traffic Forecast*, McDowell Group, December 2016. This user benefit analysis assumes no growth in Haines – Skagway traffic from the 2015 levels.

- The "Annual Average Daily Users" column is computed by:
  - converting AADT to users, using the *Revised Traffic Forecast Report's* assumptions for Juneau traffic of 3.3 users per vehicle for marine alternatives and 2.3 users per vehicle for highway alternatives. Haines – Skagway local traffic is assumed to be AMHS' 2011 average of 2.3 users per vehicle, reported in the McDowell Group 2016 *Juneau Access Haines/Skagway Traffic Forecast*; and
  - taking the average of the two alternatives' user figures.

This report's traffic projections in AADT and numbers of travelers for fiscal years 2025 and 2054 are shown in Table 12 below.

In Appendix Tables A–23 through A–29 and A–30 through A–36, under "Total Annual User Benefits", the pairs of columns show:

- for the first pair, <u>the alternative under evaluation compared to the next highest cost alternative</u>;
  - user benefits under "Year of Travel" is computed as the "Cost Reduction" multiplied by the "Annual Average Daily Users"; and
  - user benefits under "Present Value @ 7.0% 7/1/18" is computed so that the figure in that column, compounded

[25] Calculated from the 2015, 2025, and 2055 total population figures for Juneau, Haines, and Skagway, contained in Table 8 of the *Revised Traffic Forecast Report*.

from July 1, 2018 to the year of travel at a 7.0 percent rate of return, produces the "Year of Travel" user benefits;

- the figures for the second pair, the next highest cost alternative compared to the "no action" alternative, are the last pair of figures shown in the preceding User Benefits table for the next higher cost alternative; and

- the figures for the last pair, the alternative under evaluation compared to the "no action" alternative, are the sum of the figures for the first two pairs of columns.

"Total Annual User Benefits" for FY 2019–54 is simply the sum of user benefits for all the years.

TABLE 12

Traffic and Users

Alternative	AADT									Annual Average Daily Users	
	2015			FY 2025			FY 2054			FY 2025	FY 2054
	Haines	Skagway	Total	Haines	Skagway	Total	Haines	Skagway	Total		
Juneau - Haines & Skagway[1]											
Existing Service	38	24	62	39	25	64	40	25	65	213	214
1 - No Action	48	28	76	50	29	79	50	29	80	261	263
1B - Enhanced Service	65	61	126	68	63	131	68	64	132	432	435
2B - East Lynn Highway	433	346	779	450	360	810	453	362	815	1,862	1,875
3 - West Lynn Highway	401	235	636	417	244	661	420	246	666	1,520	1,531
4A - Fast Ferry Auke Bay	76	61	137	79	63	142	80	64	143	470	473
4B - Fast Ferry Berners Bay	125	103	228	130	107	237	131	108	239	782	788
4C - Monohull Auke Bay	52	40	92	54	42	96	54	42	96	316	318
4D - Monohull Berners Bay	118	95	213	123	99	221	124	99	223	731	736
Haines - Skagway[2]			2015			FY 2025			FY 2054	FY 2025	FY 2054
Existing Service			17			17			17	39	39
1 - No Action			24			24			24	56	56
1B - Enhanced Service			24			24			24	56	56
2B - East Lynn Highway			24			24			24	56	56
3 - West Lynn Highway			30			30			30	69	69
4A - Fast Ferry Auke Bay			24			24			24	56	56
4B - Fast Ferry Berners Bay			24			24			24	56	56
4C - Monohull Auke Bay			24			24			24	56	56
4D - Monohull Berners Bay			24			24			24	56	56

Notes:

1. Table 7 for Existing Service and Table 9 for Alternatives, *Memorandum, Subject: Juneau Access Improvements, Appendix D: Choice Models* , Fehr & Peers, January 5, 2017.
2. Table A-17 and *Juneau Access Haines/Skagway Traffic Forecast* , McDowell Group, December 2016, pp. 8-9.

Project Costs

Project costs consist of capital and operating costs. This report refers to the sum of capital and operating costs as "total costs".

Government revenues from operation of the project are an offset to project costs. They reduce the funds government must otherwise provide to pay for operation of the project.

Users of the transportation project pay the government revenues. They are part of the costs to users that figure in the calculation of user benefits. If revenues were not deducted from project costs, the portion of project costs charged to users would be double-counted.

This report refers to the sum of capital and operating costs minus project revenues as "net costs".

Capital Costs

Capital costs are made up of:

- acquisition costs of new facilities or vessels;
- refurbishment and replacement costs for acquired or existing facilities or vessels; and
- residual values of facilities and vessels at the end of the analysis period or, in the case of vessels, when they are removed from service in Lynn Canal.

Construction costs of existing vessels or ones that would have been built regardless of whether the JAI Project goes ahead are sunk costs. They do not need to be considered. These sunk costs will exist for all alternatives and can be factored out of the analysis. There will be no net difference between alternatives on their account.

In user benefit analysis, sunk costs are explicitly factored out: the analysis is incremental. The project costs that are compared to user benefits are the increase in costs, compared to the "no action" alternative—Alternative 1.

In life-cycle cost or total project life cost analyses, sunk costs are implicitly factored out: the "action" alternatives' costs are defined to include only acquisition costs that are not included in Alternative 1.

Acquisition Costs

Acquisition costs are generally assumed to occur during the six State of Alaska fiscal years 2019 through 2024. Each alternative is scheduled to commence operation July 1, 2025, except Alternatives 1 and 1B, which are assumed to begin operating July 1, 2018. This analysis assumes completion of the two Day Boats ACF–1 and ACF–2 in time for them to be in operation July 1, 2018.

Table 13 sets out the acquisition costs for new facilities or vessels. Road[26] and terminal[27] construction costs were provided by DOT&PF.

TABLE 13

Acquisition Costs
(2016 $000)

		AMHS			
Alternative	Road Construction	New Vessel Acquisition	Terminal Construction	Total	Road & AMHS
1 - No Action	0	0	0	0	0
1B - Enhanced Service	0	0	0	0	0
2B - East Lynn Highway	619,450	24,816	35,989	60,805	680,255
3 - West Lynn Highway	487,329	53,906	54,654	108,560	595,889
4A - Fast Ferry Auke Bay	0	206,776	44,095	250,871	250,871
4B - Fast Ferry Berners Bay	10,172	242,426	65,775	308,201	318,373
4C - Monohull Auke Bay	0	24,816	53,725	78,541	78,541
4D - Monohull Berners Bay	10,172	24,816	75,405	100,221	110,393

New vessel acquisition costs are from Coastwise Corporation's *JAI Marine Segments Technical Report*.[28] The Coastwise report's 2015 costs

[26] "2016 Alt Engineers Estimate Update with Cost Categories" Excel spreadsheet, contained in a January 20, 2017 email from Jim Calvin, McDowell Group, to Milt Barker.
[27] "Ferry Terminal Cost Categories.xlsx" and "Terminal Cost with Categories ID.pdf", contained in a January 20, 2017 email from Jim Calvin, McDowell Group, to Milt Barker.
[28] Attachment D – Revision A, *JAI Marine Segments Technical Report*, Capital Improvements Plan (CIP), Coastwise Corporation, March 2017.

are adjusted to 2016 costs using Bureau of Labor Statistics Producer Price Index for self-propelled ships, non-military.

Table 14 shows the specific terminal improvements and their capital costs, by alternative.

Appendix Tables A–37 through A–44 break out road and terminal acquisition costs into:

- earthwork;
- structures;
- other costs; and
- right of way.

Road right of way costs are assumed to occur during the first year of construction—FY 2019. All other road and terminal acquisition costs are assumed to occur over the six years prior to FY 2025. 10 percent of road and terminal acquisition costs are assumed to occur in the first and sixth years of construction, and 20 percent of such costs in each of the intervening four years.

Replacement costs for "other" road and terminal improvements are required during the life of the project and are included in Appendix Tables A–37 through A–44. They are not included in Table 13.

New acquisition vessels are assumed to be constructed during the two years prior to fiscal year 2025. Construction expenditures will occur in equal amounts each year.

Refurbishment Costs

Appendix Tables A–45 and A–46 show refurbishment costs for new and existing vessels, respectively, by year, for each JAI alternative. Appendix Table A–47 shows vessel replacement costs. These refurbishment and replacement costs are included in Appendix Tables A–37 through A–44.

TABLE 14

Terminal Acquisition Costs[1]
(2016 $000)

Terminal Improvements by Alternative	Earthwork	Structures	Other	Total
1 - No Action				0
1B - Enhanced Service				0
2B - East Lynn Highway				
Katzehin Ferry Terminal & Breakwaters	9,081	10,476	6,803	26,359
Skagway End Berth	0	6,227	3,403	9,630
Total	9,081	16,702	10,205	35,989
3 - West Lynn Highway				
Sawmill Cove Twin Stern Berths	3,063	13,454	5,163	21,680
William Henry Bay Side Berth	1,608	15,794	5,942	23,345
Skagway End Berth	0	6,227	3,403	9,630
Total	4,671	35,476	14,508	54,654
4A - Fast Ferry Auke Bay				
Auke Bay Twin Stern Berths	1,525	38,634	3,936	44,095
4B - Fast Ferry Berners Bay				
Auke Bay Twin Stern Berths	1,525	38,634	3,936	44,095
Sawmill Cove Twin Stern Berths	3,063	13,454	5,163	21,680
Total	4,587	52,089	9,099	65,775
4C - Monohull Auke Bay				
Auke Bay Twin Stern Berths	1,525	38,634	3,936	44,095
Skagway End Berth	0	6,227	3,403	9,630
Total	1,525	44,861	7,339	53,725
4D - Monohull Berners Bay				
Auke Bay Twin Stern Berths	1,525	38,634	3,936	44,095
Skagway End Berth	0	6,227	3,403	9,630
Sawmill Cove Twin Stern Berths	3,063	13,454	5,163	21,680
Total	4,587	58,316	12,502	75,405

Notes:

1. Juneau Access Ferry Terminals, Project Construction Cost Estimate, Project Number 71100, SC Region - Marine Engineering, Alaska Department of Transportation & Public Facilities, March 14, 2016 and "Ferry Terminal Cost Categories.xlsx" contained in 1/20/17 email from Jim Calvin to Milt Barker re: FW: construction cost by category.

We assume that refurbishment costs maintain the value of a vessel according to a straight-line depreciation schedule. We assume that refurbishment does not wholly or partially restore a vessel's value to its original acquisition cost or extend its economic life.

Refurbishment costs for AMHS vessels are based on schedules contained in Attachment D – Revision A of Coastwise Corporation's *JAI Marine Segments Technical Report*.[29] These schedules relate expenditures for refurbishment to a vessel's economic life and acquisition cost. The Coastwise report's 2015 costs are adjusted to 2016 costs using Bureau of Labor Statistics Producer Price Index for self-propelled ships, non-military.

In Appendix Table A–46, existing vessels' refurbishment costs are pro-rated based on the percent of time vessels operated in Lynn Canal in 2013. Except for the *M/V Malaspina*, the percentages are contained in Attachment A Rev B of Coastwise Corporation's *JAI Marine Segments Technical Report*.[30] The actual vessels that would serve Lynn Canal may vary from the ones shown in Appendix Table A–46.

M/V Malaspina refurbishment costs allocated to Lynn Canal are 55.0 percent. The percentage is based on *M/V Malaspina's* operation as a day boat in Lynn Canal during the summer season (22 weeks out of 40 weeks available annually for operation). It is assumed that the rest of *M/V Malaspina's* operations are outside Lynn Canal.

M/V Malaspina is replaced by a *M/V Taku*-equivalent vessel in 2023. A *M/V Taku*-sized vessel will be a better match for the expected Alternative 1B summer day boat traffic, as well as other alternatives' winter mainline traffic if the *M/V Malaspina* is used on those routes. *M/V Taku* refurbishment costs are used in place of *M/V Malaspina's* Alternative 1B refurbishment costs for 2024 and later years, again pro-rated by 55.0 percent.

In all alternatives, the *M/V LeConte* is assumed to be removed from winter service in Lynn Canal before FY 2019, the beginning of the JAI analysis.

Replacement Costs

Table 15 shows construction periods and useful lives for each type of capital improvement.

[29] Attachment D – Revision A, *JAI Marine Segments Technical Report*, *Capital Improvements Plan (CIP)*, Coastwise Corporation, March 2017

[30] Attachment A – Revision B, *JAI Marine Segments Technical Report, AMHS Mainline Operating Costs,* Coastwise Corporation, February 2017.

TABLE 15

Capital Improvements
Construction Periods and Useful Lives

Capital Improvement	Construction Period (Years)	Useful Life (Years)
Road & Ferry Terminals		
Earthwork	6	80
Structures	6	60
Other	6	25
Right of Way	1	100
New Vessels		
Steel displacement vessel	2	60
Aluminum fast vessel	2	32

Of all capital acquisitions, only "Other" costs for roads and ferry terminals have a useful life shorter than the 30 years of project operation from FY 2025–54. We assume that replacement costs for these improvements are the same as their original acquisition costs in 2016 dollars. We assume half of the replacement costs are expended in each of the two years prior to the end of the original improvements' useful lives.

No new vessels acquired for JAI will need to be replaced before FY 2054, based on their ages in that year and useful lives.

Appendix Table A–47 shows the year and cost of existing vessels' replacements that will occur within the FY 2019–54 analysis period. The year of replacement is based on the vessels' age and useful life—60 years for steel displacement vessels and 32 years for FVF's. Replacement costs are from Coastwise Corporation's Attachment B Rev A, *JAI Marine Segments Technical Report*.[31] The Coastwise report's 2015 costs are adjusted to 2016 costs using Bureau of Labor Statistics Producer Price Index for self-propelled ships, non-military.

[31] Attachment B Rev A, *JAI Marine Segments Technical Report, AMHS Vessel Replacement Costs*, Coastwise Corporation, August 2016, 8/24/16 draft.

Only a portion of existing vessels' replacement costs, based on each vessel's service in Lynn Canal, is included in the various alternatives' capital costs. The pro-ration percentages and basis are the same as for refurbishment costs.

We assume replacement costs are expended equally in the two years prior to a vessel's retirement.

Residual Values

Each capital improvement has a useful economic life. The value of a capital improvement declines over the course of its life, until there is no value remaining at the end of its useful life. At any point in time, the capital asset's remaining value is also referred to as its residual value.

In this analysis, residual values are credited against other capital project costs;

1. when a marine vessel is removed from Lynn Canal service; and

2. when any capital improvement still has a remaining useful life at the end of the study period.

The residual value is a negative number. It is an offset to other capital improvement costs. Appendix Tables A–48 and A–49 show AMHS new and existing vessels' and their replacements' residual values for each year in which a vessel is removed from Lynn Canal service and for FY 2054.

Residual values are included in the analysis to compensate for the fact the FY 2019–54 analysis period does not begin and end with the beginning and end of all capital assets' useful lives. Residual values account for the facts that:

1. in some alternatives, some AMHS vessels leave Lynn Canal service before the end of their useful lives; residual value in the year of removal gives recognition to the economic value made available for uses outside Lynn Canal; and

2. different capital assets have different useful lives; in FY 2054, many assets will still have remaining useful lives; it would be the rare improvement whose useful life happens to end in FY 2054; residual values in FY 2054 allocate capital costs between the study period and the post-study period; this preserves

comparability between alternatives whose acquisitions or replacements have different useful lives.

We generally assume capital improvements have a residual value in FY 2054 equal to their acquisition or replacement cost, multiplied by the ratio of their remaining useful life to their original useful life. Salvage costs or restoration costs are ignored.

Only a portion of existing vessels' residuals, based on each vessel's service in Lynn Canal, is included in the various alternatives' capital costs. The pro-ration percentages and basis are the same as for refurbishment costs.

The residual value is an estimate of market value. It represents what the proceeds might be from sale of an asset if it were removed from service in the JAI project. It also represents what another party, or AMHS in the case of ferry vessels, might pay to acquire the asset for use in another transportation project.

It may well be that assets used in JAI would have little market value for another party, or in another project. The market for U.S.-built ferry vessels can be non-existent at times. It is not readily apparent what, if any, alternative use might be made of highway improvements. Still, the depreciated replacement cost approach used in this study to estimate residual values provides a reasonable estimate of market value to the extent:

1. marine vessels might be employed elsewhere in AMHS service; or

2. the JAI project remains in place beyond FY2054.

Despite its shortcomings, depreciated replacement cost serves as an unbiased cost allocation scheme for comparability among JAI alternatives. It also approximates what actual cash flows would be for each alternative, if unexpired capital assets were liquidated when removed from Lynn Canal service or when FY 2054 arrived. Cash flow is the basis for measuring benefits and costs in a benefit-cost analysis. It correctly accounts for the opportunity cost or time value of money.

The method used to estimate residual value is the same as the accounting procedure for straight-line depreciation. This does not mean that capital costs are the same as the cumulative depreciation for a project.

Most capital costs occur during the first six years of the project. Their present values will be close to the actual cash outlays. The credit for residual value will be very small in present value because the residual value is realized so far in the future. The net capital costs—the present value of acquisition costs minus the present value of residual value—will be much greater than the present value of the annual depreciation charges during the life of the project.

Costing capital improvements through an annual depreciation charge over the life of a project would be at odds with present value analysis. Present value analysis measures costs as of the time resources are expended—i.e., on a cash basis. This is appropriate for economic evaluation.

Terminal Values

An alternative to residual values would be to estimate the costs and benefits of the project to infinity. Pragmatically, this usually requires cutting off the detailed analysis after some finite number of years. When the residual value represents the net present value of the project from the end of the study period to infinity, it is often called the terminal value.

Given the complexity of the model used to estimate JAI benefits and costs and the alternatives' varying useful lives, there are no simple algorithms to estimate net present values to infinity. The difference between a residual value of capital assets and a terminal project value is minimized because both values are realized in FY 2054, 36 years into the future. Such distant values have very small present values. Their effect on the rankings of alternatives is likely to be de minimus.

One might assume that the residual value approach stumbles when the end of the analysis period occurs around the time major capital expenditures would occur for replacement of assets. For example, what if alternative Z required $50 million to replace a marine vessel in FY 2057? Wouldn't it rank better than it should against other alternatives that did not require such expenditure? Aren't the costs for alternative Z understated in the big picture because of the arbitrary study cut-off of FY 2054?

No. If one extended the analysis to FY 2057, it would indeed recognize the additional expenditures of $50 million during FY 2055–56. But, it would also recognize an offsetting residual value of $50 million, less one year's depreciation, in FY 2057. The net result would be very little

change in the capital costs for the alternative, especially in present value in FY 2019.

Extending the analysis beyond FY 2057 to capture a more significant portion of the replacement vessel's useful life would merely perpetuate the problem. At some point along the way, another capital asset with a different useful life will expire and need replacement.

Operating Costs

Appendix Tables A–50 through A–57 show the operating costs for each alternative. Ferry terminal operating costs are included in the estimates of vessel operating costs as an overhead item.

Highways

Highway operating costs consist of highway maintenance and avalanche control costs. Highway maintenance and avalanche control costs were provided by AK DOT&PF.

AK DOT&PF's estimates, at 142.5 lane-miles for East Lynn and 102.5 lane-miles for West Lynn Highways, would place total maintenance costs, including avalanche control, for these alternatives at$17,033 and $21,136 per lane mile, respectively. This is roughly double the $9,041 average cost for highway maintenance throughout Southeast Alaska.[32] However, as the "Attachment C, Juneau Access Improvements Project, Highway Maintenance Cost Estimates" document states,

> "…it reflects additional personnel and assets assigned to the highway to address the snowfall and avalanche activity expected on this route.
>
> These cost estimates are intended to represent the cost of providing seven days per week highway maintenance during winter, and routine summer maintenance…
> Staffing levels for each alternative are estimated to provide an adequate winter level of service, but do not provide active snow plowing and patrolling 24 hours per day. During major snow storms and heavy avalanches, staffing would not be adequate to

[32] "Attachment C, Juneau Access Improvements Project, Highway Maintenance Cost Estimates", Southeast Region Maintenance & Operations, AK DOT&PF, December 28, 2016.

ensure trafficable roads at all times, and highway closures for avalanche monitoring and clean-up will be necessary..."

Vessels

Operating costs for vessels are also shown in Appendix Tables A–50 through A–57. They are delineated in three categories—Haines – Skagway shuttle, Lynn Canal, and Mainline. Lynn Canal is everything other than the shuttles and mainline vessels. These costs are from Coastwise Corporation's, *JAI Marine Segments Technical Report,* Attachment A – Revision B for mainline vessels'[33] and Attachment C – Revision A for all other vessels' operating costs[34].

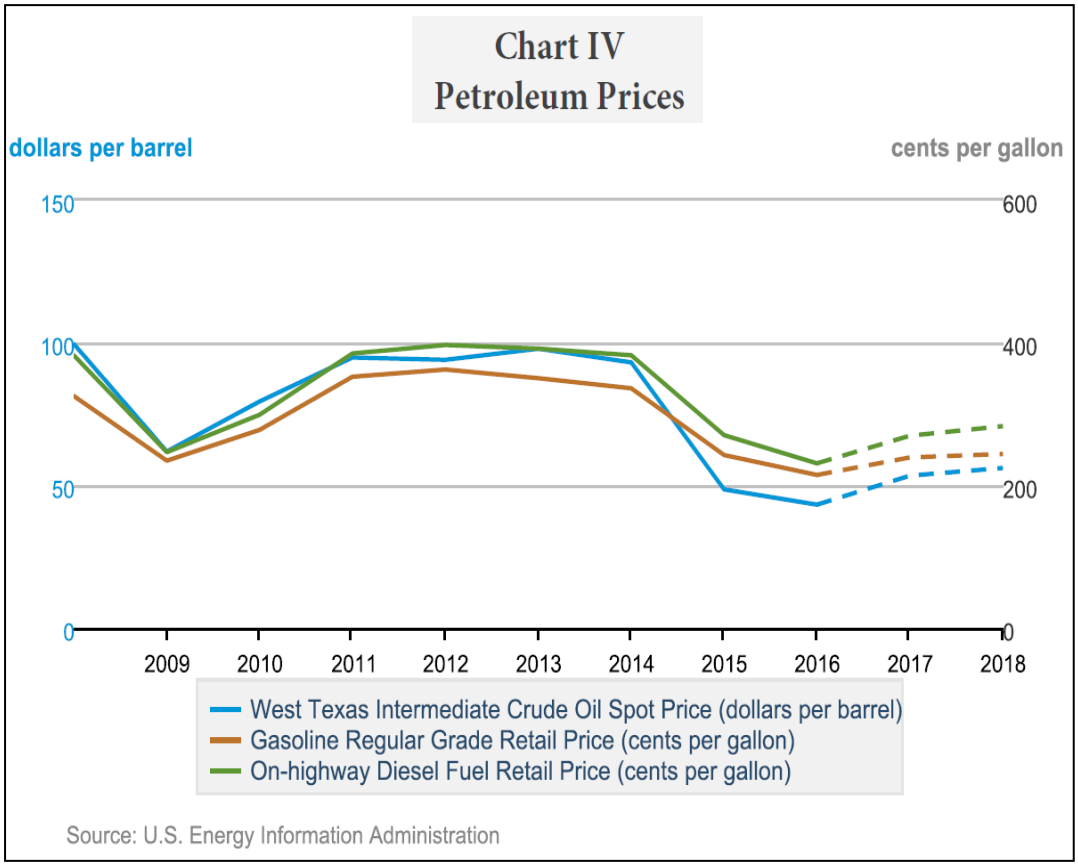
The Attachment A – Revision B's 2013 dollar costs for non-fuel expenses for the mainline vessels are adjusted to 2016 dollars by the 2.57 percent 2013 to 2016 change in the Anchorage CPI-U. The Attachment C – Revision A's 2015 dollar costs for non-fuel expenses for the Haines-Skagway Shuttle and Lynn Canal vessels are adjusted to 2016 dollars by the 0.42 percent 2015 to 2016 change in the Anchorage CPI-U.

Only a portion of operating costs are allocated to Lynn Canal for existing vessels. Mainline pro-ration is shown in the aforementioned Attachment A of the *JAI Marine Segments Technical Report*.

M/V Malaspina's operating costs in Lynn Canal are not pro-rated. Rather they are calculated directly in the aforementioned Attachment C of the *JAI Marine Segments Technical Report*. They reflect *M/V Malaspina's* post-FY 2018 Alternative 1B Auke Bay – Skagway Day Boat service.

This study's estimates of fuel costs for both vehicles and ferries reflect similar real price increases from recent price bottoms in 2015–16. Chart IV shows this recent bottoming out of prices, as well as the correlation in price among crude oil and petroleum products.

[33] Attachment A – Revision B, *JAI Marine Segments Technical Report, AMHS Mainline Operating Costs*, Coastwise Corporation, February 2017.
[34] Attachment C – Revision A, *JAI Marine Segments Technical Report,* Coastwise Corporation, March 2017.



Coastwise Corporation's AMHS fuel costs are based on a price of $3.34 per gallon for #2 low sulfur marine diesel. This was AMHS' average annual price for each of fiscal years 2013, 2014, and 2015. The $3.34 price was 43.7 percent above Oil Price Information Service' (OPIS') average FY 2015 Seattle price of $2.33 per gallon for low sulfur and ultra-low sulfur #2 marine diesel.

Regular gasoline costs for vehicles in this study are estimated at $4.122 per gallon. $4.122 per gallon was the average monthly price of regular gasoline in Juneau, Haines, and Skagway for October 2012 through October 2013 from GasPriceData.com. The $4.122 price reflects a 43.8 percent increase in real gas prices from the 2016 $2.866 weighted average price of unleaded gasoline in Juneau, Haines, and Skagway (weighted by sales counts) from OPIS.

The Alaska Department of Revenue's (DOR's) *Revenue Sources Book, Spring 2017* projects a 43.9 percent increase in real Alaska North Slope

(ANS) crude oil prices between FY 2017 and FY 2026.[35] Thus, the 43.7 percent and 43.8 percent respective real increases in AMHS' and highway vehicles' fuel costs are commensurate with DOR's forecast of real price increases for ANS crude oil.

Present value analysis, using a 7.0 percent discount rate, demonstrates that using constant $3.34 per gallon AMHS and $4.122 per gallon highway vehicle fuel costs in the benefit-cost analysis results in the same average fuel price during 2019–54 as using the more recent $2.33 AMHS fuel and $2.866 gasoline prices with annual price increases from 2016 through 2026 at the *Revenue Sources Book, Fall 2016*'s projected real growth rates. The *Revenue Sources Book, Fall 2016* expects inflation to account for most of petroleum price increases by 2026.

Revenues

Project revenues consist of highway fuel taxes and AMHS fare, stateroom, and passenger service revenues. Appendix Tables A–58 through A–65 show the calculation of revenues, for each alternative, from traffic in and out of Juneau. Revenue from stateroom and passenger services is shown in these tables under the heading "On-Board Services". Appendix Tables A–66 through A–73 show the revenue calculations for Haines – Skagway local traffic.

Appendix Tables A–75 through A–78 show the estimation of average on-board service revenue per vehicle, by JAI Alternative. Each Alternative's average on-board service revenue depends on the proportion of the Alternative's traffic traveling on Day Boat ACF or FVF, Mainline, and Malaspina Day Boat service.

These traffic proportions by vessel type are estimated in Appendix Table A–77, based on the summer and winter average daily round-trip capacities shown in Appendix Tables A–13 and A–14, by Alternative, by link (JUN–HNS vs. JUN–SGY), and by vessel type. The traffic proportions reflect weighted-averages of these capacities, weighted by the summer vs. winter traffic proportions from Appendix Tables A–6 (JUN–HNS) and A–10 (JUN–SGY) and the link proportions of traffic (JUN–HNS vs. JUN–SGY) from Appendix Table A–4.

[35] The real price increase is derived from *Revenue Sources Book, Spring 2017*'s nominal ANS West Coast crude prices of $50.05 and $88.00 for 2017 and 2026, respectively, net of Callan Associates, Inc. long-term capital markets projection of 2.25 percent annual inflation, contained in the *Revenue Sources Book Fall 2016's* Chapter 7, Table 2.

On-board revenue for shuttle traffic, which includes all local Haines–Skagway traffic and all traffic for Alternatives 2B and 3, is assumed to be de minimus and not included.

Day Boat ACF and FVF average on-board revenues are assumed to equal the Fairweather FY 2012–2015 revenue per vehicle ($2016), shown in Table A–76. Neither the ACF's nor the FVF's, including the Fairweather, have staterooms and no revenue from staterooms is included in their revenue per vehicle. Food and beverage service on the ACF's and FVF's would be similar to the Fairweather, consisting of a cold buffet/food court.

Mainline and Malaspina average revenues per vehicle are based on their respective average FY 2012–2015 revenues per vehicle, except that the Malaspina's stateroom revenues are excluded, because it would only operate as a Day Boat, in Alternative 1B.

Highway fuel taxes are estimated using the current federal tax rate of 18.4 cents per gallon of gasoline and 8.95 cents per gallon for the State. Gallons taxed are estimated from each alternative's average road miles, and gallons of fuel consumed per mile, derived from Table 11.

Table 11 indicates the average fuel cost per mile for the assumed Lynn Canal vehicle fleet is 18.12 cents per mile, at a fuel cost of $4.122 per gallon. This equals 0.044 gallons per mile or 22.8 miles per gallon. Table 5.5 of AASHTO's user benefit guidebook[36] estimates average automobile fuel consumption at 45 mph at 0.042 gallons per mile. 0.044 gallons per mile is used to estimate gasoline consumption, recognizing that a small un-estimated portion of the Lynn Canal fleet would consist of trucks with higher fuel consumption. The 0.044 gallons per mile fuel consumption maintains consistency with the fuel costs per mile used in the user benefit calculations.

Fuel tax revenue is estimated for each alternative by multiplying each year's projected traffic (AADT x 365) by the:

1. average number of road miles between origin and destination;

2. weighted average fuel consumption of 0.044 gallons per mile; and

3. the appropriate federal or State tax rate.

[36] Table 5–5, *User and Non-User Benefit Analysis for Highways*, AASHTO, September 2010.

AMHS fare revenue for each year is computed as the product of the average fare between origin and destination and the number of users (AADT x 365 x users per vehicle). Users per vehicle for Juneau – Haines and Skagway are 2.3 and 3.3 for road and marine alternatives, respectively. Users per vehicle are 2.3 for Haines – Skagway local travelers.

Appendix Tables A–13 and A–14 show the calculation of the average road miles and average fares between Juneau and Haines or Skagway. Appendix Table A–21 shows the average miles and fares for Haines and Skagway local traffic.

The JAI alternatives can be evaluated by a number of measures. Some are measures of economic efficiency. They consider the benefits received as well as project costs. Other measures look at project cost alone.

As explained in the introduction, net present value is the best measure of a project's economic value to society as a whole. But, if budgets constrain what can be spent, other measures such as benefit/cost ratios, life-cycle cost, total project life costs, or State funds may be relevant to project selection.

One can also look at the projects' impact on users, without considering project costs. Of course, since users do not pay the full costs of the project, this is not a sufficient basis for making a decision.

Economic Efficiency

Project selection based on economic efficiency would be guided by net present value (NPV), or if funding were constrained, but available for projects besides JAI, by benefit/cost (B/C) ratios. Tables 16 and 17 below show NPV and B/C ratios for all alternatives.

NPV

The tables break out the present values of user benefits and project costs to provide a more comprehensive picture of the alternatives. User benefits minus project costs equals net present value. User benefits divided by project costs equals the B/C ratio. Appendix Table A–74 provides a breakdown of project cost present values into capital costs, operating costs, and government revenues.

Table 16 shows the results when all fund sources are included in project costs. This provides the alternatives' economic efficiency with respect to the U.S. economy.

Table 17 shows the results when only State funds are included in project costs. This table's NPV's and B/C ratios might be of interest in more narrowly evaluating alternatives from the standpoint of the State's self-interest. But, use of federal or other fund sources is rarely without cost,

either in terms of other projects foregone or drawing down the State's political capital in the competition for funds.

TABLE 16

Economic Efficiency
Total Funds
(2016 $000)

Alternative	User Benefits	Incremental Net Project Costs (vs. No Action)	NPV	Benefit/Cost Ratio
	2019-54 Present Value as of 7/1/18 @ Private Sector Rate of Return			
1 - No Action	0	0	0	1.00
1B - Enhanced Service	24,383	159,089	(134,706)	0.15
2B - East Lynn Highway	127,971	478,783	(350,812)	0.27
3 - West Lynn Highway	70,324	400,877	(330,553)	0.18
4A - Fast Ferry Auke Bay	38,184	240,659	(202,475)	0.16
4B - Fast Ferry Berners Bay	53,758	265,128	(211,370)	0.20
4C - Monohull Auke Bay	10,198	85,201	(75,003)	0.12
4D - Monohull Berners Bay	35,496	61,364	(25,868)	0.58

Considering all funds, none of the alternatives have benefits that exceed their costs. Of the "action" alternatives, Alternative 4D would produce the smallest economic loss. The road alternatives show the greatest losses, followed by the FVF alternatives.

If one were using B/C ratios to evaluate JAI alternatives against other projects, Alternative 4D also would have the best B/C ratio—but a ratio below 1.0, meaning it wouldn't be in the running, if economic efficiency is the criterion. What project, if any, to select under a budget constraint would, of course, depend as well on the amount of funds available and the B/C ratios for projects other than JAI.

Looking only at State funds (Table 17), Alternatives 2B, 3, and 4D have positive NPV's, with 2B being the greatest. Alternative 4D has the second highest NPV. Alternative 4D is unique in that it reduces costs, while increasing benefits.

TABLE 17

Economic Efficiency
State Funds
(2016 $000)

Alternative	User Benefits	Incremental Net Project Costs (vs. No Action)	NPV	Benefit/Cost Ratio
	2019-54 Present Value as of 7/1/18 @ Private Sector Rate of Return			
1 - No Action	0	0	0	1.00
1B - Enhanced Service	24,383	78,335	(53,952)	0.31
2B - East Lynn Highway	127,971	46,008	81,963	2.78
3 - West Lynn Highway	70,324	27,620	42,704	2.55
4A - Fast Ferry Auke Bay	38,184	93,492	(55,308)	0.41
4B - Fast Ferry Berners Bay	53,758	58,434	(4,676)	0.92
4C - Monohull Auke Bay	10,198	40,560	(30,363)	0.25
4D - Monohull Berners Bay	35,496	(8,308)	43,804	(4.27)

Table 18 below shows the rankings of the alternatives' NPV's, in terms of both total funds and State funds. The rankings reflect the NPV's in Tables 16 and 17, with "1" being the greatest NPV.

TABLE 18

Alternative Rankings
Economic Efficiency (highest = 1)

Alternative	Net Present Value Total Funds	State Funds
1 - No Action	1	4
1B - Enhanced Service	4	7
2B - East Lynn Highway	8	1
3 - West Lynn Highway	7	3
4A - Fast Ferry Auke Bay	5	8
4B - Fast Ferry Berners Bay	6	5
4C - Monohull Auke Bay	3	6
4D - Monohull Berners Bay	2	2

B/C Ratios

B/C rankings are omitted in Table 18. The B/C rankings can produce misleading results because B/C ratios are not sensitive to scale. For example, in Table 16, Alternative 2B has a higher B/C ratio than Alternative 1B, but Alternative 2B's NPV loss is more than double Alternative 1B's.

The B/C ratios shown in Tables 16 and 17 would probably be useful only as a starting point for evaluating a given JAI alternative against projects other than JAI, under limited budgets. See the discussion under "Benefit Cost (B/C) Ratios" in the Introduction.

Appendix Tables A–1 and A–2 show how second order incremental B/C ratios can be used to compare the mutually exclusive JAI alternatives against each other. Use of second order B/C ratios would result in Alternative 1 in the case of total funds, or Alternative 2B in the case of State funds, being preferred on economic grounds. The result is the same as using NPV for evaluation.

Cost-Effectiveness

Project selection could be made on the basis of cost-effectiveness. An alternative is cost-effective if it has the lowest life-cycle cost (LCC) or total project life cost among all alternatives with a given amount of benefits.

Cost-effectiveness may be an appropriate criterion in the face of budgetary constraints. It would be the most practical criterion if all alternatives have the same benefits, or if it is impractical to assign dollar values to benefits.

If near-term, i.e., construction period, budgetary constraints are looming larger in importance, one can use B/C ratios, rather than LCC or total project life costs for alternative selection. This would bring economic efficiency into the picture, but still allow budgetary limits to be placed on project selection. It would explicitly weigh the project's benefits to its users, against its costs.

Another way to bring an element of efficiency into cost-effectiveness is to put cost-effectiveness measures on a per vehicle or per user basis. This study provides total project life cost measures on a per vehicle and per user basis. They are a partial measure of efficiency because they reflect the differing traffic demand under the various alternatives'

differing user costs, but omit the savings to users from the differing user costs.

If budgetary constraint is expected to become more severe over time, then total project life costs may be the most relevant criterion. This avoids discounting future costs for the time value of money.

Too much uncertainty about benefits might also argue for use of a cost-effectiveness standard, though there are analytical methods to address uncertainty. In this report, risk analyses and sensitivity analyses provide some feel for the project's uncertainty.

Life-Cycle Costs

Table 19 shows the present values of the life-cycle costs of each alternative, in terms of total funds.

TABLE 19

Life-Cycle Costs
Total Funds
(2016 $000)

	2019-54 Present Value as of 7/1/18 @ State Cost of Capital & Opportunity Cost				
Alternative	Capital Costs	Operating Costs	Total Costs	Revenue	Net Costs
1 - No Action	118,943	322,211	441,155	(142,508)	298,647
1B - Enhanced Service	235,578	468,351	703,929	(196,926)	507,003
2B - East Lynn Highway	511,324	355,717	867,041	(175,413)	691,627
3 - West Lynn Highway	466,805	369,727	836,532	(206,868)	629,664
4A - Fast Ferry Auke Bay	416,635	514,123	930,758	(220,456)	710,302
4B - Fast Ferry Berners Bay	514,708	508,136	1,022,844	(273,892)	748,952
4C - Monohull Auke Bay	183,572	377,351	560,923	(163,182)	397,741
4D - Monohull Berners Bay	207,093	396,677	603,770	(253,541)	350,229

Looking at total costs in Table 19, we see that Alternative 1 involves the smallest amount of government outlays, followed by Alternative 4C.

If we consider net project costs, Alternative 1 is still the cheapest, but Alternative 4D moves into second place—or first place among the

"action" alternatives. Whether project revenues are considered or not, all of the road alternatives cost less than the two fast ferry alternatives—Alternatives 4A and 4B, but more than the other marine alternatives—Alternatives 1B, 4C, and 4D.

Table 20 shows LCC rankings. Alternative 1 is the lowest cost alternative. Either Alternative 4C or 4D would be the least cost alternative among the "action" candidates.

TABLE 20

Alternative Rankings
Life-Cycle Costs
Total Funds
(lowest cost = 1)

Alternative	Total Cost	Net Cost
1 - No Action	1	1
1B - Enhanced Service	4	4
2B - East Lynn Highway	6	6
3 - West Lynn Highway	5	5
4A - Fast Ferry Auke Bay	7	7
4B - Fast Ferry Berners Bay	8	8
4C - Monohull Auke Bay	2	3
4D - Monohull Berners Bay	3	2

Total Project Life Costs

Tables 21 and 22 show the total project life costs of each alternative. Total project life costs are unique in this report in three respects:

- they are not discounted for the time value of money;
- they are presented both with and without the residual values of capital improvements deducted from costs; and

- without residual values deducted, total project life costs are equal to the capital and operating constant dollar appropriations that would be required for the JAI Project during FY 2019–54.

Residual values are the value of capital improvements remaining at the end of the analysis in FY 2054 or when an AMHS vessel is removed from service in Lynn Canal.

In contrast to Table 21, the total project life costs in Table 22 do have residual values deducted from capital project costs. The residual values of capital improvements serve travelers using the JAI improvements beyond FY 2054, or not using JAI at all, in the case of vessels removed from Lynn Canal service.

TABLE 21

Total Project Life Costs[1]

FY 2019-54

(2016 $000)

Alternative	Total Funds					State Funds				
	Capital Costs	Operating Costs	Total Costs	Revenue	Net Costs	Capital Costs[2]	Operating Costs	Total Costs	Revenue	Net Costs
1 - No Action	236,531	658,914	895,445	(292,226)	603,219	21,359	658,914	680,273	(292,196)	388,077
1B - Enhanced Service	414,481	957,766	1,372,247	(403,837)	968,410	37,428	957,766	995,194	(403,793)	591,400
2B - East Lynn Highway	896,410	740,235	1,636,645	(376,600)	1,260,046	80,946	740,235	821,181	(370,924)	450,257
3 - West Lynn Highway	826,907	774,241	1,601,148	(453,003)	1,148,145	74,670	774,241	848,911	(448,658)	400,253
4A - Fast Ferry Auke Bay	720,834	1,124,706	1,845,540	(481,565)	1,363,975	65,091	1,124,706	1,189,797	(481,521)	708,276
4B - Fast Ferry Berners Bay	853,537	1,110,176	1,963,713	(611,365)	1,352,348	77,074	1,110,176	1,187,250	(610,873)	576,377
4C - Monohull Auke Bay	338,189	792,746	1,130,935	(342,445)	788,490	44,731	792,746	837,477	(342,411)	495,066
4D - Monohull Berners Bay	376,902	839,652	1,216,554	(561,931)	654,624	45,351	839,652	885,003	(561,434)	323,569

Notes:

1. Residuals are not subtracted from capital costs. The figures in the Capital Costs, Operating Costs, and Total Costs columns for Total Funds and State Funds are the amounts of appropriations that would be required in constant dollars.

2. State Funds Capital Costs for all alternatives except Alternatives 1 and 1B consist of the greater of the required 9.03 percent State match for acquisition costs or $21.3 million in existing State general fund appropriations that will be used for acquisition costs, plus the required 9.03 percent State match for Federal funds for all other capital costs--replacements and vessel refurbishments. Alternatives 1 and 1B have no acquisition costs--road, terminal, or new vessel construction during the first six years of analysis, FY 2019-2024.

TABLE 22

Total Project Life Costs less Residual Values
FY 2019-54
(2016 $000)

	Total Funds					State Funds				
Alternative	Capital Costs	Operating Costs	Total Costs	Revenue	Net Costs	Capital Costs[1]	Operating Costs	Total Costs	Revenue	Net Costs
1 - No Action	128,387	658,914	787,301	(292,226)	495,075	11,593	658,914	670,507	(292,196)	378,311
1B - Enhanced Service	254,726	957,766	1,212,492	(403,837)	808,655	23,002	957,766	980,768	(403,793)	576,974
2B - East Lynn Highway	415,664	740,235	1,155,900	(376,600)	779,300	37,534	740,235	777,770	(370,924)	406,846
3 - West Lynn Highway	392,881	774,241	1,167,122	(453,003)	714,119	35,477	774,241	809,718	(448,658)	361,060
4A - Fast Ferry Auke Bay	496,277	1,124,706	1,620,984	(481,565)	1,139,418	44,814	1,124,706	1,169,520	(481,521)	687,999
4B - Fast Ferry Berners Bay	607,519	1,110,176	1,717,695	(611,365)	1,106,330	54,859	1,110,176	1,165,035	(610,873)	554,162
4C - Monohull Auke Bay	188,382	792,746	981,128	(342,445)	638,683	31,204	792,746	823,949	(342,411)	481,539
4D - Monohull Berners Bay	207,863	839,652	1,047,515	(561,931)	485,584	30,087	839,652	869,738	(561,434)	308,305

Notes:

1. State Funds Capital Costs for all alternatives except Alternatives 1 and 1B consist of the greater of the required 9.03 percent State match for acquisition costs or $21.3 million in existing State general fund appropriations that will be used for acquisition costs, plus the required 9.03 percent State match for Federal funds for all other capital costs--replacements and vessel refurbishments, net of residuals. Alternatives 1 and 1B have no acquisition costs--road, terminal, or new vessel construction during the first six years of analysis, FY 2019-2024.

Table 23 contains the total AADT, vehicles, and users over the 36-year analysis period of FY 2019–54.

TABLE 23

Vehicles and Users
FY 2019-54

Alternative	AADT	Vehicles	Users
1 - No Action	3,720	1,357,867	4,161,894
1B - Enhanced Service	5,593	2,041,288	6,417,182
2B - East Lynn Highway	25,718	9,387,056	21,761,008
3 - West Lynn Highway	21,416	7,816,672	18,149,125
4A - Fast Ferry Auke Bay	5,629	2,054,568	6,461,006
4B - Fast Ferry Berners Bay	8,476	3,093,908	9,890,829
4C - Monohull Auke Bay	4,221	1,540,608	4,764,940
4D - Monohull Berners Bay	8,007	2,922,588	9,325,473

The table reflects the 3.3 and 2.3 users per vehicle for the Juneau – Haines and Skagway marine and highway alternatives, respectively, and the 2.3 users per vehicle for Haines – Skagway local traffic.

The total project life costs in Table 22 can be used to calculate total project life costs on a per vehicle and per user basis, in Table 24. The Table 22 figures are the appropriate costs for this purpose, given that we are talking about vehicles and travelers using JAI during FY 2019–54.

TABLE 24

Total Project Life Costs less Residual Values
per Vehicle and User
FY 2019-54
(2016 $)

	Total Costs				Net Costs			
	per Vehicle		per User		per Vehicle		per User	
Alternative	Total Funds	State Funds	Total Funds	State Funds	Total Funds	State Funds	Total Funds	State Funds
1 - No Action	580	494	189	161	365	279	119	91
1B - Enhanced Service	594	480	189	153	396	283	126	90
2B - East Lynn Highway	123	83	53	36	83	43	36	19
3 - West Lynn Highway	149	104	64	45	91	46	39	20
4A - Fast Ferry Auke Bay	789	569	251	181	555	335	176	106
4B - Fast Ferry Berners Bay	555	377	174	118	358	179	112	56
4C - Monohull Auke Bay	637	535	206	173	415	313	134	101
4D - Monohull Berners Bay	358	298	112	93	166	105	52	33

Table 25 shows the alternatives' rankings for total project life costs, and total project life costs less residual values. On a net cost, State funds basis, Alternative 4D has the lowest total project life cost. This means that Alternative 4D would require the least amount of constant dollar State general fund capital and operating appropriations over FY 2019–54. With residuals deducted, Alternative 4D has the lowest net cost on both a total funds basis, and on a State funds basis. By all other measures, Alternative 1 has the lowest cost, including all measures of total cost (i.e., without deducting revenues), whether tallying total funds, or only State funds.

With residuals deducted, the total project life costs are equivalent to life-cycle costs with a zero discount rate. The total project life costs rankings in Table 25 are essentially a sensitivity case for LCC with a zero discount rate. As such, the total funds rankings, whether residuals are deducted or not, are similar to the LCC total funds rankings in Table 20. LCC analysis puts the "no action" alternative as the least costly, and either Alternative 4C or 4D as the least costly "action" alternative, depending on whether the measure is total costs or net costs.

TABLE 25

Alternative Rankings
Total Project Life Costs
(lowest cost = 1)

Alternative	Total Project Life Costs				Total Project Life Costs less Residual Values			
	Total Costs		Net Costs		Total Costs		Net Costs	
	Total Funds	State Funds	Total Funds	State Funds	Total Funds	State Funds	Total Funds	State Funds
1 - No Action	1	1	1	2	1	1	2	3
1B - Enhanced Service	4	6	4	7	6	6	6	7
2B - East Lynn Highway	6	2	6	4	4	2	5	4
3 - West Lynn Highway	5	4	5	3	5	3	4	2
4A - Fast Ferry Auke Bay	7	8	8	8	7	8	8	8
4B - Fast Ferry Berners Bay	8	7	7	6	8	7	7	6
4C - Monohull Auke Bay	2	3	3	5	2	4	3	5
4D - Monohull Berners Bay	3	5	2	1	3	5	1	1

When we look at rankings for total project life costs (less residuals) per vehicle and user, Table 26 indicates Alternative 2B is the least costly under all the cost metrics. Alternatives 3 and 4D rank as the second and third least costly alternatives, respectively, across all measures.

TABLE 26

Alternative Rankings
Total Project Life Costs less Residual Values
per Vehicle and User
(lowest cost = 1)

Alternative	Total Cost				Net Cost			
	per Vehicle		per User		per Vehicle		per User	
	Total Funds	State Funds	Total Funds	State Funds	Total Funds	State Funds	Total Funds	State Funds
1 - No Action	5	6	6	6	5	5	5	6
1B - Enhanced Service	6	5	5	5	6	6	6	5
2B - East Lynn Highway	1	1	1	1	1	1	1	1
3 - West Lynn Highway	2	2	2	2	2	2	2	2
4A - Fast Ferry Auke Bay	8	8	8	8	8	8	8	8
4B - Fast Ferry Berners Bay	4	4	4	4	4	4	4	4
4C - Monohull Auke Bay	7	7	7	7	7	7	7	7
4D - Monohull Berners Bay	3	3	3	3	3	3	3	3

Annual Revenues during Operations

Table 27 shows average annual revenues during the years after all alternatives would be in operation. As with total project life costs, these revenues are not discounted for the time value of money.

TABLE 27

Average Annual Revenues
FY 2025-54
(2016 $000)

Alternative	Total Funds	State Funds	AMHS Revenue
1 - No Action	8,138	8,138	8,137
1B - Enhanced Service	11,247	11,246	11,246
2B - East Lynn Highway	11,083	10,894	10,802
3 - West Lynn Highway	13,630	13,485	13,415
4A - Fast Ferry Auke Bay	14,450	14,448	14,448
4B - Fast Ferry Berners Bay	18,776	18,760	18,752
4C - Monohull Auke Bay	9,812	9,811	9,811
4D - Monohull Berners Bay	17,129	17,112	17,104

User Costs and Benefits

User cost is the cost per one-way trip to the individual users. It is a prime determinant of an alternative's frequency of use. User cost is the basis of the Juneau traffic projections for all alternatives, contained in the *Revised Traffic Forecast Report*.

Haines and Skagway local traffic is not calibrated to user cost. It is estimated in the 2016 *Juneau Access Haines/Skagway Traffic Forecast* based on 2015 traffic and changes in service frequency under each alternative.

TABLE 28

User Cost Comparisons
2017 FSEIS vs. *2006 FEIS*

Alternative	*2006 FEIS*[1] (2004 $)	*2006 FEIS* (2016 $)	*2017 FSEIS* User Costs (2016 $) Average Cost	*2017 FSEIS* User Costs (2016 $) Modal Cost	% of *2006 FEIS* (2016 $) Average Cost	% of *2006 FEIS* (2016 $) Modal Cost
Juneau - Haines and Skagway						
Existing Service	NA	NA	158.37	165.17		
1 - No Action	155.55	203.26	149.69	148.85	74%	73%
1B - Enhanced Service	NA	NA	134.68	134.14		
2B - East Lynn Highway	60.83	79.49	88.32	98.04	111%	123%
3 - West Lynn Highway	67.16	87.76	99.04	109.11	113%	124%
4A - Fast Ferry Auke Bay	116.20	151.84	123.99	121.51	82%	80%
4B - Fast Ferry Berners Bay	100.38	131.16	110.21	113.56	84%	87%
4C - Monohull Auke Bay	152.37	199.10	145.49	138.34	73%	69%
4D - Monohull Berners Bay	124.05	162.10	124.27	122.94	77%	76%
Haines - Skagway						
Existing Service	NA	NA	57.29			
1 - No Action	42.74	55.84	44.46		80%	
1B - Enhanced Service	NA	NA	40.99			
2B - East Lynn Highway	37.65	49.20	42.49		86%	
3 - West Lynn Highway	34.01	44.44	37.50		84%	
4A - Fast Ferry Auke Bay	43.80	57.23	40.29		70%	
4B - Fast Ferry Berners Bay	43.80	57.23	40.29		70%	
4C - Monohull Auke Bay	43.80	57.23	40.29		70%	
4D - Monohull Berners Bay	43.80	57.23	40.29		70%	

Notes:

1. *Juneau Access Improvements, Final Environmental Impact Statement* , Appendix E, User Benefit Analysis, McDowell Group, Inc. and MB Barker, LLC, October 2004.

Table 28 summarizes user costs and compares them to the *2006 FEIS* user costs, adjusted for inflation. For Juneau traffic, *2018 FSEIS* user costs are somewhat higher for the road alternatives, but significantly lower for marine alternatives.

The decline in marine alternative user costs is in spite of an increase in real AMHS fare costs. For example, the *2006 FEIS* Juneau – Skagway

fares for Alternative 4C were $35 per person and $83 per vehicle. In 2016 dollars, they would be about $46 and $108, somewhat less than the $53 per person and $116 per vehicle fares in this *FSEIS*.

The main source of the decline in marine user costs is reduction in user time attributed to frequency delay. For example, *2006 FEIS* Juneau – Skagway frequency delay for Alternative 4C was 7 hours and 25 minutes. In this *FSEIS*, it is 1 hour and 18 minutes.

Average user costs for the two road alternatives are less than any marine alternative. The road alternatives have lower costs mainly because of the inclusion of time as a user cost. The ferry alternatives have a higher cost for time because of the slower travel speeds, as well as the trip frequency delays.

User costs for roads also are lower than for ferries because of the absence of tolls. Ferries charge fares for both passengers and vehicles.

TABLE 29

Traffic and User Costs & Benefits
FY 2019-54
(2016 $)

Alternative	Vehicles	Users	Modal User Costs (Juneau)	User Benefits ($000)
Existing Service			165.17	
1 - No Action	1,357,867	4,161,894	148.85	0
1B - Enhanced Service	2,041,288	6,417,182	134.14	24,383
2B - East Lynn Highway	9,387,056	21,761,008	98.04	127,971
3 - West Lynn Highway	7,816,672	18,149,125	109.11	70,324
4A - Fast Ferry Auke Bay	2,054,568	6,461,006	121.51	38,184
4B - Fast Ferry Berners Bay	3,093,908	9,890,829	113.56	53,758
4C - Monohull Auke Bay	1,540,608	4,764,940	138.34	10,198
4D - Monohull Berners Bay	2,922,588	9,325,473	122.94	35,496

Table 29 summarizes projected traffic, Juneau user costs, and user benefits for FY 2019–54.

User benefits are an aggregate measure of all users' user cost savings for an alternative, compared to the "no action" alternative's user costs. They take traffic into account.

The road alternatives have higher benefits than marine alternatives because they generally reduce user costs more than do marine alternatives. But, road alternatives' benefits are also higher because their lower costs induce more travel.

Because traffic is largely a function of travel cost, it is not surprising that project ranking based on user benefits mirrors the ranking based on user cost to or from Juneau, the largest generator of traffic.[37] See Table 30.

Whether ranked by traffic, user costs, or user benefits, Alternative 2B comes out on top. Alternative 3 ranks second across all measures. Alternative 4B is the best marine alternative by all measures.

[37] Modal user cost (Juneau) and user benefit rankings can differ because, among other things:

- an additional service index and modal constants were used in the *Revised Traffic Forecast Report's* projections of Juneau traffic; and
- Haines – Skagway traffic is not related to the Juneau user costs cited in Tables 28 and 29.

TABLE 30

Alternative Rankings
Traffic and User Costs & Benefits
FY 2019-54

Alternative	Vehicles (highest = 1)	Users (highest = 1)	Modal User Costs (Juneau) (lowest = 1)	User Benefits (highest = 1)
1 - No Action	8	8	8	8
1B - Enhanced Service	6	6	6	6
2B - East Lynn Highway	1	1	1	1
3 - West Lynn Highway	2	2	2	2
4A - Fast Ferry Auke Bay	5	5	4	4
4B - Fast Ferry Berners Bay	3	3	3	3
4C - Monohull Auke Bay	7	7	7	7
4D - Monohull Berners Bay	4	4	5	5

Risk Analyses

Two measures of project risk are an alternative's breakeven point and the variation in its net present value over time.

Breakeven

Breakeven would be the first year in which cumulative net present value turns positive. It is one measure of the alternatives' risks. All other things being equal, the alternative that reaches breakeven sooner would be preferred. This is because the uncertainty of the estimates increases the farther the estimates are into the future.

None of the alternatives reach breakeven within the study period, if we look at total funds. Only the highway alternatives, Alternatives 2B and 3, and Alternative 4D show increases in NPV over time. See Chart V.

But, even these alternatives' gains have flattened out in later years to such an extent that it is questionable if any of them would ever reach breakeven. The upticks in NPV in FY 2054 reflect the credits for residual values in that year.

Chart V shows the diminishing upward trend in cumulative NPV for Alternatives 2B, 3, and 4D—and the downward trend for all other alternatives—over FY 2019–54.

As depicted in Chart V, only Alternative 4D is possibly within striking distance of breakeven, based on the trends through FY 2054.

If we look only at State funds, Alternatives 2B, 3, and 4D reach breakeven—in FY 2031, 2033 and 2029, respectively. As with total funds, Alternatives 2B, 3, and 4D show upward trends in NPV over time. Alternative 4B also trends upward, but so slightly that it can be considered flat. All other alternatives lose ground over time in terms of NPV. See Chart VI.

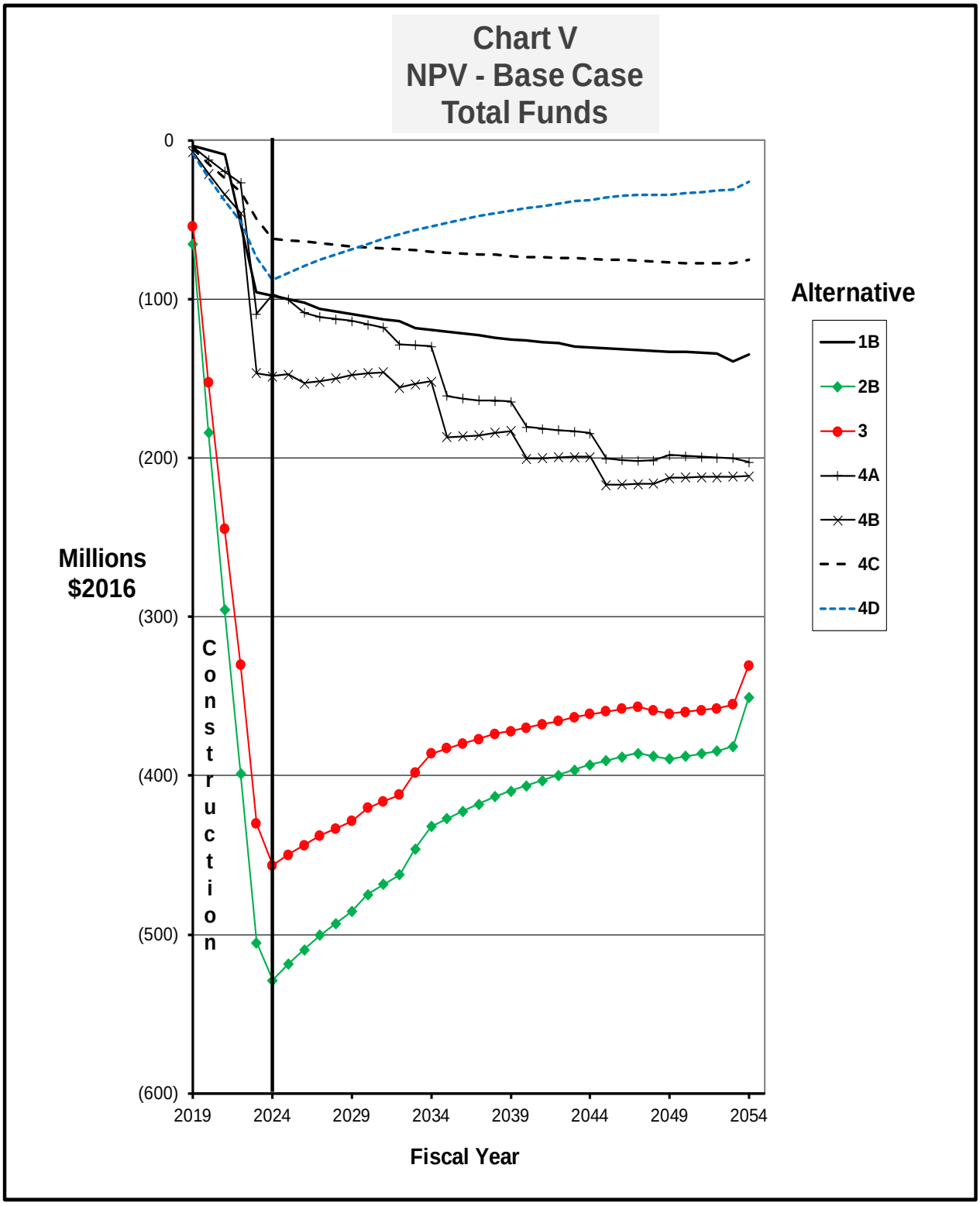


Chart V
NPV - Base Case
Total Funds
0
(100)
(200)
(300)
(400)
(500)
(600)
Millions
$2016
Construction
2019
2024
2029
2034
2039
2044
2049
2054
Fiscal Year
Alternative
1B
2B
3
4A
4B
4C
4D

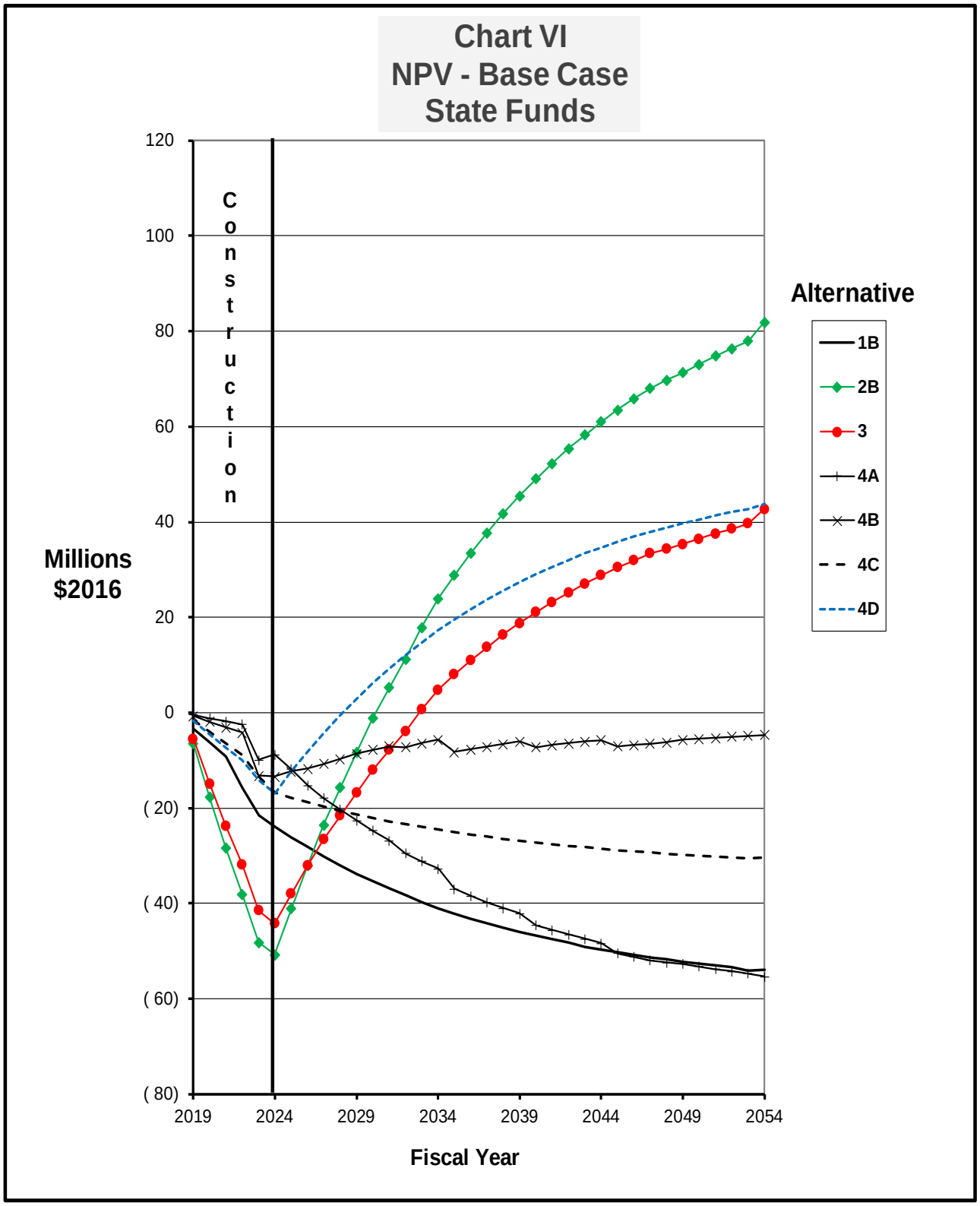


Chart VI
NPV - Base Case
State Funds
120
100
80
60
40
20
0
(20)
(40)
(60)
(80)
Construction
Millions
$2016
2019
2024
2029
2034
2039
2044
2049
2054
Fiscal Year
Alternative
1B
2B
3
4A
4B
4C
4D

Variation in Net Present Value

Of course, the breakeven point does not indicate the magnitude of the risks. Risk is measured by the variation in NPV. All other things being equal, the alternative with the least variation in NPV over time would be preferred.

Risk preferences may differentiate between downside risk and upside risk. Decision-makers are often more averse to downside risk than they are enthusiastic about upside potential.

The road alternatives have the greatest downside risk in terms of total funds, due to their heavy upfront capital costs. However, Alternative 4A has the greatest downside risk in terms of State funds, while marine alternatives operating from Berners Bay have the least. Table 31 shows the variation in cumulative NPV over the study period.

TABLE 31

Variation in Net Present Value
FY 2025-54
(2016 $000)

	Total Funds		State Funds	
Alternative	Min NPV	Max NPV	Min NPV	Max NPV
1 - No Action	NA	NA	NA	NA
1B - Enhanced Service	(139,070)	(100,213)	(54,065)	(26,066)
2B - East Lynn Highway	(518,644)	(350,812)	(41,036)	81,963
3 - West Lynn Highway	(449,702)	(330,553)	(37,899)	42,704
4A - Fast Ferry Auke Bay	(202,475)	(100,108)	(55,308)	(11,843)
4B - Fast Ferry Berners Bay	(216,926)	(145,876)	(12,249)	(4,676)
4C - Monohull Auke Bay	(77,625)	(62,818)	(30,469)	(17,777)
4D - Monohull Berners Bay	(83,363)	(25,868)	(12,404)	43,804

The variation in NPV over time can be seen in Charts V and VI. Charts VII and VIII, below, display the range of this variation specifically.

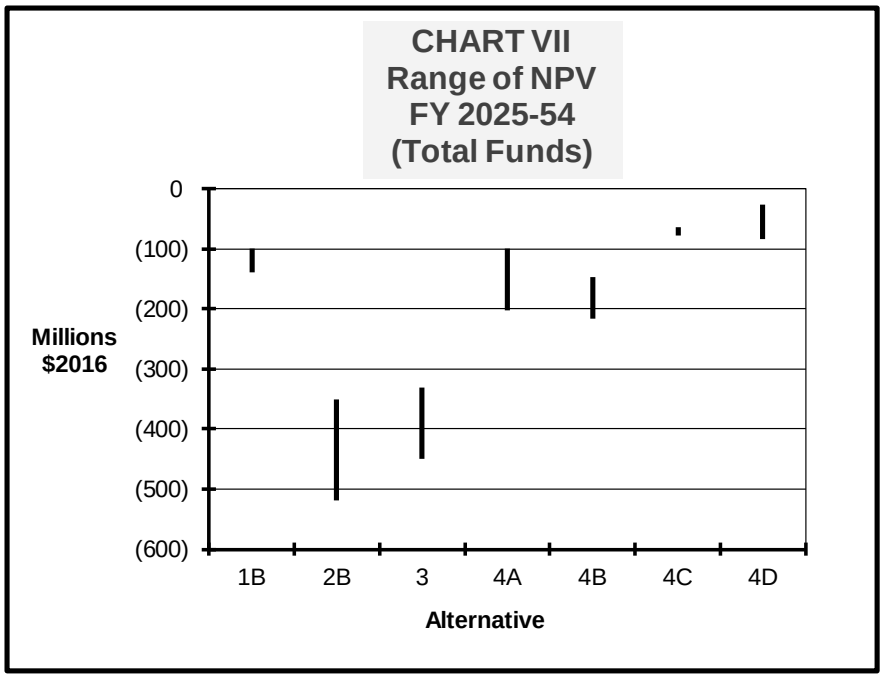


CHART VII
Range of NPV
FY 2025-54
(Total Funds)
0
(100)
(200)
(300)
(400)
(500)
(600)
Millions
$2016
1B
2B
3
4A
4B
4C
4D
Alternative

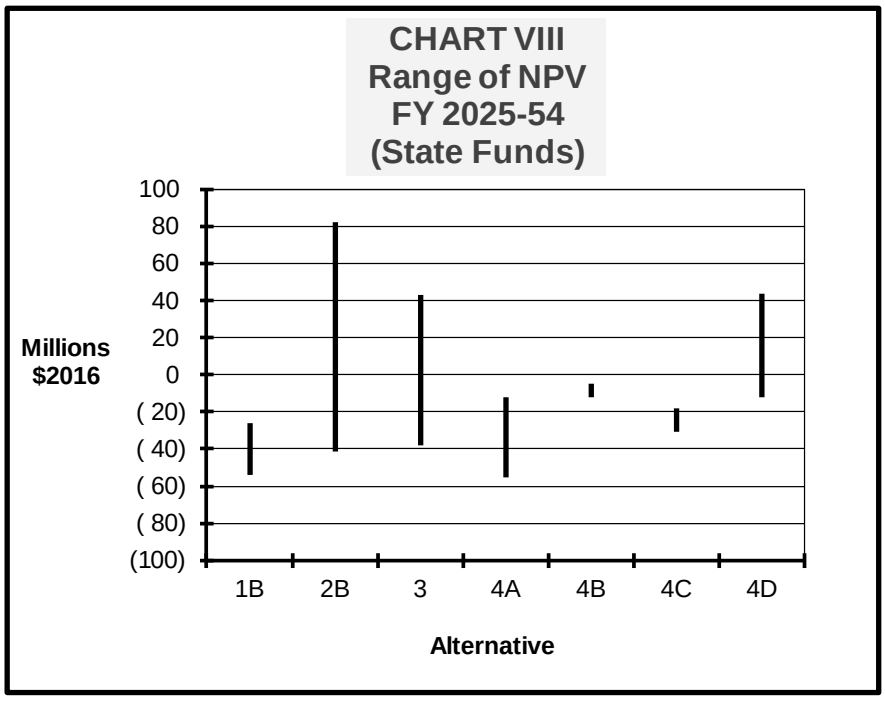


CHART VIII
Range of NPV
FY 2025-54
(State Funds)
100
80
60
40
20
0
(20)
(40)
(60)
(80)
(100)
Millions
$2016
1B
2B
3
4A
4B
4C
4D
Alternative

Sensitivity Analyses

Sensitivity analyses were performed to see the effects of changing certain assumptions. The analyses tested the sensitivity of:

- omitting the modal adjustments to user costs;
- 25 percent construction cost overruns; and
- non-work time value.

As indicated in the earlier discussion of Table 25, total project life costs less residual values can be considered a sensitivity case for life-cycle costs with a zero discount rate. As such, total project life costs, less residuals, produced no change in the LCC rankings of the three least costly alternatives, on a total costs (and total funds) basis. On a net costs (and total funds) basis, LCC's ranking of Alternative 1 as the least costly was displaced by Alternative 4D, under the total project life costs less residuals ranking.

The *2006 FEIS* contained additional sensitivity analyses of excess burden, 50 percent construction cost overruns, no time value for non-work travel, and no frequency delay.

No excess burden analysis has been done because the user benefit analyses indicate project costs exceed user benefits for all alternatives. Adding an excess burden to project costs would only exacerbate the losses.

Because of additional JAI studies and planning undertaken by DOT&PF since 2006, and resulting major revisions of capital costs, the cost overrun analysis has been limited to a 25 percent case.

The *Revised Traffic Forecast Report's* ability to backcast historical AMHS traffic, with a user cost included for travel time, suggests that the idea that there is no user cost for non-work travel time is incorrect. Non-work travel is estimated in this user benefit analysis to represent 80 percent of Alaska resident travel and 95 percent of non-resident travel.

Delay Costs

The *2006 FEIS*' no frequency delay sensitivity case embodied the idea that there was zero cost to users for delay. The *Revised Traffic Forecast Report's* research found that ferry delay time is more costly, not less costly, to users. Their traffic model specified that a minute of ferry delay

was 224 percent more costly to users than a minute of travel on a highway, and almost three times—282 percent—more costly than a minute spent traveling on a ferry.

In addition, the *Revised Traffic Forecast Report* redefined frequency delay to be more attuned to the context of JAI alternatives considered for this *FSEIS*.

The *2006 FEIS* alternatives included all-road connections between Juneau and Skagway. Frequency delay was zero for the all-road alternatives. For marine alternatives, it was defined as one-half the interval between ferry departures during a 16-hour AMHS work-day.

This definition took account of the delay experiences of travelers arriving by road from outside Lynn Canal. It assumed these persons did not have a lot of control over their arrival times in Haines or Skagway, and had few alternative uses of their delay time, while waiting for a ferry. Assuming random arrival times during the interval between ferry departures, the average delay would be one-half the interval.

One-half the interval was also seen as a reasonable measure of delay for persons that could reschedule, including those already present in Lynn Canal communities. The difference between their preferred and actual times of departure would be at most one-half the interval, assuming they could move up their departure to the earlier ferry or wait for the next one.

With this *FSEIS*, no all-road alternatives are under consideration.

In addition, the forecasted traffic from outside Lynn Canal is much diminished. The *2006 FEIS Traffic Forecast Report*[38] estimated 120 AADT out of 500 AADT—24 percent of traffic—on an East Lynn Highway would be road traffic to or from points outside Lynn Canal. *2014 DSEIS's Traffic Forecast Report* contains an estimate of 89 AADT out of 1,133 AADT—8 percent—of traffic generated outside Lynn Canal.[39]

With more of JAI traffic being local to Lynn Canal, the 2017 *Revised Traffic Forecast Report* generally defined delay for the two road

[38] *Appendix C, Traffic Forecast Report, JAI Final Environmental Impact Statement (FEIS)*, Alaska DOT&PF, January 2006.
[39] Table 5, *Juneau Access Improvements Project, Supplemental Environmental Impact Statement, Traffic Forecast Report Draft Revision 4*, Fehr & Peers, July 2013.

alternatives, Alternatives 2B and 3, as one-quarter of the interval between ferry departures.

The assumption is that one-half of these alternatives' traffic will arrive randomly—resulting in average delay for them of one-half the interval—and the other half of Alternatives 2B and 3's travelers will schedule travel to arrive at ferry departure time—i.e., zero delay. This would make for average delay of one-quarter the interval.

Assuming that half of travelers schedule arrival at ferry departure time recognizes the predominance of trip generation coming from Juneau, Haines, and Skagway. The *Traffic Forecast Report* notes that one-quarter of the headway is similar to the Washington State Ferry System's delay assumptions.

Also recognizing the predominance of local Lynn Canal traffic, as well as the greater relative focus of this *FSEIS* on marine alternatives, the *Revised Traffic Forecast Report* adopted a second delay estimation methodology, specific to marine alternatives. Delay for marine alternatives is defined to be the sum of AMHS check-in and unload times.

The foregoing changes in the estimation and definition of delay dramatically reduced user costs for delay time—in one case to as little as one-sixth the delay estimated in the *2006 FEIS*—as noted under the "User Costs and Benefits" heading of this report's "Alternative Evaluation" section. Thus, user benefit analysis results for JAI alternatives should be much less sensitive to differing assumptions about delay costs for users.

Consistency with Traffic Forecast

Traffic projections were not revised for any of the sensitivity analyses. None of the sensitivity analyses would change the utilities upon which the *Revised Traffic Forecast Report's* traffic projections are based.

Modal user costs combine the *Revised Traffic Forecast Report's* user costs and the utility formula weights, which produce the report's traffic projections. Plugging modal user costs into the *Revised Traffic Forecast Report's* model would mean that the ferry user costs' formula weights would need to be set equal to the highway weights for time and dollar costs. Whether using modal user costs or average user costs, the *Revised Traffic Forecast Report's* traffic projections would be the same.

Construction costs do not enter into forecasting traffic. The dollar value of time did not enter into the *Revised Traffic Forecast Report's* projections because time costs were measured in minutes and hours.

Base Case

Table 32 reprises the summary of evaluation measures for the base case, described in this report heretofore. The base case is the best estimate of JAI's benefits and costs.

Table 32 can be compared to the summary tables presented for each sensitivity case. One can then see what difference changing certain assumptions makes.

TABLE 32

Evaluation Summary
Base Case
(2016 $)

Alternative	1	1B	2B	3	4A	4B	4C	4D
Net Present Value of Benefits & Costs ($ Millions)								
Total Funds	0	(134.7)	(350.8)	(330.6)	(202.5)	(211.4)	(75.0)	(25.9)
Rank	1	4	8	7	5	6	3	2
State Funds	0	(54.0)	82.0	42.7	(55.3)	(4.7)	(30.4)	43.8
Rank	4	7	1	3	8	5	6	2
Life-Cycle Costs								
Life-Cycle Costs ($ Millions)								
Total Funds								
Total Costs	441.2	703.9	867.0	836.5	930.8	1,022.8	560.9	603.8
Rank	1	4	6	5	7	8	2	3
Net Costs	298.6	507.0	691.6	629.7	710.3	749.0	397.7	350.2
Rank	1	4	6	5	7	8	3	2
Total Project Life Costs								
Total Project Life Costs ($ Millions)								
Total Funds								
Total Costs	895.4	1,372.2	1,636.6	1,601.1	1,845.5	1,963.7	1,130.9	1,216.6
Rank	1	4	6	5	7	8	2	3
Net Costs	603.2	968.4	1,260.0	1,148.1	1,364.0	1,352.3	788.5	654.6
Rank	1	4	6	5	8	7	3	2
State Funds								
Total Costs	680.3	995.2	821.2	848.9	1,189.8	1,187.3	837.5	885.0
Rank	1	6	2	4	8	7	3	5
Net Costs	388.1	591.4	450.3	400.3	708.3	576.4	495.1	323.6
Rank	2	7	4	3	8	6	5	1
Total Project Life Costs less Residual Values per Vehicle ($)								
Total Funds								
Total Costs	580	594	123	149	789	555	637	358
Rank	5	6	1	2	8	4	7	3
Net Costs	365	396	83	91	555	358	415	166
Rank	5	6	1	2	8	4	7	3
State Funds								
Total Costs	494	480	83	104	569	377	535	298
Rank	6	5	1	2	8	4	7	3
Net Costs	279	283	43	46	335	179	313	105
Rank	5	6	1	2	8	4	7	3
Traffic, User Costs per Trip (Juneau), and User Benefits								
Vehicles (FY 2019–54) (Millions)	1.4	2.0	9.4	7.8	2.1	3.1	1.5	2.9
Rank	8	6	1	2	5	3	7	4
Modal User Costs ($)	149	134	98	109	122	114	138	123
Rank	8	6	1	2	4	3	7	5
Benefits (FY 2019–54) ($ Millions)	0	24.4	128.0	70.3	38.2	53.8	10.2	35.5
Rank	8	6	1	2	4	3	7	5
Breakeven								
Total Funds	—	—	—	—	—	—	—	—
State Funds	—	—	2031	2033	—	—	—	2029
Variation in NPV ($ Millions)								
Total Funds	0	38.9	167.8	119.1	102.4	71.1	14.8	57.5
Rank	1	3	8	7	6	5	2	4
State Funds	0	28.0	123.0	80.6	43.5	7.6	12.7	56.2
Rank	1	4	8	7	5	2	3	6

Notes:

1.Total project life cost less residual values rankings on a per user basis are similar to the rankings on a per vehicle basis See Tables 24 and 26 for per user costs and rankings.

Average User Costs

The alternatives were re-evaluated using average user costs, rather than further adjusting them by the modal weights from the *Revised Traffic Forecast Report*.

Table 33 displays only the evaluation measures for this sensitivity case that are related to user costs or benefits. Purely project cost or traffic-related evaluation measures would not change in values or rank from the base case. The table highlights changes in rankings and breakeven years from the base case.

TABLE 33

Evaluation Summary (Sensitivity Case)
Average User Costs
(2016 $)

Alternative	1	1B	2B	3	4A	4B	4C	4D
Net Present Value of Benefits & Costs ($ Millions)								
Total Funds	0	(132.5)	(318.6)	(296.5)	(204.0)	(201.5)	(80.7)	(25.3)
Rank	1	4	8	7	6	5	3	2
State Funds	0	(51.7)	114.1	76.8	(56.9)	5.2	(36.0)	44.4
Rank	5	7	1	2	8	4	6	3
Traffic, User Costs per Trip (Juneau), and User Benefits								
Vehicles (FY 2019–54) (Millions)	1.4	2.0	9.4	7.8	2.1	3.1	1.5	2.9
Rank	8	6	1	2	5	3	7	4
Modal User Costs ($)	150	135	88	99	124	110	145	124
Rank	8	6	1	2	4	3	7	5
Benefits (FY 2019–54) ($ Millions)	0	26.6	160.2	104.4	36.6	63.6	4.5	36.1
Rank	8	6	1	2	4	3	7	5
Breakeven								
Total Funds	—	—	—	—	—	—	—	—
State Funds	—	—	2029	2030	—	2038	—	2029
Variation in NPV ($ Millions)								
Total Funds	0	37.0	197.6	150.7	103.8	66.7	20.0	58.1
Rank	1	3	8	7	6	5	2	4
State Funds	0	26.1	152.8	112.1	44.9	16.7	17.9	56.8
Rank	1	4	8	7	5	2	3	6

Notes:
1. Highlighted rankings or breakeven years are different than the base case.

Average user costs still leave all alternatives in negative territory based on NPV of total funds.

Use of average user costs noticeably improves NPV for Alternatives 2B and 3, and enables Alternative 4B to show positive results on a State funds basis.

Average user costs changes none of the top four NPV rankings found in the base case, on a total funds basis. On a State funds basis, it changes NPV rankings somewhat. Alternative 1 still ranks first, but Alternative 3 moves ahead of 4D, from third to second place. Rankings other than NPV are unaffected by the use of average user costs.

Breakeven for Alternatives 2B and 3, on a State funds basis, is two and three years earlier than in the base case, for Alternatives 2B and 3, respectively. Alternative 4D's breakeven is unaffected. Alternatives 2B, 3, 4B, and 4D reach breakeven in FY 2029, 2031, 2038, and 2029, respectively.

Average costs reduce road user costs and generally increase marine user costs. Given the much greater traffic on the road alternatives, average user costs' most pronounced changes to user benefits are for the road alternatives. This can be seen in the more steeply upwardly sloping lines for Alternatives 2B and 3 in Chart IX, compared to their lines in Chart VI. Average user costs also give a distinct upward trend to Alternative 4B State funds NPV in Chart IX.

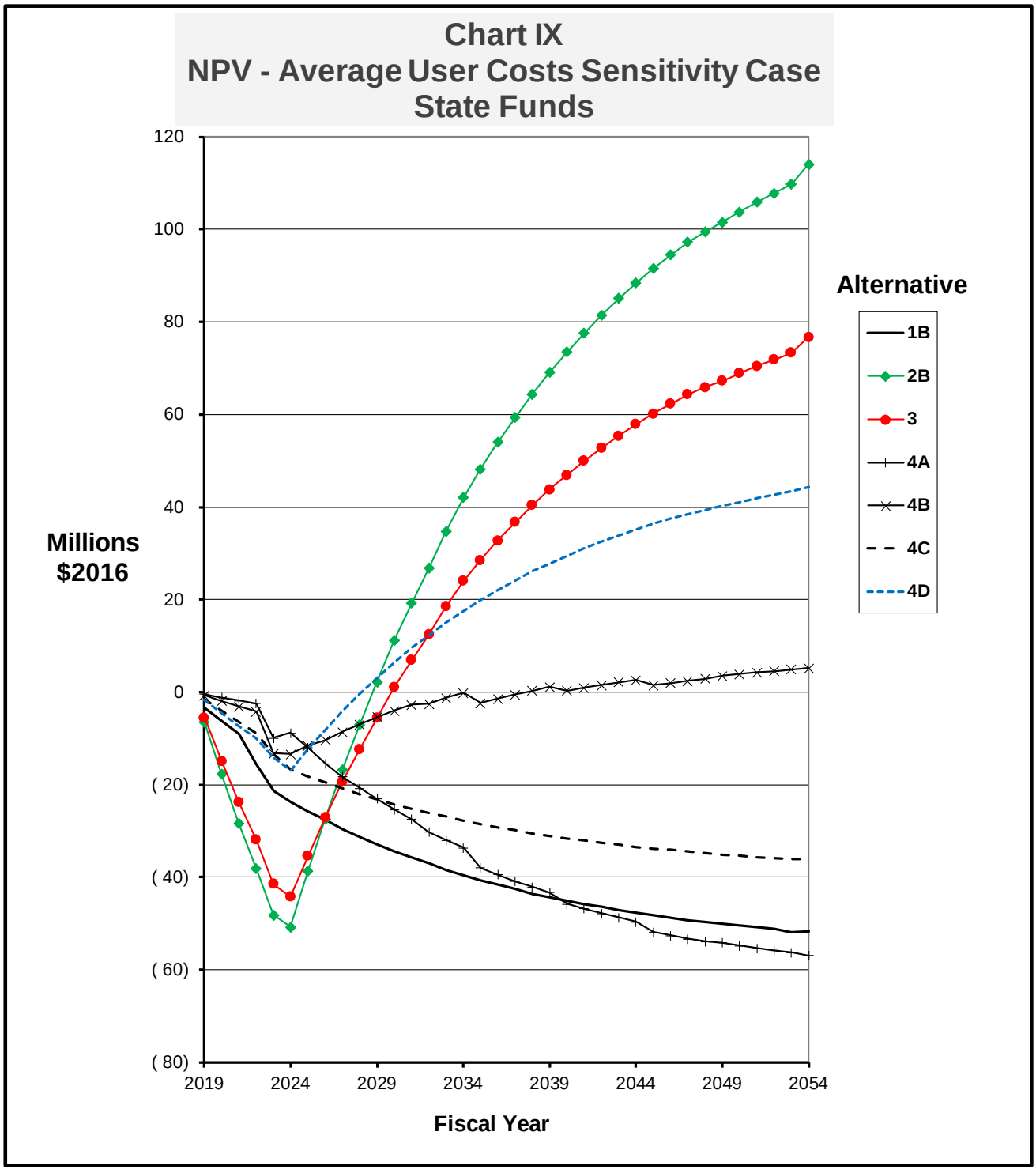


Chart IX
NPV - Average User Costs Sensitivity Case
State Funds
120
100
80
60
40
20
0
(20)
(40)
(60)
(80)
Millions
$2016
2019
2024
2029
2034
2039
2044
2049
2054
Fiscal Year
Alternative
1B
2B
3
4A
4B
4C
4D

25 Percent Construction Cost Overruns

As a construction cost overrun sensitivity case, we increased all capital costs by 25 percent. The increases apply to acquisition costs, replacement costs, and vessel refurbishment costs. Residual values also increase 25 percent as a result.

Table 34 below summarizes evaluation measures for the 25 percent cost overrun case. Rankings that have changed from the base case are highlighted in the table. There are no changes in the three highest ranking alternatives with a 25 percent cost overrun.

Cost overruns do not change the basic picture presented by the base case's NPV results. NPV values, of course, decline for all alternatives, when considering total funds.

There is also a perceptible decline in NPV for most alternatives, when looking at only State funds. But, Alternatives 4C and 4D show no change from the base case on a State funds basis. This is because the $21.3 million of non-match State general funds for acquisition costs more than covers matching requirements, even with 25 percent cost overruns. Thus, cost overruns at the 25 percent level, do not increase State costs for these alternatives.

As in the base case, no alternative has a positive NPV for total funds. Alternatives 2B, 3, and 4D remain the only alternatives with a positive NPV in terms of State funds. The State funds breakeven is two and three years later for Alternatives 2B and 3, respectively, but unchanged for Alternative 4D.

Total project life costs (total costs, total funds) for the most expensive alternatives, the FVF alternatives, increase from around $1.9 billion to over $2.0 billion, with 25 percent construction cost overruns. The road alternatives increase from $1.6 billion to $1.8 billion in these terms. Net of revenues, the FVF alternatives would cost around $1.5 billion and the road alternatives around $1.4 billion.

The LCC and total project life cost effects of overruns are muted in terms of State funds, because of the 90.97 percent federal share of construction costs, as well as the floor level of $21.3 million non-match State general funds.

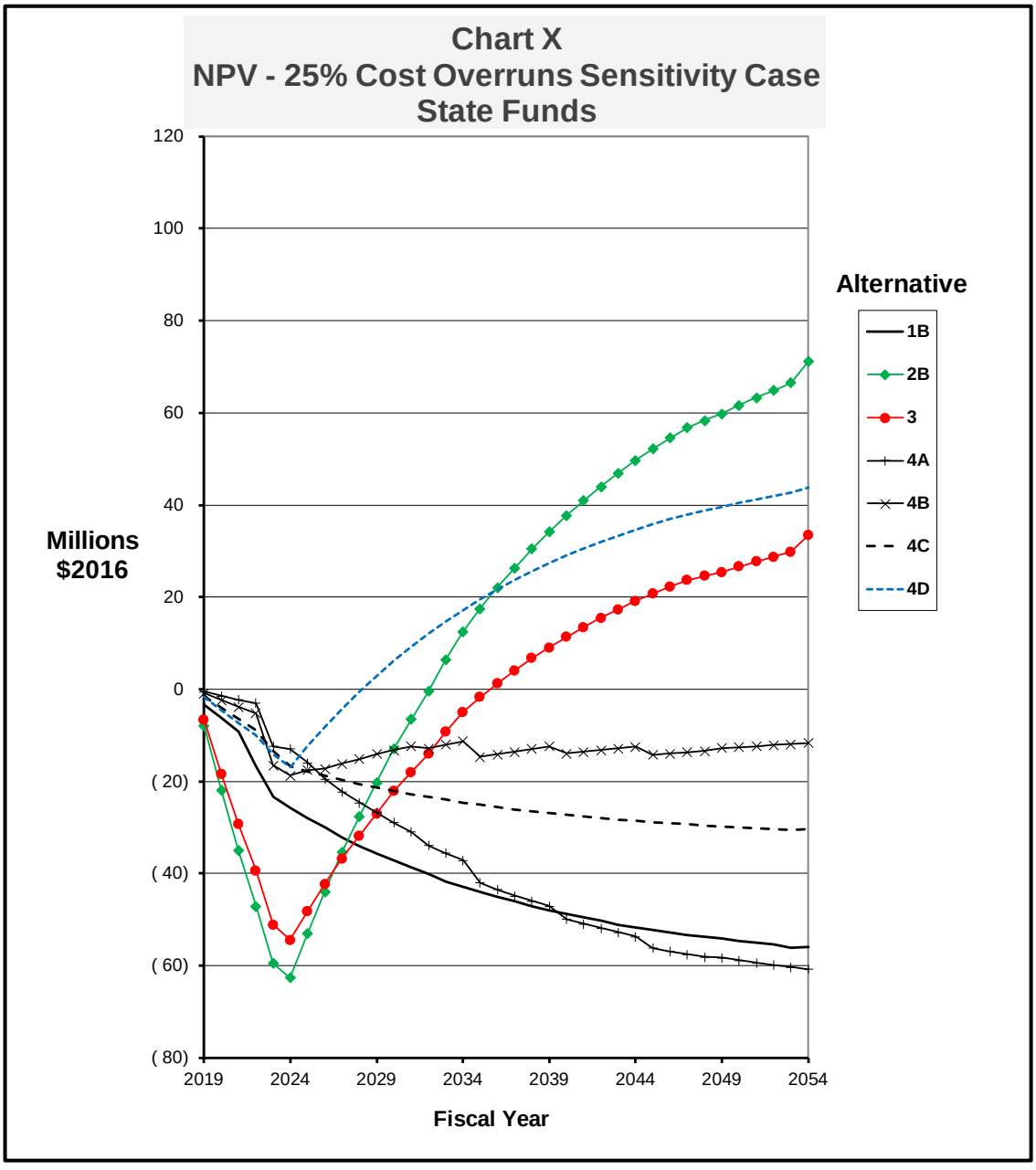
TABLE 34

Evaluation Summary (Sensitivity Case)
25 Percent Construction Cost Overruns
(2016 $)

Alternative	1	1B	2B	3	4A	4B	4C	4D
Net Present Value of Benefits & Costs ($ Millions)								
Total Funds	0	(156.9)	(470.2)	(433.5)	(263.3)	(288.6)	(90.3)	(47.5)
Rank	1	4	8	7	5	6	3	2
State Funds	0	(56.0)	71.2	33.4	(60.8)	(11.6)	(30.4)	43.8
Rank	4	7	1	3	8	5	6	2
Life-Cycle Costs								
Life-Cycle Costs ($ Millions)								
Total Funds								
Total Costs	479.2	771.2	1003.2	961.6	1063.9	1,180.5	615.1	663.9
Rank	1	4	6	5	7	8	2	3
Net Costs	336.7	574.2	827.8	754.7	843.4	906.6	452.0	410.3
Rank	1	4	6	5	7	8	3	2
Total Project Life Costs								
Total Project Life Costs ($ Millions)								
Total Funds								
Total Costs	954.6	1,475.9	1,860.7	1,807.9	2,025.7	2,177.1	1,215.5	1,310.8
Rank	1	4	6	5	7	8	2	3
Net Costs	662.4	1,072.0	1,484.1	1,354.9	1,544.2	1,565.7	873.0	748.8
Rank	1	4	6	5	7	8	3	2
State Funds								
Total Costs	685.6	1,004.6	841.4	867.6	1,206.1	1,206.5	843.3	891.0
Rank	1	6	2	4	7	8	3	5
Net Costs	393.4	600.8	470.5	418.9	724.5	595.6	500.9	329.6
Rank	2	7	4	3	8	6	5	1
Total Project Life Costs less Residual Values per Vehicle ($)								
Total Funds								
Total Costs	614	632	136	164	865	614	677	381
Rank	4	6	1	2	8	5	7	3
Net Costs	399	434	96	106	630	417	454	189
Rank	4	6	1	2	8	5	7	3
State Funds								
Total Costs	497	484	84	105	576	382	537	299
Rank	6	5	1	2	8	4	7	3
Net Costs	282	286	44	47	342	184	315	107
Rank	5	6	1	2	8	4	7	3
Traffic, User Costs per Trip (Juneau), and User Benefits								
Vehicles (FY 2019–54) (Millions)	1.4	2.0	9.4	7.8	2.1	3.1	1.5	2.9
Rank	8	6	1	2	5	3	7	4
Modal User Costs ($)	149	134	98	109	122	114	138	123
Rank	8	6	1	2	4	3	7	5
Benefits (FY 2019–54) ($ Millions)	0	24.4	128.0	70.3	38.2	53.8	10.2	35.5
Rank	8	6	1	2	4	3	7	5
Breakeven								
Total Funds	—	—	—	—	—	—	—	—
State Funds	—	—	2033	2036	—	—	—	2029
Variation in NPV ($ Millions)								
Total Funds	0	41.8	179.7	129.4	118.6	90.6	15.4	57.8
Rank	1	3	8	7	6	5	2	4
State Funds	0	28.3	124.1	81.5	44.8	6.3	12.7	56.2
Rank	1	4	8	7	5	2	3	6

Notes:
1. Rankings or breakeven years that differ from the base case are highlighted.

The trends in State-funded NPV over the study period, shown in Chart X, differ little from the base case's Chart VI, except for Alternatives 2B, 3, 4A, and 4B. Alternatives 2B, 3, 4A, and 4B NPV traces are moved downward a notch and have somewhat flatter slopes, due to the cost overruns.



70 Percent of Average Wages as Time Value for Non-Work Travel

For this sensitivity case, we set the value of time spent traveling for non-work purposes equal to 70 percent of average wages. This is the AASHTO manual's guideline[40] for personal intercity travel by auto.

In the base case, non-work travel time is valued at 50 percent of wages. This recognizes the more tenuous connection to work that ferry travel has—because of its much longer travel times and far greater concentration of tourist travel—than the national intercity auto travel data that AASHTO bases its guideline on.

Table 35 summarizes evaluation measures for the non-work travel at 70 percent of wages case. Table 35 displays only this sensitivity case's evaluation measures that are related to user costs or benefits. Purely project cost or traffic-related evaluation measures would not change in values or rank from the base case. Rankings or breakeven years that have changed from the base case are highlighted in the table.

Using 70 percent of wages as the value of non-work travel time increases the net present value of all alternatives. Still, as in the base case, no alternative has a positive NPV for total funds. The rankings based on total funds NPV remain unchanged from the base case.

With regard to State funds, non-work travel time at 70 percent of wages produces a positive NPV for Alternative 4B, in addition to the alternatives with a positive NPV in the base case—Alternatives 2B, 3, and 4D. Three adjacent pairs of alternatives in State funds NPV rankings switch places, though Alternative 2B stays in first place. Alternative 3 switches from third to second place with 4D, Alternative 4B switches from fifth to fourth place with Alternative 1, and Alternative 4A switches from last to seventh place with Alternative 1B. State funds breakeven is a year earlier for Alternatives 2B, 3, and 4D.

Non-work travel time at 70 percent of wages increases all user costs. But, the "action" alternatives' reduction in user costs, compared to the "no action" alternative, also increases, for all alternatives. The result is an increase in user benefits and NPV for all alternatives.

This can be seen in the somewhat elevated locus of the NPV lines in Chart XI, compared to Chart VI. The lines for the alternatives that already had a positive State funds NPV—Alternatives 2B, 3, and 4D—

[40] Table 5–1, *User and Non-User Benefit Analysis for Highways*, AASHTO, September 2010.

are more steeply upwardly sloping in Chart XI, compared to Chart VI. Alternative 4B's NPV line shifts to an upward slope, from flat in the base case.

Non-work travel time at 70 percent of wages produces limited shufflings in State NPV rankings. The only other altered ranking—of variation in State NPV—is of minor significance.

LCC and total project life cost values and rank would be the same as the base case.

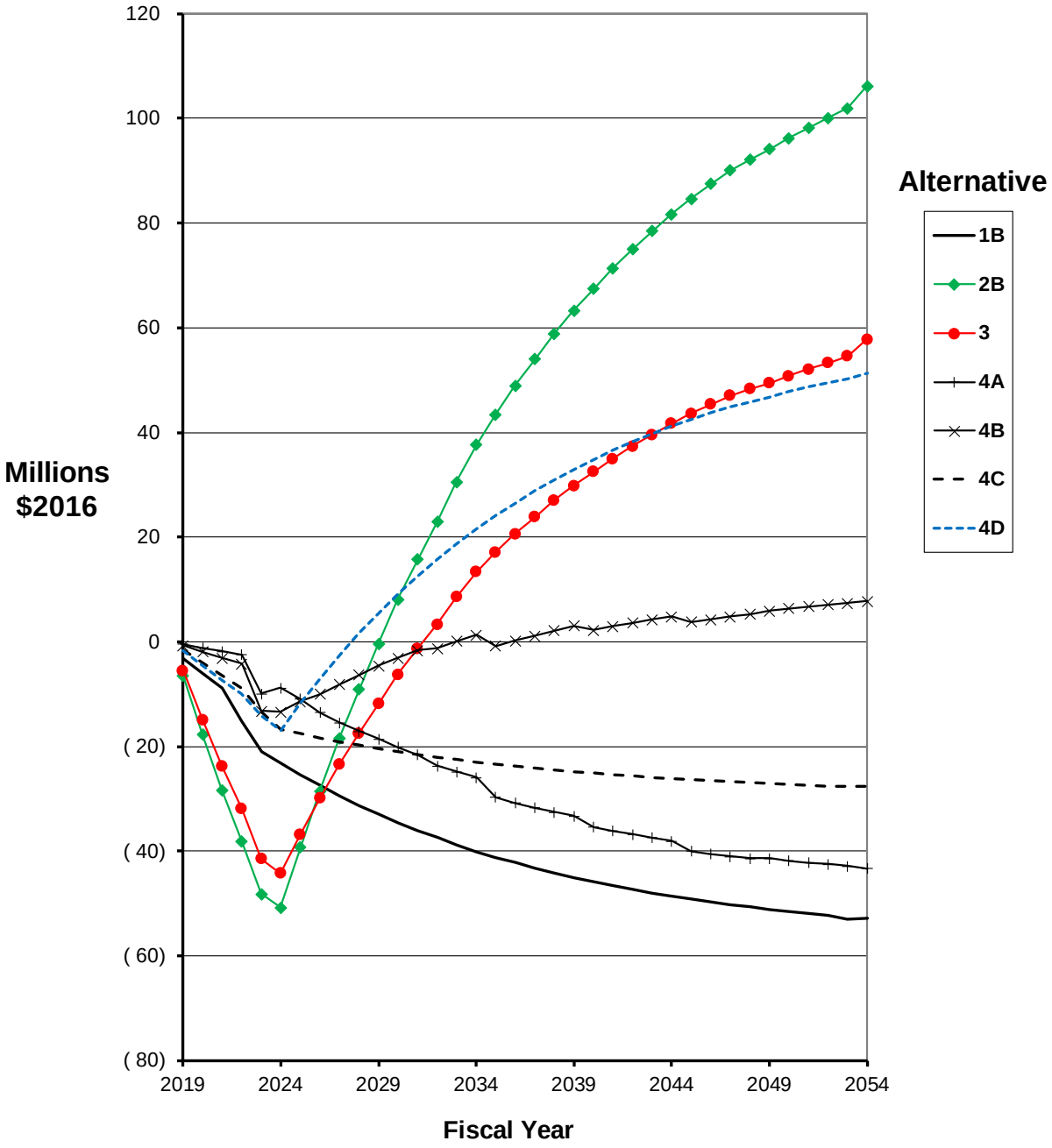
TABLE 35

Evaluation Summary (Sensitivity Case)
Non-Work Travel Time @ 70 Percent of Wages
(2016 $)

Alternative	**1**	**1B**	**2B**	**3**	**4A**	**4B**	**4C**	**4D**
Net Present Value of Benefits & Costs ($ Millions)								
Total Funds	0	(133.6)	(326.5)	(315.5)	(190.4)	(198.9)	(72.2)	(18.3)
Rank	1	4	8	7	5	6	3	2
State Funds	0	(52.9)	106.2	57.8	(43.3)	7.7	(27.5)	51.4
Rank	5	8	1	2	7	4	6	3
Traffic, User Costs per Trip (Juneau), and User Benefits								
Vehicles (FY 2019–54) (Millions)	1.4	2.0	9.4	7.8	2.1	3.1	1.5	2.9
Rank	8	6	1	2	5	3	7	4
Modal User Costs ($)	171	156	111	123	137	129	158	141
Rank	8	6	1	2	4	3	7	5
Benefits (FY 2019–54) ($ Millions)	0	25.5	152.2	85.4	50.2	66.2	13.0	43.1
Rank	8	6	1	2	4	3	7	5
Breakeven								
Total Funds	—	—	—	—	—	—	—	—
State Funds	—	—	2030	2032	—	2033	—	2028
Variation in NPV ($ Millions)								
Total Funds	0	38.5	190.3	133.1	91.6	65.6	12.2	64.5
Rank	1	3	8	7	6	5	2	4
State Funds	0	27.6	145.4	94.5	32.3	19.1	10.1	63.2
Rank	1	4	8	7	5	3	2	6

Notes:
1.Rankings or breakeven years that differ from the base case are highlighted.

Chart XI
NPV - Non-Work @ 70% of Wages Sensitivity Case
State Funds



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APPENDIX A

APPENDIX TABLES A–1 through A–78
(This Appendix A replaces the 2014 Appendix A in full)

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TABLE A-1

Incremental Benefit Cost (B/C) Ratios
Total Funds
(2016 $000)[1]

Alternative[3]	2019-54 Present Value as of 7/1/18 @ Private Sector Rate of Return: Net Project Costs (vs. No Action)	User Benefits	NPV	B/C	Increments over Lower Cost Efficient Alternatives[2]: Increment	Incremental Cost	Incremental Benefits	Incremental B/C	Efficient Alternative
1 - No Action	0	0	0	1.00					1
4D - Monohull Berners Bay	61,364	35,496	(25,868)	0.58	4D - 1	61,364	35,496	0.58	1
4C - Monohull Auke Bay	85,201	10,198	(75,003)	0.12	4C - 1	85,201	10,198	0.12	1
1B - Enhanced Service	159,089	24,383	(134,706)	0.15	1B - 1	159,089	24,383	0.15	1
4A - Fast Ferry Auke Bay	240,659	38,184	(202,475)	0.16	4A - 1	240,659	38,184	0.16	1
4B - Fast Ferry Berners Bay	265,128	53,758	(211,370)	0.20	4B - 1	265,128	53,758	0.20	1
3 - West Lynn Highway	400,877	70,324	(330,553)	0.18	3 - 1	400,877	70,324	0.18	1
2B - East Lynn Highway	478,783	127,971	(350,812)	0.27	2B - 1	478,783	127,971	0.27	1

Notes:

1. Dollar amounts are the sum of the present values as of July 1, 2018, at the real private sector rate of return, of 2019-54 amounts in thousands of 2016 dollars.
2. An alternative is efficient if
   (a) the incremental B/C ≥ 1, if numerator and denominator are positive (increase in benefits exceeds increase in costs),
   (b) the incremental B/C ≤ 1, if numerator and denominator are negative (decrease in benefits is less than decrease in costs); or,
   (c) the numerator is positive and the denominator is negative (more benefits for less money).
3. Alternatives are in increasing net project cost order.

TABLE A-2

Incremental Benefit Cost (B/C) Ratios
State Funds
(2016 $000)[1]

Alternative[3]	2019-54 Present Value as of 7/1/18 @ Private Sector Rate of Return: Net Project Costs (vs. No Action)	User Benefits	NPV	B/C	Increments over Lower Cost Efficient Alternatives[2]: Increment	Incremental Cost	Incremental Benefits	Incremental B/C	Efficient Alternative
1 - No Action	0	0	0	1.00					1
4D - Monohull Berners Bay	(8,308)	35,496	43,804	(4.27)	4D - 1	(8,308)	35,496	(4.27)	4D
3 - West Lynn Highway	27,620	70,324	42,704	2.55	3 - 4D	35,928	34,828	0.97	4D
4C - Monohull Auke Bay	40,560	10,198	(30,363)	0.25	4C - 4D	48,869	(25,298)	(0.52)	4D
2B - East Lynn Highway	46,008	127,971	81,963	2.78	2B - 4D	54,317	92,475	1.70	2B
4B - Fast Ferry Berners Bay	58,434	53,758	(4,676)	0.92	4B - 2B	12,426	(74,213)	(5.97)	2B
1B - Enhanced Service	78,335	24,383	(53,952)	0.31	1B - 2B	32,327	(103,588)	(3.20)	2B
4A - Fast Ferry Auke Bay	93,492	38,184	(55,308)	0.41	4A - 2B	47,484	(89,787)	(1.89)	2B

Notes:

1. Dollar amounts are the sum of the present values as of July 1, 2018, at the real private sector rate of return, of 2019-54 amounts in thousands of 2016 dollars.
2. An alternative is efficient if
   (a) the incremental B/C ≥ 1, if numerator and denominator are positive (increase in benefits exceeds increase in costs),
   (b) the incremental B/C ≤ 1, if numerator and denominator are negative (decrease in benefits is less than decrease in costs); or,
   (c) the numerator is positive and the denominator is negative (more benefits for less money).
3. Alternatives are in increasing net project cost order.

Revised Traffic Forecast Report
Utility Values

Utility Values[1]									
Haines	Auto Time (min)	Auto Cost (cents)	Ferry Time (min)	Ferry Cost (cents)	Ferry Wait (min)	SI Utility	Modal Constant	Total Utility	Exponential
All Road	-0.1379	-0.2571	0.0000	0.0000	0.0000	0.00	0.000	-0.395	0.674
Existing	-0.0076	-0.0135	-0.2714	-0.6451	-0.4442	-0.50	-0.715	-2.597	0.074
1	-0.0076	-0.0135	-0.2823	-0.6451	-0.2926	-0.46	-0.715	-2.416	0.089
1B	-0.0076	-0.0135	-0.2840	-0.5420	-0.2788	-0.33	-0.715	-2.175	0.114
2B	-0.1366	-0.2540	-0.0281	-0.1164	-0.1709	-0.05	-0.007	-0.759	0.468
3	-0.1214	-0.2272	-0.0452	-0.1619	-0.1509	-0.04	-0.090	-0.834	0.434
4A	-0.0076	-0.0135	-0.1657	-0.6451	-0.2618	-0.22	-0.715	-2.032	0.131
4B	-0.0548	-0.1024	-0.1050	-0.4327	-0.2681	-0.18	-0.456	-1.595	0.203
4C	-0.0076	-0.0135	-0.2848	-0.6451	-0.2590	-0.43	-0.715	-2.351	0.095
4D	-0.0548	-0.1024	-0.1845	-0.4327	-0.2422	-0.18	-0.456	-1.648	0.192
Skagway	Auto Time (min)	Auto Cost (cents)	Ferry Time (min)	Ferry Cost (cents)	Ferry Wait (min)	SI Utility	Modal Constant	Total Utility	Exponential
All Road	-0.1607	-0.3003	0.0000	0.0000	0.0000	0.00	0.000	-0.461	0.631
Existing	0.0000	0.0000	-0.3920	-0.8581	-0.4442	-0.50	-0.757	-2.951	0.052
1	0.0000	0.0000	-0.3570	-0.8581	-0.4228	-0.46	-0.757	-2.854	0.058
1B	0.0000	0.0000	-0.3407	-0.7040	-0.3127	-0.18	-0.757	-2.293	0.101
2B	-0.1290	-0.2404	-0.0603	-0.1886	-0.2136	-0.06	-0.149	-1.042	0.353
3	-0.1290	-0.2407	-0.0985	-0.3371	-0.3417	-0.11	-0.149	-1.410	0.244
4A	0.0000	0.0000	-0.1970	-0.8581	-0.2618	-0.22	-0.757	-2.297	0.101
4B	-0.0472	-0.0888	-0.1315	-0.5986	-0.2681	-0.18	-0.535	-1.844	0.158
4C	0.0000	0.0000	-0.3316	-0.8581	-0.2590	-0.43	-0.757	-2.631	0.072
4D	-0.0472	-0.0888	-0.2247	-0.5986	-0.2422	-0.18	-0.535	-1.912	0.148

Notes:

1. Utility values used in the *Juneau Access Improvements Project Final SEIS, Revised Traffic Forecast Report, Rev. 8* , Fehr & Peers, January 2017. Table provided directly by Fehr & Peers.

Cost per User
Juneau - Haines & Skagway

Alternative	Haines Traffic[1]	Skagway Traffic[1]	Average Costs for Haines and Skagway: Ferry Delay (hours)	Ferry Travel (hours)	Ferry Fare	Highway Travel (hours)	Highway Vehicle Cost
Existing Service	61%	39%	2:36	5:16	$74.81	0:03	$ 0.84
1 - No Action	63%	37%	1:58	5:08	$74.35	0:03	$ 0.69
1B - Enhanced Service	54%	46%	1:47	5:09	$61.00	0:03	$ 0.74
2B - East Lynn Highway	56%	44%	1:06	0:42	$15.25	1:44	$35.94
3 - West Lynn Highway	63%	37%	1:19	1:04	$23.27	1:38	$33.66
4A - Fast Ferry Auke Bay	55%	45%	1:31	2:57	$76.05	0:03	$ 0.76
4B - Fast Ferry Berners Bay	55%	45%	1:33	2:10	$58.82	0:30	$ 7.22
4C - Monohull Auke Bay	56%	44%	1:30	5:03	$75.79	0:03	$ 0.77
4D - Monohull Berners Bay	56%	44%	1:25	3:43	$57.14	0:32	$ 7.81

Notes:

1. Calculated from the summer and winter traffic totals for Haines and Skagway in Tables A-6 and A-10.

TABLE A-5

Cost per User
Juneau - Haines

Alternative	Ferry Delay (hours)	Ferry Travel (hours)	Ferry Fare	Highway Travel (hours)	Highway Vehicle Cost
Existing Service	2:36	4:30	$66.27	0:06	$ 1.37
1 - No Action	1:41	4:41	$66.27	0:04	$ 1.10
1B - Enhanced Service	1:38	4:41	$52.82	0:06	$ 1.37
2B - East Lynn Highway	1:00	0:28	$11.96	1:47	$36.81
3 - West Lynn Highway	0:58	0:45	$16.63	1:36	$32.93
4A - Fast Ferry Auke Bay	1:31	2:43	$66.27	0:06	$ 1.37
4B - Fast Ferry Berners Bay	1:33	1:58	$50.56	0:32	$ 7.83
4C - Monohull Auke Bay	1:30	4:43	$66.27	0:06	$ 1.37
4D - Monohull Berners Bay	1:25	3:25	$49.16	0:35	$ 8.40

TABLE A-6

Seasonal Traffic
Juneau - Haines
2025

Alternative	SADT[1]	WADT[1]	Days[2]		Annual Traffic		Annual Traffic %	
			Summer	Winter	Summer	Winter	Summer	Winter
Existing Service	59	23	153	212	8,960	4,914	64.6%	35.4%
1 - No Action	78	30	153	212	11,934	6,360	65.2%	34.8%
1B - Enhanced Service	105	30	153	212	16,065	6,360	71.6%	28.4%
2B - East Lynn Highway	701	273	153	212	107,253	57,876	65.0%	35.0%
3 - West Lynn Highway	650	254	153	212	99,450	53,848	64.9%	35.1%
4A - Fast Ferry Auke Bay	123	48	153	212	18,819	10,176	64.9%	35.1%
4B - Fast Ferry Berners Bay	203	48	138	227	28,014	10,896	72.0%	28.0%
4C - Monohull Auke Bay	85	32	153	212	13,005	6,784	65.7%	34.3%
4D - Monohull Berners Bay	191	32	138	227	26,358	7,264	78.4%	21.6%

Note:

1. Table 7 for Existing Service and Table 9 for Alternatives, *Memorandum, Subject: Juneau Access Improvements, Appendix D: Choice Models* , Fehr & Peers, January 5, 2017.

2. Due to environmental concerns in Berners Bay during the spring (herring and eulachon spawning as well as humpback whale and Steller sea lion concentrations), the summer schedule for Alternatives 4B and 4D would start on May 15, rather than May 1, and run to September 30.

TABLE A-7

Cost per User
Summer
Juneau - Haines

Alternative	Ferry Delay (hours)	Ferry Travel (hours)	Ferry Fare	Highway Travel (hours)	Highway Vehicle Cost[1]
Existing Service	2:36	4:30	$66.27	0:06	$ 1.37
1 - No Action	1:42	4:40	$66.27	0:04	$ 0.95
1B - Enhanced Service	1:38	4:42	$52.82	0:06	$ 1.37
2B - East Lynn Highway	1:00	0:28	$11.96	1:47	$36.81
3 - West Lynn Highway	0:53	0:45	$16.63	1:36	$32.93
4A - Fast Ferry Auke Bay	1:31	2:44	$66.27	0:06	$ 1.37
4B - Fast Ferry Berners Bay	1:34	1:44	$44.45	0:43	$10.34
4C - Monohull Auke Bay	1:30	4:43	$66.27	0:06	$ 1.37
4D - Monohull Berners Bay	1:25	3:03	$44.45	0:43	$10.34

Notes:
1. Cost per user.

TABLE A-8

Cost per User
Winter
Juneau - Haines

Alternative	Ferry Delay (hours)	Ferry Travel (hours)	Ferry Fare	Highway Travel (hours)	Highway Vehicle Cost[1]
Existing Service	2:36	4:30	$66.27	0:06	$ 1.37
1 - No Action	1:39	4:41	$66.27	0:06	$ 1.37
1B - Enhanced Service	1:39	4:41	$52.82	0:06	$ 1.37
2B - East Lynn Highway	1:00	0:28	$11.96	1:48	$36.81
3 - West Lynn Highway	1:08	0:45	$16.63	1:36	$32.93
4A - Fast Ferry Auke Bay	1:29	2:41	$66.27	0:06	$ 1.37
4B - Fast Ferry Berners Bay	1:32	2:36	$66.27	0:06	$ 1.37
4C - Monohull Auke Bay	1:28	4:43	$66.27	0:06	$ 1.37
4D - Monohull Berners Bay	1:28	4:43	$66.27	0:06	$ 1.37

Notes:
1. Cost per user.

TABLE A-9

Cost per User
Juneau - Skagway

Alternative	Ferry Delay (hours)	Ferry Travel (hours)	Ferry Fare	Highway Travel (hours)	Highway Vehicle Cost
Existing Service	2:36	6:30	$88.15	0:00	$ 0.00
1 - No Action	2:28	5:54	$88.15	0:00	$ 0.00
1B - Enhanced Service	1:57	5:41	$70.68	0:00	$ 0.00
2B - East Lynn Highway	1:15	1:00	$19.37	1:42	$34.85
3 - West Lynn Highway	1:56	1:38	$34.63	1:42	$34.90
4A - Fast Ferry Auke Bay	1:31	3:13	$88.15	0:00	$ 0.00
4B - Fast Ferry Berners Bay	1:33	2:24	$68.89	0:26	$ 6.48
4C - Monohull Auke Bay	1:30	5:29	$88.15	0:00	$ 0.00
4D - Monohull Berners Bay	1:25	4:05	$67.14	0:29	$ 7.07

TABLE A-10

Seasonal Traffic
Juneau - Skagway
2025

Alternative	SADT[1]	WADT[1]	Days[2]		Annual Traffic		Annual Traffic %	
			Summer	Winter	Summer	Winter	Summer	Winter
Existing Service	37	15	153	212	5,728	3,142	64.6%	35.4%
1 - No Action	45	18	153	212	6,885	3,816	64.3%	35.7%
1B - Enhanced Service	99	18	153	212	15,147	3,816	79.9%	20.1%
2B - East Lynn Highway	561	218	153	212	85,833	46,216	65.0%	35.0%
3 - West Lynn Highway	381	148	153	212	58,293	31,376	65.0%	35.0%
4A - Fast Ferry Auke Bay	99	39	153	212	15,147	8,268	64.7%	35.3%
4B - Fast Ferry Berners Bay	167	39	138	227	23,046	8,853	72.2%	27.8%
4C - Monohull Auke Bay	65	25	153	212	9,945	5,300	65.2%	34.8%
4D - Monohull Berners Bay	153	25	138	227	21,114	5,675	78.8%	21.2%

Note:

1. Table 7 for Existing Service and Table 9 for Alternatives, *Memorandum, Subject: Juneau Access Improvements, Appendix D: Choice Models* , Fehr & Peers, January 5, 2017.

2. Due to environmental concerns in Berners Bay during the spring (herring and eulachon spawning as well as humpback whale and Steller sea lion concentrations), the summer schedule for Alternatives 4B and 4D would start on May 15, rather than May 1, and run to September 30.

TABLE A-11

Cost per User
Summer
Juneau - Skagway

Alternative	Ferry Delay (hours)	Ferry Travel (hours)	Ferry Fare	Highway Travel (hours)	Highway Vehicle Cost[1]
Existing Service	2:36	6:30	$88.15	0:00	$ 0.00
1 - No Action	2:28	5:55	$88.15	0:00	$ 0.00
1B - Enhanced Service	1:49	5:38	$70.68	0:00	$ 0.00
2B - East Lynn Highway	1:15	1:00	$19.37	1:42	$34.85
3 - West Lynn Highway	2:00	1:38	$34.63	1:42	$34.90
4A - Fast Ferry Auke Bay	1:31	3:16	$88.15	0:00	$ 0.00
4B - Fast Ferry Berners Bay	1:34	2:10	$61.49	0:37	$ 8.97
4C - Monohull Auke Bay	1:30	5:29	$88.15	0:00	$ 0.00
4D - Monohull Berners Bay	1:25	3:43	$61.49	0:37	$ 8.97

Notes:
1. Cost per user.

TABLE A-12

Cost per User
Winter
Juneau - Skagway

Alternative	Ferry Delay (hours)	Ferry Travel (hours)	Ferry Fare	Highway Travel (hours)	Highway Vehicle Cost[1]
Existing Service	2:36	6:30	$88.15	0:00	$ 0.00
1 - No Action	2:27	5:52	$88.15	0:00	$ 0.00
1B - Enhanced Service	2:27	5:52	$70.68	0:00	$ 0.00
2B - East Lynn Highway	1:15	1:00	$19.37	1:42	$34.85
3 - West Lynn Highway	1:50	1:38	$34.63	1:42	$34.90
4A - Fast Ferry Auke Bay	1:29	3:10	$88.15	0:00	$ 0.00
4B - Fast Ferry Berners Bay	1:32	2:59	$88.15	0:00	$ 0.00
4C - Monohull Auke Bay	1:28	5:27	$88.15	0:00	$ 0.00
4D - Monohull Berners Bay	1:28	5:27	$88.15	0:00	$ 0.00

Notes:
1. Cost per user.

TABLE A-13

User Cost Detail
Juneau - Haines & Skagway
Summer

Alternative	Ferry	Terminal	RT Vehicle Capacity	Weekly Round Trips	Destination	Destination RT Capacity	Daily RT Capacity	Ferry Time (minutes)						Highway Travel			Total Time (minutes)	Total Time (hours)	Ferry Fare (dollars)			
								Delay	Load	Unload	Ferry	Total Delay	Total	Distance	Time	Cost			Vehicle	Person	AVO	Total
All Road Scenario														81.6	1:49	$85.72	1:49	1.8				
														95.3	2:07	$100.12	2:07	2.1				
Existing	Malaspina	Auke Bay	157	5	Haines	79	56	2:00		0:36	4:30	2:36	7:06	4.3	0:06	$4.52	7:12	7.2	$90.00	$39.00	3.3	$66.27
					Skagway via Haines	79	56	2:00		0:36	6:30	2:36	9:06	0.0	0:00	$0.00	9:06	9.1	$116.00	$53.00	3.3	$88.15
	Mainline	Auke Bay	148	2	Haines	74	21	2:00		0:36	4:30	2:36	7:06	4.3	0:06	$4.52	7:12	7.2	$90.00	$39.00	3.3	$66.27
					Skagway via Haines	74	21	2:00		0:36	6:30	2:36	9:06	0.0	0:00	$0.00	9:06	9.1	$116.00	$53.00	3.3	$88.15
Alt 1: No Action	New Day Boats	Auke Bay	106	6	Haines	53	45	1:00		0:18	4:46	1:18	6:04	4.3	0:06	$4.52	6:10	6.2	$90.00	$39.00	3.3	$66.27
					Skagway via Shuttle	53	45	2:00		0:25	5:39	2:25	8:04	0.0	0:00	$0.00	8:04	8.1	$116.00	$53.00	3.3	$88.15
	Mainline	Auke Bay	148	2	Haines	74	21	2:00		0:36	4:30	2:36	7:06	0.2	0:00	$0.19	7:06	7.1	$90.00	$39.00	3.3	$66.27
					Skagway via Haines	74	21	2:00		0:36	6:30	2:36	9:06	0.0	0:00	$0.00	9:06	9.1	$116.00	$53.00	3.3	$88.15
Alt 1B: Enhanced Service	New Day Boats	Auke Bay	106	7	Haines	53	53	1:00		0:18	4:46	1:18	6:04	4.3	0:06	$4.52	6:10	6.2	$72.00	$31.00	3.3	$52.82
					Skagway via Shuttle	53	53	2:00		0:25	5:39	2:25	8:04	0.0	0:00	$0.00	8:04	8.1	$93.00	$42.50	3.3	$70.68
	Malaspina	Auke Bay	176	5	Skagway Direct	176	126	1:00		0:31	5:18	1:31	6:49	0.0	0:00	$0.00	6:49	6.8	$93.00	$42.50	3.3	$70.68
	Malaspina	Auke Bay	176	2	Haines	88	13	1:00		0:31	4:46	1:31	6:17	4.3	0:06	$4.52	6:23	6.4	$72.00	$31.00	3.3	$52.82
					Skagway via Haines	88	25	1:00		0:31	6:41	1:31	8:12	0.0	0:00	$0.00	8:12	8.2	$93.00	$42.50	3.3	$70.68
	Mainline	Auke Bay	148	2	Haines	74	21	2:00		0:36	4:30	2:36	7:06	4.3	0:06	$4.52	7:12	7.2	$72.00	$31.00	3.3	$52.82
					Skagway via Haines	74	21	2:00		0:36	6:30	2:36	9:06	0.0	0:00	$0.00	9:06	9.1	$93.00	$42.50	3.3	$70.68
Alt 2B: East Lynn	New Day Boat #1	Katzehin	106	56	Haines	106	848	0:30	0:15	0:15	0:28	1:00	1:28	80.6	1:47	$84.67	3:15	3.3	$16.00	$5.00	2.3	$11.96
	New Day Boat #2	Katzehin	106	42	Skagway Direct	106	636	0:45	0:15	0:15	1:00	1:15	2:15	76.3	1:42	$80.16	3:57	4.0	$25.00	$8.50	2.3	$19.37
Alt 3: Sawmill Cove	New Day Boat #1	Sawmill Cove	75	84	William Henry Bay	75	901	0:23	0:15	0:15	0:45	0:53	1:38	72.1	1:36	$75.74	3:14	3.2	$21.00	$7.50	2.3	$16.63
	New Day Boat #2	Sawmill Cove	31	35	Skagway via Shuttle	31	155	1:04	0:28	0:28	1:38	2:00	3:38	76.4	1:42	$80.26	5:20	5.3	$23.00	$8.00	2.3	$34.63
Alt 4A: Fast Ferry Auke Bay	Fast Ferry #1	Auke Bay	62	14	Haines	62	124	1:00		0:21	2:27	1:21	3:48	4.3	0:06	$4.52	3:54	3.9	$90.00	$39.00	3.3	$66.27
	Fast Ferry #2	Auke Bay	62	14	Skagway Direct	62	124	1:00		0:21	2:43	1:21	4:04	0.0	0:00	$0.00	4:04	4.1	$116.00	$53.00	3.3	$88.15
	Mainline	Auke Bay	148	2	Haines	74	21	2:00		0:36	4:30	2:36	7:06	4.3	0:06	$4.52	7:12	7.2	$90.00	$39.00	3.3	$66.27
					Skagway via Haines	74	21	2:00		0:36	6:30	2:36	9:06	0.0	0:00	$0.00	9:06	9.1	$116.00	$53.00	3.3	$88.15
Alt 4B: Fast Ferry Sawmill Cove	Fast Ferry #1	Sawmill Cove	106	14	Haines	106	212	1:00		0:28	1:28	1:28	2:56	35.3	0:47	$37.08	3:43	3.7	$57.00	$25.00	3.3	$42.27
	Fast Ferry #2	Sawmill Cove	106	14	Skagway Direct	106	212	1:00		0:28	1:45	1:28	3:13	31.0	0:41	$32.57	3:54	3.9	$77.00	$35.50	3.3	$58.83
	Mainline	Auke Bay	148	2	Haines	74	21	2:00		0:36	4:30	2:36	7:06	4.3	0:06	$4.52	7:12	7.2	$90.00	$39.00	3.3	$66.27
					Skagway via Haines	74	21	2:00		0:36	6:30	2:36	9:06	0.0	0:00	$0.00	9:06	9.1	$116.00	$53.00	3.3	$88.15
Alt 4C: Dayboat Auke Bay	New Day Boat #1	Auke Bay	106	7	Haines	106	106	1:00		0:18	4:46	1:18	6:04	4.3	0:06	$4.52	6:10	6.2	$90.00	$39.00	3.3	$66.27
	New Day Boat #2	Auke Bay	106	7	Skagway Direct	106	106	1:00		0:18	5:18	1:18	6:36	0.0	0:00	$0.00	6:36	6.6	$116.00	$53.00	3.3	$88.15
	Mainline	Auke Bay	148	2	Haines	74	21	2:00		0:36	4:30	2:36	7:06	4.3	0:06	$4.52	7:12	7.2	$90.00	$39.00	3.3	$66.27
					Skagway via Haines	74	21	2:00		0:36	6:30	2:36	9:06	0.0	0:00	$0.00	9:06	9.1	$116.00	$53.00	3.3	$88.15
Alt 4D: Dayboat Sawmill Cove	New Day Boat #1	Sawmill Cove	106	14	Haines	106	212	1:00		0:18	2:55	1:18	4:13	35.3	0:47	$37.08	5:00	5.0	$57.00	$25.00	3.3	$42.27
	New Day Boat #2	Sawmill Cove	106	14	Skagway Direct	106	212	1:00		0:18	3:27	1:18	4:45	31.0	0:41	$32.57	5:26	5.4	$77.00	$35.50	3.3	$58.83
	Mainline	Auke Bay	148	2	Haines	74	21	2:00		0:36	4:30	2:36	7:06	4.3	0:06	$4.52	7:12	7.2	$90.00	$39.00	3.3	$66.27
					Skagway via Haines	74	21	2:00		0:36	6:30	2:36	9:06	0.0	0:00	$0.00	9:06	9.1	$116.00	$53.00	3.3	$88.15

Notes:
Fares are based on a 16-19ft vehicle.
Delay is check-in & loading time, except that 2B & 3 is 1/4 of headway (departure intervals = operating hours/RT/day).
Distances measured from Auke Bay Terminal and Downtown Haines at 3rd & Main.
Fehr & Peers assumed road distance from Haines to Katzehin of 5.3 miles.
Assumed 67% of 111 mainline capacity based on existing utilization (average of Matanuska=88 and Columbia=134).
Skagway Alt 3 ferry delay is based on analysis of predicted delay for each possible ferry connection.
Skagway Alt 3 ferry RT is only 5.0 per day because no Juneau travelers can catch first or last shuttle to Skagway.
RT is round-trip.
AVO is average vehicle occupancy.

Haines share:	50%	25.8	Auke Bay to Echo Cove
Mainline capacity:	67%	5.2	Echo Cove to Sawmill Cove
Driving speed (mph):	45	50.5	Echo Cove to Katzehin Delta
Driving cost ($/mi):	1.05	38.9	William Henry to Mud Bay
		2.2	Mud Bay to Downtown Haines
		4.3	Downtown Haines to Lutak
		95.3	Auke Bay to Skagway
		5.3	Katzehin to Downtown Haines

TABLE A-14

User Cost Detail
Juneau - Haines & Skagway
Winter

Alternative	Ferry	Terminal	RT Vehicle Capacity	Weekly Round Trips	Destination	Destination RT Capacity	Daily RT Capacity	Ferry Time (minutes)						Highway Travel			Total Time (minutes)	Total Time (hours)	Ferry Fare (dollars)			
								Delay	Load	Unload	Ferry	Total Delay	Total	Distance	Time	Cost			Vehicle	Person	AVO	Total
All Road Scenario														81.6	1:49	$85.72	1:49	1.8				
														95.3	2:07	$100.12	2:07	2.1				
Existing	LeConte	Auke Bay	68	3	Haines	34	15	2:00		0:36	4:30	2:36	7:06	4.3	0:06	$4.52	7:12	7.2	$90.00	$39.00	3.3	$66.27
					Skagway via Haines	34	15	2:00		0:36	6:30	2:36	9:06	0.0	0:00	$0.00	9:06	9.1	$116.00	$53.00	3.3	$88.15
	Mainline	Auke Bay	117	1	Haines	59	8	2:00		0:36	4:30	2:36	7:06	4.3	0:06	$4.52	7:12	7.2	$90.00	$39.00	3.3	$66.27
					Skagway via Haines	59	8	2:00		0:36	6:30	2:36	9:06	0.0	0:00	$0.00	9:06	9.1	$116.00	$53.00	3.3	$88.15
Alt 1: No Action	New Day Boats	Auke Bay	106	3	Haines	53	23	1:00		0:18	4:46	1:18	6:04	4.3	0:06	$4.52	6:10	6.2	$90.00	$39.00	3.3	$66.27
					Skagway via Shuttle	53	23	2:00		0:25	5:39	2:25	8:04	0.0	0:00	$0.00	8:04	8.1	$116.00	$53.00	3.3	$88.15
	Mainline	Auke Bay	117	1	Haines	59	8	2:00		0:36	4:30	2:36	7:06	4.3	0:06	$4.52	7:12	7.2	$90.00	$39.00	3.3	$66.27
					Skagway via Haines	59	8	2:00		0:36	6:30	2:36	9:06	0.0	0:00	$0.00	9:06	9.1	$116.00	$53.00	3.3	$88.15
Alt 1B: Enhanced Service	New Day Boats	Auke Bay	106	3	Haines	53	23	1:00		0:18	4:46	1:18	6:04	4.3	0:06	$4.52	6:10	6.2	$72.00	$31.00	3.3	$52.82
					Skagway via Shuttle	53	23	2:00		0:25	5:39	2:25	8:04	0.0	0:00	$0.00	8:04	8.1	$93.00	$42.50	3.3	$70.68
	Malaspina	Auke Bay	0	0	Skagway Direct	0	0	0:00		0:00	0:00	0:00	0:00	0.0	0:00	$0.00			$0.00	$0.00		
	Malaspina	Auke Bay	0	0	Haines	0	0	0:00		0:00	0:00	0:00	0:00	0.0	0:00	$0.00			$0.00	$0.00		
					Skagway via Haines	0	0	0:00		0:00	0:00	0:00	0:00	0.0	0:00	$0.00			$0.00	$0.00		
	Mainline	Auke Bay	117	1	Haines	59	8	2:00		0:36	4:30	2:36	7:06	4.3	0:06	$4.52	7:12	7.2	$72.00	$31.00	3.3	$52.82
					Skagway via Haines	59	8	2:00		0:36	6:30	2:36	9:06	0.0	0:00	$0.00	9:06	9.1	$93.00	$42.50	3.3	$70.68
Alt 2B: East Lynn	New Day Boat #1	Katzehin	106	42	Haines	106	636	0:30	0:15	0:15	0:28	1:00	1:28	80.6	1:48	$84.67	3:16	3.3	$16.00	$5.00	2.3	$11.96
	New Day Boat #2	Katzehin	106	28	Skagway Direct	106	424	0:45	0:15	0:15	1:00	1:15	2:15	76.3	1:42	$80.16	3:57	4.0	$25.00	$8.50	2.3	$19.37
Alt 3: Sawmill Cove	New Day Boat #1	Sawmill Cove	66	28	William Henry Bay	66	265	0:38	0:15	0:15	0:45	1:08	1:53	72.1	1:36	$75.74	3:29	3.5	$21.00	$7.50	2.3	$16.63
	New Day Boat #2	Sawmill Cove	40	21	Skagway via Shuttle	40	119	0:54	0:28	0:28	1:38	1:50	3:28	76.4	1:42	$80.26	5:10	5.2	$23.00	$8.00	2.3	$34.63
Alt 4A: Fast Ferry Auke Bay	Fast Ferry #1	Auke Bay	62	7	Haines	62	62	1:00		0:21	2:27	1:21	3:48	4.3	0:06	$4.52	3:54	3.9	$90.00	$39.00	3.3	$66.27
	Fast Ferry #2	Auke Bay	62	7	Skagway Direct	62	62	1:00		0:21	2:43	1:21	4:04	0.0	0:00	$0.00	4:04	4.1	$116.00	$53.00	3.3	$88.15
	Mainline	Auke Bay	117	1	Haines	59	8	2:00		0:36	4:30	2:36	7:06	4.3	0:06	$4.52	7:12	7.2	$90.00	$39.00	3.3	$66.27
					Skagway via Haines	59	8	2:00		0:36	6:30	2:36	9:06	0.0	0:00	$0.00	9:06	9.1	$116.00	$53.00	3.3	$88.15
Alt 4B: Fast Ferry Sawmill Cove	Fast Ferry #1	Auke Bay	106	7	Haines	106	106	1:00		0:28	2:27	1:28	3:55	4.3	0:06	$4.52	4:01	4.0	$90.00	$39.00	3.3	$66.27
	Fast Ferry #2	Auke Bay	106	7	Skagway Direct	106	106	1:00		0:28	2:43	1:28	4:11	0.0	0:00	$0.00	4:11	4.2	$116.00	$53.00	3.3	$88.15
	Mainline	Auke Bay	117	1	Haines	59	8	2:00		0:36	4:30	2:36	7:06	4.3	0:06	$4.52	7:12	7.2	$90.00	$39.00	3.3	$66.27
					Skagway via Haines	59	8	2:00		0:36	6:30	2:36	9:06	0.0	0:00	$0.00	9:06	9.1	$116.00	$53.00	3.3	$88.15
Alt 4C: Dayboat Auke Bay	New Day Boat #1	Auke Bay	106	3.5	Haines	106	53	1:00		0:18	4:46	1:18	6:04	4.3	0:06	$4.52	6:10	6.2	$90.00	$39.00	3.3	$66.27
	New Day Boat #2	Auke Bay	106	3.5	Skagway Direct	106	53	1:00		0:18	5:18	1:18	6:36	0.0	0:00	$0.00	6:36	6.6	$116.00	$53.00	3.3	$88.15
	Mainline	Auke Bay	117	1	Haines	59	8	2:00		0:36	4:30	2:36	7:06	4.3	0:06	$4.52	7:12	7.2	$90.00	$39.00	3.3	$66.27
					Skagway via Haines	59	8	2:00		0:36	6:30	2:36	9:06	0.0	0:00	$0.00	9:06	9.1	$116.00	$53.00	3.3	$88.15
Alt 4D: Dayboat Sawmill Cove	New Day Boat #1	Auke Bay	106	3.5	Haines	106	53	1:00		0:18	4:46	1:18	6:04	4.3	0:06	$4.52	6:10	6.2	$90.00	$39.00	3.3	$66.27
	New Day Boat #2	Auke Bay	106	3.5	Skagway Direct	106	53	1:00		0:18	5:18	1:18	6:36	0.0	0:00	$0.00	6:36	6.6	$116.00	$53.00	3.3	$88.15
	Mainline	Auke Bay	117	1	Haines	59	8	2:00		0:36	4:30	2:36	7:06	4.3	0:06	$4.52	7:12	7.2	$90.00	$39.00	3.3	$66.27
					Skagway via Haines	59	8	2:00		0:36	6:30	2:36	9:06	0.0	0:00	$0.00	9:06	9.1	$116.00	$53.00	3.3	$88.15

Notes:

Fares are based on a 16-19ft vehicle.
Delay is check-in & loading time, except that 2B & 3 is 1/4 of headway (departure intervals = operating hours/round-trips/day).
Distances measured from Auke Bay Terminal and Downtown Haines at 3rd & Main.
Fehr & Peers assumed road distance from Haines to Katzehin of 5.3 miles.
Assumed 67% of mainline capacity based on existing utilization (Matanuska=88).
Skagway Alt 3 ferry delay is based on analysis of predicted delay for each possible ferry connection.
Skagway Alt 3 ferry RT is only 3.0 per day because no Juneau travelers can catch first or last shuttle to Skagway.
RT is round-trip.
AVO is average vehicle occupancy.

Haines share:	50%
Mainline capacity:	67%
Driving speed (mph):	45
Driving cost ($/mi):	1.05

25.8	Auke Bay to Echo Cove
5.2	Echo Cove to Sawmill Cove
50.5	Echo Cove to Katzehin Delta
38.9	William Henry to Mud Bay
2.2	Mud Bay to Downtown Haines
4.3	Downtown Haines to Lutak
95.3	Auke Bay to Skagway
5.3	Katzehin to Downtown Haines

TABLE A-15

Average Cost per User
Haines - Skagway

Alternative	Ferry Delay	Ferry Travel	Ferry Fare	Highway Travel	Highway Vehicle Cost	Total
Existing Service	$27.09	$ 9.20	$18.00	$ 1.04	$ 1.96	$57.29
1 - No Action	$14.25	$ 9.20	$18.00	$ 1.04	$ 1.96	$44.46
1B - Enhanced Service	$14.39	$ 9.20	$14.40	$ 1.04	$ 1.96	$40.99
2B - East Lynn Highway	$ 9.96	$ 9.93	$19.59	$ 1.04	$ 1.96	$42.49
3 - West Lynn Highway	$ 7.29	$ 9.20	$18.00	$ 1.04	$ 1.96	$37.50
4A - Fast Ferry Auke Bay	$10.08	$ 9.20	$18.00	$ 1.04	$ 1.96	$40.29
4B - Fast Ferry Berners Bay	$10.08	$ 9.20	$18.00	$ 1.04	$ 1.96	$40.29
4C - Monohull Auke Bay	$10.08	$ 9.20	$18.00	$ 1.04	$ 1.96	$40.29
4D - Monohull Berners Bay	$10.08	$ 9.20	$18.00	$ 1.04	$ 1.96	$40.29

TABLE A-16

Cost per User
Haines - Skagway

Alternative	Ferry Delay (hours)	Ferry Travel (hours)	Ferry Fare	Highway Travel (hours)	Highway Vehicle Cost
Existing Service	2:36	0:53	$18.00	0:06	$ 1.96
1 - No Action	1:22	0:53	$18.00	0:06	$ 1.96
1B - Enhanced Service	1:22	0:53	$14.40	0:06	$ 1.96
2B - East Lynn Highway	0:57	0:57	$19.59	0:06	$ 1.96
3 - West Lynn Highway	0:42	0:53	$18.00	0:06	$ 1.96
4A - Fast Ferry Auke Bay	0:58	0:53	$18.00	0:06	$ 1.96
4B - Fast Ferry Berners Bay	0:58	0:53	$18.00	0:06	$ 1.96
4C - Monohull Auke Bay	0:58	0:53	$18.00	0:06	$ 1.96
4D - Monohull Berners Bay	0:58	0:53	$18.00	0:06	$ 1.96

TABLE A-17

Seasonal Traffic
Haines - Skagway
2015

Alternative	Ferry RT/Day[1]		AADT Increase over Existing Service[2]		AADT[2]		Days		Annual Traffic		Annual Traffic %	
	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
Existing Service	1	1			34	5	153	212	5,202	1,060	83.1%	16.9%
1 - No Action	2	1	50%		51	5	153	212	7,803	1,060	88.0%	12.0%
1B - Enhanced Service	2	1	50%		51	5	153	212	7,803	1,060	88.0%	12.0%
2B - East Lynn Highway	2	0	50%		51	5	153	212	7,803	1,060	88.0%	12.0%
3 - West Lynn Highway	6	4	75%	75%	60	9	153	212	9,104	1,855	83.1%	16.9%
4A - Fast Ferry Auke Bay	2	1	50%		51	5	153	212	7,803	1,060	88.0%	12.0%
4B - Fast Ferry Berners Bay	2	1	50%		51	5	153	212	7,803	1,060	88.0%	12.0%
4C - Monohull Auke Bay	2	1	50%		51	5	153	212	7,803	1,060	88.0%	12.0%
4D - Monohull Berners Bay	2	1	50%		51	5	153	212	7,803	1,060	88.0%	12.0%

Notes:
1. Table A-21.
2. *Juneau Access Haines/Skagway Traffic Forecast* , McDowell Group, December 2016, p. 8.

TABLE A-18

Cost per User
Summer
Haines - Skagway

Alternative	Ferry Delay (hours)	Ferry Travel (hours)	Ferry Fare	Highway Travel (hours)	Highway Vehicle Cost[1]
Existing Service	2:36	0:53	$18.00	0:06	$ 1.96
1 - No Action	1:22	0:53	$18.00	0:06	$ 1.96
1B - Enhanced Service	1:23	0:53	$14.40	0:06	$ 1.96
2B - East Lynn Highway	0:42	0:53	$18.00	0:06	$ 1.96
3 - West Lynn Highway	0:42	0:53	$18.00	0:06	$ 1.96
4A - Fast Ferry Auke Bay	0:57	0:53	$18.00	0:06	$ 1.96
4B - Fast Ferry Berners Bay	0:57	0:53	$18.00	0:06	$ 1.96
4C - Monohull Auke Bay	0:57	0:53	$18.00	0:06	$ 1.96
4D - Monohull Berners Bay	0:57	0:53	$18.00	0:06	$ 1.96

Notes:
1. Cost per user.

TABLE A-19

Cost per User
Winter
Haines - Skagway

Alternative	Ferry Delay (hours)	Ferry Travel (hours)	Ferry Fare	Highway Travel (hours)	Highway Vehicle Cost[1]
Existing Service	2:36	0:53	$18.00	0:06	$ 1.96
1 - No Action	1:19	0:53	$18.00	0:06	$ 1.96
1B - Enhanced Service	1:19	0:53	$14.40	0:06	$ 1.96
2B - East Lynn Highway	2:50	1:28	$31.33	0:06	$ 1.96
3 - West Lynn Highway	0:42	0:53	$18.00	0:06	$ 1.96
4A - Fast Ferry Auke Bay	1:04	0:53	$18.00	0:06	$ 1.96
4B - Fast Ferry Berners Bay	1:04	0:53	$18.00	0:06	$ 1.96
4C - Monohull Auke Bay	1:04	0:53	$18.00	0:06	$ 1.96
4D - Monohull Berners Bay	1:04	0:53	$18.00	0:06	$ 1.96

Notes:
1. Cost per user.

TABLE A-20

Haines - Skagway Port-to-Port Vehicle Traffic 2015

	Vehicles On-Off	Vessel Trips[2]	2015 Vessel Capacity Per Trip[3]	2015 Vessel Capacity Annual	HNS & SGY Utilization
Haines - Skagway					
Aurora	163	36			
LeConte	776	63			
Lynn Canal Total	939	99			
Columbia	509	19			
Malaspina	1,136	75			
Matanuska	144	22			
Taku	612	46			
Mainline Total	2,401	162			
Skagway - Haines					
Aurora	175	36			
LeConte	701	63			
Lynn Canal Total	876	99			
Columbia	399	19			
Malaspina	843	74			
Matanuska	222	22			
Taku	581	32			
Mainline Total	2,045	147			
Total					
Aurora	338	72	33	2,376	14.2%
LeConte	1,477	126	33	4,158	35.5%
Lynn Canal Total	1,815	198		6,534	27.8%
Columbia	908	38	133	5,054	18.0%
Malaspina	1,979	149	83	12,367	16.0%
Matanuska	366	44	83	3,652	10.0%
Taku	1,193	78	50	3,900	30.6%
Mainline Total	4,446	309		24,973	17.8%

Notes:

1. Port to Port Traffic (On/Off), *Annual Traffic Volume Report 2015, AMHS.*
2. Link Volume Summary, *Ibid*.
3. Vessel Information Table, *Ibid*.

TABLE A-21

User Cost Detail
Haines - Skagway
Summer & Winter

Alternative	Ferry	Link	Season	RT Capacity (veh)	Destination RT Capacity (veh)	Destination Ferry RT/ Week	Destination RT Capacity/ Day (veh)	Ferry Travel Time						Ferry Fare				Highway Travel		
								Delay (min)	Load (min)	Unload (min)	Delay Total (min)	Ferry Travel Time (min)	Total Ferry Time (min)	Vehicle Fare	Person Fare	AVO	Ferry Fare	Distance (mi)	Time (min)	Vehicle Cost
Existing	Malaspina	Haines - Skagway	Summer	157	39	5	28	2:00		0:36	2:36	0:53	3:29	23.00	8.00	2.3	18.00	4.3	0:06	$4.52
			Winter			0	0							23.00	8.00	2.3	18.00	4.3	0:06	$4.52
	Mainline	Haines - Skagway	Summer	148	22	2	6	2:00		0:36	2:36	0:53	3:29	23.00	8.00	2.3	18.00	4.3	0:06	$4.52
			Winter	117	18	1	3	2:00		0:36	2:36	0:53	3:29	23.00	8.00	2.3	18.00	4.3	0:06	$4.52
	Leconte	Haines - Skagway	Summer			0	0							23.00	8.00	2.3	18.00	4.3	0:06	$4.52
			Winter	68	17	3	7	2:00		0:36	2:36	0:53	3:29	23.00	8.00	2.3	18.00	4.3	0:06	$4.52
Alt 1: No Action	New Day Boats	Haines - Skagway	Summer	106	27	12	45	1:00		0:07	1:07	0:53	2:00	23.00	8.00	2.3	18.00	4.3	0:06	$4.52
			Winter		27	6	23	1:00		0:07	1:07	0:53	2:00	23.00	8.00	2.3	18.00	4.3	0:06	$4.52
	Mainline	Haines - Skagway	Summer	222	33	2	10	2:00		0:36	2:36	0:53	3:29	23.00	8.00	2.3	18.00	4.3	0:06	$4.52
			Winter	176	26	1	4	2:00		0:36	2:36	0:53	3:29	23.00	8.00	2.3	18.00	4.3	0:06	$4.52
Alt 1B: Enhanced Service	New Day Boats	Haines - Skagway	Summer	106	27	12	45	1:00		0:07	1:07	0:53	2:00	18.40	6.40	2.3	14.40	4.3	0:06	$4.52
			Winter		27	6	23	1:00		0:07	1:07	0:53	2:00	18.40	6.40	2.3	14.40	4.3	0:06	$4.52
	Malaspina	Haines - Skagway	Summer	176	44	2	6	1:00		0:31	1:31	0:53	2:24	18.40	6.40	2.3	14.40	4.3	0:06	$4.52
			Winter			0	0													
	Mainline	Haines - Skagway	Summer	222	33	2	10	2:00		0:36	2:36	0:53	3:29	18.40	6.40	2.3	14.40	4.3	0:06	$4.52
			Winter	176	26	1	4	2:00		0:36	2:36	0:53	3:29	18.40	6.40	2.3	14.40	4.3	0:06	$4.52
Alt 2B: East Lynn KTZ	New Shuttle	Haines - Skagway	Summer	36	36	14	72	0:16	0:13	0:13	0:42	0:53	1:35	23.00	8.00	2.3	18.00	4.3	0:06	$4.52
	New Day Boats		Winter	106	27	28	106	1:50	0:30	0:30	2:50	1:28	4:18	41.00	13.50	2.3	31.33	4.3	0:06	$4.52
Alt 3: West Lynn	New Shuttle	Haines - Skagway	Summer	82	21	42	123	0:16	0:13	0:13	0:42	0:53	1:35	23.00	8.00	2.3	18.00	4.3	0:06	$4.52
			Winter		21	28	82	0:16	0:13	0:13	0:42	0:53	1:35	23.00	8.00	2.3	18.00	4.3	0:06	$4.52
Alt 4A: FVF Auke Bay	New Shuttle	Haines - Skagway	Summer	36	36	12	62	0:16	0:13	0:13	0:42	0:53	1:35	23.00	8.00	2.3	18.00	4.3	0:06	$4.52
			Winter		36	3	15	0:16	0:13	0:13	0:42	0:53	1:35	23.00	8.00	2.3	18.00	4.3	0:06	$4.52
	Mainline	Haines - Skagway	Summer	222	33	2	10	2:00		0:36	2:36	0:53	3:29	23.00	8.00	2.3	18.00	4.3	0:06	$4.52
			Winter	176	26	1	4	2:00		0:36	2:36	0:53	3:29	23.00	8.00	2.3	18.00	4.3	0:06	$4.52
Alt 4B: FVF Sawmill Cove	New Shuttle	Haines - Skagway	Summer	36	36	12	62	0:16	0:13	0:13	0:42	0:53	1:35	23.00	8.00	2.3	18.00	4.3	0:06	$4.52
			Winter		36	3	15	0:16	0:13	0:13	0:42	0:53	1:35	23.00	8.00	2.3	18.00	4.3	0:06	$4.52
	Mainline	Haines - Skagway	Summer	222	33	2	10	2:00		0:36	2:36	0:53	3:29	23.00	8.00	2.3	18.00	4.3	0:06	$4.52
			Winter	176	26	1	4	2:00		0:36	2:36	0:53	3:29	23.00	8.00	2.3	18.00	4.3	0:06	$4.52
Alt 4C: Dayboat Auke Bay	New Shuttle	Haines - Skagway	Summer	36	36	12	62	0:16	0:13	0:13	0:42	0:53	1:35	23.00	8.00	2.3	18.00	4.3	0:06	$4.52
			Winter		36	3	15	0:16	0:13	0:13	0:42	0:53	1:35	23.00	8.00	2.3	18.00	4.3	0:06	$4.52
	Mainline	Haines - Skagway	Summer	222	33	2	10	2:00		0:36	2:36	0:53	3:29	23.00	8.00	2.3	18.00	4.3	0:06	$4.52
			Winter	176	26	1	4	2:00		0:36	2:36	0:53	3:29	23.00	8.00	2.3	18.00	4.3	0:06	$4.52
Alt 4D: Dayboat Sawmill Cove	New Shuttle	Haines - Skagway	Summer	36	36	12	62	0:16	0:13	0:13	0:42	0:53	1:35	23.00	8.00	2.3	18.00	4.3	0:06	$4.52
			Winter		36	3	15	0:16	0:13	0:13	0:42	0:53	1:35	23.00	8.00	2.3	18.00	4.3	0:06	$4.52
	Mainline	Haines - Skagway	Summer	222	33	2	10	2:00		0:36	2:36	0:53	3:29	23.00	8.00	2.3	18.00	4.3	0:06	$4.52
			Winter	176	26	1	4	2:00		0:36	2:36	0:53	3:29	23.00	8.00	2.3	18.00	4.3	0:06	$4.52

Notes:

Fares are based on a 16-19ft vehicle.

Distances measured from Auke Bay Terminal and Downtown Haines at 3rd & Main

Different formulas based on unique attributes of each alternative

Delay is check-in & loading time, except shuttle delay is the Alt 3 JUN-HNS &SGY winter incremental delay for SGY traffic.

Alt 2B winter delay is based on analysis of predicted delay for each possible ferry connection in Table A-22.

Alt 1B Malaspina trips are one-way SGY-HNS-AUK-SGY.

RT is round-trip. AVO is average vehicle occupancy.

HNS/SGY share of vessels operating solely in Lynn Canal, but carrying JUN traffic:	25%
HNS/SGY share of vessels carrying traffic outside Lynn Canal:	15%
Driving speed (mph):	45
Driving cost ($/mi):	1.05
1B fare reduction:	20%

Auke Bay to Echo Cove:	25.8
Echo Cove to Sawmill Cove:	5.2
Echo Cove to Katzehin Delta:	50.5
William Henry to Mud Bay:	38.9
Mud Bay to Downtown Haines:	2.2
Downtown Haines to Lutak:	4.3
Auke Bay to Skagway:	95.3
Katzehin to Downtown Haines:	5.3

TABLE A-22

Haines - Skagway Winter Delay
Alternative 2B

Katzehin - Haines 12.6 hour Winter Schedule

check-in	load	depart HNS	travel	unload	check-in	load	depart Katzehin	travel	unload	check-in	load
0:05	0:15	6:00	0:28	0:15	0:05	0:15	7:03	0:28	0:15	0:05	0:15
		8:07	0:28	0:15	0:05	0:15	9:10	0:28	0:15	0:05	0:15
		10:14	0:28	0:15	0:05	0:15	11:17	0:28	0:15	0:05	0:15
		12:21	0:28	0:15	0:05	0:15	13:24	0:28	0:15	0:05	0:15
		14:28	0:28	0:15	0:05	0:15	15:31	0:28	0:15	0:05	0:15
		16:35	0:28	0:15	0:05	0:15	17:38	0:28	0:15		
									18:21		

Katzehin - Skagway 13 hour Winter Schedule

check-in	load	depart SGY	travel	unload	check-in	load	depart Katzehin	travel	unload	check-in	load
0:08	0:15	6:00	1:00	0:15	0:08	0:15	7:38	1:00	0:15	0:08	0:15
		9:17	1:00	0:15	0:08	0:15	10:55	1:00	0:15	0:08	0:15
		12:34	1:00	0:15	0:08	0:15	14:12	1:00	0:15	0:08	0:15
		15:51	1:00	0:15	0:08	0:15	17:29	1:00	0:15		
									18:44		

Haines to Skagway Travel

Delay at HNS	load	depart HNS	travel	unload	arrive KTZ	delay	load	depart KTZ	travel	unload	arrive SGY	Total Delay
0:30	0:15	6:00	0:28	0:15	6:43	0:40	0:15	7:38	1:00	0:15	8:53	1:10
0:30	0:15	8:07	0:28	0:15	8:50	1:50	0:15	10:55	1:00	0:15	12:10	2:20
0:30	0:15	10:14	0:28	0:15	10:57	3:00	0:15	14:12	1:00	0:15	15:27	3:30
0:30	0:15	12:21	0:28	0:15	13:04	0:53	0:15	14:12	1:00	0:15	15:27	1:23
0:30	0:15	14:28	0:28	0:15	15:11	2:03	0:15	17:29	1:00	0:15	18:44	2:33
0:30	0:15	16:35	0:28	0:15	17:18	0:00	0:11	17:29	1:00	0:15	18:44	0:30

Skagway to Haines Travel

Delay at SGY	load	depart SGY	travel	unload	arrive KTZ	delay	load	depart KTZ	travel	unload	arrive HNS	Total Delay
0:45	0:15	6:00	1:00	0:15	7:15	1:40	0:15	9:10	0:28	0:15	9:53	2:25
0:45	0:15	9:17	1:00	0:15	10:32	0:30	0:15	11:17	0:28	0:15	12:00	1:15
0:45	0:15	12:34	1:00	0:15	13:49	1:27	0:15	15:31	0:28	0:15	16:14	2:12
0:45	0:15	15:51	1:00	0:15	17:06	0:17	0:15	17:38	0:28	0:15	18:21	1:02

Average Total Delay 1:50

TABLE A-23

User Benefits
Juneau - Haines & Skagway
Alternative 4C - Monohull Auke Bay

	Period of Service (Fiscal Years)	Users per Vehicle	Annual Growth in AADT[1]	AADT 2015[2]	AADT FY 2019	AADT FY 2025	AADT FY 2054
2015-25		3.3	0.429%				
2015-55			0.125%				
2025-55			0.024%				
Alternative 1 - No Action	2019-54	3.3		76	77	79	80
Alternative 4C - Monohull Auke Bay	2025-54	3.3		92	93	96	96

Fiscal Year	Modal Cost per User: Alternative 1 No Action	Modal Cost per User: Alternative 4C Monohull Auke Bay	Modal Cost per User: Cost Reduction	AADT: Alternative 1 No Action	AADT: Alternative 4C Monohull Auke Bay	Annual Average Daily Users	Total Annual User Benefits (2016 $000): Year of Travel	Total Annual User Benefits (2016 $000): Present Value[3] @ 7.0% 7/1/18
2019	149	149	0	77	77	255	0	0
2020	149	149	0	77	77	256	0	0
2021	149	149	0	78	78	257	0	0
2022	149	149	0	78	78	258	0	0
2023	149	149	0	78	78	259	0	0
2024	149	149	0	79	79	260	0	0
2025	149	138	11	79	96	288	1,105	712
2026	149	138	11	79	96	288	1,105	665
2027	149	138	11	79	96	288	1,105	622
2028	149	138	11	79	96	288	1,106	581
2029	149	138	11	79	96	288	1,106	543
2030	149	138	11	79	96	288	1,106	508
2031	149	138	11	79	96	289	1,106	475
2032	149	138	11	79	96	289	1,107	444
2033	149	138	11	79	96	289	1,107	415
2034	149	138	11	79	96	289	1,107	388
2035	149	138	11	79	96	289	1,107	363
2036	149	138	11	79	96	289	1,108	339
2037	149	138	11	79	96	289	1,108	317
2038	149	138	11	79	96	289	1,108	296
2039	149	138	11	79	96	289	1,108	277
2040	149	138	11	79	96	289	1,109	259

TABLE A-23

User Benefits
Juneau - Haines & Skagway
Alternative 4C - Monohull Auke Bay

	Period of Service (Fiscal Years)	Users per Vehicle	Annual Growth in AADT[1]	AADT 2015[2]	AADT FY 2019	AADT FY 2025	AADT FY 2054
2015-25		3.3	0.429%				
2015-55			0.125%				
2025-55			0.024%				
Alternative 1 - No Action	2019-54	3.3		76	77	79	80
Alternative 4C - Monohull Auke Bay	2025-54	3.3		92	93	96	96

Fiscal Year	Modal Cost per User: Alternative 1 No Action	Modal Cost per User: Alternative 4C Monohull Auke Bay	Modal Cost per User: Cost Reduction	AADT: Alternative 1 No Action	AADT: Alternative 4C Monohull Auke Bay	Annual Average Daily Users	Total Annual User Benefits (2016 $000): Year of Travel	Total Annual User Benefits (2016 $000): Present Value[3] @ 7.0% 7/1/18
2041	149	138	11	79	96	289	1,109	242
2042	149	138	11	79	96	289	1,109	226
2043	149	138	11	79	96	289	1,110	211
2044	149	138	11	79	96	289	1,110	198
2045	149	138	11	79	96	290	1,110	185
2046	149	138	11	79	96	290	1,110	173
2047	149	138	11	79	96	290	1,111	161
2048	149	138	11	79	96	290	1,111	151
2049	149	138	11	79	96	290	1,111	141
2050	149	138	11	79	96	290	1,111	132
2051	149	138	11	79	96	290	1,112	123
2052	149	138	11	80	96	290	1,112	115
2053	149	138	11	80	96	290	1,112	108
2054	149	138	11	80	96	290	1,112	101
Total				2,846	3,347		33,258	9,471

Note:

1. Growth rates calculated from Total Population figures for 2015, 2025, and 2055 in Table 8, *Memorandum, Subject: Juneau Access Improvements, Appendix D: Choice Models*, Fehr & Peers, January 5, 2017.
2. Table 7, Ibid.
3. Present value at private sector real rate of return of 7.0 percent.

TABLE A-24

User Benefits
Juneau - Haines & Skagway
Alternative 1B - Enhanced Service

	Period of Service (Fiscal Years)	Users per Vehicle	Annual Growth in AADT[1]	AADT 2015[2]	AADT FY 2019	AADT FY 2025	AADT FY 2054
2015-25		3.3	0.429%				
2015-55			0.125%				
2025-55			0.024%				
Alternative 1 - No Action	2019-24	3.3		76	77		
Alternative 4C - Monohull Auke Bay	2025-54	3.3		92	93	96	96
Alternative 1B - Enhanced Service	2019-54	3.3		126	128	131	132

	Modal Cost per User			AADT			Total Annual User Benefits (2016 $000)					
							Alternative 1B vs. 4C		Alternative 4C vs. No Action		Alternative 1B vs. No Action	
Fiscal Year	Alternative 4C Monohull Auke Bay	Alternative 1B Enhanced Service	Cost Reduction	Alternative 4C Monohull Auke Bay	Alternative 1B Enhanced Service	Annual Average Daily Users	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18
2019	149	134	15	77	128	338	1,816	1,756	0	0	1,816	1,756
2020	149	134	15	77	128	340	1,824	1,648	0	0	1,824	1,648
2021	149	134	15	78	129	341	1,832	1,547	0	0	1,832	1,547
2022	149	134	15	78	130	343	1,840	1,452	0	0	1,840	1,452
2023	149	134	15	78	130	344	1,848	1,363	0	0	1,848	1,363
2024	149	134	15	79	131	346	1,855	1,279	0	0	1,855	1,279
2025	138	134	4	96	131	374	573	369	1,105	712	1,678	1,081
2026	138	134	4	96	131	374	573	345	1,105	665	1,679	1,011
2027	138	134	4	96	131	374	574	323	1,105	622	1,679	945
2028	138	134	4	96	131	374	574	302	1,106	581	1,679	883
2029	138	134	4	96	131	374	574	282	1,106	543	1,680	825
2030	138	134	4	96	131	374	574	264	1,106	508	1,680	772
2031	138	134	4	96	131	374	574	246	1,106	475	1,681	721
2032	138	134	4	96	131	375	574	230	1,107	444	1,681	674
2033	138	134	4	96	131	375	574	215	1,107	415	1,681	630
2034	138	134	4	96	131	375	575	201	1,107	388	1,682	589
2035	138	134	4	96	131	375	575	188	1,107	363	1,682	551
2036	138	134	4	96	131	375	575	176	1,108	339	1,683	515
2037	138	134	4	96	131	375	575	164	1,108	317	1,683	481
2038	138	134	4	96	131	375	575	154	1,108	296	1,683	450
2039	138	134	4	96	131	375	575	144	1,108	277	1,684	421
2040	138	134	4	96	131	375	575	134	1,109	259	1,684	393

TABLE A-24

User Benefits
Juneau - Haines & Skagway
Alternative 1B - Enhanced Service

	Period of Service (Fiscal Years)	Users per Vehicle	Annual Growth in AADT[1]	AADT 2015[2]	AADT FY 2019	AADT FY 2025	AADT FY 2054
2015-25		3.3	0.429%				
2015-55			0.125%				
2025-55			0.024%				
Alternative 1 - No Action	2019-24	3.3		76	77		
Alternative 4C - Monohull Auke Bay	2025-54	3.3		92	93	96	96
Alternative 1B - Enhanced Service	2019-54	3.3		126	128	131	132

	Modal Cost per User			AADT			Total Annual User Benefits (2016 $000)					
							Alternative 1B vs. 4C		Alternative 4C vs. No Action		Alternative 1B vs. No Action	
Fiscal Year	Alternative 4C Monohull Auke Bay	Alternative 1B Enhanced Service	Cost Reduction	Alternative 4C Monohull Auke Bay	Alternative 1B Enhanced Service	Annual Average Daily Users	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18
2041	138	134	4	96	131	375	576	126	1,109	242	1,685	368
2042	138	134	4	96	132	375	576	117	1,109	226	1,685	344
2043	138	134	4	96	132	375	576	110	1,110	211	1,685	321
2044	138	134	4	96	132	376	576	103	1,110	198	1,686	300
2045	138	134	4	96	132	376	576	96	1,110	185	1,686	281
2046	138	134	4	96	132	376	576	90	1,110	173	1,687	262
2047	138	134	4	96	132	376	576	84	1,111	161	1,687	245
2048	138	134	4	96	132	376	577	78	1,111	151	1,687	229
2049	138	134	4	96	132	376	577	73	1,111	141	1,688	214
2050	138	134	4	96	132	376	577	68	1,111	132	1,688	200
2051	138	134	4	96	132	376	577	64	1,112	123	1,689	187
2052	138	134	4	96	132	376	577	60	1,112	115	1,689	175
2053	138	134	4	96	132	376	577	56	1,112	108	1,689	164
2054	138	134	4	96	132	376	577	52	1,112	101	1,690	153
Total				3,347	4,718		28,275	13,959	33,258	9,471	61,533	23,430

Note:

1. Growth rates calculated from Total Population figures for 2015, 2025, and 2055 in Table 8, *Memorandum, Subject: Juneau Access Improvements, Appendix D: Choice Models*, Fehr & Peers, January 5, 2017.
2. Table 7, Ibid.
3. Present value at private sector real rate of return of 7.0 percent.

TABLE A-25

User Benefits
Juneau - Haines & Skagway
Alternative 4D - Monohull Berners Bay

	Period of Service (Fiscal Years)	Users per Vehicle	Annual Growth in AADT[1]	AADT 2015[2]	AADT FY 2019	AADT FY 2025	AADT FY 2054
2015-25		3.3	0.429%				
2015-55			0.125%				
2025-55			0.024%				
Alternative 1 - No Action	2019-24	3.3		76	77		
Alternative 1B - Enhanced Service	2019-54	3.3		126	128	131	132
Alternative 4D - Monohull Berners Bay	2025-54	3.3		213	216	221	223

	Modal Cost per User			AADT			Total Annual User Benefits (2016 $000)					
							Alternative 4D vs. 1B		Alternative 1B vs. No Action		Alternative 4D vs. No Action	
Fiscal Year	Alternative 1B Enhanced Service	Alternative 4D Monohull Berners Bay	Cost Reduction	Alternative 1B Enhanced Service	Alternative 4D Monohull Berners Bay	Annual Average Daily Users	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18
2019	134	149	(15)	128	77	338	(1,816)	(1,756)	1,816	1,756	0	0
2020	134	149	(15)	128	77	340	(1,824)	(1,648)	1,824	1,648	0	0
2021	134	149	(15)	129	78	341	(1,832)	(1,547)	1,832	1,547	0	0
2022	134	149	(15)	130	78	343	(1,840)	(1,452)	1,840	1,452	0	0
2023	134	149	(15)	130	78	344	(1,848)	(1,363)	1,848	1,363	0	0
2024	134	149	(15)	131	79	346	(1,855)	(1,279)	1,855	1,279	0	0
2025	134	123	11	131	221	581	2,378	1,532	1,678	1,081	4,056	2,613
2026	134	123	11	131	221	582	2,378	1,432	1,679	1,011	4,057	2,442
2027	134	123	11	131	222	582	2,379	1,338	1,679	945	4,058	2,283
2028	134	123	11	131	222	582	2,379	1,251	1,679	883	4,059	2,134
2029	134	123	11	131	222	582	2,380	1,170	1,680	825	4,060	1,995
2030	134	123	11	131	222	582	2,380	1,093	1,680	772	4,060	1,865
2031	134	123	11	131	222	582	2,381	1,022	1,681	721	4,061	1,743
2032	134	123	11	131	222	582	2,381	955	1,681	674	4,062	1,630
2033	134	123	11	131	222	583	2,382	893	1,681	630	4,063	1,523
2034	134	123	11	131	222	583	2,383	835	1,682	589	4,064	1,424
2035	134	123	11	131	222	583	2,383	780	1,682	551	4,065	1,331
2036	134	123	11	131	222	583	2,384	730	1,683	515	4,066	1,244
2037	134	123	11	131	222	583	2,384	682	1,683	481	4,067	1,163
2038	134	123	11	131	222	583	2,385	638	1,683	450	4,068	1,087
2039	134	123	11	131	222	583	2,385	596	1,684	421	4,069	1,017
2040	134	123	11	131	222	583	2,386	557	1,684	393	4,070	950

TABLE A-25

User Benefits
Juneau - Haines & Skagway
Alternative 4D - Monohull Berners Bay

	Period of Service (Fiscal Years)	Users per Vehicle	Annual Growth in AADT[1]	AADT 2015[2]	AADT FY 2019	AADT FY 2025	AADT FY 2054
2015-25		3.3	0.429%				
2015-55			0.125%				
2025-55			0.024%				
Alternative 1 - No Action	2019-24	3.3		76	77		
Alternative 1B - Enhanced Service	2019-54	3.3		126	128	131	132
Alternative 4D - Monohull Berners Bay	2025-54	3.3		213	216	221	223

	Modal Cost per User			AADT			Total Annual User Benefits (2016 $000)					
							Alternative 4D vs. 1B		Alternative 1B vs. No Action		Alternative 4D vs. No Action	
Fiscal Year	Alternative 1B Enhanced Service	Alternative 4D Monohull Berners Bay	Cost Reduction	Alternative 1B Enhanced Service	Alternative 4D Monohull Berners Bay	Annual Average Daily Users	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18
2041	134	123	11	131	222	584	2,387	521	1,685	368	4,071	888
2042	134	123	11	132	222	584	2,387	487	1,685	344	4,072	830
2043	134	123	11	132	222	584	2,388	455	1,685	321	4,073	776
2044	134	123	11	132	222	584	2,388	425	1,686	300	4,074	726
2045	134	123	11	132	222	584	2,389	398	1,686	281	4,075	678
2046	134	123	11	132	223	584	2,389	372	1,687	262	4,076	634
2047	134	123	11	132	223	584	2,390	348	1,687	245	4,077	593
2048	134	123	11	132	223	585	2,391	325	1,687	229	4,078	554
2049	134	123	11	132	223	585	2,391	304	1,688	214	4,079	518
2050	134	123	11	132	223	585	2,392	284	1,688	200	4,080	484
2051	134	123	11	132	223	585	2,392	265	1,689	187	4,081	453
2052	134	123	11	132	223	585	2,393	248	1,689	175	4,082	423
2053	134	123	11	132	223	585	2,393	232	1,689	164	4,083	396
2054	134	123	11	132	223	585	2,394	217	1,690	153	4,084	370
Total				4,718	7,133		60,558	11,339	61,533	23,430	122,091	34,769

Note:

1. Growth rates calculated from Total Population figures for 2015, 2025, and 2055 in Table 8, *Memorandum, Subject: Juneau Access Improvements, Appendix D: Choice Models*, Fehr & Peers, January 5, 2017.
2. Table 7, Ibid.
3. Present value at private sector real rate of return of 7.0 percent.

TABLE A-26

User Benefits
Juneau - Haines & Skagway
Alternative 4A - Fast Ferry Auke Bay

	Period of Service (Fiscal Years)	Users per Vehicle	Annual Growth in AADT[1]	AADT 2015[2]	AADT FY 2019	AADT FY 2025	AADT FY 2054
2015-25		3.3	0.429%				
2015-55			0.125%				
2025-55			0.024%				
Alternative 1 - No Action	2019-24	3.3		76	77		
Alternative 4A - Fast Ferry Auke Bay	2025-54	3.3		137	139	142	143
Alternative 4D - Monohull Berners Bay	2025-54	3.3		213	216	221	223

	Modal Cost per User			AADT			Total Annual User Benefits (2016 $000)					
							Alternative 4A vs. 4D		Alternative 4D vs. No Action		Alternative 4A vs. No Action	
Fiscal Year	Alternative 4D Monohull Berners Bay	Alternative 4A Fast Ferry Auke Bay	Cost Reduction	Alternative 4D Monohull Berners Bay	Alternative 4A Fast Ferry Auke Bay	Annual Average Daily Users	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18
2019	149	149	0	77	77	255	0	0	0	0	0	0
2020	149	149	0	77	77	256	0	0	0	0	0	0
2021	149	149	0	78	78	257	0	0	0	0	0	0
2022	149	149	0	78	78	258	0	0	0	0	0	0
2023	149	149	0	78	78	259	0	0	0	0	0	0
2024	149	149	0	79	79	260	0	0	0	0	0	0
2025	123	122	1	221	142	600	314	202	4,056	2,613	4,369	2,815
2026	123	122	1	221	142	600	314	189	4,057	2,442	4,370	2,631
2027	123	122	1	222	142	601	314	177	4,058	2,283	4,371	2,459
2028	123	122	1	222	143	601	314	165	4,059	2,134	4,372	2,299
2029	123	122	1	222	143	601	314	154	4,060	1,995	4,373	2,149
2030	123	122	1	222	143	601	314	144	4,060	1,865	4,374	2,009
2031	123	122	1	222	143	601	314	135	4,061	1,743	4,375	1,878
2032	123	122	1	222	143	601	314	126	4,062	1,630	4,376	1,756
2033	123	122	1	222	143	601	314	118	4,063	1,523	4,378	1,641
2034	123	122	1	222	143	602	314	110	4,064	1,424	4,379	1,534
2035	123	122	1	222	143	602	314	103	4,065	1,331	4,380	1,434
2036	123	122	1	222	143	602	314	96	4,066	1,244	4,381	1,341
2037	123	122	1	222	143	602	314	90	4,067	1,163	4,382	1,253
2038	123	122	1	222	143	602	315	84	4,068	1,087	4,383	1,172
2039	123	122	1	222	143	602	315	79	4,069	1,017	4,384	1,095
2040	123	122	1	222	143	602	315	73	4,070	950	4,385	1,024

TABLE A-26

User Benefits
Juneau - Haines & Skagway
Alternative 4A - Fast Ferry Auke Bay

	Period of Service (Fiscal Years)	Users per Vehicle	Annual Growth in AADT[1]	AADT 2015[2]	AADT FY 2019	AADT FY 2025	AADT FY 2054
2015-25		3.3	0.429%				
2015-55			0.125%				
2025-55			0.024%				
Alternative 1 - No Action	2019-24	3.3		76	77		
Alternative 4A - Fast Ferry Auke Bay	2025-54	3.3		137	139	142	143
Alternative 4D - Monohull Berners Bay	2025-54	3.3		213	216	221	223

	Modal Cost per User			AADT			Total Annual User Benefits (2016 $000)					
							Alternative 4A vs. 4D		Alternative 4D vs. No Action		Alternative 4A vs. No Action	
Fiscal Year	Alternative 4D Monohull Berners Bay	Alternative 4A Fast Ferry Auke Bay	Cost Reduction	Alternative 4D Monohull Berners Bay	Alternative 4A Fast Ferry Auke Bay	Annual Average Daily Users	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18
2041	123	122	1	222	143	603	315	69	4,071	888	4,386	957
2042	123	122	1	222	143	603	315	64	4,072	830	4,387	895
2043	123	122	1	222	143	603	315	60	4,073	776	4,388	836
2044	123	122	1	222	143	603	315	56	4,074	726	4,389	782
2045	123	122	1	222	143	603	315	52	4,075	678	4,390	731
2046	123	122	1	223	143	603	315	49	4,076	634	4,391	683
2047	123	122	1	223	143	603	315	46	4,077	593	4,392	639
2048	123	122	1	223	143	604	315	43	4,078	554	4,393	597
2049	123	122	1	223	143	604	315	40	4,079	518	4,394	558
2050	123	122	1	223	143	604	315	37	4,080	484	4,395	522
2051	123	122	1	223	143	604	315	35	4,081	453	4,396	488
2052	123	122	1	223	143	604	316	33	4,082	423	4,397	456
2053	123	122	1	223	143	604	316	31	4,083	396	4,398	426
2054	123	122	1	223	143	604	316	29	4,084	370	4,400	398
Total				7,133	4,755		9,439	2,688	122,091	34,769	131,530	37,458

Note:

1. Growth rates calculated from Total Population figures for 2015, 2025, and 2055 in Table 8, *Memorandum, Subject: Juneau Access Improvements, Appendix D: Choice Models*, Fehr & Peers, January 5, 2017.
2. Table 7, Ibid.
3. Present value at private sector real rate of return of 7.0 percent.

TABLE A-27

User Benefits
Juneau - Haines & Skagway
Alternative 4B - Fast Ferry Berners Bay

	Period of Service (Fiscal Years)	Users per Vehicle	Annual Growth in AADT[1]	AADT 2015[2]	AADT FY 2019	AADT FY 2025	AADT FY 2054
2015-25		3.3	0.429%				
2015-55			0.125%				
2025-55			0.024%				
Alternative 1 - No Action	2019-24	3.3		76	77		
Alternative 4A - Fast Ferry Auke Bay	2025-54	3.3		137	139	142	143
Alternative 4B - Fast Ferry Berners Bay	2025-54	3.3		228	231	237	239

	Modal Cost per User			AADT			Total Annual User Benefits (2016 $000)					
							Alternative 4B vs. 4A		Alternative 4A vs. No Action		Alternative 4B vs. No Action	
Fiscal Year	Alternative 4A Fast Ferry Auke Bay	Alternative 4B Fast Ferry Berners Bay	Cost Reduction	Alternative 4A Fast Ferry Auke Bay	Alternative 4B Fast Ferry Berners Bay	Annual Average Daily Users	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18
2019	149	149	0	77	77	255	0	0	0	0	0	0
2020	149	149	0	77	77	256	0	0	0	0	0	0
2021	149	149	0	78	78	257	0	0	0	0	0	0
2022	149	149	0	78	78	258	0	0	0	0	0	0
2023	149	149	0	78	78	259	0	0	0	0	0	0
2024	149	149	0	79	79	260	0	0	0	0	0	0
2025	122	114	8	142	237	626	1,817	1,170	4,369	2,815	6,186	3,985
2026	122	114	8	142	237	626	1,817	1,094	4,370	2,631	6,187	3,725
2027	122	114	8	142	237	626	1,818	1,023	4,371	2,459	6,189	3,482
2028	122	114	8	143	237	626	1,818	956	4,372	2,299	6,190	3,255
2029	122	114	8	143	237	627	1,818	894	4,373	2,149	6,192	3,043
2030	122	114	8	143	237	627	1,819	835	4,374	2,009	6,193	2,844
2031	122	114	8	143	237	627	1,819	781	4,375	1,878	6,195	2,659
2032	122	114	8	143	237	627	1,820	730	4,376	1,756	6,196	2,486
2033	122	114	8	143	237	627	1,820	682	4,378	1,641	6,198	2,324
2034	122	114	8	143	238	627	1,821	638	4,379	1,534	6,199	2,172
2035	122	114	8	143	238	627	1,821	596	4,380	1,434	6,201	2,030
2036	122	114	8	143	238	628	1,821	557	4,381	1,341	6,202	1,898
2037	122	114	8	143	238	628	1,822	521	4,382	1,253	6,204	1,774
2038	122	114	8	143	238	628	1,822	487	4,383	1,172	6,205	1,659
2039	122	114	8	143	238	628	1,823	455	4,384	1,095	6,207	1,551
2040	122	114	8	143	238	628	1,823	426	4,385	1,024	6,208	1,449

TABLE A-27

User Benefits
Juneau - Haines & Skagway
Alternative 4B - Fast Ferry Berners Bay

	Period of Service (Fiscal Years)	Users per Vehicle	Annual Growth in AADT[1]	AADT 2015[2]	AADT FY 2019	AADT FY 2025	AADT FY 2054
2015-25		3.3	0.429%				
2015-55			0.125%				
2025-55			0.024%				
Alternative 1 - No Action	2019-24	3.3		76	77		
Alternative 4A - Fast Ferry Auke Bay	2025-54	3.3		137	139	142	143
Alternative 4B - Fast Ferry Berners Bay	2025-54	3.3		228	231	237	239

	Modal Cost per User			AADT			Total Annual User Benefits (2016 $000)					
							Alternative 4B vs. 4A		Alternative 4A vs. No Action		Alternative 4B vs. No Action	
Fiscal Year	Alternative 4A Fast Ferry Auke Bay	Alternative 4B Fast Ferry Berners Bay	Cost Reduction	Alternative 4A Fast Ferry Auke Bay	Alternative 4B Fast Ferry Berners Bay	Annual Average Daily Users	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18
2041	122	114	8	143	238	628	1,824	398	4,386	957	6,209	1,355
2042	122	114	8	143	238	629	1,824	372	4,387	895	6,211	1,267
2043	122	114	8	143	238	629	1,824	348	4,388	836	6,212	1,184
2044	122	114	8	143	238	629	1,825	325	4,389	782	6,214	1,107
2045	122	114	8	143	238	629	1,825	304	4,390	731	6,215	1,035
2046	122	114	8	143	238	629	1,826	284	4,391	683	6,217	967
2047	122	114	8	143	238	629	1,826	266	4,392	639	6,218	904
2048	122	114	8	143	238	629	1,827	248	4,393	597	6,220	845
2049	122	114	8	143	238	630	1,827	232	4,394	558	6,221	790
2050	122	114	8	143	238	630	1,828	217	4,395	522	6,223	739
2051	122	114	8	143	238	630	1,828	203	4,396	488	6,224	690
2052	122	114	8	143	239	630	1,828	190	4,397	456	6,226	645
2053	122	114	8	143	239	630	1,829	177	4,398	426	6,227	603
2054	122	114	8	143	239	630	1,829	166	4,400	398	6,229	564
Total				4,755	7,602		54,688	15,574	131,530	37,458	186,218	53,032

Note:
1. Growth rates calculated from Total Population figures for 2015, 2025, and 2055 in Table 8, *Memorandum, Subject: Juneau Access Improvements, Appendix D: Choice Models*, Fehr & Peers, January 5, 2017.
2. Table 7, Ibid.
3. Present value at private sector real rate of return of 7.0 percent.

TABLE A-28

User Benefits
Juneau - Haines & Skagway
Alternative 3 - West Lynn Highway

	Period of Service (Fiscal Years)	Users per Vehicle	Annual Growth in AADT[1]	AADT 2015[2]	AADT FY 2019	AADT FY 2025	AADT FY 2054
2015-25		3.3	0.429%				
2015-55			0.125%				
2025-55			0.024%				
Alternative 1 - No Action	2019-24	3.3		76	77		
Alternative 4B - Fast Ferry Berners Bay	2025-54	3.3		228	231	237	239
Alternative 3 - West Lynn Highway	2025-54	2.3		636	646	661	666

	Modal Cost per User			AADT			Total Annual User Benefits (2016 $000)					
							Alternative 3 vs. 4B		Alternative 4B vs. No Action		Alternative 3 vs. No Action	
Fiscal Year	Alternative 4B Fast Ferry Berners Bay	Alternative 3 West Lynn Highway	Cost Reduction	Alternative 4B Fast Ferry Berners Bay	Alternative 3 West Lynn Highway	Annual Average Daily Users	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18
2019	149	149	0	77	77	255	0	0	0	0	0	0
2020	149	149	0	77	77	256	0	0	0	0	0	0
2021	149	149	0	78	78	257	0	0	0	0	0	0
2022	149	149	0	78	78	258	0	0	0	0	0	0
2023	149	149	0	78	78	259	0	0	0	0	0	0
2024	149	149	0	79	79	260	0	0	0	0	0	0
2025	114	109	4	237	661	1,151	1,869	1,204	6,186	3,985	8,055	5,189
2026	114	109	4	237	661	1,152	1,869	1,125	6,187	3,725	8,057	4,850
2027	114	109	4	237	661	1,152	1,870	1,052	6,189	3,482	8,058	4,534
2028	114	109	4	237	662	1,152	1,870	983	6,190	3,255	8,060	4,238
2029	114	109	4	237	662	1,152	1,871	919	6,192	3,043	8,062	3,962
2030	114	109	4	237	662	1,153	1,871	859	6,193	2,844	8,064	3,704
2031	114	109	4	237	662	1,153	1,871	803	6,195	2,659	8,066	3,462
2032	114	109	4	237	662	1,153	1,872	751	6,196	2,486	8,068	3,237
2033	114	109	4	237	662	1,153	1,872	702	6,198	2,324	8,070	3,026
2034	114	109	4	238	663	1,154	1,873	656	6,199	2,172	8,072	2,828
2035	114	109	4	238	663	1,154	1,873	613	6,201	2,030	8,074	2,644
2036	114	109	4	238	663	1,154	1,874	573	6,202	1,898	8,076	2,472
2037	114	109	4	238	663	1,155	1,874	536	6,204	1,774	8,078	2,310
2038	114	109	4	238	663	1,155	1,875	501	6,205	1,659	8,080	2,160
2039	114	109	4	238	663	1,155	1,875	468	6,207	1,551	8,082	2,019
2040	114	109	4	238	663	1,155	1,876	438	6,208	1,449	8,084	1,887

TABLE A-28

User Benefits
Juneau - Haines & Skagway
Alternative 3 - West Lynn Highway

	Period of Service (Fiscal Years)	Users per Vehicle	Annual Growth in AADT[1]	AADT 2015[2]	AADT FY 2019	AADT FY 2025	AADT FY 2054
2015-25		3.3	0.429%				
2015-55			0.125%				
2025-55			0.024%				
Alternative 1 - No Action	2019-24	3.3		76	77		
Alternative 4B - Fast Ferry Berners Bay	2025-54	3.3		228	231	237	239
Alternative 3 - West Lynn Highway	2025-54	2.3		636	646	661	666

	Modal Cost per User			AADT			Total Annual User Benefits (2016 $000)					
							Alternative 3 vs. 4B		Alternative 4B vs. No Action		Alternative 3 vs. No Action	
Fiscal Year	Alternative 4B Fast Ferry Berners Bay	Alternative 3 West Lynn Highway	Cost Reduction	Alternative 4B Fast Ferry Berners Bay	Alternative 3 West Lynn Highway	Annual Average Daily Users	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18
2041	114	109	4	238	664	1,156	1,876	409	6,209	1,355	8,085	1,764
2042	114	109	4	238	664	1,156	1,876	383	6,211	1,267	8,087	1,649
2043	114	109	4	238	664	1,156	1,877	358	6,212	1,184	8,089	1,542
2044	114	109	4	238	664	1,157	1,877	334	6,214	1,107	8,091	1,441
2045	114	109	4	238	664	1,157	1,878	313	6,215	1,035	8,093	1,347
2046	114	109	4	238	664	1,157	1,878	292	6,217	967	8,095	1,259
2047	114	109	4	238	665	1,157	1,879	273	6,218	904	8,097	1,177
2048	114	109	4	238	665	1,158	1,879	255	6,220	845	8,099	1,101
2049	114	109	4	238	665	1,158	1,880	239	6,221	790	8,101	1,029
2050	114	109	4	238	665	1,158	1,880	223	6,223	739	8,103	962
2051	114	109	4	238	665	1,158	1,880	209	6,224	690	8,105	899
2052	114	109	4	239	665	1,159	1,881	195	6,226	645	8,107	840
2053	114	109	4	239	666	1,159	1,881	182	6,227	603	8,109	786
2054	114	109	4	239	666	1,159	1,882	170	6,229	564	8,111	734
Total				7,602	20,369		56,259	16,022	186,218	53,032	242,477	69,053

Note:

1. Growth rates calculated from Total Population figures for 2015, 2025, and 2055 in Table 8, *Memorandum, Subject: Juneau Access Improvements, Appendix D: Choice Models*, Fehr & Peers, January 5, 2017.
2. Table 7, Ibid.
3. Present value at private sector real rate of return of 7.0 percent.

TABLE A-29

User Benefits
Juneau - Haines & Skagway
Alternative 2B - East Lynn Highway

	Period of Service (Fiscal Years)	Users per Vehicle	Annual Growth in AADT[1]	AADT 2015[2]	AADT FY 2019	AADT FY 2025	AADT FY 2054
2015-25		3.3	0.429%				
2015-55			0.125%				
2025-55			0.024%				
Alternative 1 - No Action	2019-24	3.3		76	77		
Alternative 3 - West Lynn Highway	2025-54	2.3		636	646	661	666
Alternative 2B - East Lynn Highway	2025-54	2.3		779	791	810	815

	Modal Cost per User			AADT			Total Annual User Benefits (2016 $000)					
							Alternative 2B vs. 3		Alternative 3 vs. No Action		Alternative 2B vs. No Action	
Fiscal Year	Alternative 3 West Lynn Highway	Alternative 2B East Lynn Highway	Cost Reduction	Alternative 3 West Lynn Highway	Alternative 2B East Lynn Highway	Annual Average Daily Users	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18
2019	149	149	0	77	77	255	0	0	0	0	0	0
2020	149	149	0	77	77	256	0	0	0	0	0	0
2021	149	149	0	78	78	257	0	0	0	0	0	0
2022	149	149	0	78	78	258	0	0	0	0	0	0
2023	149	149	0	78	78	259	0	0	0	0	0	0
2024	149	149	0	79	79	260	0	0	0	0	0	0
2025	109	98	11	661	810	1,691	6,838	4,405	8,055	5,189	14,892	9,593
2026	109	98	11	661	810	1,692	6,839	4,117	8,057	4,850	14,896	8,968
2027	109	98	11	661	810	1,692	6,841	3,849	8,058	4,534	14,899	8,383
2028	109	98	11	662	810	1,693	6,842	3,598	8,060	4,238	14,903	7,837
2029	109	98	11	662	810	1,693	6,844	3,363	8,062	3,962	14,906	7,326
2030	109	98	11	662	811	1,693	6,846	3,144	8,064	3,704	14,910	6,848
2031	109	98	11	662	811	1,694	6,847	2,939	8,066	3,462	14,914	6,402
2032	109	98	11	662	811	1,694	6,849	2,748	8,068	3,237	14,917	5,984
2033	109	98	11	662	811	1,695	6,851	2,568	8,070	3,026	14,921	5,594
2034	109	98	11	663	811	1,695	6,852	2,401	8,072	2,828	14,924	5,229
2035	109	98	11	663	812	1,695	6,854	2,244	8,074	2,644	14,928	4,888
2036	109	98	11	663	812	1,696	6,856	2,098	8,076	2,472	14,931	4,570
2037	109	98	11	663	812	1,696	6,857	1,961	8,078	2,310	14,935	4,272
2038	109	98	11	663	812	1,697	6,859	1,833	8,080	2,160	14,938	3,993
2039	109	98	11	663	812	1,697	6,860	1,714	8,082	2,019	14,942	3,733
2040	109	98	11	663	813	1,697	6,862	1,602	8,084	1,887	14,946	3,489

TABLE A-29

User Benefits
Juneau - Haines & Skagway
Alternative 2B - East Lynn Highway

	Period of Service (Fiscal Years)	Users per Vehicle	Annual Growth in AADT[1]	AADT 2015[2]	AADT FY 2019	AADT FY 2025	AADT FY 2054
2015-25		3.3	0.429%				
2015-55			0.125%				
2025-55			0.024%				
Alternative 1 - No Action	2019-24	3.3		76	77		
Alternative 3 - West Lynn Highway	2025-54	2.3		636	646	661	666
Alternative 2B - East Lynn Highway	2025-54	2.3		779	791	810	815

	Modal Cost per User			AADT			Total Annual User Benefits (2016 $000)					
							Alternative 2B vs. 3		Alternative 3 vs. No Action		Alternative 2B vs. No Action	
Fiscal Year	Alternative 3 West Lynn Highway	Alternative 2B East Lynn Highway	Cost Reduction	Alternative 3 West Lynn Highway	Alternative 2B East Lynn Highway	Annual Average Daily Users	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18
2041	109	98	11	664	813	1,698	6,864	1,498	8,085	1,764	14,949	3,262
2042	109	98	11	664	813	1,698	6,865	1,400	8,087	1,649	14,953	3,049
2043	109	98	11	664	813	1,699	6,867	1,309	8,089	1,542	14,956	2,851
2044	109	98	11	664	813	1,699	6,869	1,223	8,091	1,441	14,960	2,665
2045	109	98	11	664	814	1,700	6,870	1,144	8,093	1,347	14,963	2,491
2046	109	98	11	664	814	1,700	6,872	1,069	8,095	1,259	14,967	2,329
2047	109	98	11	665	814	1,700	6,874	999	8,097	1,177	14,971	2,177
2048	109	98	11	665	814	1,701	6,875	934	8,099	1,101	14,974	2,035
2049	109	98	11	665	814	1,701	6,877	873	8,101	1,029	14,978	1,902
2050	109	98	11	665	815	1,702	6,878	816	8,103	962	14,981	1,778
2051	109	98	11	665	815	1,702	6,880	763	8,105	899	14,985	1,662
2052	109	98	11	665	815	1,702	6,882	713	8,107	840	14,988	1,554
2053	109	98	11	666	815	1,703	6,883	667	8,109	786	14,992	1,453
2054	109	98	11	666	815	1,703	6,885	623	8,111	734	14,996	1,358
Total				20,369	24,844		205,838	58,619	242,477	69,053	448,315	127,672

Note:

1. Growth rates calculated from Total Population figures for 2015, 2025, and 2055 in Table 8, *Memorandum, Subject: Juneau Access Improvements, Appendix D: Choice Models*, Fehr & Peers, January 5, 2017.
2. Table 7, Ibid.
3. Present value at private sector real rate of return of 7.0 percent.

TABLE A-30

User Benefits
Haines - Skagway
Alternative 4C - Monohull Auke Bay

	Period of Service (Fiscal Years)	Users per Vehicle	Annual Growth in AADT[1]	AADT 2015[2]	AADT FY 2019	AADT FY 2025	AADT FY 2054
2015-25		2.3	0.0%				
2015-55			0.0%				
2025-55			0.0%				
Alternative 1 - No Action	2019-54	2.3		24	24	24	24
Alternative 4C - Monohull Auke Bay	2025-54	2.3		24	24	24	24

	Cost per User			AADT			Total Annual User Benefits (2016 $000)	
Fiscal Year	Alternative 1 No Action	Alternative 4C Monohull Auke Bay	Cost Reduction	Alternative 1 No Action	Alternative 4C Monohull Auke Bay	Annual Average Daily Users	During Year of Travel	Present Value[3] @ 7.0% 7/1/18
2019	44	44	0	24	24	56	0	0
2020	44	44	0	24	24	56	0	0
2021	44	44	0	24	24	56	0	0
2022	44	44	0	24	24	56	0	0
2023	44	44	0	24	24	56	0	0
2024	44	44	0	24	24	56	0	0
2025	44	40	4	24	24	56	85	55
2026	44	40	4	24	24	56	85	51
2027	44	40	4	24	24	56	85	48
2028	44	40	4	24	24	56	85	45
2029	44	40	4	24	24	56	85	42
2030	44	40	4	24	24	56	85	39
2031	44	40	4	24	24	56	85	36
2032	44	40	4	24	24	56	85	34
2033	44	40	4	24	24	56	85	32
2034	44	40	4	24	24	56	85	30
2035	44	40	4	24	24	56	85	28
2036	44	40	4	24	24	56	85	26
2037	44	40	4	24	24	56	85	24
2038	44	40	4	24	24	56	85	23
2039	44	40	4	24	24	56	85	21
2040	44	40	4	24	24	56	85	20

TABLE A-30

User Benefits
Haines - Skagway
Alternative 4C - Monohull Auke Bay

	Period of Service (Fiscal Years)	Users per Vehicle	Annual Growth in AADT[1]	AADT 2015[2]	AADT FY 2019	AADT FY 2025	AADT FY 2054
2015-25		2.3	0.0%				
2015-55			0.0%				
2025-55			0.0%				
Alternative 1 - No Action	2019-54	2.3		24	24	24	24
Alternative 4C - Monohull Auke Bay	2025-54	2.3		24	24	24	24

	Cost per User			AADT			Total Annual User Benefits (2016 $000)	
Fiscal Year	Alternative 1 No Action	Alternative 4C Monohull Auke Bay	Cost Reduction	Alternative 1 No Action	Alternative 4C Monohull Auke Bay	Annual Average Daily Users	During Year of Travel	Present Value[3] @ 7.0% 7/1/18
2041	44	40	4	24	24	56	85	19
2042	44	40	4	24	24	56	85	17
2043	44	40	4	24	24	56	85	16
2044	44	40	4	24	24	56	85	15
2045	44	40	4	24	24	56	85	14
2046	44	40	4	24	24	56	85	13
2047	44	40	4	24	24	56	85	12
2048	44	40	4	24	24	56	85	12
2049	44	40	4	24	24	56	85	11
2050	44	40	4	24	24	56	85	10
2051	44	40	4	24	24	56	85	9
2052	44	40	4	24	24	56	85	9
2053	44	40	4	24	24	56	85	8
2054	44	40	4	24	24	56	85	8
Total				874	874		2,548	727

Notes:

1. Zero growth based on *Juneau Access Haines/Skagway Traffic Forecast* , McDowell Group, December 2016, pp. 8-9 and growth rates calculated from Total Population figures for 2015, 2025, and 2055 in Table 8, *Memorandum, Subject: Juneau Access Improvements, Appendix D: Choice Models* , Fehr & Peers, January 5, 2017.
2. Table A-17.
3. Present value at private sector real rate of return of 7.0 percent.

TABLE A-31

User Benefits
Haines - Skagway
Alternative 1B - Enhanced Service

	Period of Service (Fiscal Years)	Users per Vehicle	Annual Growth in AADT[1]	AADT 2015[2]	AADT FY 2019	AADT FY 2025	AADT FY 2054
2015-25		2.3	0.0%				
2015-55			0.0%				
2025-55			0.0%				
Alternative 1 - No Action	2019-24	2.3		24	24		
Alternative 4C - Monohull Auke Bay	2025-54	2.3		24	24	24	24
Alternative 1B - Enhanced Service	2019-54	2.3		24	24	24	24

Fiscal Year	Cost per User: Alternative 4C Monohull Auke Bay	Cost per User: Alternative 1B Enhanced Service	Cost per User: Cost Reduction	AADT: Alternative 4C Monohull Auke Bay	AADT: Alternative 1B Enhanced Service	Annual Average Daily Users	Total Annual User Benefits (2016 $000): Alternative 1B vs. 4C: Year of Travel	Alternative 1B vs. 4C: Present Value[3] @ 7.0% 7/1/18	Alternative 4C vs. No Action: Year of Travel	Alternative 4C vs. No Action: Present Value[3] @ 7.0% 7/1/18	Alternative 1B vs. No Action: Year of Travel	Alternative 1B vs. No Action: Present Value[3] @ 7.0% 7/1/18
2019	44	41	3	24	24	56	71	68	0	0	71	68
2020	44	41	3	24	24	56	71	64	0	0	71	64
2021	44	41	3	24	24	56	71	60	0	0	71	60
2022	44	41	3	24	24	56	71	56	0	0	71	56
2023	44	41	3	24	24	56	71	52	0	0	71	52
2024	44	41	3	24	24	56	71	49	0	0	71	49
2025	40	41	(1)	24	24	56	(14)	(9)	85	55	71	46
2026	40	41	(1)	24	24	56	(14)	(9)	85	51	71	43
2027	40	41	(1)	24	24	56	(14)	(8)	85	48	71	40
2028	40	41	(1)	24	24	56	(14)	(8)	85	45	71	37
2029	40	41	(1)	24	24	56	(14)	(7)	85	42	71	35
2030	40	41	(1)	24	24	56	(14)	(7)	85	39	71	32
2031	40	41	(1)	24	24	56	(14)	(6)	85	36	71	30
2032	40	41	(1)	24	24	56	(14)	(6)	85	34	71	28
2033	40	41	(1)	24	24	56	(14)	(5)	85	32	71	26
2034	40	41	(1)	24	24	56	(14)	(5)	85	30	71	25
2035	40	41	(1)	24	24	56	(14)	(5)	85	28	71	23
2036	40	41	(1)	24	24	56	(14)	(4)	85	26	71	22
2037	40	41	(1)	24	24	56	(14)	(4)	85	24	71	20
2038	40	41	(1)	24	24	56	(14)	(4)	85	23	71	19
2039	40	41	(1)	24	24	56	(14)	(4)	85	21	71	18
2040	40	41	(1)	24	24	56	(14)	(3)	85	20	71	16

TABLE A-31

User Benefits
Haines - Skagway
Alternative 1B - Enhanced Service

	Period of Service (Fiscal Years)	Users per Vehicle	Annual Growth in AADT[1]	AADT 2015[2]	AADT FY 2019	AADT FY 2025	AADT FY 2054
2015-25		2.3	0.0%				
2015-55			0.0%				
2025-55			0.0%				
Alternative 1 - No Action	2019-24	2.3		24	24		
Alternative 4C - Monohull Auke Bay	2025-54	2.3		24	24	24	24
Alternative 1B - Enhanced Service	2019-54	2.3		24	24	24	24

	Cost per User			AADT			Total Annual User Benefits (2016 $000)					
							Alternative 1B vs. 4C		Alternative 4C vs. No Action		Alternative 1B vs. No Action	
Fiscal Year	Alternative 4C Monohull Auke Bay	Alternative 1B Enhanced Service	Cost Reduction	Alternative 4C Monohull Auke Bay	Alternative 1B Enhanced Service	Annual Average Daily Users	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18
2041	40	41	(1)	24	24	56	(14)	(3)	85	19	71	15
2042	40	41	(1)	24	24	56	(14)	(3)	85	17	71	14
2043	40	41	(1)	24	24	56	(14)	(3)	85	16	71	13
2044	40	41	(1)	24	24	56	(14)	(3)	85	15	71	13
2045	40	41	(1)	24	24	56	(14)	(2)	85	14	71	12
2046	40	41	(1)	24	24	56	(14)	(2)	85	13	71	11
2047	40	41	(1)	24	24	56	(14)	(2)	85	12	71	10
2048	40	41	(1)	24	24	56	(14)	(2)	85	12	71	10
2049	40	41	(1)	24	24	56	(14)	(2)	85	11	71	9
2050	40	41	(1)	24	24	56	(14)	(2)	85	10	71	8
2051	40	41	(1)	24	24	56	(14)	(2)	85	9	71	8
2052	40	41	(1)	24	24	56	(14)	(1)	85	9	71	7
2053	40	41	(1)	24	24	56	(14)	(1)	85	8	71	7
2054	40	41	(1)	24	24	56	(14)	(1)	85	8	71	6
Total				874	874		(5)	226	2,548	727	2,543	952

Notes:

1. Zero growth based on *Juneau Access Haines/Skagway Traffic Forecast*, McDowell Group, December 2016, pp. 8-9 and growth rates calculated from Total Population figures for 2015, 2025, and 2055 in Table 8, *Memorandum, Subject: Juneau Access Improvements, Appendix D: Choice Models*, Fehr & Peers, January 5, 2017.
2. Table A-17.
3. Present value at private sector real rate of return of 7.0 percent.

TABLE A-32

User Benefits
Haines - Skagway
Alternative 4D - Monohull Berners Bay

	Period of Service (Fiscal Years)	Users per Vehicle	Annual Growth in AADT[1]	AADT 2015[2]	AADT FY 2019	AADT FY 2025	AADT FY 2054
2015-25		2.3	0.0%				
2015-55			0.0%				
2025-55			0.0%				
Alternative 1 - No Action	2019-24	2.3		24	24		
Alternative 1B - Enhanced Service	2019-54	2.3		24	24	24	24
Alternative 4D - Monohull Berners Bay	2025-54	2.3		24	24	24	24

	Cost per User			AADT			Total Annual User Benefits (2016 $000)					
							Alternative 4D vs. 1B		Alternative 1B vs. No Action		Alternative 4D vs. No Action	
Fiscal Year	Alternative 1B Enhanced Service	Alternative 4D Monohull Berners Bay	Cost Reduction	Alternative 1B Enhanced Service	Alternative 4D Monohull Berners Bay	Annual Average Daily Users	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18
2019	41	44	(3)	24	24	56	(71)	(68)	71	68	0	0
2020	41	44	(3)	24	24	56	(71)	(64)	71	64	0	0
2021	41	44	(3)	24	24	56	(71)	(60)	71	60	0	0
2022	41	44	(3)	24	24	56	(71)	(56)	71	56	0	0
2023	41	44	(3)	24	24	56	(71)	(52)	71	52	0	0
2024	41	44	(3)	24	24	56	(71)	(49)	71	49	0	0
2025	41	40	1	24	24	56	14	9	71	46	85	55
2026	41	40	1	24	24	56	14	9	71	43	85	51
2027	41	40	1	24	24	56	14	8	71	40	85	48
2028	41	40	1	24	24	56	14	8	71	37	85	45
2029	41	40	1	24	24	56	14	7	71	35	85	42
2030	41	40	1	24	24	56	14	7	71	32	85	39
2031	41	40	1	24	24	56	14	6	71	30	85	36
2032	41	40	1	24	24	56	14	6	71	28	85	34
2033	41	40	1	24	24	56	14	5	71	26	85	32
2034	41	40	1	24	24	56	14	5	71	25	85	30
2035	41	40	1	24	24	56	14	5	71	23	85	28
2036	41	40	1	24	24	56	14	4	71	22	85	26
2037	41	40	1	24	24	56	14	4	71	20	85	24
2038	41	40	1	24	24	56	14	4	71	19	85	23
2039	41	40	1	24	24	56	14	4	71	18	85	21
2040	41	40	1	24	24	56	14	3	71	16	85	20

TABLE A-32

User Benefits
Haines - Skagway
Alternative 4D - Monohull Berners Bay

	Period of Service (Fiscal Years)	Users per Vehicle	Annual Growth in AADT[1]	AADT 2015[2]	AADT FY 2019	AADT FY 2025	AADT FY 2054
2015-25		2.3	0.0%				
2015-55			0.0%				
2025-55			0.0%				
Alternative 1 - No Action	2019-24	2.3		24	24		
Alternative 1B - Enhanced Service	2019-54	2.3		24	24	24	24
Alternative 4D - Monohull Berners Bay	2025-54	2.3		24	24	24	24

	Cost per User			AADT			Total Annual User Benefits (2016 $000)					
							Alternative 4D vs. 1B		Alternative 1B vs. No Action		Alternative 4D vs. No Action	
Fiscal Year	Alternative 1B Enhanced Service	Alternative 4D Monohull Berners Bay	Cost Reduction	Alternative 1B Enhanced Service	Alternative 4D Monohull Berners Bay	Annual Average Daily Users	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18
2041	41	40	1	24	24	56	14	3	71	15	85	19
2042	41	40	1	24	24	56	14	3	71	14	85	17
2043	41	40	1	24	24	56	14	3	71	13	85	16
2044	41	40	1	24	24	56	14	3	71	13	85	15
2045	41	40	1	24	24	56	14	2	71	12	85	14
2046	41	40	1	24	24	56	14	2	71	11	85	13
2047	41	40	1	24	24	56	14	2	71	10	85	12
2048	41	40	1	24	24	56	14	2	71	10	85	12
2049	41	40	1	24	24	56	14	2	71	9	85	11
2050	41	40	1	24	24	56	14	2	71	8	85	10
2051	41	40	1	24	24	56	14	2	71	8	85	9
2052	41	40	1	24	24	56	14	1	71	7	85	9
2053	41	40	1	24	24	56	14	1	71	7	85	8
2054	41	40	1	24	24	56	14	1	71	6	85	8
Total				874	874		5	(226)	2,543	952	2,548	727

Notes:

1. Zero growth based on *Juneau Access Haines/Skagway Traffic Forecast*, McDowell Group, December 2016, pp. 8-9 and growth rates calculated from Total Population figures for 2015, 2025, and 2055 in Table 8, *Memorandum, Subject: Juneau Access Improvements, Appendix D: Choice Models*, Fehr & Peers, January 5, 2017.
2. Table A-17.
3. Present value at private sector real rate of return of 7.0 percent.

TABLE A-33

User Benefits
Haines - Skagway
Alternative 4A - Fast Ferry Auke Bay

	Period of Service (Fiscal Years)	Users per Vehicle	Annual Growth in AADT[1]	AADT 2015[2]	AADT FY 2019	AADT FY 2025	AADT FY 2054
2015-25		2.3	0.0%				
2015-55			0.0%				
2025-55			0.0%				
Alternative 1 - No Action	2019-24	2.3		24	24		
Alternative 4A - Fast Ferry Auke Bay	2025-54	2.3		24	24	24	24
Alternative 4D - Monohull Berners Bay	2025-54	2.3		24	24	24	24

	Cost per User			AADT			Total Annual User Benefits (2016 $000)					
							Alternative 4A vs. 4D		Alternative 4D vs. No Action		Alternative 4A vs. No Action	
Fiscal Year	Alternative 4D Monohull Berners Bay	Alternative 4A Fast Ferry Auke Bay	Cost Reduction	Alternative 4D Monohull Berners Bay	Alternative 4A Fast Ferry Auke Bay	Annual Average Daily Users	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18
2019	44	44	0	24	24	56	0	0	0	0	0	0
2020	44	44	0	24	24	56	0	0	0	0	0	0
2021	44	44	0	24	24	56	0	0	0	0	0	0
2022	44	44	0	24	24	56	0	0	0	0	0	0
2023	44	44	0	24	24	56	0	0	0	0	0	0
2024	44	44	0	24	24	56	0	0	0	0	0	0
2025	40	40	0	24	24	56	0	0	85	55	85	55
2026	40	40	0	24	24	56	0	0	85	51	85	51
2027	40	40	0	24	24	56	0	0	85	48	85	48
2028	40	40	0	24	24	56	0	0	85	45	85	45
2029	40	40	0	24	24	56	0	0	85	42	85	42
2030	40	40	0	24	24	56	0	0	85	39	85	39
2031	40	40	0	24	24	56	0	0	85	36	85	36
2032	40	40	0	24	24	56	0	0	85	34	85	34
2033	40	40	0	24	24	56	0	0	85	32	85	32
2034	40	40	0	24	24	56	0	0	85	30	85	30
2035	40	40	0	24	24	56	0	0	85	28	85	28
2036	40	40	0	24	24	56	0	0	85	26	85	26
2037	40	40	0	24	24	56	0	0	85	24	85	24
2038	40	40	0	24	24	56	0	0	85	23	85	23
2039	40	40	0	24	24	56	0	0	85	21	85	21
2040	40	40	0	24	24	56	0	0	85	20	85	20

TABLE A-33

User Benefits
Haines - Skagway
Alternative 4A - Fast Ferry Auke Bay

	Period of Service (Fiscal Years)	Users per Vehicle	Annual Growth in AADT[1]	AADT 2015[2]	AADT FY 2019	AADT FY 2025	AADT FY 2054
2015-25		2.3	0.0%				
2015-55			0.0%				
2025-55			0.0%				
Alternative 1 - No Action	2019-24	2.3		24	24		
Alternative 4A - Fast Ferry Auke Bay	2025-54	2.3		24	24	24	24
Alternative 4D - Monohull Berners Bay	2025-54	2.3		24	24	24	24

	Cost per User			AADT			Total Annual User Benefits (2016 $000)					
							Alternative 4A vs. 4D		Alternative 4D vs. No Action		Alternative 4A vs. No Action	
Fiscal Year	Alternative 4D Monohull Berners Bay	Alternative 4A Fast Ferry Auke Bay	Cost Reduction	Alternative 4D Monohull Berners Bay	Alternative 4A Fast Ferry Auke Bay	Annual Average Daily Users	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18
2041	40	40	0	24	24	56	0	0	85	19	85	19
2042	40	40	0	24	24	56	0	0	85	17	85	17
2043	40	40	0	24	24	56	0	0	85	16	85	16
2044	40	40	0	24	24	56	0	0	85	15	85	15
2045	40	40	0	24	24	56	0	0	85	14	85	14
2046	40	40	0	24	24	56	0	0	85	13	85	13
2047	40	40	0	24	24	56	0	0	85	12	85	12
2048	40	40	0	24	24	56	0	0	85	12	85	12
2049	40	40	0	24	24	56	0	0	85	11	85	11
2050	40	40	0	24	24	56	0	0	85	10	85	10
2051	40	40	0	24	24	56	0	0	85	9	85	9
2052	40	40	0	24	24	56	0	0	85	9	85	9
2053	40	40	0	24	24	56	0	0	85	8	85	8
2054	40	40	0	24	24	56	0	0	85	8	85	8
Total				874	874		0	0	2,548	727	2,548	727

Notes:

1. Zero growth based on *Juneau Access Haines/Skagway Traffic Forecast*, McDowell Group, December 2016, pp. 8-9 and growth rates calculated from Total Population figures for 2015, 2025, and 2055 in Table 8, *Memorandum, Subject: Juneau Access Improvements, Appendix D: Choice Models*, Fehr & Peers, January 5, 2017.
2. Table A-17.
3. Present value at private sector real rate of return of 7.0 percent.

TABLE A-34

User Benefits
Haines - Skagway
Alternative 4B - Fast Ferry Berners Bay

	Period of Service (Fiscal Years)	Users per Vehicle	Annual Growth in AADT[1]	AADT 2015[2]	AADT FY 2019	AADT FY 2025	AADT FY 2054
2015-25		2.3	0.0%				
2015-55			0.0%				
2025-55			0.0%				
Alternative 1 - No Action	2019-24	2.3		24	24		
Alternative 4A - Fast Ferry Auke Bay	2025-54	2.3		24	24	24	24
Alternative 4B - Fast Ferry Berners Bay	2025-54	2.3		24	24	24	24

	Cost per User			AADT			Total Annual User Benefits (2016 $000)					
							Alternative 4B vs. 4A		Alternative 4A vs. No Action		Alternative 4B vs. No Action	
Fiscal Year	Alternative 4A Fast Ferry Auke Bay	Alternative 4B Fast Ferry Berners Bay	Cost Reduction	Alternative 4A Fast Ferry Auke Bay	Alternative 4B Fast Ferry Berners Bay	Annual Average Daily Users	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18
2019	44	44	0	24	24	56	0	0	0	0	0	0
2020	44	44	0	24	24	56	0	0	0	0	0	0
2021	44	44	0	24	24	56	0	0	0	0	0	0
2022	44	44	0	24	24	56	0	0	0	0	0	0
2023	44	44	0	24	24	56	0	0	0	0	0	0
2024	44	44	0	24	24	56	0	0	0	0	0	0
2025	40	40	0	24	24	56	0	0	85	55	85	55
2026	40	40	0	24	24	56	0	0	85	51	85	51
2027	40	40	0	24	24	56	0	0	85	48	85	48
2028	40	40	0	24	24	56	0	0	85	45	85	45
2029	40	40	0	24	24	56	0	0	85	42	85	42
2030	40	40	0	24	24	56	0	0	85	39	85	39
2031	40	40	0	24	24	56	0	0	85	36	85	36
2032	40	40	0	24	24	56	0	0	85	34	85	34
2033	40	40	0	24	24	56	0	0	85	32	85	32
2034	40	40	0	24	24	56	0	0	85	30	85	30
2035	40	40	0	24	24	56	0	0	85	28	85	28
2036	40	40	0	24	24	56	0	0	85	26	85	26
2037	40	40	0	24	24	56	0	0	85	24	85	24
2038	40	40	0	24	24	56	0	0	85	23	85	23
2039	40	40	0	24	24	56	0	0	85	21	85	21
2040	40	40	0	24	24	56	0	0	85	20	85	20

TABLE A-34

User Benefits
Haines - Skagway
Alternative 4B - Fast Ferry Berners Bay

	Period of Service (Fiscal Years)	Users per Vehicle	Annual Growth in AADT[1]	AADT 2015[2]	AADT FY 2019	AADT FY 2025	AADT FY 2054
2015-25		2.3	0.0%				
2015-55			0.0%				
2025-55			0.0%				
Alternative 1 - No Action	2019-24	2.3		24	24		
Alternative 4A - Fast Ferry Auke Bay	2025-54	2.3		24	24	24	24
Alternative 4B - Fast Ferry Berners Bay	2025-54	2.3		24	24	24	24

	Cost per User			AADT			Total Annual User Benefits (2016 $000)					
							Alternative 4B vs. 4A		Alternative 4A vs. No Action		Alternative 4B vs. No Action	
Fiscal Year	Alternative 4A Fast Ferry Auke Bay	Alternative 4B Fast Ferry Berners Bay	Cost Reduction	Alternative 4A Fast Ferry Auke Bay	Alternative 4B Fast Ferry Berners Bay	Annual Average Daily Users	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18
2041	40	40	0	24	24	56	0	0	85	19	85	19
2042	40	40	0	24	24	56	0	0	85	17	85	17
2043	40	40	0	24	24	56	0	0	85	16	85	16
2044	40	40	0	24	24	56	0	0	85	15	85	15
2045	40	40	0	24	24	56	0	0	85	14	85	14
2046	40	40	0	24	24	56	0	0	85	13	85	13
2047	40	40	0	24	24	56	0	0	85	12	85	12
2048	40	40	0	24	24	56	0	0	85	12	85	12
2049	40	40	0	24	24	56	0	0	85	11	85	11
2050	40	40	0	24	24	56	0	0	85	10	85	10
2051	40	40	0	24	24	56	0	0	85	9	85	9
2052	40	40	0	24	24	56	0	0	85	9	85	9
2053	40	40	0	24	24	56	0	0	85	8	85	8
2054	40	40	0	24	24	56	0	0	85	8	85	8
Total				874	874		0	0	2,548	727	2,548	727

Notes:

1. Zero growth based on *Juneau Access Haines/Skagway Traffic Forecast*, McDowell Group, December 2016, pp. 8-9 and growth rates calculated from Total Population figures for 2015, 2025, and 2055 in Table 8, *Memorandum, Subject: Juneau Access Improvements, Appendix D: Choice Models*, Fehr & Peers, January 5, 2017.
2. Table A-17.
3. Present value at private sector real rate of return of 7.0 percent.

TABLE A-35

User Benefits
Haines - Skagway
Alternative 3 - West Lynn Highway

	Period of Service (Fiscal Years)	Users per Vehicle	Annual Growth in AADT[1]	AADT 2015[2]	AADT FY 2019	AADT FY 2025	AADT FY 2054
2015-25		2.3	0.0%				
2015-55			0.0%				
2025-55			0.0%				
Alternative 1 - No Action	2019-24	2.3		24	24		
Alternative 4B - Fast Ferry Berners Bay	2025-54	2.3		24	24	24	24
Alternative 3 - West Lynn Highway	2025-54	2.3		30	30	30	30

	Cost per User			AADT			Total Annual User Benefits (2016 $000)					
							Alternative 3 vs. 4B		Alternative 4B vs. No Action		Alternative 3 vs. No Action	
Fiscal Year	Alternative 4B Fast Ferry Berners Bay	Alternative 3 West Lynn Highway	Cost Reduction	Alternative 4B Fast Ferry Berners Bay	Alternative 3 West Lynn Highway	Annual Average Daily Users	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18
2019	44	44	0	24	24	56	0	0	0	0	0	0
2020	44	44	0	24	24	56	0	0	0	0	0	0
2021	44	44	0	24	24	56	0	0	0	0	0	0
2022	44	44	0	24	24	56	0	0	0	0	0	0
2023	44	44	0	24	24	56	0	0	0	0	0	0
2024	44	44	0	24	24	56	0	0	0	0	0	0
2025	40	38	3	24	30	62	64	41	85	55	149	96
2026	40	38	3	24	30	62	64	38	85	51	149	89
2027	40	38	3	24	30	62	64	36	85	48	149	84
2028	40	38	3	24	30	62	64	33	85	45	149	78
2029	40	38	3	24	30	62	64	31	85	42	149	73
2030	40	38	3	24	30	62	64	29	85	39	149	68
2031	40	38	3	24	30	62	64	27	85	36	149	64
2032	40	38	3	24	30	62	64	26	85	34	149	60
2033	40	38	3	24	30	62	64	24	85	32	149	56
2034	40	38	3	24	30	62	64	22	85	30	149	52
2035	40	38	3	24	30	62	64	21	85	28	149	49
2036	40	38	3	24	30	62	64	19	85	26	149	45
2037	40	38	3	24	30	62	64	18	85	24	149	43
2038	40	38	3	24	30	62	64	17	85	23	149	40
2039	40	38	3	24	30	62	64	16	85	21	149	37
2040	40	38	3	24	30	62	64	15	85	20	149	35

TABLE A-35

User Benefits
Haines - Skagway
Alternative 3 - West Lynn Highway

	Period of Service (Fiscal Years)	Users per Vehicle	Annual Growth in AADT[1]	AADT 2015[2]	AADT FY 2019	AADT FY 2025	AADT FY 2054
2015-25		2.3	0.0%				
2015-55			0.0%				
2025-55			0.0%				
Alternative 1 - No Action	2019-24	2.3		24	24		
Alternative 4B - Fast Ferry Berners Bay	2025-54	2.3		24	24	24	24
Alternative 3 - West Lynn Highway	2025-54	2.3		30	30	30	30

Fiscal Year	Cost per User: Alternative 4B Fast Ferry Berners Bay	Cost per User: Alternative 3 West Lynn Highway	Cost Reduction	AADT: Alternative 4B Fast Ferry Berners Bay	AADT: Alternative 3 West Lynn Highway	Annual Average Daily Users	Total Annual User Benefits (2016 $000): Alternative 3 vs. 4B Year of Travel	Alternative 3 vs. 4B Present Value[3] @ 7.0% 7/1/18	Alternative 4B vs. No Action Year of Travel	Alternative 4B vs. No Action Present Value[3] @ 7.0% 7/1/18	Alternative 3 vs. No Action Year of Travel	Alternative 3 vs. No Action Present Value[3] @ 7.0% 7/1/18
2041	40	38	3	24	30	62	64	14	85	19	149	32
2042	40	38	3	24	30	62	64	13	85	17	149	30
2043	40	38	3	24	30	62	64	12	85	16	149	28
2044	40	38	3	24	30	62	64	11	85	15	149	26
2045	40	38	3	24	30	62	64	11	85	14	149	25
2046	40	38	3	24	30	62	64	10	85	13	149	23
2047	40	38	3	24	30	62	64	9	85	12	149	22
2048	40	38	3	24	30	62	64	9	85	12	149	20
2049	40	38	3	24	30	62	64	8	85	11	149	19
2050	40	38	3	24	30	62	64	8	85	10	149	18
2051	40	38	3	24	30	62	64	7	85	9	149	16
2052	40	38	3	24	30	62	64	7	85	9	149	15
2053	40	38	3	24	30	62	64	6	85	8	149	14
2054	40	38	3	24	30	62	64	6	85	8	149	13
Total				874	1,046		1,910	544	2,548	727	4,458	1,271

Notes:
1. Zero growth based on *Juneau Access Haines/Skagway Traffic Forecast*, McDowell Group, December 2016, pp. 8-9 and growth rates calculated from Total Population figures for 2015, 2025, and 2055 in Table 8, *Memorandum, Subject: Juneau Access Improvements, Appendix D: Choice Models*, Fehr & Peers, January 5, 2017.
2. Table A-17.
3. Present value at private sector real rate of return of 7.0 percent.

TABLE A-36

User Benefits
Haines - Skagway
Alternative 2B - East Lynn Highway

	Period of Service (Fiscal Years)	Users per Vehicle	Annual Growth in AADT[1]	AADT 2015[2]	AADT FY 2019	AADT FY 2025	AADT FY 2054
2015-25		2.3	0.0%				
2015-55			0.0%				
2025-55			0.0%				
Alternative 1 - No Action	2019-24	2.3		24	24		
Alternative 3 - West Lynn Highway	2025-54	2.3		30	30	30	30
Alternative 2B - East Lynn Highway	2025-54	2.3		24	24	24	24

	Cost per User			AADT			Total Annual User Benefits (2016 $000)					
							Alternative 2B vs. 3		Alternative 3 vs. No Action		Alternative 2B vs. No Action	
Fiscal Year	Alternative 3 West Lynn Highway	Alternative 2B East Lynn Highway	Cost Reduction	Alternative 3 West Lynn Highway	Alternative 2B East Lynn Highway	Annual Average Daily Users	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18	Year of Travel	Present Value[3] @ 7.0% 7/1/18
2019	44	44	0	24	24	56	0	0	0	0	0	0
2020	44	44	0	24	24	56	0	0	0	0	0	0
2021	44	44	0	24	24	56	0	0	0	0	0	0
2022	44	44	0	24	24	56	0	0	0	0	0	0
2023	44	44	0	24	24	56	0	0	0	0	0	0
2024	44	44	0	24	24	56	0	0	0	0	0	0
2025	38	42	(5)	30	24	62	(114)	(73)	149	96	35	22
2026	38	42	(5)	30	24	62	(114)	(68)	149	89	35	21
2027	38	42	(5)	30	24	62	(114)	(64)	149	84	35	20
2028	38	42	(5)	30	24	62	(114)	(60)	149	78	35	18
2029	38	42	(5)	30	24	62	(114)	(56)	149	73	35	17
2030	38	42	(5)	30	24	62	(114)	(52)	149	68	35	16
2031	38	42	(5)	30	24	62	(114)	(49)	149	64	35	15
2032	38	42	(5)	30	24	62	(114)	(46)	149	60	35	14
2033	38	42	(5)	30	24	62	(114)	(43)	149	56	35	13
2034	38	42	(5)	30	24	62	(114)	(40)	149	52	35	12
2035	38	42	(5)	30	24	62	(114)	(37)	149	49	35	11
2036	38	42	(5)	30	24	62	(114)	(35)	149	45	35	11
2037	38	42	(5)	30	24	62	(114)	(33)	149	43	35	10
2038	38	42	(5)	30	24	62	(114)	(30)	149	40	35	9
2039	38	42	(5)	30	24	62	(114)	(28)	149	37	35	9
2040	38	42	(5)	30	24	62	(114)	(27)	149	35	35	8

TABLE A-36

User Benefits
Haines - Skagway
Alternative 2B - East Lynn Highway

	Period of Service (Fiscal Years)	Users per Vehicle	Annual Growth in AADT[1]	AADT 2015[2]	AADT FY 2019	AADT FY 2025	AADT FY 2054
2015-25		2.3	0.0%				
2015-55			0.0%				
2025-55			0.0%				
Alternative 1 - No Action	2019-24	2.3		24	24		
Alternative 3 - West Lynn Highway	2025-54	2.3		30	30	30	30
Alternative 2B - East Lynn Highway	2025-54	2.3		24	24	24	24

Fiscal Year	Cost per User: Alternative 3 West Lynn Highway	Cost per User: Alternative 2B East Lynn Highway	Cost per User: Cost Reduction	AADT: Alternative 3 West Lynn Highway	AADT: Alternative 2B East Lynn Highway	Annual Average Daily Users	Total Annual User Benefits (2016 $000): Alternative 2B vs. 3 Year of Travel	Alternative 2B vs. 3 Present Value[3] @ 7.0% 7/1/18	Alternative 3 vs. No Action Year of Travel	Alternative 3 vs. No Action Present Value[3] @ 7.0% 7/1/18	Alternative 2B vs. No Action Year of Travel	Alternative 2B vs. No Action Present Value[3] @ 7.0% 7/1/18
2041	38	42	(5)	30	24	62	(114)	(25)	149	32	35	8
2042	38	42	(5)	30	24	62	(114)	(23)	149	30	35	7
2043	38	42	(5)	30	24	62	(114)	(22)	149	28	35	7
2044	38	42	(5)	30	24	62	(114)	(20)	149	26	35	6
2045	38	42	(5)	30	24	62	(114)	(19)	149	25	35	6
2046	38	42	(5)	30	24	62	(114)	(18)	149	23	35	5
2047	38	42	(5)	30	24	62	(114)	(17)	149	22	35	5
2048	38	42	(5)	30	24	62	(114)	(15)	149	20	35	5
2049	38	42	(5)	30	24	62	(114)	(14)	149	19	35	4
2050	38	42	(5)	30	24	62	(114)	(13)	149	18	35	4
2051	38	42	(5)	30	24	62	(114)	(13)	149	16	35	4
2052	38	42	(5)	30	24	62	(114)	(12)	149	15	35	4
2053	38	42	(5)	30	24	62	(114)	(11)	149	14	35	3
2054	38	42	(5)	30	24	62	(114)	(10)	149	13	35	3
Total				1,046	874		(3,411)	(972)	4,458	1,271	1,047	299

Notes:

1. Zero growth based on *Juneau Access Haines/Skagway Traffic Forecast*, McDowell Group, December 2016, pp. 8-9 and growth rates calculated from Total Population figures for 2015, 2025, and 2055 in Table 8, *Memorandum, Subject: Juneau Access Improvements, Appendix D: Choice Models*, Fehr & Peers, January 5, 2017.
2. Table A-17.
3. Present value at private sector real rate of return of 7.0 percent.

TABLE A-37

Construction Costs (Residual Values)
Alternative 1 - No Action
(2016 $000)

	Acquisition Costs			Construction Period	Useful Life
	Roads	Ferry Terminals	Total	(Years)	(Years)
Road & Ferry Terminals					
Earthwork			0	6	80
Structures			0	6	60
Other			0	6	25
Right of Way			0	1	100
Subtotal	0	0	0		
New Vessels					
Steel displacement vessels			0	2	60
Aluminum fast vessels			0	2	32
Total			0		

	Road & AMHS Ferry Terminals					AMHS Vessels							Road & AMHS		
						New Vessel			Existing Vessel					Present Value as of 7/1/18 @	
Fiscal Year	Earthwork	Structures	Other	Right of Way	Total	Acquisition	Refurbishment	Residuals	Replacement	Refurbishment	Residuals	Total	Total	1.5 % State & Federal Cost of Capital	7.0% Private Sector Rate of Return
2019	0	0	0	0	0		0	0		694	0	694	694	689	671
2020	0	0	0		0		0	0		15,653	0	15,653	15,653	15,307	14,143
2021	0	0	0		0		0	0		0	0	0	0	0	0
2022	0	0	0		0		2,096	0	17,979	0	0	20,076	20,076	19,056	15,843
2023	0	0	0		0		2,096	0	17,979	0	0	20,076	20,076	18,775	14,806
2024	0	0	0		0		0	0		0	0	0	0	0	0
2025					0		0	0		503	0	503	503	456	324
2026					0		0	0		0	0	0	0	0	0
2027					0		0	0		1,079	0	1,079	1,079	951	607
2028					0		2,769	0		0	0	2,769	2,769	2,403	1,456
2029					0		2,769	0		0	0	2,769	2,769	2,368	1,361
2030					0		0	0		7,911	0	7,911	7,911	6,666	3,633
2031					0		0	0		0	0	0	0	0	0
2032					0		0	0		0	0	0	0	0	0
2033					0		3,701	0	25,680	2,616	0	31,997	31,997	25,784	11,996
2034					0		3,701	0	25,680	0	0	29,382	29,382	23,327	10,295
2035					0		0	0		0	0	0	0	0	0
2036					0		0	0		0	0	0	0	0	0
2037					0		0	0		0	0	0	0	0	0
2038					0		4,213	0		2,815	0	7,028	7,028	5,257	1,879
2039					0		4,213	0		0	0	4,213	4,213	3,105	1,052
2040					0		0	0		0	0	0	0	0	0

TABLE A-37

Construction Costs (Residual Values)
Alternative 1 - No Action
(2016 $000)

	Acquisition Costs			Construction Period	Useful Life
	Roads	Ferry Terminals	Total	(Years)	(Years)
Road & Ferry Terminals					
Earthwork			0	6	80
Structures			0	6	60
Other			0	6	25
Right of Way			0	1	100
Subtotal	0	0	0		
New Vessels					
Steel displacement vessels			0	2	60
Aluminum fast vessels			0	2	32
Total			0		

	Road & AMHS Ferry Terminals					AMHS Vessels							Road & AMHS		
						New Vessel			Existing Vessel					Present Value as of 7/1/18 @	
Fiscal Year	Earthwork	Structures	Other	Right of Way	Total	Acquisition	Refurbishment	Residuals	Replacement	Refurbishment	Residuals	Total	Total	1.5 % State & Federal Cost of Capital	7.0% Private Sector Rate of Return
2041					0		0	0		0	0	0	0	0	0
2042					0		0	0		0	0	0	0	0	0
2043					0		0	0		2,985	0	2,985	2,985	2,073	569
2044					0		0	0		3,913	0	3,913	3,913	2,677	697
2045					0		0	0		0	0	0	0	0	0
2046					0		0	0		0	0	0	0	0	0
2047					0		0	0		0	0	0	0	0	0
2048			0		0		31,718	0		0	0	31,718	31,718	20,443	4,310
2049			0		0		31,718	0		1,585	0	33,302	33,302	21,148	4,229
2050					0		0	0		0	0	0	0	0	0
2051					0		0	0		0	0	0	0	0	0
2052					0		0	0		0	0	0	0	0	0
2053					0		0	0		16,049	0	16,049	16,049	9,602	1,555
2054	0	0	0	0	0	0	0	(56,524)	0	4,416	(51,620)	(103,728)	(103,728)	(61,144)	(9,392)
Total	0	0	0	0	0	0	88,994	(56,524)	87,319	60,218	(51,620)	128,387	128,387	118,943	80,033

TABLE A-38

Construction Costs (Residual Values)
Alternative 1B - Enhanced Service
(2016 $000)

	Acquisition Costs			Construction Period	Useful Life
	Roads	Ferry Terminals	Total	(Years)	(Years)
Road & Ferry Terminals					
Earthwork			0	6	80
Structures			0	6	60
Other			0	6	25
Right of Way			0	1	100
Subtotal	0	0	0		
New Vessels					
Steel displacement vessels			0	2	60
Aluminum fast vessels			0	2	32
Total			0		

	Road & AMHS Ferry Terminals					AMHS Vessels							Road & AMHS		
						New Vessel			Existing Vessel					Present Value as of 7/1/18 @	
Fiscal Year	Earthwork	Structures	Other	Right of Way	Total	Acquisition	Refurbishment	Residuals	Replacement	Refurbishment	Residuals	Total	Total	1.5 % State & Federal Cost of Capital	7.0% Private Sector Rate of Return
2019	0	0	0	0	0		0	0		694	0	694	694	689	671
2020	0	0	0		0		0	0		15,653	0	15,653	15,653	15,307	14,143
2021	0	0	0		0		0	0		0	0	0	0	0	0
2022	0	0	0		0		2,096	0	71,370	0	0	73,466	73,466	69,736	57,976
2023	0	0	0		0		2,096	0	71,370	0	0	73,466	73,466	68,705	54,183
2024	0	0	0		0		0	0		0	0	0	0	0	0
2025					0		0	0		503	0	503	503	456	324
2026					0		0	0		0	0	0	0	0	0
2027					0		0	0		4,284	0	4,284	4,284	3,775	2,411
2028					0		2,769	0		0	0	2,769	2,769	2,403	1,456
2029					0		2,769	0		0	0	2,769	2,769	2,368	1,361
2030					0		0	0		7,911	0	7,911	7,911	6,666	3,633
2031					0		0	0		0	0	0	0	0	0
2032					0		0	0		0	0	0	0	0	0
2033					0		3,701	0	25,680	10,135	0	39,517	39,517	31,844	14,816
2034					0		3,701	0	25,680	0	0	29,382	29,382	23,327	10,295
2035					0		0	0		0	0	0	0	0	0
2036					0		0	0		0	0	0	0	0	0
2037					0		0	0		0	0	0	0	0	0
2038					0		4,213	0		6,721	0	10,934	10,934	8,179	2,923
2039					0		4,213	0		0	0	4,213	4,213	3,105	1,052
2040					0		0	0		0	0	0	0	0	0

TABLE A-38

Construction Costs (Residual Values)
Alternative 1B - Enhanced Service
(2016 $000)

	Acquisition Costs			Construction Period	Useful Life
	Roads	Ferry Terminals	Total	(Years)	(Years)
Road & Ferry Terminals					
Earthwork			0	6	80
Structures			0	6	60
Other			0	6	25
Right of Way			0	1	100
Subtotal	0	0	0		
New Vessels					
Steel displacement vessels			0	2	60
Aluminum fast vessels			0	2	32
Total			0		

	Road & AMHS Ferry Terminals					AMHS Vessels							Road & AMHS		
						New Vessel			Existing Vessel					Present Value as of 7/1/18 @	
Fiscal Year	Earthwork	Structures	Other	Right of Way	Total	Acquisition	Refurbishment	Residuals	Replacement	Refurbishment	Residuals	Total	Total	1.5 % State & Federal Cost of Capital	7.0% Private Sector Rate of Return
2041					0		0	0		0	0	0	0	0	0
2042					0		0	0		0	0	0	0	0	0
2043					0		0	0		11,470	0	11,470	11,470	7,965	2,186
2044					0		0	0		3,913	0	3,913	3,913	2,677	697
2045					0		0	0		0	0	0	0	0	0
2046					0		0	0		0	0	0	0	0	0
2047					0		0	0		0	0	0	0	0	0
2048			0		0		31,718	0		0	0	31,718	31,718	20,443	4,310
2049			0		0		31,718	0		1,585	0	33,302	33,302	21,148	4,229
2050					0		0	0		0	0	0	0	0	0
2051					0		0	0		0	0	0	0	0	0
2052					0		0	0		0	0	0	0	0	0
2053					0		0	0		64,101	0	64,101	64,101	38,352	6,211
2054	0	0	0	0	0	0	0	(56,524)	0	4,416	(103,231)	(155,339)	(155,339)	(91,566)	(14,066)
Total	0	0	0	0	0	0	88,994	(56,524)	194,100	131,387	(103,231)	254,726	254,726	235,578	168,809

TABLE A-39

Construction Costs (Residual Values)
Alternative 2B - East Lynn Highway
(2016 $000)

	Acquisition Costs			Construction Period	Useful Life
	Roads	Ferry Terminals	Total	(Years)	(Years)
Road & Ferry Terminals					
Earthwork	167,811	9,081	176,892	6	80
Structures	401,069	16,702	417,771	6	60
Other	48,871	10,205	59,076	6	25
Right of Way	1,700	0	1,700	1	100
Subtotal	619,450	35,989	655,439		
New Vessels					
Steel displacement vessels			24,816	2	60
Aluminum fast vessels			0	2	32
Total			680,255		

	Road & AMHS Ferry Terminals					AMHS Vessels							Road & AMHS		
						New Vessel			Existing Vessel					Present Value as of 7/1/18 @	
Fiscal Year	Earthwork	Structures	Other	Right of Way	Total	Acquisition	Refurbishment	Residuals	Replacement	Refurbishment	Residuals	Total	Total	1.5 % State & Federal Cost of Capital	7.0% Private Sector Rate of Return
2019	17,689	41,777	5,908	1,700	67,074		0	0		694	0	694	67,768	67,265	65,513
2020	35,378	83,554	11,815		130,748		0	0		15,653	0	15,653	146,401	143,168	132,272
2021	35,378	83,554	11,815		130,748		0	0		0	0	0	130,748	125,971	110,401
2022	35,378	83,554	11,815		130,748		2,096	0	17,979	0	0	20,076	150,824	143,165	119,022
2023	35,378	83,554	11,815		130,748	12,408	2,096	0	17,979	0	0	32,484	163,232	152,654	120,386
2024	17,689	41,777	5,908		65,374	12,408	0	0		0	(43,919)	(31,511)	33,863	31,200	23,340
2025					0		0	0				0	0	0	0
2026					0		0	0				0	0	0	0
2027					0		0	0				0	0	0	0
2028					0		3,511	0				3,511	3,511	3,048	1,846
2029					0		2,769	0				2,769	2,769	2,368	1,361
2030					0		0	0				0	0	0	0
2031					0		0	0				0	0	0	0
2032					0		0	0				0	0	0	0
2033					0		3,701	0				3,701	3,701	2,983	1,388
2034					0		4,624	0				4,624	4,624	3,671	1,620
2035					0		0	0				0	0	0	0
2036					0		0	0				0	0	0	0
2037					0		0	0				0	0	0	0
2038					0		4,213	0				4,213	4,213	3,151	1,126
2039					0		5,808	0				5,808	5,808	4,280	1,451
2040					0		0	0				0	0	0	0

TABLE A-39

Construction Costs (Residual Values)
Alternative 2B - East Lynn Highway
(2016 $000)

	Acquisition Costs			Construction Period	Useful Life
	Roads	Ferry Terminals	Total	(Years)	(Years)
Road & Ferry Terminals					
Earthwork	167,811	9,081	176,892	6	80
Structures	401,069	16,702	417,771	6	60
Other	48,871	10,205	59,076	6	25
Right of Way	1,700	0	1,700	1	100
Subtotal	619,450	35,989	655,439		
New Vessels					
Steel displacement vessels			24,816	2	60
Aluminum fast vessels			0	2	32
Total			680,255		

	Road & AMHS Ferry Terminals					AMHS Vessels							Road & AMHS		
						New Vessel			Existing Vessel					Present Value as of 7/1/18 @	
Fiscal Year	Earthwork	Structures	Other	Right of Way	Total	Acquisition	Refurbishment	Residuals	Replacement	Refurbishment	Residuals	Total	Total	1.5 % State & Federal Cost of Capital	7.0% Private Sector Rate of Return
2041					0		0	0				0	0	0	0
2042					0		0	0				0	0	0	0
2043					0		0	0				0	0	0	0
2044					0		1,404	0				1,404	1,404	961	250
2045					0		0	0				0	0	0	0
2046					0		0	0				0	0	0	0
2047					0		0	0				0	0	0	0
2048			29,538		29,538		31,718	0				31,718	61,256	39,482	8,324
2049			29,538		29,538		31,718	0				31,718	61,256	38,898	7,779
2050					0		0	0				0	0	0	0
2051					0		0	0				0	0	0	0
2052					0		0	0				0	0	0	0
2053					0		0	0				0	0	0	0
2054	(110,557)	(208,886)	(47,261)	(1,190)	(367,894)	0	11,114	(68,932)	0	0	0	(57,818)	(425,712)	(250,941)	(38,547)
Total	66,334	208,886	70,892	510	346,622	24,816	104,772	(68,932)	35,959	16,347	(43,919)	69,043	415,664	511,324	557,534

TABLE A-40

Construction Costs (Residual Values)
Alternative 3 - West Lynn Highway
(2016 $000)

	Acquisition Costs			Construction Period	Useful Life
	Roads	Ferry Terminals	Total	(Years)	(Years)
Road & Ferry Terminals					
Earthwork	144,901	4,671	149,572	6	80
Structures	299,962	35,476	335,438	6	60
Other	40,965	14,508	55,473	6	25
Right of Way	1,500	0	1,500	1	100
Subtotal	487,329	54,654	541,983		
New Vessels					
Steel displacement vessels			53,906	2	60
Aluminum fast vessels			0	2	32
Total			595,889		

	Road & AMHS Ferry Terminals					AMHS Vessels							Road & AMHS		
						New Vessel			Existing Vessel					Present Value as of 7/1/18 @	
Fiscal Year	Earthwork	Structures	Other	Right of Way	Total	Acquisition	Refurbishment	Residuals	Replacement	Refurbishment	Residuals	Total	Total	1.5 % State & Federal Cost of Capital	7.0% Private Sector Rate of Return
2019	14,957	33,544	5,547	1,500	55,548		0	0		694	0	694	56,242	55,825	54,371
2020	29,914	67,088	11,095		108,097		0	0		15,653	0	15,653	123,750	121,017	111,807
2021	29,914	67,088	11,095		108,097		0	0		0	0	0	108,097	104,147	91,275
2022	29,914	67,088	11,095		108,097		2,096	0	17,979	0	0	20,076	128,172	121,664	101,147
2023	29,914	67,088	11,095		108,097	26,953	2,096	0	17,979	0	0	47,029	155,125	145,073	114,408
2024	14,957	33,544	5,547		54,048	26,953	0	0		0	(43,919)	(16,967)	37,082	34,166	25,559
2025					0		0	0				0	0	0	0
2026					0		0	0				0	0	0	0
2027					0		0	0				0	0	0	0
2028					0		4,383	0				4,383	4,383	3,805	2,305
2029					0		2,769	0				2,769	2,769	2,368	1,361
2030					0		0	0				0	0	0	0
2031					0		0	0				0	0	0	0
2032					0		0	0				0	0	0	0
2033					0		3,701	0				3,701	3,701	2,983	1,388
2034					0		5,698	0				5,698	5,698	4,523	1,996
2035					0		0	0				0	0	0	0
2036					0		0	0				0	0	0	0
2037					0		0	0				0	0	0	0
2038					0		4,213	0				4,213	4,213	3,151	1,126
2039					0		7,674	0				7,674	7,674	5,655	1,917
2040					0		0	0				0	0	0	0

TABLE A-40

Construction Costs (Residual Values)
Alternative 3 - West Lynn Highway
(2016 $000)

	Acquisition Costs			Construction Period	Useful Life
	Roads	Ferry Terminals	Total	(Years)	(Years)
Road & Ferry Terminals					
Earthwork	144,901	4,671	149,572	6	80
Structures	299,962	35,476	335,438	6	60
Other	40,965	14,508	55,473	6	25
Right of Way	1,500	0	1,500	1	100
Subtotal	487,329	54,654	541,983		
New Vessels					
Steel displacement vessels			53,906	2	60
Aluminum fast vessels			0	2	32
Total			595,889		

	Road & AMHS Ferry Terminals					AMHS Vessels							Road & AMHS		
						New Vessel			Existing Vessel					Present Value as of 7/1/18 @	
Fiscal Year	Earthwork	Structures	Other	Right of Way	Total	Acquisition	Refurbishment	Residuals	Replacement	Refurbishment	Residuals	Total	Total	1.5 % State & Federal Cost of Capital	7.0% Private Sector Rate of Return
2041					0		0	0				0	0	0	0
2042					0		0	0				0	0	0	0
2043					0		0	0				0	0	0	0
2044					0		3,029	0				3,029	3,029	2,072	540
2045					0		0	0				0	0	0	0
2046					0		0	0				0	0	0	0
2047					0		0	0				0	0	0	0
2048			27,737		27,737		31,718	0				31,718	59,454	38,321	8,079
2049			27,737		27,737		31,718	0				31,718	59,454	37,755	7,551
2050					0		0	0				0	0	0	0
2051					0		0	0				0	0	0	0
2052					0		0	0				0	0	0	0
2053					0		0	0				0	0	0	0
2054	(93,482)	(167,719)	(44,379)	(1,050)	(306,630)	0	24,144	(83,477)	0	0	0	(59,333)	(365,963)	(215,721)	(33,137)
Total	56,089	167,719	66,568	450	290,826	53,906	123,239	(83,477)	35,959	16,347	(43,919)	102,054	392,881	466,805	491,692

Construction Costs (Residual Values)
Alternative 4A - Fast Ferry Auke Bay
(2016 $000)

	Acquisition Costs			Construction Period	Useful Life
	Roads	Ferry Terminals	Total	(Years)	(Years)
Road & Ferry Terminals					
Earthwork		1,525	1,525	6	80
Structures		38,634	38,634	6	60
Other		3,936	3,936	6	25
Right of Way		0	0	1	100
Subtotal	0	44,095	44,095		
New Vessels					
Steel displacement vessels			24,816	2	60
Aluminum fast vessels			181,960	2	32
Total			250,871		

	Road & AMHS Ferry Terminals					AMHS Vessels							Road & AMHS		
						New Vessel			Existing Vessel					Present Value as of 7/1/18 @	
Fiscal Year	Earthwork	Structures	Other	Right of Way	Total	Acquisition	Refurbishment	Residuals	Replacement	Refurbishment	Residuals	Total	Total	1.5 % State & Federal Cost of Capital	7.0% Private Sector Rate of Return
2019	152	3,863	394	0	4,410		0	0		694	0	694	5,103	5,065	4,933
2020	305	7,727	787		8,819		0	0		15,653	0	15,653	24,472	23,932	22,110
2021	305	7,727	787		8,819		0	0		0	0	0	8,819	8,497	7,447
2022	305	7,727	787		8,819		2,096	0	17,979	0	0	20,076	28,895	27,428	22,802
2023	305	7,727	787		8,819	103,388	2,096	0	17,979	0	0	123,464	132,283	123,711	97,561
2024	152	3,863	394		4,410	103,388	0	(125,737)		0	0	(22,349)	(17,939)	(16,529)	(12,365)
2025					0		0	0		503	0	503	503	456	324
2026					0		9,108	0		0	0	9,108	9,108	8,146	5,483
2027					0		0	0		1,079	0	1,079	1,079	951	607
2028					0		742	0		0	0	742	742	644	390
2029					0		0	0		0	0	0	0	0	0
2030					0		0	0		7,911	0	7,911	7,911	6,666	3,633
2031					0		0	0		0	0	0	0	0	0
2032					0		21,847	0		0	0	21,847	21,847	17,869	8,764
2033					0		0	0	25,680	2,616	0	28,296	28,296	22,802	10,609
2034					0		923	0	25,680	0	0	26,603	26,603	21,121	9,321
2035					0		91,000	0		0	0	91,000	91,000	71,179	29,800
2036					0		0	0		0	0	0	0	0	0
2037					0		0	0		0	0	0	0	0	0
2038					0		0	0		2,815	0	2,815	2,815	2,106	752
2039					0		1,595	0		0	0	1,595	1,595	1,175	398
2040					0		63,716	0		0	0	63,716	63,716	46,262	14,876

TABLE A-41

Construction Costs (Residual Values)
Alternative 4A - Fast Ferry Auke Bay
(2016 $000)

	Acquisition Costs			Construction Period	Useful Life
	Roads	Ferry Terminals	Total	(Years)	(Years)
Road & Ferry Terminals					
Earthwork		1,525	1,525	6	80
Structures		38,634	38,634	6	60
Other		3,936	3,936	6	25
Right of Way		0	0	1	100
Subtotal	0	44,095	44,095		
New Vessels					
Steel displacement vessels			24,816	2	60
Aluminum fast vessels			181,960	2	32
Total			250,871		

	Road & AMHS Ferry Terminals					AMHS Vessels							Road & AMHS		
						New Vessel			Existing Vessel					Present Value as of 7/1/18 @	
Fiscal Year	Earthwork	Structures	Other	Right of Way	Total	Acquisition	Refurbishment	Residuals	Replacement	Refurbishment	Residuals	Total	Total	1.5 % State & Federal Cost of Capital	7.0% Private Sector Rate of Return
2041					0		0	0		0	0	0	0	0	0
2042					0		0	0		0	0	0	0	0	0
2043					0		0	0		2,985	0	2,985	2,985	2,073	569
2044					0		1,404	0		3,913	0	5,318	5,318	3,638	947
2045					0		91,000	0		0	0	91,000	91,000	61,333	15,149
2046					0		0	0		0	0	0	0	0	0
2047					0		0	0		0	0	0	0	0	0
2048			1,968		1,968		21,847	0		0	0	21,847	23,815	15,350	3,236
2049			1,968		1,968		0	0		1,585	0	1,585	3,553	2,256	451
2050					0		0	0		0	0	0	0	0	0
2051					0		0	0		0	0	0	0	0	0
2052					0		0	0		0	0	0	0	0	0
2053					0		0	0		16,049	0	16,049	16,049	9,602	1,555
2054	(953)	(19,317)	(3,149)	0	(23,419)	0	11,114	(23,781)	0	4,416	(51,620)	(59,871)	(83,290)	(49,096)	(7,542)
Total	572	19,317	4,723	0	24,612	206,776	318,490	(149,518)	87,319	60,218	(51,620)	471,665	496,277	416,635	241,813

TABLE A-42

Construction Costs (Residual Values)
Alternative 4B - Fast Ferry Berners Bay
(2016 $000)

	Acquisition Costs			Construction Period	Useful Life
	Roads	Ferry Terminals	Total	(Years)	(Years)
Road & Ferry Terminals					
Earthwork	6,920	4,587	11,508	6	80
Structures	1,554	52,089	53,643	6	60
Other	1,698	9,099	10,797	6	25
Right of Way	0	0	0	1	100
Subtotal	10,172	65,775	75,947		
New Vessels					
Steel displacement vessels			24,816	2	60
Aluminum fast vessels			217,610	2	32
Total			318,373		

	Road & AMHS Ferry Terminals					AMHS Vessels							Road & AMHS		
						New Vessel			Existing Vessel					Present Value as of 7/1/18 @	
Fiscal Year	Earthwork	Structures	Other	Right of Way	Total	Acquisition	Refurbishment	Residuals	Replacement	Refurbishment	Residuals	Total	Total	1.5 % State & Federal Cost of Capital	7.0% Private Sector Rate of Return
2019	1,151	5,364	1,080	0	7,595		0	0		694	0	694	8,288	8,227	8,013
2020	2,302	10,729	2,159		15,189		0	0		15,653	0	15,653	30,843	30,161	27,866
2021	2,302	10,729	2,159		15,189		0	0		0	0	0	15,189	14,634	12,826
2022	2,302	10,729	2,159		15,189		2,096	0	17,979	0	0	20,076	35,265	33,475	27,829
2023	2,302	10,729	2,159		15,189	121,213	2,096	0	17,979	0	0	141,289	156,478	146,338	115,406
2024	1,151	5,364	1,080		7,595	121,213	0	(125,737)		0	0	(4,524)	3,071	2,829	2,117
2025					0		0	0		503	0	503	503	456	324
2026					0		10,873	0		0	0	10,873	10,873	9,725	6,546
2027					0		0	0		1,079	0	1,079	1,079	951	607
2028					0		742	0		0	0	742	742	644	390
2029					0		0	0		0	0	0	0	0	0
2030					0		0	0		7,911	0	7,911	7,911	6,666	3,633
2031					0		0	0		0	0	0	0	0	0
2032					0		26,100	0		0	0	26,100	26,100	21,348	10,470
2033					0		0	0	25,680	2,616	0	28,296	28,296	22,802	10,609
2034					0		923	0	25,680	0	0	26,603	26,603	21,121	9,321
2035					0		108,815	0		0	0	108,815	108,815	85,113	35,633
2036					0		0	0		0	0	0	0	0	0
2037					0		0	0		0	0	0	0	0	0
2038					0		0	0		2,815	0	2,815	2,815	2,106	752
2039					0		1,595	0		0	0	1,595	1,595	1,175	398
2040					0		76,154	0		0	0	76,154	76,154	55,294	17,780

TABLE A-42

Construction Costs (Residual Values)
Alternative 4B - Fast Ferry Berners Bay
(2016 $000)

	Acquisition Costs			Construction Period	Useful Life
	Roads	Ferry Terminals	Total	(Years)	(Years)
Road & Ferry Terminals					
Earthwork	6,920	4,587	11,508	6	80
Structures	1,554	52,089	53,643	6	60
Other	1,698	9,099	10,797	6	25
Right of Way	0	0	0	1	100
Subtotal	10,172	65,775	75,947		
New Vessels					
Steel displacement vessels			24,816	2	60
Aluminum fast vessels			217,610	2	32
Total			318,373		

	Road & AMHS Ferry Terminals					AMHS Vessels							Road & AMHS		
						New Vessel			Existing Vessel					Present Value as of 7/1/18 @	
Fiscal Year	Earthwork	Structures	Other	Right of Way	Total	Acquisition	Refurbishment	Residuals	Replacement	Refurbishment	Residuals	Total	Total	1.5 % State & Federal Cost of Capital	7.0% Private Sector Rate of Return
2041					0		0	0		0	0	0	0	0	0
2042					0		0	0		0	0	0	0	0	0
2043					0		0	0		2,985	0	2,985	2,985	2,073	569
2044					0		1,404	0		3,913	0	5,318	5,318	3,638	947
2045					0		108,815	0		0	0	108,815	108,815	73,339	18,114
2046					0		0	0		0	0	0	0	0	0
2047					0		0	0		0	0	0	0	0	0
2048			5,398		5,398		26,100	0		0	0	26,100	31,499	20,302	4,280
2049			5,398		5,398		0	0		1,585	0	1,585	6,983	4,435	887
2050					0		0	0		0	0	0	0	0	0
2051					0		0	0		0	0	0	0	0	0
2052					0		0	0		0	0	0	0	0	0
2053					0		0	0		16,049	0	16,049	16,049	9,602	1,555
2054	(7,192)	(26,821)	(8,637)	0	(42,651)	0	11,114	(26,009)	0	4,416	(51,620)	(62,099)	(104,750)	(61,746)	(9,485)
Total	4,315	26,821	12,956	0	44,093	242,426	376,829	(151,746)	87,319	60,218	(51,620)	563,427	607,519	514,708	307,390

TABLE A-43

Construction Costs (Residual Values)
Alternative 4C - Monohull Auke Bay
(2016 $000)

	Acquisition Costs			Construction Period	Useful Life
	Roads	Ferry Terminals	Total	(Years)	(Years)
Road & Ferry Terminals					
Earthwork		1,525	1,525	6	80
Structures		44,861	44,861	6	60
Other		7,339	7,339	6	25
Right of Way		0	0	1	100
Subtotal	0	53,725	53,725		
New Vessels					
Steel displacement vessels			24,816	2	60
Aluminum fast vessels			0	2	32
Total			78,541		

	Road & AMHS Ferry Terminals					AMHS Vessels							Road & AMHS		
						New Vessel			Existing Vessel					Present Value as of 7/1/18 @	
Fiscal Year	Earthwork	Structures	Other	Right of Way	Total	Acquisition	Refurbishment	Residuals	Replacement	Refurbishment	Residuals	Total	Total	1.5 % State & Federal Cost of Capital	7.0% Private Sector Rate of Return
2019	152	4,486	734	0	5,372		0	0		694	0	694	6,066	6,021	5,864
2020	305	8,972	1,468		10,745		0	0		15,653	0	15,653	26,398	25,815	23,850
2021	305	8,972	1,468		10,745		0	0		0	0	0	10,745	10,352	9,073
2022	305	8,972	1,468		10,745		2,096	0	17,979	0	0	20,076	30,821	29,256	24,322
2023	305	8,972	1,468		10,745	12,408	2,096	0	17,979	0	0	32,484	43,229	40,428	31,882
2024	152	4,486	734		5,372	12,408	0	0		0	0	12,408	17,781	16,383	12,256
2025					0		0	0		503	0	503	503	456	324
2026					0		0	0		0	0	0	0	0	0
2027					0		0	0		1,079	0	1,079	1,079	951	607
2028					0		3,511	0		0	0	3,511	3,511	3,048	1,846
2029					0		2,769	0		0	0	2,769	2,769	2,368	1,361
2030					0		0	0		7,911	0	7,911	7,911	6,666	3,633
2031					0		0	0		0	0	0	0	0	0
2032					0		0	0		0	0	0	0	0	0
2033					0		3,701	0	25,680	2,616	0	31,997	31,997	25,784	11,996
2034					0		4,624	0	25,680	0	0	30,304	30,304	24,059	10,618
2035					0		0	0		0	0	0	0	0	0
2036					0		0	0		0	0	0	0	0	0
2037					0		0	0		0	0	0	0	0	0
2038					0		4,213	0		2,815	0	7,028	7,028	5,257	1,879
2039					0		5,808	0		0	0	5,808	5,808	4,280	1,451
2040					0		0	0		0	0	0	0	0	0

TABLE A-43

Construction Costs (Residual Values)
Alternative 4C - Monohull Auke Bay
(2016 $000)

	Acquisition Costs			Construction Period	Useful Life
	Roads	Ferry Terminals	Total	(Years)	(Years)
Road & Ferry Terminals					
Earthwork		1,525	1,525	6	80
Structures		44,861	44,861	6	60
Other		7,339	7,339	6	25
Right of Way		0	0	1	100
Subtotal	0	53,725	53,725		
New Vessels					
Steel displacement vessels			24,816	2	60
Aluminum fast vessels			0	2	32
Total			78,541		

	Road & AMHS Ferry Terminals					AMHS Vessels							Road & AMHS		
						New Vessel			Existing Vessel					Present Value as of 7/1/18 @	
Fiscal Year	Earthwork	Structures	Other	Right of Way	Total	Acquisition	Refurbishment	Residuals	Replacement	Refurbishment	Residuals	Total	Total	1.5 % State & Federal Cost of Capital	7.0% Private Sector Rate of Return
2041					0		0	0		0	0	0	0	0	0
2042					0		0	0		0	0	0	0	0	0
2043					0		0	0		2,985	0	2,985	2,985	2,073	569
2044					0		1,404	0		3,913	0	5,318	5,318	3,638	947
2045					0		0	0		0	0	0	0	0	0
2046					0		0	0		0	0	0	0	0	0
2047					0		0	0		0	0	0	0	0	0
2048			3,669		3,669		31,718	0		0	0	31,718	35,387	22,808	4,809
2049			3,669		3,669		31,718	0		1,585	0	33,302	36,972	23,478	4,695
2050					0		0	0		0	0	0	0	0	0
2051					0		0	0		0	0	0	0	0	0
2052					0		0	0		0	0	0	0	0	0
2053					0		0	0		16,049	0	16,049	16,049	9,602	1,555
2054	(953)	(22,431)	(5,871)	0	(29,255)	0	11,114	(68,932)	0	4,416	(51,620)	(105,022)	(134,277)	(79,151)	(12,158)
Total	572	22,431	8,806	0	31,809	24,816	104,772	(68,932)	87,319	60,218	(51,620)	156,573	188,382	183,572	141,379

TABLE A-44

Construction Costs (Residual Values)
Alternative 4D - Monohull Berners Bay
(2016 $000)

	Acquisition Costs			Construction Period	Useful Life
	Roads	Ferry Terminals	Total	(Years)	(Years)
Road & Ferry Terminals					
Earthwork	6,920	4,587	11,508	6	80
Structures	1,554	58,316	59,869	6	60
Other	1,698	12,502	14,200	6	25
Right of Way	0	0	0	1	100
Subtotal	10,172	75,405	85,577		
New Vessels					
Steel displacement vessels			24,816	2	60
Aluminum fast vessels			0	2	32
Total			110,393		

	Road & AMHS Ferry Terminals					AMHS Vessels							Road & AMHS		
						New Vessel			Existing Vessel					Present Value as of 7/1/18 @	
Fiscal Year	Earthwork	Structures	Other	Right of Way	Total	Acquisition	Refurbishment	Residuals	Replacement	Refurbishment	Residuals	Total	Total	1.5 % State & Federal Cost of Capital	7.0% Private Sector Rate of Return
2019	1,151	5,987	1,420	0	8,558		0	0		694	0	694	9,251	9,183	8,944
2020	2,302	11,974	2,840		17,115		0	0		15,653	0	15,653	32,769	32,045	29,606
2021	2,302	11,974	2,840		17,115		0	0		0	0	0	17,115	16,490	14,452
2022	2,302	11,974	2,840		17,115		2,096	0	17,979	0	0	20,076	37,191	35,303	29,349
2023	2,302	11,974	2,840		17,115	12,408	2,096	0	17,979	0	0	32,484	49,599	46,385	36,580
2024	1,151	5,987	1,420		8,558	12,408	0	0		0	0	12,408	20,966	19,317	14,451
2025					0		0	0		503	0	503	503	456	324
2026					0		0	0		0	0	0	0	0	0
2027					0		0	0		1,079	0	1,079	1,079	951	607
2028					0		3,511	0		0	0	3,511	3,511	3,048	1,846
2029					0		2,769	0		0	0	2,769	2,769	2,368	1,361
2030					0		0	0		7,911	0	7,911	7,911	6,666	3,633
2031					0		0	0		0	0	0	0	0	0
2032					0		0	0		0	0	0	0	0	0
2033					0		3,701	0	25,680	2,616	0	31,997	31,997	25,784	11,996
2034					0		4,624	0	25,680	0	0	30,304	30,304	24,059	10,618
2035					0		0	0		0	0	0	0	0	0
2036					0		0	0		0	0	0	0	0	0
2037					0		0	0		0	0	0	0	0	0
2038					0		4,213	0		2,815	0	7,028	7,028	5,257	1,879
2039					0		5,808	0		0	0	5,808	5,808	4,280	1,451
2040					0		0	0		0	0	0	0	0	0

TABLE A-44

Construction Costs (Residual Values)
Alternative 4D - Monohull Berners Bay
(2016 $000)

	Acquisition Costs			Construction Period	Useful Life
	Roads	Ferry Terminals	Total	(Years)	(Years)
Road & Ferry Terminals					
Earthwork	6,920	4,587	11,508	6	80
Structures	1,554	58,316	59,869	6	60
Other	1,698	12,502	14,200	6	25
Right of Way	0	0	0	1	100
Subtotal	10,172	75,405	85,577		
New Vessels					
Steel displacement vessels			24,816	2	60
Aluminum fast vessels			0	2	32
Total			110,393		

	Road & AMHS Ferry Terminals					AMHS Vessels							Road & AMHS		
						New Vessel			Existing Vessel					Present Value as of 7/1/18 @	
Fiscal Year	Earthwork	Structures	Other	Right of Way	Total	Acquisition	Refurbishment	Residuals	Replacement	Refurbishment	Residuals	Total	Total	1.5 % State & Federal Cost of Capital	7.0% Private Sector Rate of Return
2041					0		0	0		0	0	0	0	0	0
2042					0		0	0		0	0	0	0	0	0
2043					0		0	0		2,985	0	2,985	2,985	2,073	569
2044					0		1,404	0		3,913	0	5,318	5,318	3,638	947
2045					0		0	0		0	0	0	0	0	0
2046					0		0	0		0	0	0	0	0	0
2047					0		0	0		0	0	0	0	0	0
2048			7,100		7,100		31,718	0		0	0	31,718	38,817	25,019	5,275
2049			7,100		7,100		31,718	0		1,585	0	33,302	40,402	25,656	5,131
2050					0		0	0		0	0	0	0	0	0
2051					0		0	0		0	0	0	0	0	0
2052					0		0	0		0	0	0	0	0	0
2053					0		0	0		16,049	0	16,049	16,049	9,602	1,555
2054	(7,192)	(29,935)	(11,360)	0	(48,487)	0	11,114	(68,932)	0	4,416	(51,620)	(105,022)	(153,509)	(90,488)	(13,900)
Total	4,315	29,935	17,040	0	51,290	24,816	104,772	(68,932)	87,319	60,218	(51,620)	156,573	207,863	207,093	166,675

TABLE A-45

AMHS Vessel Refurbishment Costs
New Vessels
(2016 $000)

Alternatives:	2019-24: all Alternatives 2025-54: 1, 1B, 2B, 3, 4C-D				4A		4B		2B, 4A-D		3	
Number of Vessels:	one Day Boat ACF-1 (53 ASV)		one Day Boat ACF-2 (53 ASV)		two Fast Vehicle Ferry-1 (31 ASV)		two Fast Vehicle Ferry-2 (53 ASV)		one HNS-SGY Shuttle (18 ASV)		one HNS-SGY Shuttle (41 ASV)	
Fiscal Year	Year of Life	Cost[1]	Year of Life	Cost[1]	Year of Life	Cost per vessel[1]	Year of Life	Cost per vessel[1]	Year of Life	Cost[1]	Year of Life	Cost[1]
2019	1											
2020	2		1									
2021	3		2									
2022	4	2,096	3									
2023	5		4	2,096								
2024	6		5									
2025	7		6		1		1		1		1	
2026	8		7		2	4,554	2	5,437	2		2	
2027	9		8		3		3		3		3	
2028	10	2,769	9		4		4		4	742	4	1,615
2029	11		10	2,769	5		5		5		5	
2030	12		11		6		6		6		6	
2031	13		12		7		7		7		7	
2032	14		13		8	10,924	8	13,050	8		8	
2033	15	3,701	14		9		9		9		9	
2034	16		15	3,701	10		10		10	923	10	1,996
2035	17		16		11	45,500	11	54,407	11		11	
2036	18		17		12		12		12		12	
2037	19		18		13		13		13		13	
2038	20	4,213	19		14		14		14		14	
2039	21		20	4,213	15		15		15	1,595	15	3,461
2040	22		21		16	31,858	16	38,077	16		16	

TABLE A-45

AMHS Vessel Refurbishment Costs
New Vessels
(2016 $000)

Alternatives:	2019-24: all Alternatives 2025-54: 1, 1B, 2B, 3, 4C-D				4A		4B		2B, 4A-D		3	
Number of Vessels:	one Day Boat ACF-1 (53 ASV)		one Day Boat ACF-2 (53 ASV)		two Fast Vehicle Ferry-1 (31 ASV)		two Fast Vehicle Ferry-2 (53 ASV)		one HNS-SGY Shuttle (18 ASV)		one HNS-SGY Shuttle (41 ASV)	
Fiscal Year	Year of Life	Cost[1]	Year of Life	Cost[1]	Year of Life	Cost per vessel[1]	Year of Life	Cost per vessel[1]	Year of Life	Cost[1]	Year of Life	Cost[1]
2041	23		22		17		17		17		17	
2042	24		23		18		18		18		18	
2043	25		24		19		19		19		19	
2044	26		25		20		20		20	1,404	20	3,029
2045	27		26		21	45,500	21	54,407	21		21	
2046	28		27		22		22		22		22	
2047	29		28		23		23		23		23	
2048	30	31,718	29		24	10,924	24	13,050	24		24	
2049	31		30	31,718	25		25		25		25	
2050	32		31		26		26		26		26	
2051	33		32		27		27		27		27	
2052	34		33		28		28		28		28	
2053	35		34		29		29		29		29	
2054	36		35		30		30		30	11,114	30	24,144

Notes:

1. Attachment D Rev A, *JAI Marine Segments Technical Report* , CWC Project 15018, Coastwise Corporation, March 2017. 2015 costs adjusted to 2016 costs using Bureau of Labor Statistics Producer Price Index for self-propelled ships, non-military.

TABLE A-46

AMHS Vessel Refurbishment Costs
Existing Vessels & Replacements
(2016 $000)

Alternatives:	Day Boat Service 2019-54: 1B			Mainliner Service 2019-24: all Alternatives 2025-54: 1, 1B, 4A-D								
	Malaspina[1]			Columbia			Matanuska			Taku		
Fiscal Year	Year of Life	Cost[2]	Lynn Canal Costs[3] @ 55.0%	Year of Life	Cost[2]	Lynn Canal Costs[4] @ 12.5%	Year of Life	Cost[2]	Lynn Canal Costs[4] @ 11.4%	Year of Life	Cost[2]	Lynn Canal Costs[4] @ 3.8%
2019	56			45			56			56	18,256	694
2020	57			46	125,225	15,653	57			57		
2021	58			47			58			58		
2022	59			48			59			59		
2023	60			49			60			60		
2024	1			50			1			1		
2025	2			51	4,022	503	2			2		
2026	3			52			3			3		
2027	4	5,828	3,205	53			4	7,523	858	4	5,828	221
2028	5			54			5			5		
2029	6			55			6			6		
2030	7			56	63,285	7,911	7			7		
2031	8			57			8			8		
2032	9			58			9			9		
2033	10	13,672	7,520	59			10	18,387	2,096	10	13,672	520
2034	11			60			11			11		
2035	12			1			12			12		
2036	13			2			13			13		
2037	14			3			14			14		
2038	15	7,102	3,906	4	12,328	1,541	15	8,807	1,004	15	7,102	270
2039	16			5			16			16		
2040	17			6			17			17		

TABLE A-46

AMHS Vessel Refurbishment Costs
Existing Vessels & Replacements
(2016 $000)

Alternatives:	Day Boat Service 2019-54: 1B			Mainliner Service 2019-24: all Alternatives 2025-54: 1, 1B, 4A-D								
	Malaspina[1]			Columbia			Matanuska			Taku		
Fiscal Year	Year of Life	Cost[2]	Lynn Canal Costs[3] @ 55.0%	Year of Life	Cost[2]	Lynn Canal Costs[4] @ 12.5%	Year of Life	Cost[2]	Lynn Canal Costs[4] @ 11.4%	Year of Life	Cost[2]	Lynn Canal Costs[4] @ 3.8%
2041	18			7			18			18		
2042	19			8			19			19		
2043	20	15,427	8,485	9			20	21,045	2,399	20	15,427	586
2044	21			10	31,306	3,913	21			21		
2045	22			11			22			22		
2046	23			12			23			23		
2047	24			13			24			24		
2048	25			14			25			25		
2049	26			15	12,679	1,585	26			26		
2050	27			16			27			27		
2051	28			17			28			28		
2052	29			18			29			29		
2053	30	87,369	48,053	19			30	111,654	12,729	30	87,369	3,320
2054	31			20	35,329	4,416	31			31		

Notes:

1. Malaspina is replaced by a Taku-equivalent vessel in 2024. A Taku-sized vessel will be a better match for the expected Alternative 1B summer day boat and other alternatives' winter mainline traffic the Malaspina would carry. Taku refurbishment costs are used for 2024 and later years.

2. Attachment D Rev A, JAI Marine Segments Technical Report, CWC Project 15018, Coastwise Corporation, March 2017. 2015 costs adjusted to 2016 costs using Bureau of Labor Statistics Producer Price Index for self-propelled ships, non-military.

3. Costs allocated to Lynn Canal are 55.0 percent based on Malaspina operation as a day boat in Lynn Canal during the summer season (22 weeks out of 40 weeks available annually for operation).

4. Costs allocated to Lynn Canal based on 2013 Northern Lynn Canal vessel operating days ratio to total vessel operating days. Ratios from Attachment A Rev B, JAI Marine Segments Technical Report, AMHS Mainline Operating Costs, Based on Lynn Canal Annual Operating Expenditures - 2013, CWC Project 12019, Coastwise Corporation, February 2017.

TABLE A-47

AMHS Vessel Replacement Costs
(2016 $000)

Vessel	Built	Retire	Construct	Cost[1]	Lynn Canal Service[1,2]	Lynn Canal Cost
Mainliner Service: 2019-24: all Alternatives; 2025-54: 1, 1B, 4A-D						
Taku	1963	2023	2022-23	194,147	3.8%	7,378
Matanuska	1963	2023	2022-23	250,711	11.4%	28,581
Columbia	1974	2034	2033-34	410,884	12.5%	51,361
Summer AUK-SGY Day Boat Service: 1B						
Malaspina	1963	2023	2022-23	194,147	55.0%	106,781

Notes:

1. Attachment B Rev A, Draft 8/24/16, *JAI Marine Segments Technical Report* , AMHS Vessel Replacement Costs, CWC Project 15018, Coastwise Corporation, August 2016. 2015 costs adjusted to 2016 costs using Bureau of Labor Statistics Producer Price Index for self-propelled ships, non-military. Malaspina replacement cost is estimated to be the same as the Taku. The Malaspina is larger than required for both summer Lynn Canal day boat service and winter mainline service.

2. Mainline service percentages from Attachment A Rev B, *JAI Marine Segments Technical Report* , AMHS Mainline Operating Costs, Based on Lynn Canal Annual Operating Expenditures - 2013, CWC Project 12019, Coastwise Corporation, February 2017.

TABLE A-48

AMHS Vessel Residual Values
New Vessels
(2016 $000)

Alternatives:	Removal 2024: 4A-B End of Study 2054: 1, 1B, 2B, 3, 4C-D				4A		4B		2B, 4A-D		3	
Number of Vessels:	one		one		two		two		one		one	
	Day Boat ACF-1 (53 ASV)		Day Boat ACF-2 (53 ASV)		Fast Vehicle Ferry-1 (31 ASV)		Fast Vehicle Ferry-2 (53 ASV)		HNS-SGY Shuttle (18 ASV)		HNS-SGY Shuttle (41 ASV)	
Fiscal Year	Year of Life	Value	Year of Life	Value	Year of Life	Value per vessel	Year of Life	Value per vessel	Year of Life	Value	Year of Life	Value
Construction Cost[1]:		69,213		69,213		90,980		108,805		24,816		53,906
2019	1											
2020	2		1									
2021	3		2									
2022	4		3									
2023	5		4									
2024	6	(62,292)	5	(63,445)								
2025	7		6		1		1		1		1	
2026	8		7		2		2		2		2	
2027	9		8		3		3		3		3	
2028	10		9		4		4		4		4	
2029	11		10		5		5		5		5	
2030	12		11		6		6		6		6	
2031	13		12		7		7		7		7	
2032	14		13		8		8		8		8	
2033	15		14		9		9		9		9	
2034	16		15		10		10		10		10	
2035	17		16		11		11		11		11	
2036	18		17		12		12		12		12	
2037	19		18		13		13		13		13	
2038	20		19		14		14		14		14	
2039	21		20		15		15		15		15	
2040	22		21		16		16		16		16	

TABLE A-48

AMHS Vessel Residual Values
New Vessels
(2016 $000)

Alternatives:	Removal 2024: 4A-B End of Study 2054: 1, 1B, 2B, 3, 4C-D		4A		4B		2B, 4A-D		3	
Number of Vessels:	one Day Boat ACF-1 (53 ASV)		one Day Boat ACF-2 (53 ASV)		two Fast Vehicle Ferry-1 (31 ASV)		two Fast Vehicle Ferry-2 (53 ASV)		one HNS-SGY Shuttle (18 ASV)		one HNS-SGY Shuttle (41 ASV)	
Fiscal Year	Year of Life	Value	Year of Life	Value	Year of Life	Value per vessel	Year of Life	Value per vessel	Year of Life	Value	Year of Life	Value
Construction Cost[1]:		69,213		69,213		90,980		108,805		24,816		53,906
2041	23		22		17		17		17		17	
2042	24		23		18		18		18		18	
2043	25		24		19		19		19		19	
2044	26		25		20		20		20		20	
2045	27		26		21		21		21		21	
2046	28		27		22		22		22		22	
2047	29		28		23		23		23		23	
2048	30		29		24		24		24		24	
2049	31		30		25		25		25		25	
2050	32		31		26		26		26		26	
2051	33		32		27		27		27		27	
2052	34		33		28		28		28		28	
2053	35		34		29		29		29		29	
2054	36	(27,685)	35	(28,839)	30	(5,686)	30	(6,800)	30	(12,408)	30	(26,953)

Notes:

1. Attachment D Rev A, JAI Marine Segments Technical Report, CWC Project 15018, Coastwise Corporation, March 2017. Estimates for Day Boats ACF-1 & 2 based on refurbishment costs as a percent of construction costs. 2015 costs adjusted to 2016 costs using Bureau of Labor Statistics Producer Price Index for self-propelled ships, non-military.

TABLE A-49

AMHS Vessel Residual Values
Existing Vessels & Replacements
(2016 $000)

Alternatives:	End of Study 2054: 1B			Mainline: Removal 2024: 2B, 3 End of Study 2054: 1, 1B, 4A-D								
	Malaspina[1]			Columbia			Matanuska			Taku		
	Year of Life	Cost[2]	Lynn Canal Value[3] @ 55.0%	Year of Life	Cost[2]	Lynn Canal Value[4] @ 12.5%	Year of Life	Cost[2]	Lynn Canal Value[4] @ 11.4%	Year of Life	Cost[2]	Lynn Canal Value[4] @ 3.8%
Construction Cost:		194,147	106,781		410,884	51,361		250,711	28,581		194,147	7,378
Fiscal Year												
2019	56			45			56			56		
2020	57			46			57			57		
2021	58			47			58			58		
2022	59			48			59			59		
2023	60			49			60			60		
2024	1			50		(8,560)	1		(28,105)	1		(7,255)
2025	2			51			2			2		
2026	3			52			3			3		
2027	4			53			4			4		
2028	5			54			5			5		
2029	6			55			6			6		
2030	7			56			7			7		
2031	8			57			8			8		
2032	9			58			9			9		
2033	10			59			10			10		
2034	11			60			11			11		
2035	12			1			12			12		
2036	13			2			13			13		
2037	14			3			14			14		
2038	15			4			15			15		
2039	16			5			16			16		
2040	17			6			17			17		

TABLE A-49

AMHS Vessel Residual Values
Existing Vessels & Replacements
(2016 $000)

Alternatives:	End of Study 2054: 1B			Mainline: Removal 2024: 2B, 3 End of Study 2054: 1, 1B, 4A-D								
	Malaspina[1]			Columbia			Matanuska			Taku		
	Year of Life	Cost[2]	Lynn Canal Value[3] @ 55.0%	Year of Life	Cost[2]	Lynn Canal Value[4] @ 12.5%	Year of Life	Cost[2]	Lynn Canal Value[4] @ 11.4%	Year of Life	Cost[2]	Lynn Canal Value[4] @ 3.8%
Construction Cost:		194,147	106,781		410,884	51,361		250,711	28,581		194,147	7,378
Fiscal Year												
2041	18			7			18			18		
2042	19			8			19			19		
2043	20			9			20			20		
2044	21			10			21			21		
2045	22			11			22			22		
2046	23			12			23			23		
2047	24			13			24			24		
2048	25			14			25			25		
2049	26			15			26			26		
2050	27			16			27			27		
2051	28			17			28			28		
2052	29			18			29			29		
2053	30			19			30			30		
2054	31		(51,611)	20		(34,240)	31		(13,814)	31		(3,566)

Notes:

1. Malaspina is replaced by a Taku-equivalent vessel in 2024. A Taku-sized vessel will be a better match for the expected Alternative 1B summer day boat traffic and other alternatives' winter mainline traffic that the Malaspina would carry. Taku replacement costs are used to figure residual value.

2. Attachment B Rev A, Draft 8/24/16, *JAI Marine Segments Technical Report* , AMHS Vessel Replacement Costs, CWC Project 15018, Coastwise Corporation, August 2016. 2015 costs adjusted to 2016 costs using Bureau of Labor Statistics Producer Price Index for self-propelled ships, non-military.

3. Costs allocated to Lynn Canal are 55.0 percent based on Malaspina operation as a day boat in Lynn Canal during the summer season (22 weeks out of 40 weeks available annually for operation).

4. Costs allocated to Lynn Canal based on 2013 Northern Lynn Canal vessel operating days ratio to total vessel operating days. Ratios from Attachment A Rev B, JAI Marine Segments Technical Report, AMHS Mainline Operating Costs, Based on Lynn Canal Annual Operating Expenditures - 2013, CWC Project 12019, Coastwise Corporation, February 2017.

TABLE A-50

Operating & Maintenance Costs
Alternative 1 - No Action
(2016 $000)

Fiscal Year	Road			AMHS				Road & AMHS		
									Present Value as of 7/1/18 @	
	Highway Maintenance	Avalanche Control	Total	Haines-Skagway Shuttle[1]	Lynn Canal[1]	Mainline[2]	Total	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2019			0	4,498	6,417	7,389	18,303	18,303	17,888	17,694
2020			0	4,498	6,417	7,389	18,303	18,303	17,085	16,537
2021			0	4,498	6,417	7,389	18,303	18,303	16,318	15,455
2022			0	4,498	6,417	7,389	18,303	18,303	15,585	14,444
2023			0	4,498	6,417	7,389	18,303	18,303	14,886	13,499
2024			0	4,498	6,417	7,389	18,303	18,303	14,217	12,616
2025			0	4,498	6,417	7,389	18,303	18,303	13,579	11,790
2026			0	4,498	6,417	7,389	18,303	18,303	12,970	11,019
2027			0	4,498	6,417	7,389	18,303	18,303	12,387	10,298
2028			0	4,498	6,417	7,389	18,303	18,303	11,831	9,625
2029			0	4,498	6,417	7,389	18,303	18,303	11,300	8,995
2030			0	4,498	6,417	7,389	18,303	18,303	10,793	8,406
2031			0	4,498	6,417	7,389	18,303	18,303	10,308	7,856
2032			0	4,498	6,417	7,389	18,303	18,303	9,846	7,343
2033			0	4,498	6,417	7,389	18,303	18,303	9,404	6,862
2034			0	4,498	6,417	7,389	18,303	18,303	8,982	6,413
2035			0	4,498	6,417	7,389	18,303	18,303	8,578	5,994
2036			0	4,498	6,417	7,389	18,303	18,303	8,193	5,602
2037			0	4,498	6,417	7,389	18,303	18,303	7,826	5,235
2038			0	4,498	6,417	7,389	18,303	18,303	7,474	4,893
2039			0	4,498	6,417	7,389	18,303	18,303	7,139	4,573
2040			0	4,498	6,417	7,389	18,303	18,303	6,818	4,273

TABLE A-50

Operating & Maintenance Costs
Alternative 1 - No Action
(2016 $000)

Fiscal Year	Road			AMHS				Road & AMHS		
									Present Value as of 7/1/18 @	
	Highway Maintenance	Avalanche Control	Total	Haines-Skagway Shuttle[1]	Lynn Canal[1]	Mainline[2]	Total	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2041			0	4,498	6,417	7,389	18,303	18,303	6,512	3,994
2042			0	4,498	6,417	7,389	18,303	18,303	6,220	3,733
2043			0	4,498	6,417	7,389	18,303	18,303	5,941	3,488
2044			0	4,498	6,417	7,389	18,303	18,303	5,674	3,260
2045			0	4,498	6,417	7,389	18,303	18,303	5,419	3,047
2046			0	4,498	6,417	7,389	18,303	18,303	5,176	2,848
2047			0	4,498	6,417	7,389	18,303	18,303	4,944	2,661
2048			0	4,498	6,417	7,389	18,303	18,303	4,722	2,487
2049			0	4,498	6,417	7,389	18,303	18,303	4,510	2,324
2050			0	4,498	6,417	7,389	18,303	18,303	4,307	2,172
2051			0	4,498	6,417	7,389	18,303	18,303	4,114	2,030
2052			0	4,498	6,417	7,389	18,303	18,303	3,929	1,897
2053			0	4,498	6,417	7,389	18,303	18,303	3,753	1,773
2054	0	0	0	4,498	6,417	7,389	18,303	18,303	3,584	1,657
Total	0	0	0	161,923	230,994	265,997	658,914	658,914	322,211	246,795

Notes:

1. Attachment C - Revision A, JAI Marine Segments Technical Report, CWC Project 15018, Coastwise Corporation, March 2017. Haines-Skagway Shuttle and Lynn Canal non-fuel expenses adjusted to 2016 $ by 0.42 percent 2015 to 2016 change in Anchorage CPI-U.

2. 2013 dollar costs, in tenths of millions of dollars, from Attachment A Rev B, JAI Marine Segments Technical Report, CWC Project 12019, Coastwise Corporation, February 2017, with supplemental precision from Attachment C - Revision A, JAI Marine Segments Technical Report, Coastwise Corporation, Draft 11/30/16 ("MarSegs Alternatives Summaries.pdf", attached to January 6, 2017 email from Jason R. Bluhm, Alaska Department of Transportation & Public Facilities, to Jim Calvin, McDowell Group, RE: data needs). Non-fuel expenses adjusted to 2016 $ by 2.57 percent 2013 to 2016 change in Anchorage CPI-U.

TABLE A-51

Operating & Maintenance Costs
Alternative 1B - Enhanced Service
(2016 $000)

	Road			AMHS				Road & AMHS		
									Present Value as of 7/1/18 @	
Fiscal Year	Highway Maintenance	Avalanche Control	Total	Haines-Skagway Shuttle[1]	Lynn Canal[1]	Mainline[2]	Total	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2019			0	4,498	14,718	7,389	26,605	26,605	26,001	25,720
2020			0	4,498	14,718	7,389	26,605	26,605	24,833	24,037
2021			0	4,498	14,718	7,389	26,605	26,605	23,719	22,465
2022			0	4,498	14,718	7,389	26,605	26,605	22,654	20,995
2023			0	4,498	14,718	7,389	26,605	26,605	21,637	19,621
2024			0	4,498	14,718	7,389	26,605	26,605	20,666	18,338
2025			0	4,498	14,718	7,389	26,605	26,605	19,738	17,138
2026			0	4,498	14,718	7,389	26,605	26,605	18,852	16,017
2027			0	4,498	14,718	7,389	26,605	26,605	18,006	14,969
2028			0	4,498	14,718	7,389	26,605	26,605	17,197	13,990
2029			0	4,498	14,718	7,389	26,605	26,605	16,425	13,075
2030			0	4,498	14,718	7,389	26,605	26,605	15,688	12,219
2031			0	4,498	14,718	7,389	26,605	26,605	14,984	11,420
2032			0	4,498	14,718	7,389	26,605	26,605	14,311	10,673
2033			0	4,498	14,718	7,389	26,605	26,605	13,669	9,975
2034			0	4,498	14,718	7,389	26,605	26,605	13,055	9,322
2035			0	4,498	14,718	7,389	26,605	26,605	12,469	8,712
2036			0	4,498	14,718	7,389	26,605	26,605	11,909	8,142
2037			0	4,498	14,718	7,389	26,605	26,605	11,375	7,610
2038			0	4,498	14,718	7,389	26,605	26,605	10,864	7,112
2039			0	4,498	14,718	7,389	26,605	26,605	10,376	6,646
2040			0	4,498	14,718	7,389	26,605	26,605	9,911	6,212

TABLE A-51

Operating & Maintenance Costs
Alternative 1B - Enhanced Service
(2016 $000)

	Road			AMHS				Road & AMHS		
									Present Value as of 7/1/18 @	
Fiscal Year	Highway Maintenance	Avalanche Control	Total	Haines-Skagway Shuttle[1]	Lynn Canal[1]	Mainline[2]	Total	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2041			0	4,498	14,718	7,389	26,605	26,605	9,466	5,805
2042			0	4,498	14,718	7,389	26,605	26,605	9,041	5,425
2043			0	4,498	14,718	7,389	26,605	26,605	8,635	5,071
2044			0	4,498	14,718	7,389	26,605	26,605	8,247	4,739
2045			0	4,498	14,718	7,389	26,605	26,605	7,877	4,429
2046			0	4,498	14,718	7,389	26,605	26,605	7,524	4,139
2047			0	4,498	14,718	7,389	26,605	26,605	7,186	3,868
2048			0	4,498	14,718	7,389	26,605	26,605	6,863	3,615
2049			0	4,498	14,718	7,389	26,605	26,605	6,555	3,379
2050			0	4,498	14,718	7,389	26,605	26,605	6,261	3,158
2051			0	4,498	14,718	7,389	26,605	26,605	5,980	2,951
2052			0	4,498	14,718	7,389	26,605	26,605	5,711	2,758
2053			0	4,498	14,718	7,389	26,605	26,605	5,455	2,578
2054	0	0	0	4,498	14,718	7,389	26,605	26,605	5,210	2,409
Total	0	0	0	161,923	529,846	265,997	957,766	957,766	468,351	358,729

Notes:

1. Attachment C - Revision A, JAI Marine Segments Technical Report, CWC Project 15018, Coastwise Corporation, March 2017. Haines-Skagway Shuttle and Lynn Canal non-fuel expenses adjusted to 2016 $ by 0.42 percent 2015 to 2016 change in Anchorage CPI-U.

2. 2013 dollar costs, in tenths of millions of dollars, from Attachment A Rev B, JAI Marine Segments Technical Report, CWC Project 12019, Coastwise Corporation, February 2017, with supplemental precision from Attachment C - Revision A, JAI Marine Segments Technical Report, Coastwise Corporation, Draft 11/30/16 ("MarSegs Alternatives Summaries.pdf", attached to January 6, 2017 email from Jason R. Bluhm, Alaska Department of Transportation & Public Facilities, to Jim Calvin, McDowell Group, RE: data needs). Non-fuel expenses adjusted to 2016 $ by 2.57 percent 2013 to 2016 change in Anchorage CPI-U.

TABLE A-52

Operating & Maintenance Costs
Alternative 2B - East Lynn Highway
(2016 $000)

Fiscal Year	Road[1]			AMHS				Road & AMHS	Road & AMHS Present Value as of 7/1/18 @	
	Highway Maintenance	Avalanche Control	Total	Haines-Skagway Shuttle[2]	Lynn Canal[2]	Mainline[3]	Total	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2019			0	4,498	6,417	7,389	18,303	18,303	17,888	17,694
2020			0	4,498	6,417	7,389	18,303	18,303	17,085	16,537
2021			0	4,498	6,417	7,389	18,303	18,303	16,318	15,455
2022			0	4,498	6,417	7,389	18,303	18,303	15,585	14,444
2023			0	4,498	6,417	7,389	18,303	18,303	14,886	13,499
2024			0	4,498	6,417	7,389	18,303	18,303	14,217	12,616
2025	969	1,459	2,427	1,494	17,092		18,587	21,014	15,590	13,537
2026	969	1,459	2,427	1,494	17,092		18,587	21,014	14,890	12,651
2027	969	1,459	2,427	1,494	17,092		18,587	21,014	14,222	11,823
2028	969	1,459	2,427	1,494	17,092		18,587	21,014	13,584	11,050
2029	969	1,459	2,427	1,494	17,092		18,587	21,014	12,974	10,327
2030	969	1,459	2,427	1,494	17,092		18,587	21,014	12,391	9,651
2031	969	1,459	2,427	1,494	17,092		18,587	21,014	11,835	9,020
2032	969	1,459	2,427	1,494	17,092		18,587	21,014	11,304	8,430
2033	969	1,459	2,427	1,494	17,092		18,587	21,014	10,796	7,878
2034	969	1,459	2,427	1,494	17,092		18,587	21,014	10,312	7,363
2035	969	1,459	2,427	1,494	17,092		18,587	21,014	9,849	6,881
2036	969	1,459	2,427	1,494	17,092		18,587	21,014	9,407	6,431
2037	969	1,459	2,427	1,494	17,092		18,587	21,014	8,984	6,010
2038	969	1,459	2,427	1,494	17,092		18,587	21,014	8,581	5,617
2039	969	1,459	2,427	1,494	17,092		18,587	21,014	8,196	5,250
2040	969	1,459	2,427	1,494	17,092		18,587	21,014	7,828	4,906

TABLE A-52

Operating & Maintenance Costs
Alternative 2B - East Lynn Highway
(2016 $000)

	Road[1]			AMHS				Road & AMHS		
									Present Value as of 7/1/18 @	
Fiscal Year	Highway Maintenance	Avalanche Control	Total	Haines-Skagway Shuttle[2]	Lynn Canal[2]	Mainline[3]	Total	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2041	969	1,459	2,427	1,494	17,092		18,587	21,014	7,477	4,585
2042	969	1,459	2,427	1,494	17,092		18,587	21,014	7,141	4,285
2043	969	1,459	2,427	1,494	17,092		18,587	21,014	6,820	4,005
2044	969	1,459	2,427	1,494	17,092		18,587	21,014	6,514	3,743
2045	969	1,459	2,427	1,494	17,092		18,587	21,014	6,222	3,498
2046	969	1,459	2,427	1,494	17,092		18,587	21,014	5,943	3,269
2047	969	1,459	2,427	1,494	17,092		18,587	21,014	5,676	3,055
2048	969	1,459	2,427	1,494	17,092		18,587	21,014	5,421	2,856
2049	969	1,459	2,427	1,494	17,092		18,587	21,014	5,178	2,669
2050	969	1,459	2,427	1,494	17,092		18,587	21,014	4,945	2,494
2051	969	1,459	2,427	1,494	17,092		18,587	21,014	4,723	2,331
2052	969	1,459	2,427	1,494	17,092		18,587	21,014	4,511	2,178
2053	969	1,459	2,427	1,494	17,092		18,587	21,014	4,309	2,036
2054	969	1,459	2,427	1,494	17,092	0	18,587	21,014	4,115	1,903
Total	29,056	43,762	72,818	71,821	551,265	44,333	667,418	740,235	355,717	269,980

Notes:

1. "Hwy and Avalanche Maintence (sic) Estimate.xlsx", attached to January 6, 2017 email from Jason R. Bluhm, Alaska Department of Transportation & Public Facilities, to Jim Calvin, McDowell Group, RE: data needs.

2. Attachment C - Revision A, JAI Marine Segments Technical Report, CWC Project 15018, Coastwise Corporation, March 2017. Haines-Skagway Shuttle and Lynn Canal non-fuel expenses adjusted to 2016 $ by 0.42 percent 2015 to 2016 change in Anchorage CPI-U.

3. 2013 dollar costs, in tenths of millions of dollars, from Attachment A Rev B, JAI Marine Segments Technical Report, CWC Project 12019, Coastwise Corporation, February 2017, with supplemental precision from Attachment C - Revision A, JAI Marine Segments Technical Report, Coastwise Corporation, Draft 11/30/16 ("MarSegs Alternatives Summaries.pdf", attached to January 6, 2017 email from Jason R. Bluhm, Alaska Department of Transportation & Public Facilities, to Jim Calvin, McDowell Group, RE: data needs). Non-fuel expenses adjusted to 2016 $ by 2.57 percent 2013 to 2016 change in Anchorage CPI-U.

TABLE A-53

Operating & Maintenance Costs
Alternative 3 - West Lynn Highway
(2016 $000)

	Road[1]			AMHS				Road & AMHS		
									Present Value as of 7/1/18 @	
Fiscal Year	Highway Maintenance	Avalanche Control	Total	Haines-Skagway Shuttle[2]	Lynn Canal[2]	Mainline[3]	Total	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2019			0	4,498	6,417	7,389	18,303	18,303	17,888	17,694
2020			0	4,498	6,417	7,389	18,303	18,303	17,085	16,537
2021			0	4,498	6,417	7,389	18,303	18,303	16,318	15,455
2022			0	4,498	6,417	7,389	18,303	18,303	15,585	14,444
2023			0	4,498	6,417	7,389	18,303	18,303	14,886	13,499
2024			0	4,498	6,417	7,389	18,303	18,303	14,217	12,616
2025	909	1,257	2,166	7,401	12,580		19,981	22,147	16,431	14,267
2026	909	1,257	2,166	7,401	12,580		19,981	22,147	15,694	13,334
2027	909	1,257	2,166	7,401	12,580		19,981	22,147	14,989	12,461
2028	909	1,257	2,166	7,401	12,580		19,981	22,147	14,316	11,646
2029	909	1,257	2,166	7,401	12,580		19,981	22,147	13,674	10,884
2030	909	1,257	2,166	7,401	12,580		19,981	22,147	13,060	10,172
2031	909	1,257	2,166	7,401	12,580		19,981	22,147	12,474	9,507
2032	909	1,257	2,166	7,401	12,580		19,981	22,147	11,914	8,885
2033	909	1,257	2,166	7,401	12,580		19,981	22,147	11,379	8,303
2034	909	1,257	2,166	7,401	12,580		19,981	22,147	10,868	7,760
2035	909	1,257	2,166	7,401	12,580		19,981	22,147	10,380	7,253
2036	909	1,257	2,166	7,401	12,580		19,981	22,147	9,914	6,778
2037	909	1,257	2,166	7,401	12,580		19,981	22,147	9,469	6,335
2038	909	1,257	2,166	7,401	12,580		19,981	22,147	9,044	5,920
2039	909	1,257	2,166	7,401	12,580		19,981	22,147	8,638	5,533
2040	909	1,257	2,166	7,401	12,580		19,981	22,147	8,250	5,171

TABLE A-53

Operating & Maintenance Costs
Alternative 3 - West Lynn Highway
(2016 $000)

	Road[1]			AMHS				Road & AMHS		
									Present Value as of 7/1/18 @	
Fiscal Year	Highway Maintenance	Avalanche Control	Total	Haines-Skagway Shuttle[2]	Lynn Canal[2]	Mainline[3]	Total	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2041	909	1,257	2,166	7,401	12,580		19,981	22,147	7,880	4,833
2042	909	1,257	2,166	7,401	12,580		19,981	22,147	7,526	4,517
2043	909	1,257	2,166	7,401	12,580		19,981	22,147	7,188	4,221
2044	909	1,257	2,166	7,401	12,580		19,981	22,147	6,866	3,945
2045	909	1,257	2,166	7,401	12,580		19,981	22,147	6,557	3,687
2046	909	1,257	2,166	7,401	12,580		19,981	22,147	6,263	3,446
2047	909	1,257	2,166	7,401	12,580		19,981	22,147	5,982	3,220
2048	909	1,257	2,166	7,401	12,580		19,981	22,147	5,713	3,010
2049	909	1,257	2,166	7,401	12,580		19,981	22,147	5,457	2,813
2050	909	1,257	2,166	7,401	12,580		19,981	22,147	5,212	2,629
2051	909	1,257	2,166	7,401	12,580		19,981	22,147	4,978	2,457
2052	909	1,257	2,166	7,401	12,580		19,981	22,147	4,755	2,296
2053	909	1,257	2,166	7,401	12,580		19,981	22,147	4,541	2,146
2054	909	1,257	2,166	7,401	12,580	0	19,981	22,147	4,337	2,005
Total	27,268	37,724	64,992	249,004	415,912	44,333	709,249	774,241	369,727	279,675

Notes:

1. "Hwy and Avalanche Maintence (sic) Estimate.xlsx", attached to January 6, 2017 email from Jason R. Bluhm, Alaska Department of Transportation & Public Facilities, to Jim Calvin, McDowell Group, RE: data needs.

2. Attachment C - Revision A, JAI Marine Segments Technical Report, CWC Project 15018, Coastwise Corporation, March 2017. Haines-Skagway Shuttle and Lynn Canal non-fuel expenses adjusted to 2016 $ by 0.42 percent 2015 to 2016 change in Anchorage CPI-U.

3. 2013 dollar costs, in tenths of millions of dollars, from Attachment A Rev B, JAI Marine Segments Technical Report, CWC Project 12019, Coastwise Corporation, February 2017, with supplemental precision from Attachment C - Revision A, JAI Marine Segments Technical Report, Coastwise Corporation, Draft 11/30/16 ("MarSegs Alternatives Summaries.pdf", attached to January 6, 2017 email from Jason R. Bluhm, Alaska Department of Transportation & Public Facilities, to Jim Calvin, McDowell Group, RE: data needs). Non-fuel expenses adjusted to 2016 $ by 2.57 percent 2013 to 2016 change in Anchorage CPI-U.

TABLE A-54

Operating & Maintenance Costs
Alternative 4A - Fast Ferry Auke Bay
(2016 $000)

	Road			AMHS				Road & AMHS		
									Present Value as of 7/1/18 @	
Fiscal Year	Highway Maintenance	Avalanche Control	Total	Haines-Skagway Shuttle[1]	Lynn Canal[1]	Mainline[2]	Total	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2019			0	4,498	6,417	7,389	18,303	18,303	17,888	17,694
2020			0	4,498	6,417	7,389	18,303	18,303	17,085	16,537
2021			0	4,498	6,417	7,389	18,303	18,303	16,318	15,455
2022			0	4,498	6,417	7,389	18,303	18,303	15,585	14,444
2023			0	4,498	6,417	7,389	18,303	18,303	14,886	13,499
2024			0	4,498	6,417	7,389	18,303	18,303	14,217	12,616
2025			0	2,270	24,170	7,389	33,830	33,830	25,098	21,792
2026			0	2,270	24,170	7,389	33,830	33,830	23,972	20,367
2027			0	2,270	24,170	7,389	33,830	33,830	22,895	19,034
2028			0	2,270	24,170	7,389	33,830	33,830	21,868	17,789
2029			0	2,270	24,170	7,389	33,830	33,830	20,886	16,625
2030			0	2,270	24,170	7,389	33,830	33,830	19,948	15,538
2031			0	2,270	24,170	7,389	33,830	33,830	19,053	14,521
2032			0	2,270	24,170	7,389	33,830	33,830	18,198	13,571
2033			0	2,270	24,170	7,389	33,830	33,830	17,381	12,683
2034			0	2,270	24,170	7,389	33,830	33,830	16,601	11,854
2035			0	2,270	24,170	7,389	33,830	33,830	15,855	11,078
2036			0	2,270	24,170	7,389	33,830	33,830	15,144	10,353
2037			0	2,270	24,170	7,389	33,830	33,830	14,464	9,676
2038			0	2,270	24,170	7,389	33,830	33,830	13,815	9,043
2039			0	2,270	24,170	7,389	33,830	33,830	13,194	8,451
2040			0	2,270	24,170	7,389	33,830	33,830	12,602	7,899

TABLE A-54

Operating & Maintenance Costs
Alternative 4A - Fast Ferry Auke Bay
(2016 $000)

Fiscal Year	Road			AMHS				Road & AMHS		
									Present Value as of 7/1/18 @	
	Highway Maintenance	Avalanche Control	Total	Haines-Skagway Shuttle[1]	Lynn Canal[1]	Mainline[2]	Total	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2041			0	2,270	24,170	7,389	33,830	33,830	12,036	7,382
2042			0	2,270	24,170	7,389	33,830	33,830	11,496	6,899
2043			0	2,270	24,170	7,389	33,830	33,830	10,980	6,448
2044			0	2,270	24,170	7,389	33,830	33,830	10,487	6,026
2045			0	2,270	24,170	7,389	33,830	33,830	10,016	5,632
2046			0	2,270	24,170	7,389	33,830	33,830	9,567	5,263
2047			0	2,270	24,170	7,389	33,830	33,830	9,137	4,919
2048			0	2,270	24,170	7,389	33,830	33,830	8,727	4,597
2049			0	2,270	24,170	7,389	33,830	33,830	8,335	4,296
2050			0	2,270	24,170	7,389	33,830	33,830	7,961	4,015
2051			0	2,270	24,170	7,389	33,830	33,830	7,604	3,753
2052			0	2,270	24,170	7,389	33,830	33,830	7,262	3,507
2053			0	2,270	24,170	7,389	33,830	33,830	6,936	3,278
2054	0	0	0	2,270	24,170	7,389	33,830	33,830	6,625	3,063
Total	0	0	0	95,096	763,613	265,997	1,124,706	1,124,706	514,123	379,595

Notes:

1. Attachment C - Revision A, JAI Marine Segments Technical Report, CWC Project 15018, Coastwise Corporation, March 2017. Haines-Skagway Shuttle and Lynn Canal non-fuel expenses adjusted to 2016 $ by 0.42 percent 2015 to 2016 change in Anchorage CPI-U.

2. 2013 dollar costs, in tenths of millions of dollars, from Attachment A Rev B, JAI Marine Segments Technical Report, CWC Project 12019, Coastwise Corporation, February 2017, with supplemental precision from Attachment C - Revision A, JAI Marine Segments Technical Report, Coastwise Corporation, Draft 11/30/16 ("MarSegs Alternatives Summaries.pdf", attached to January 6, 2017 email from Jason R. Bluhm, Alaska Department of Transportation & Public Facilities, to Jim Calvin, McDowell Group, RE: data needs). Non-fuel expenses adjusted to 2016 $ by 2.57 percent 2013 to 2016 change in Anchorage CPI-U.

TABLE A-55

Operating & Maintenance Costs
Alternative 4B - Fast Ferry Berners Bay
(2016 $000)

	Road[1]			AMHS				Road & AMHS		
									Present Value as of 7/1/18 @	
Fiscal Year	Highway Maintenance	Avalanche Control	Total	Haines-Skagway Shuttle[2]	Lynn Canal[2]	Mainline[3]	Total	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2019			0	4,498	6,417	7,389	18,303	18,303	17,888	17,694
2020			0	4,498	6,417	7,389	18,303	18,303	17,085	16,537
2021			0	4,498	6,417	7,389	18,303	18,303	16,318	15,455
2022			0	4,498	6,417	7,389	18,303	18,303	15,585	14,444
2023			0	4,498	6,417	7,389	18,303	18,303	14,886	13,499
2024			0	4,498	6,417	7,389	18,303	18,303	14,217	12,616
2025	18		18	2,373	23,565	7,389	33,327	33,345	24,739	21,480
2026	18		18	2,373	23,565	7,389	33,327	33,345	23,628	20,075
2027	18		18	2,373	23,565	7,389	33,327	33,345	22,568	18,762
2028	18		18	2,373	23,565	7,389	33,327	33,345	21,555	17,534
2029	18		18	2,373	23,565	7,389	33,327	33,345	20,587	16,387
2030	18		18	2,373	23,565	7,389	33,327	33,345	19,663	15,315
2031	18		18	2,373	23,565	7,389	33,327	33,345	18,780	14,313
2032	18		18	2,373	23,565	7,389	33,327	33,345	17,937	13,377
2033	18		18	2,373	23,565	7,389	33,327	33,345	17,132	12,502
2034	18		18	2,373	23,565	7,389	33,327	33,345	16,363	11,684
2035	18		18	2,373	23,565	7,389	33,327	33,345	15,628	10,919
2036	18		18	2,373	23,565	7,389	33,327	33,345	14,927	10,205
2037	18		18	2,373	23,565	7,389	33,327	33,345	14,257	9,537
2038	18		18	2,373	23,565	7,389	33,327	33,345	13,617	8,914
2039	18		18	2,373	23,565	7,389	33,327	33,345	13,005	8,330
2040	18		18	2,373	23,565	7,389	33,327	33,345	12,422	7,785

TABLE A-55

Operating & Maintenance Costs
Alternative 4B - Fast Ferry Berners Bay
(2016 $000)

	Road[1]			AMHS				Road & AMHS		
									Present Value as of 7/1/18 @	
Fiscal Year	Highway Maintenance	Avalanche Control	Total	Haines-Skagway Shuttle[2]	Lynn Canal[2]	Mainline[3]	Total	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2041	18		18	2,373	23,565	7,389	33,327	33,345	11,864	7,276
2042	18		18	2,373	23,565	7,389	33,327	33,345	11,331	6,800
2043	18		18	2,373	23,565	7,389	33,327	33,345	10,823	6,355
2044	18		18	2,373	23,565	7,389	33,327	33,345	10,337	5,939
2045	18		18	2,373	23,565	7,389	33,327	33,345	9,873	5,551
2046	18		18	2,373	23,565	7,389	33,327	33,345	9,430	5,188
2047	18		18	2,373	23,565	7,389	33,327	33,345	9,006	4,848
2048	18		18	2,373	23,565	7,389	33,327	33,345	8,602	4,531
2049	18		18	2,373	23,565	7,389	33,327	33,345	8,216	4,235
2050	18		18	2,373	23,565	7,389	33,327	33,345	7,847	3,958
2051	18		18	2,373	23,565	7,389	33,327	33,345	7,495	3,699
2052	18		18	2,373	23,565	7,389	33,327	33,345	7,158	3,457
2053	18		18	2,373	23,565	7,389	33,327	33,345	6,837	3,231
2054	18	0	18	2,373	23,565	7,389	33,327	33,345	6,530	3,019
Total	542	0	542	98,179	745,457	265,997	1,109,633	1,110,176	508,136	375,452

Notes:

1. "Hwy and Avalanche Maintence (sic) Estimate.xlsx", attached to January 6, 2017 email from Jason R. Bluhm, Alaska Department of Transportation & Public Facilities, to Jim Calvin, McDowell Group, RE: data needs.

2. Attachment C - Revision A, JAI Marine Segments Technical Report, CWC Project 15018, Coastwise Corporation, March 2017. Haines-Skagway Shuttle and Lynn Canal non-fuel expenses adjusted to 2016 $ by 0.42 percent 2015 to 2016 change in Anchorage CPI-U.

3. 2013 dollar costs, in tenths of millions of dollars, from Attachment A Rev B, JAI Marine Segments Technical Report, CWC Project 12019, Coastwise Corporation, February 2017, with supplemental precision from Attachment C - Revision A, JAI Marine Segments Technical Report, Coastwise Corporation, Draft 11/30/16 ("MarSegs Alternatives Summaries.pdf", attached to January 6, 2017 email from Jason R. Bluhm, Alaska Department of Transportation & Public Facilities, to Jim Calvin, McDowell Group, RE: data needs). Non-fuel expenses adjusted to 2016 $ by 2.57 percent 2013 to 2016 change in Anchorage CPI-U.

TABLE A-56

Operating & Maintenance Costs
Alternative 4C - Monohull Auke Bay
(2016 $000)

	Road			AMHS				Road & AMHS		
									Present Value as of 7/1/18 @	
Fiscal Year	Highway Maintenance	Avalanche Control	Total	Haines-Skagway Shuttle[1]	Lynn Canal[1]	Mainline[2]	Total	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2019			0	4,498	6,417	7,389	18,303	18,303	17,888	17,694
2020			0	4,498	6,417	7,389	18,303	18,303	17,085	16,537
2021			0	4,498	6,417	7,389	18,303	18,303	16,318	15,455
2022			0	4,498	6,417	7,389	18,303	18,303	15,585	14,444
2023			0	4,498	6,417	7,389	18,303	18,303	14,886	13,499
2024			0	4,498	6,417	7,389	18,303	18,303	14,217	12,616
2025			0	2,270	13,105	7,389	22,764	22,764	16,889	14,664
2026			0	2,270	13,105	7,389	22,764	22,764	16,131	13,705
2027			0	2,270	13,105	7,389	22,764	22,764	15,407	12,808
2028			0	2,270	13,105	7,389	22,764	22,764	14,715	11,970
2029			0	2,270	13,105	7,389	22,764	22,764	14,054	11,187
2030			0	2,270	13,105	7,389	22,764	22,764	13,424	10,455
2031			0	2,270	13,105	7,389	22,764	22,764	12,821	9,771
2032			0	2,270	13,105	7,389	22,764	22,764	12,245	9,132
2033			0	2,270	13,105	7,389	22,764	22,764	11,696	8,535
2034			0	2,270	13,105	7,389	22,764	22,764	11,171	7,976
2035			0	2,270	13,105	7,389	22,764	22,764	10,669	7,455
2036			0	2,270	13,105	7,389	22,764	22,764	10,190	6,967
2037			0	2,270	13,105	7,389	22,764	22,764	9,733	6,511
2038			0	2,270	13,105	7,389	22,764	22,764	9,296	6,085
2039			0	2,270	13,105	7,389	22,764	22,764	8,879	5,687
2040			0	2,270	13,105	7,389	22,764	22,764	8,480	5,315

TABLE A-56

Operating & Maintenance Costs
Alternative 4C - Monohull Auke Bay
(2016 $000)

	Road			AMHS				Road & AMHS		
									Present Value as of 7/1/18 @	
Fiscal Year	Highway Maintenance	Avalanche Control	Total	Haines-Skagway Shuttle[1]	Lynn Canal[1]	Mainline[2]	Total	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2041			0	2,270	13,105	7,389	22,764	22,764	8,099	4,967
2042			0	2,270	13,105	7,389	22,764	22,764	7,736	4,642
2043			0	2,270	13,105	7,389	22,764	22,764	7,389	4,339
2044			0	2,270	13,105	7,389	22,764	22,764	7,057	4,055
2045			0	2,270	13,105	7,389	22,764	22,764	6,740	3,790
2046			0	2,270	13,105	7,389	22,764	22,764	6,438	3,542
2047			0	2,270	13,105	7,389	22,764	22,764	6,149	3,310
2048			0	2,270	13,105	7,389	22,764	22,764	5,873	3,093
2049			0	2,270	13,105	7,389	22,764	22,764	5,609	2,891
2050			0	2,270	13,105	7,389	22,764	22,764	5,357	2,702
2051			0	2,270	13,105	7,389	22,764	22,764	5,117	2,525
2052			0	2,270	13,105	7,389	22,764	22,764	4,887	2,360
2053			0	2,270	13,105	7,389	22,764	22,764	4,668	2,206
2054	0	0	0	2,270	13,105	7,389	22,764	22,764	4,458	2,061
Total	0	0	0	95,096	431,653	265,997	792,746	792,746	377,351	284,951

Notes:

1. Attachment C - Revision A, JAI Marine Segments Technical Report, CWC Project 15018, Coastwise Corporation, March 2017. Haines-Skagway Shuttle and Lynn Canal non-fuel expenses adjusted to 2016 $ by 0.42 percent 2015 to 2016 change in Anchorage CPI-U.

2. 2013 dollar costs, in tenths of millions of dollars, from Attachment A Rev B, JAI Marine Segments Technical Report, CWC Project 12019, Coastwise Corporation, February 2017, with supplemental precision from Attachment C - Revision A, JAI Marine Segments Technical Report, Coastwise Corporation, Draft 11/30/16 ("MarSegs Alternatives Summaries.pdf", attached to January 6, 2017 email from Jason R. Bluhm, Alaska Department of Transportation & Public Facilities, to Jim Calvin, McDowell Group, RE: data needs). Non-fuel expenses adjusted to 2016 $ by 2.57 percent 2013 to 2016 change in Anchorage CPI-U.

TABLE A-57

Operating & Maintenance Costs
Alternative 4D - Monohull Berners Bay
(2016 $000)

	Road[1]			AMHS				Road & AMHS		
									Present Value as of 7/1/18 @	
Fiscal Year	Highway Maintenance	Avalanche Control	Total	Haines-Skagway Shuttle[2]	Lynn Canal[2]	Mainline[3]	Total	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2019			0	4,498	6,417	7,389	18,303	18,303	17,888	17,694
2020			0	4,498	6,417	7,389	18,303	18,303	17,085	16,537
2021			0	4,498	6,417	7,389	18,303	18,303	16,318	15,455
2022			0	4,498	6,417	7,389	18,303	18,303	15,585	14,444
2023			0	4,498	6,417	7,389	18,303	18,303	14,886	13,499
2024			0	4,498	6,417	7,389	18,303	18,303	14,217	12,616
2025	18		18	2,373	14,548	7,389	24,310	24,328	18,049	15,671
2026	18		18	2,373	14,548	7,389	24,310	24,328	17,239	14,646
2027	18		18	2,373	14,548	7,389	24,310	24,328	16,465	13,688
2028	18		18	2,373	14,548	7,389	24,310	24,328	15,726	12,793
2029	18		18	2,373	14,548	7,389	24,310	24,328	15,020	11,956
2030	18		18	2,373	14,548	7,389	24,310	24,328	14,345	11,173
2031	18		18	2,373	14,548	7,389	24,310	24,328	13,702	10,443
2032	18		18	2,373	14,548	7,389	24,310	24,328	13,086	9,759
2033	18		18	2,373	14,548	7,389	24,310	24,328	12,499	9,121
2034	18		18	2,373	14,548	7,389	24,310	24,328	11,938	8,524
2035	18		18	2,373	14,548	7,389	24,310	24,328	11,402	7,967
2036	18		18	2,373	14,548	7,389	24,310	24,328	10,890	7,445
2037	18		18	2,373	14,548	7,389	24,310	24,328	10,401	6,958
2038	18		18	2,373	14,548	7,389	24,310	24,328	9,934	6,503
2039	18		18	2,373	14,548	7,389	24,310	24,328	9,488	6,078
2040	18		18	2,373	14,548	7,389	24,310	24,328	9,063	5,680

TABLE A-57

Operating & Maintenance Costs
Alternative 4D - Monohull Berners Bay
(2016 $000)

	Road[1]			AMHS				Road & AMHS		
									Present Value as of 7/1/18 @	
Fiscal Year	Highway Maintenance	Avalanche Control	Total	Haines-Skagway Shuttle[2]	Lynn Canal[2]	Mainline[3]	Total	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2041	18		18	2,373	14,548	7,389	24,310	24,328	8,656	5,308
2042	18		18	2,373	14,548	7,389	24,310	24,328	8,267	4,961
2043	18		18	2,373	14,548	7,389	24,310	24,328	7,896	4,637
2044	18		18	2,373	14,548	7,389	24,310	24,328	7,542	4,333
2045	18		18	2,373	14,548	7,389	24,310	24,328	7,203	4,050
2046	18		18	2,373	14,548	7,389	24,310	24,328	6,880	3,785
2047	18		18	2,373	14,548	7,389	24,310	24,328	6,571	3,537
2048	18		18	2,373	14,548	7,389	24,310	24,328	6,276	3,306
2049	18		18	2,373	14,548	7,389	24,310	24,328	5,994	3,090
2050	18		18	2,373	14,548	7,389	24,310	24,328	5,725	2,887
2051	18		18	2,373	14,548	7,389	24,310	24,328	5,468	2,699
2052	18		18	2,373	14,548	7,389	24,310	24,328	5,223	2,522
2053	18		18	2,373	14,548	7,389	24,310	24,328	4,988	2,357
2054	18	0	18	2,373	14,548	7,389	24,310	24,328	4,764	2,203
Total	542	0	542	98,179	474,933	265,997	839,109	839,652	396,677	298,324

Notes:

1. "Hwy and Avalanche Maintence (sic) Estimate.xlsx", attached to January 6, 2017 email from Jason R. Bluhm, Alaska Department of Transportation & Public Facilities, to Jim Calvin, McDowell Group, RE: data needs.

2. Attachment C - Revision A, JAI Marine Segments Technical Report, CWC Project 15018, Coastwise Corporation, March 2017. Haines-Skagway Shuttle and Lynn Canal non-fuel expenses adjusted to 2016 $ by 0.42 percent 2015 to 2016 change in Anchorage CPI-U.

3. 2013 dollar costs, in tenths of millions of dollars, from Attachment A Rev B, JAI Marine Segments Technical Report, CWC Project 12019, Coastwise Corporation, February 2017, with supplemental precision from Attachment C - Revision A, JAI Marine Segments Technical Report, Coastwise Corporation, Draft 11/30/16 ("MarSegs Alternatives Summaries.pdf", attached to January 6, 2017 email from Jason R. Bluhm, Alaska Department of Transportation & Public Facilities, to Jim Calvin, McDowell Group, RE: data needs). Non-fuel expenses adjusted to 2016 $ by 2.57 percent 2013 to 2016 change in Anchorage CPI-U.

TABLE A-58

Revenues
Juneau - Haines & Skagway
Alternative 1 - No Action
(2016 $000)

			Highway Fuel Taxes				AMHS Revenues: Fares			Total Revenues			State Revenues		
											Present Value as of 7/1/18 @			Present Value as of 7/1/18 @	
Fiscal Year	AADT	Average Road Miles	Federal (18.4¢/gal)	State (8.95¢/gal)	Total	Annual Average Daily Users	Average Fares per User	Total Fares	On-Board Services	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2019	77	2	0	0	1	255	74	6,909	653	7,563	7,391	7,311	7,562	7,391	7,311
2020	77	2	0	0	1	256	74	6,938	656	7,595	7,090	6,862	7,595	7,089	6,862
2021	78	2	0	0	1	257	74	6,968	659	7,628	6,801	6,441	7,628	6,800	6,441
2022	78	2	1	0	1	258	74	6,998	662	7,661	6,523	6,045	7,660	6,523	6,045
2023	78	2	1	0	1	259	74	7,028	665	7,694	6,257	5,674	7,693	6,257	5,674
2024	79	2	1	0	1	260	74	7,058	668	7,727	6,002	5,326	7,726	6,002	5,325
2025	79	2	1	0	1	261	74	7,074	669	7,744	5,745	4,989	7,744	5,745	4,988
2026	79	2	1	0	1	261	74	7,076	669	7,746	5,489	4,663	7,746	5,488	4,663
2027	79	2	1	0	1	261	74	7,078	669	7,748	5,244	4,359	7,747	5,243	4,359
2028	79	2	1	0	1	261	74	7,079	670	7,750	5,010	4,075	7,749	5,009	4,075
2029	79	2	1	0	1	261	74	7,081	670	7,752	4,786	3,809	7,751	4,785	3,809
2030	79	2	1	0	1	261	74	7,083	670	7,753	4,572	3,561	7,753	4,572	3,561
2031	79	2	1	0	1	261	74	7,084	670	7,755	4,368	3,329	7,755	4,368	3,329
2032	79	2	1	0	1	261	74	7,086	670	7,757	4,173	3,112	7,757	4,172	3,112
2033	79	2	1	0	1	261	74	7,088	670	7,759	3,986	2,909	7,759	3,986	2,909
2034	79	2	1	0	1	261	74	7,090	671	7,761	3,808	2,719	7,760	3,808	2,719
2035	79	2	1	0	1	261	74	7,091	671	7,763	3,638	2,542	7,762	3,638	2,542
2036	79	2	1	0	1	261	74	7,093	671	7,765	3,476	2,376	7,764	3,476	2,376
2037	79	2	1	0	1	261	74	7,095	671	7,766	3,321	2,221	7,766	3,320	2,221
2038	79	2	1	0	1	262	74	7,096	671	7,768	3,172	2,077	7,768	3,172	2,076
2039	79	2	1	0	1	262	74	7,098	671	7,770	3,031	1,941	7,770	3,030	1,941
2040	79	2	1	0	1	262	74	7,100	672	7,772	2,895	1,815	7,771	2,895	1,814

TABLE A-58

Revenues
Juneau - Haines & Skagway
Alternative 1 - No Action
(2016 $000)

			Highway Fuel Taxes				AMHS Revenues: Fares			Total Revenues			State Revenues		
											Present Value as of 7/1/18 @			Present Value as of 7/1/18 @	
Fiscal Year	AADT	Average Road Miles	Federal (18.4¢/gal)	State (8.95¢/gal)	Total	Annual Average Daily Users	Average Fares per User	Total Fares	On-Board Services	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2041	79	2	1	0	1	262	74	7,101	672	7,774	2,766	1,696	7,773	2,766	1,696
2042	79	2	1	0	1	262	74	7,103	672	7,776	2,642	1,586	7,775	2,642	1,586
2043	79	2	1	0	1	262	74	7,105	672	7,778	2,524	1,482	7,777	2,524	1,482
2044	79	2	1	0	1	262	74	7,106	672	7,779	2,412	1,386	7,779	2,411	1,386
2045	79	2	1	0	1	262	74	7,108	672	7,781	2,304	1,295	7,781	2,304	1,295
2046	79	2	1	0	1	262	74	7,110	672	7,783	2,201	1,211	7,783	2,201	1,211
2047	79	2	1	0	1	262	74	7,112	673	7,785	2,103	1,132	7,784	2,103	1,132
2048	79	2	1	0	1	262	74	7,113	673	7,787	2,009	1,058	7,786	2,009	1,058
2049	79	2	1	0	1	262	74	7,115	673	7,789	1,919	989	7,788	1,919	989
2050	79	2	1	0	1	262	74	7,117	673	7,791	1,833	925	7,790	1,833	925
2051	79	2	1	0	1	262	74	7,118	673	7,792	1,751	864	7,792	1,751	864
2052	80	2	1	0	1	262	74	7,120	673	7,794	1,673	808	7,794	1,673	808
2053	80	2	1	0	1	262	74	7,122	674	7,796	1,599	755	7,796	1,598	755
2054	80	2	1	0	1	263	74	7,123	674	7,798	1,527	706	7,797	1,527	706
Total			18	9	27			254,866	24,107	279,000	136,040	104,052	278,981	136,031	104,046

TABLE A-59

Revenues
Juneau - Haines & Skagway
Alternative 1B - Enhanced Service
(2016 $000)

								AMHS Revenues			Total Revenues			State Revenues		
			Highway Fuel Taxes					Fares				Present Value as of 7/1/18 @			Present Value as of 7/1/18 @	
Fiscal Year	AADT	Average Road Miles	Federal (18.4¢/gal)	State (8.95¢/gal)	Total	Annual Average Daily Users	Average Fares per User	Total Fares	On-Board Services	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2019	128	2	1	0	1	422	61	9,398	1,261	10,660	10,418	10,305	10,659	10,417	10,305
2020	128	2	1	0	1	424	61	9,438	1,266	10,706	9,993	9,673	10,705	9,992	9,672
2021	129	2	1	0	1	426	61	9,479	1,271	10,752	9,585	9,079	10,751	9,585	9,078
2022	130	2	1	0	1	428	61	9,520	1,277	10,798	9,195	8,521	10,797	9,194	8,520
2023	130	2	1	0	1	429	61	9,561	1,282	10,844	8,819	7,998	10,843	8,819	7,997
2024	131	2	1	0	1	431	61	9,602	1,288	10,891	8,460	7,507	10,890	8,459	7,506
2025	131	2	1	0	1	432	61	9,623	1,291	10,916	8,098	7,032	10,915	8,098	7,031
2026	131	2	1	0	1	432	61	9,626	1,291	10,918	7,737	6,573	10,917	7,736	6,573
2027	131	2	1	0	1	432	61	9,628	1,291	10,921	7,391	6,145	10,920	7,390	6,144
2028	131	2	1	0	1	433	61	9,630	1,292	10,923	7,061	5,744	10,922	7,060	5,743
2029	131	2	1	0	1	433	61	9,633	1,292	10,926	6,746	5,369	10,925	6,745	5,369
2030	131	2	1	0	1	433	61	9,635	1,292	10,929	6,444	5,019	10,928	6,444	5,019
2031	131	2	1	0	1	433	61	9,637	1,293	10,931	6,157	4,692	10,930	6,156	4,692
2032	131	2	1	0	1	433	61	9,639	1,293	10,934	5,882	4,386	10,933	5,881	4,386
2033	131	2	1	0	1	433	61	9,642	1,293	10,936	5,619	4,100	10,936	5,618	4,100
2034	131	2	1	0	1	433	61	9,644	1,294	10,939	5,368	3,833	10,938	5,367	3,833
2035	131	2	1	0	1	433	61	9,646	1,294	10,942	5,128	3,583	10,941	5,128	3,583
2036	131	2	1	0	1	433	61	9,649	1,294	10,944	4,899	3,349	10,943	4,899	3,349
2037	131	2	1	0	1	433	61	9,651	1,295	10,947	4,680	3,131	10,946	4,680	3,131
2038	131	2	1	0	1	434	61	9,653	1,295	10,949	4,471	2,927	10,949	4,471	2,927
2039	131	2	1	0	1	434	61	9,656	1,295	10,952	4,272	2,736	10,951	4,271	2,736
2040	131	2	1	0	1	434	61	9,658	1,295	10,955	4,081	2,558	10,954	4,080	2,557

TABLE A-59

Revenues
Juneau - Haines & Skagway
Alternative 1B - Enhanced Service
(2016 $000)

Fiscal Year	AADT	Average Road Miles	Highway Fuel Taxes: Federal (18.4¢/gal)	Highway Fuel Taxes: State (8.95¢/gal)	Highway Fuel Taxes: Total	Annual Average Daily Users	AMHS Revenues: Fares: Average Fares per User	AMHS Revenues: Fares: Total Fares	AMHS Revenues: On-Board Services	Total Revenues: Total	Total Revenues: PV as of 7/1/18 @ 4.7% State Govt Opportunity Cost	Total Revenues: PV as of 7/1/18 @ 7.0% Private Sector Rate of Return	State Revenues: Total	State Revenues: PV as of 7/1/18 @ 4.7% State Govt Opportunity Cost	State Revenues: PV as of 7/1/18 @ 7.0% Private Sector Rate of Return
2041	131	2	1	0	1	434	61	9,660	1,296	10,957	3,899	2,391	10,956	3,898	2,391
2042	132	2	1	0	1	434	61	9,662	1,296	10,960	3,724	2,235	10,959	3,724	2,235
2043	132	2	1	0	1	434	61	9,665	1,296	10,963	3,558	2,089	10,962	3,558	2,089
2044	132	2	1	0	1	434	61	9,667	1,297	10,965	3,399	1,953	10,964	3,399	1,953
2045	132	2	1	0	1	434	61	9,669	1,297	10,968	3,247	1,826	10,967	3,247	1,826
2046	132	2	1	0	1	434	61	9,672	1,297	10,970	3,102	1,707	10,969	3,102	1,707
2047	132	2	1	0	1	434	61	9,674	1,298	10,973	2,964	1,595	10,972	2,964	1,595
2048	132	2	1	0	1	435	61	9,676	1,298	10,976	2,831	1,491	10,975	2,831	1,491
2049	132	2	1	0	1	435	61	9,679	1,298	10,978	2,705	1,394	10,977	2,705	1,394
2050	132	2	1	0	1	435	61	9,681	1,299	10,981	2,584	1,303	10,980	2,584	1,303
2051	132	2	1	0	1	435	61	9,683	1,299	10,983	2,469	1,218	10,983	2,469	1,218
2052	132	2	1	0	1	435	61	9,686	1,299	10,986	2,358	1,139	10,985	2,358	1,139
2053	132	2	1	0	1	435	61	9,688	1,300	10,989	2,253	1,065	10,988	2,253	1,065
2054	132	2	1	0	1	435	61	9,690	1,300	10,991	2,152	995	10,990	2,152	995
Total			32	16	48			346,699	46,506	393,253	191,750	146,663	393,221	191,734	146,651

TABLE A-60

Revenues
Juneau - Haines & Skagway
Alternative 2B - East Lynn Highway
(2016 $000)

			Highway Fuel Taxes				AMHS Revenues: Fares			Total Revenues			State Revenues		
											Present Value as of 7/1/18 @			Present Value as of 7/1/18 @	
Fiscal Year	AADT	Average Road Miles	Federal (18.4¢/gal)	State (8.95¢/gal)	Total	Annual Average Daily Users	Average Fares per User	Total Fares	On-Board Services	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2019	77	2	0	0	1	255	74	6,909		6,909	6,753	6,680	6,909	6,752	6,679
2020	77	2	0	0	1	256	74	6,938		6,939	6,477	6,269	6,939	6,477	6,269
2021	78	2	0	0	1	257	74	6,968		6,969	6,213	5,884	6,968	6,213	5,884
2022	78	2	1	0	1	258	74	6,998		6,999	5,960	5,523	6,998	5,959	5,523
2023	78	2	1	0	1	259	74	7,028		7,029	5,716	5,184	7,028	5,716	5,184
2024	79	2	1	0	1	260	74	7,058		7,059	5,483	4,866	7,059	5,483	4,865
2025	810	79	188	91	280	1,862	15	10,367		10,646	7,898	6,858	10,458	7,759	6,737
2026	810	79	188	92	280	1,863	15	10,369		10,649	7,546	6,411	10,461	7,412	6,298
2027	810	79	188	92	280	1,863	15	10,372		10,651	7,209	5,993	10,463	7,081	5,887
2028	810	79	188	92	280	1,864	15	10,374		10,654	6,887	5,602	10,466	6,765	5,503
2029	810	79	188	92	280	1,864	15	10,377		10,656	6,579	5,237	10,468	6,463	5,144
2030	811	79	188	92	280	1,865	15	10,379		10,659	6,285	4,896	10,471	6,174	4,809
2031	811	79	188	92	280	1,865	15	10,382		10,661	6,005	4,576	10,473	5,899	4,496
2032	811	79	188	92	280	1,865	15	10,384		10,664	5,736	4,278	10,476	5,635	4,202
2033	811	79	188	92	280	1,866	15	10,386		10,667	5,480	3,999	10,478	5,383	3,928
2034	811	79	188	92	280	1,866	15	10,389		10,669	5,235	3,738	10,481	5,143	3,672
2035	812	79	189	92	280	1,867	15	10,391		10,672	5,002	3,495	10,483	4,913	3,433
2036	812	79	189	92	280	1,867	15	10,394		10,674	4,778	3,267	10,486	4,694	3,209
2037	812	79	189	92	280	1,868	15	10,396		10,677	4,565	3,054	10,488	4,484	3,000
2038	812	79	189	92	280	1,868	15	10,399		10,679	4,361	2,855	10,491	4,284	2,804
2039	812	79	189	92	280	1,869	15	10,401		10,682	4,166	2,669	10,493	4,093	2,621
2040	813	79	189	92	281	1,869	15	10,404		10,684	3,980	2,495	10,496	3,910	2,451

TABLE A-60

Revenues
Juneau - Haines & Skagway
Alternative 2B - East Lynn Highway
(2016 $000)

			Highway Fuel Taxes				AMHS Revenues: Fares			Total Revenues	Total Revenues: Present Value as of 7/1/18 @		State Revenues	State Revenues: Present Value as of 7/1/18 @	
Fiscal Year	AADT	Average Road Miles	Federal (18.4¢/gal)	State (8.95¢/gal)	Total	Annual Average Daily Users	Average Fares per User	Total Fares	On-Board Services	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2041	813	79	189	92	281	1,869	15	10,406		10,687	3,802	2,332	10,498	3,735	2,291
2042	813	79	189	92	281	1,870	15	10,409		10,690	3,633	2,180	10,501	3,568	2,141
2043	813	79	189	92	281	1,870	15	10,411		10,692	3,470	2,038	10,503	3,409	2,002
2044	813	79	189	92	281	1,871	15	10,414		10,695	3,315	1,905	10,506	3,257	1,871
2045	814	79	189	92	281	1,871	15	10,416		10,697	3,167	1,781	10,508	3,111	1,749
2046	814	79	189	92	281	1,872	15	10,419		10,700	3,026	1,665	10,511	2,972	1,635
2047	814	79	189	92	281	1,872	15	10,421		10,702	2,891	1,556	10,513	2,840	1,529
2048	814	79	189	92	281	1,873	15	10,424		10,705	2,762	1,455	10,516	2,713	1,429
2049	814	79	189	92	281	1,873	15	10,426		10,707	2,638	1,360	10,518	2,592	1,336
2050	815	79	189	92	281	1,874	15	10,429		10,710	2,520	1,271	10,521	2,476	1,249
2051	815	79	189	92	281	1,874	15	10,431		10,712	2,408	1,188	10,523	2,365	1,167
2052	815	79	189	92	281	1,874	15	10,434		10,715	2,300	1,111	10,526	2,260	1,091
2053	815	79	189	92	281	1,875	15	10,436		10,718	2,198	1,038	10,528	2,159	1,020
2054	815	79	189	92	281	1,875	15	10,439		10,720	2,099	971	10,531	2,062	954
Total			5665	2755	8420			353,979		362,399	168,544	125,678	356,734	166,211	124,063

TABLE A-61

Revenues
Juneau - Haines & Skagway
Alternative 3 - West Lynn Highway
(2016 $000)

			Highway Fuel Taxes				AMHS Revenues: Fares			Total Revenues	Total Revenues: Present Value as of 7/1/18 @		State Revenues	State Revenues: Present Value as of 7/1/18 @	
Fiscal Year	AADT	Average Road Miles	Federal (18.4¢/gal)	State (8.95¢/gal)	Total	Annual Average Daily Users	Average Fares per User	Total Fares	On-Board Services	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2019	77	2	0	0	1	255	74	6,909		6,909	6,753	6,680	6,909	6,752	6,679
2020	77	2	0	0	1	256	74	6,938		6,939	6,477	6,269	6,939	6,477	6,269
2021	78	2	0	0	1	257	74	6,968		6,969	6,213	5,884	6,968	6,213	5,884
2022	78	2	1	0	1	258	74	6,998		6,999	5,960	5,523	6,998	5,959	5,523
2023	78	2	1	0	1	259	74	7,028		7,029	5,716	5,184	7,028	5,716	5,184
2024	79	2	1	0	1	260	74	7,058		7,059	5,483	4,866	7,059	5,483	4,865
2025	661	74	144	70	214	1,520	23	12,916		13,130	9,741	8,458	12,986	9,635	8,365
2026	661	74	144	70	214	1,521	23	12,919		13,133	9,306	7,907	12,989	9,204	7,820
2027	661	74	144	70	214	1,521	23	12,922		13,136	8,891	7,391	12,992	8,793	7,310
2028	662	74	144	70	214	1,522	23	12,926		13,139	8,493	6,909	12,996	8,400	6,834
2029	662	74	144	70	214	1,522	23	12,929		13,143	8,114	6,459	12,999	8,025	6,388
2030	662	74	144	70	214	1,522	23	12,932		13,146	7,752	6,038	13,002	7,667	5,972
2031	662	74	144	70	214	1,523	23	12,935		13,149	7,405	5,644	13,005	7,324	5,582
2032	662	74	144	70	214	1,523	23	12,938		13,152	7,075	5,276	13,008	6,997	5,218
2033	662	74	144	70	214	1,523	23	12,941		13,155	6,759	4,932	13,011	6,685	4,878
2034	663	74	144	70	214	1,524	23	12,944		13,158	6,457	4,611	13,014	6,386	4,560
2035	663	74	144	70	214	1,524	23	12,947		13,161	6,169	4,310	13,017	6,101	4,263
2036	663	74	144	70	214	1,524	23	12,950		13,165	5,893	4,029	13,020	5,828	3,985
2037	663	74	144	70	214	1,525	23	12,953		13,168	5,630	3,766	13,023	5,568	3,725
2038	663	74	144	70	214	1,525	23	12,956		13,171	5,378	3,521	13,027	5,319	3,482
2039	663	74	144	70	214	1,526	23	12,960		13,174	5,138	3,291	13,030	5,082	3,255
2040	663	74	144	70	214	1,526	23	12,963		13,177	4,909	3,077	13,033	4,855	3,043

TABLE A-61

Revenues
Juneau - Haines & Skagway
Alternative 3 - West Lynn Highway
(2016 $000)

							AMHS Revenues								
			Highway Fuel Taxes				Fares			Total Revenues			State Revenues		
											Present Value as of 7/1/18 @			Present Value as of 7/1/18 @	
Fiscal Year	AADT	Average Road Miles	Federal (18.4¢/gal)	State (8.95¢/gal)	Total	Annual Average Daily Users	Average Fares per User	Total Fares	On-Board Services	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2041	664	74	144	70	215	1,526	23	12,966		13,180	4,689	2,876	13,036	4,638	2,845
2042	664	74	144	70	215	1,527	23	12,969		13,183	4,480	2,688	13,039	4,431	2,659
2043	664	74	144	70	215	1,527	23	12,972		13,187	4,280	2,513	13,042	4,233	2,486
2044	664	74	144	70	215	1,527	23	12,975		13,190	4,089	2,349	13,045	4,044	2,324
2045	664	74	144	70	215	1,528	23	12,978		13,193	3,906	2,196	13,048	3,863	2,172
2046	664	74	145	70	215	1,528	23	12,981		13,196	3,732	2,053	13,051	3,691	2,031
2047	665	74	145	70	215	1,528	23	12,984		13,199	3,565	1,919	13,055	3,526	1,898
2048	665	74	145	70	215	1,529	23	12,987		13,202	3,406	1,794	13,058	3,369	1,774
2049	665	74	145	70	215	1,529	23	12,990		13,205	3,254	1,677	13,061	3,218	1,659
2050	665	74	145	70	215	1,530	23	12,994		13,209	3,108	1,568	13,064	3,074	1,551
2051	665	74	145	70	215	1,530	23	12,997		13,212	2,970	1,466	13,067	2,937	1,449
2052	665	74	145	70	215	1,530	23	13,000		13,215	2,837	1,370	13,070	2,806	1,355
2053	666	74	145	70	215	1,531	23	13,003		13,218	2,710	1,281	13,073	2,681	1,267
2054	666	74	145	70	215	1,531	23	13,006		13,221	2,589	1,197	13,076	2,561	1,184
Total			4332	2107	6439			430,733		437,171	199,327	146,971	432,840	197,542	145,736

TABLE A-62

Revenues
Juneau - Haines & Skagway
Alternative 4A - Fast Ferry Auke Bay
(2016 $000)

			Highway Fuel Taxes				AMHS Revenues: Fares			Total Revenues			State Revenues		
											Present Value as of 7/1/18 @			Present Value as of 7/1/18 @	
Fiscal Year	AADT	Average Road Miles	Federal (18.4¢/gal)	State (8.95¢/gal)	Total	Annual Average Daily Users	Average Fares per User	Total Fares	On-Board Services	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2019	77	2	0	0	1	255	74	6,909	653	7,563	7,391	7,311	7,562	7,391	7,311
2020	77	2	0	0	1	256	74	6,938	656	7,595	7,090	6,862	7,595	7,089	6,862
2021	78	2	0	0	1	257	74	6,968	659	7,628	6,801	6,441	7,628	6,800	6,441
2022	78	2	1	0	1	258	74	6,998	662	7,661	6,523	6,045	7,660	6,523	6,045
2023	78	2	1	0	1	259	74	7,028	665	7,694	6,257	5,674	7,693	6,257	5,674
2024	79	2	1	0	1	260	74	7,058	668	7,727	6,002	5,326	7,726	6,002	5,325
2025	142	2	1	0	1	470	76	13,044	988	14,034	10,412	9,040	14,033	10,411	9,040
2026	142	2	1	0	1	470	76	13,047	988	14,037	9,947	8,451	14,036	9,946	8,450
2027	142	2	1	0	1	470	76	13,050	989	14,040	9,502	7,900	14,039	9,502	7,899
2028	143	2	1	0	1	470	76	13,053	989	14,044	9,078	7,385	14,043	9,077	7,384
2029	143	2	1	0	1	470	76	13,056	989	14,047	8,673	6,903	14,046	8,672	6,903
2030	143	2	1	0	1	470	76	13,060	989	14,050	8,285	6,453	14,049	8,285	6,453
2031	143	2	1	0	1	471	76	13,063	990	14,054	7,915	6,033	14,053	7,915	6,032
2032	143	2	1	0	1	471	76	13,066	990	14,057	7,562	5,639	14,056	7,561	5,639
2033	143	2	1	0	1	471	76	13,069	990	14,061	7,224	5,272	14,060	7,223	5,271
2034	143	2	1	0	1	471	76	13,072	990	14,064	6,901	4,928	14,063	6,901	4,927
2035	143	2	1	0	1	471	76	13,075	991	14,067	6,593	4,607	14,066	6,593	4,606
2036	143	2	1	0	1	471	76	13,078	991	14,071	6,299	4,306	14,070	6,298	4,306
2037	143	2	1	0	1	471	76	13,081	991	14,074	6,017	4,025	14,073	6,017	4,025
2038	143	2	1	0	1	471	76	13,085	991	14,077	5,749	3,763	14,076	5,748	3,763
2039	143	2	1	0	1	472	76	13,088	992	14,081	5,492	3,518	14,080	5,491	3,517
2040	143	2	1	0	1	472	76	13,091	992	14,084	5,247	3,288	14,083	5,246	3,288

TABLE A-62

Revenues
Juneau - Haines & Skagway
Alternative 4A - Fast Ferry Auke Bay
(2016 $000)

Fiscal Year	AADT	Average Road Miles	Highway Fuel Taxes: Federal (18.4¢/gal)	Highway Fuel Taxes: State (8.95¢/gal)	Highway Fuel Taxes: Total	Annual Average Daily Users	AMHS Revenues: Fares: Average Fares per User	AMHS Revenues: Fares: Total Fares	AMHS Revenues: On-Board Services	Total Revenues: Total	Total Revenues: Present Value as of 7/1/18 @ 4.7% State Govt Opportunity Cost	Total Revenues: Present Value as of 7/1/18 @ 7.0% Private Sector Rate of Return	State Revenues: Total	State Revenues: Present Value as of 7/1/18 @ 4.7% State Govt Opportunity Cost	State Revenues: Present Value as of 7/1/18 @ 7.0% Private Sector Rate of Return
2041	143	2	1	0	1	472	76	13,094	992	14,087	5,012	3,074	14,086	5,012	3,074
2042	143	2	1	0	1	472	76	13,097	992	14,091	4,788	2,874	14,090	4,788	2,873
2043	143	2	1	0	1	472	76	13,100	992	14,094	4,575	2,686	14,093	4,574	2,686
2044	143	2	1	0	1	472	76	13,103	993	14,097	4,370	2,511	14,096	4,370	2,511
2045	143	2	1	0	1	472	76	13,106	993	14,101	4,175	2,347	14,100	4,175	2,347
2046	143	2	1	0	1	472	76	13,110	993	14,104	3,989	2,194	14,103	3,988	2,194
2047	143	2	1	0	1	472	76	13,113	993	14,108	3,810	2,051	14,107	3,810	2,051
2048	143	2	1	0	1	473	76	13,116	994	14,111	3,640	1,917	14,110	3,640	1,917
2049	143	2	1	0	1	473	76	13,119	994	14,114	3,478	1,792	14,113	3,477	1,792
2050	143	2	1	0	1	473	76	13,122	994	14,118	3,322	1,676	14,117	3,322	1,675
2051	143	2	1	0	1	473	76	13,125	994	14,121	3,174	1,566	14,120	3,174	1,566
2052	143	2	1	0	1	473	76	13,128	995	14,124	3,032	1,464	14,123	3,032	1,464
2053	143	2	1	0	1	473	76	13,131	995	14,128	2,897	1,369	14,127	2,897	1,369
2054	143	2	1	0	1	473	76	13,135	995	14,131	2,767	1,280	14,130	2,767	1,279
Total			33	16	49			434,577	33,713	468,339	213,988	157,973	468,306	213,973	157,962

TABLE A-63

Revenues
Juneau - Haines & Skagway
Alternative 4B - Fast Ferry Berners Bay
(2016 $000)

							AMHS Revenues			Total Revenues			State Revenues		
			Highway Fuel Taxes				Fares				Present Value as of 7/1/18 @			Present Value as of 7/1/18 @	
Fiscal Year	AADT	Average Road Miles	Federal (18.4¢/gal)	State (8.95¢/gal)	Total	Annual Average Daily Users	Average Fares per User	Total Fares	On-Board Services	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2019	77	2	0	0	1	255	74	6,909	653	7,563	7,391	7,311	7,562	7,391	7,311
2020	77	2	0	0	1	256	74	6,938	656	7,595	7,090	6,862	7,595	7,089	6,862
2021	78	2	0	0	1	257	74	6,968	659	7,628	6,801	6,441	7,628	6,800	6,441
2022	78	2	1	0	1	258	74	6,998	662	7,661	6,523	6,045	7,660	6,523	6,045
2023	78	2	1	0	1	259	74	7,028	665	7,694	6,257	5,674	7,693	6,257	5,674
2024	79	2	1	0	1	260	74	7,058	668	7,727	6,002	5,326	7,726	6,002	5,325
2025	237	23	16	8	24	782	59	16,790	1,532	18,345	13,611	11,818	18,330	13,599	11,807
2026	237	23	16	8	24	782	59	16,794	1,532	18,350	13,003	11,047	18,334	12,991	11,038
2027	237	23	16	8	24	782	59	16,798	1,533	18,354	12,422	10,327	18,338	12,411	10,318
2028	237	23	16	8	24	783	59	16,802	1,533	18,359	11,867	9,654	18,343	11,857	9,645
2029	237	23	16	8	24	783	59	16,806	1,533	18,363	11,337	9,024	18,347	11,327	9,016
2030	237	23	16	8	24	783	59	16,810	1,534	18,367	10,831	8,436	18,351	10,821	8,429
2031	237	23	16	8	24	783	59	16,814	1,534	18,372	10,347	7,886	18,356	10,338	7,879
2032	237	23	16	8	24	783	59	16,818	1,534	18,376	9,885	7,372	18,360	9,876	7,365
2033	237	23	16	8	24	784	59	16,822	1,535	18,380	9,443	6,891	18,365	9,435	6,885
2034	238	23	16	8	24	784	59	16,826	1,535	18,385	9,022	6,442	18,369	9,014	6,436
2035	238	23	16	8	24	784	59	16,830	1,535	18,389	8,619	6,022	18,373	8,611	6,017
2036	238	23	16	8	24	784	59	16,834	1,536	18,394	8,234	5,629	18,378	8,227	5,624
2037	238	23	16	8	24	784	59	16,838	1,536	18,398	7,866	5,262	18,382	7,859	5,258
2038	238	23	16	8	24	785	59	16,842	1,537	18,402	7,515	4,919	18,386	7,508	4,915
2039	238	23	16	8	24	785	59	16,846	1,537	18,407	7,179	4,598	18,391	7,173	4,594
2040	238	23	16	8	24	785	59	16,850	1,537	18,411	6,858	4,299	18,395	6,853	4,295

TABLE A-63

Revenues
Juneau - Haines & Skagway
Alternative 4B - Fast Ferry Berners Bay
(2016 $000)

			Highway Fuel Taxes				AMHS Revenues: Fares			Total Revenues			State Revenues		
											Present Value as of 7/1/18 @			Present Value as of 7/1/18 @	
Fiscal Year	AADT	Average Road Miles	Federal (18.4¢/gal)	State (8.95¢/gal)	Total	Annual Average Daily Users	Average Fares per User	Total Fares	On-Board Services	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2041	238	23	16	8	24	785	59	16,854	1,538	18,416	6,552	4,018	18,400	6,547	4,015
2042	238	23	16	8	24	785	59	16,858	1,538	18,420	6,260	3,756	18,404	6,254	3,753
2043	238	23	16	8	24	785	59	16,862	1,538	18,424	5,980	3,511	18,408	5,975	3,508
2044	238	23	16	8	24	786	59	16,866	1,539	18,429	5,713	3,283	18,413	5,708	3,280
2045	238	23	16	8	24	786	59	16,870	1,539	18,433	5,458	3,069	18,417	5,453	3,066
2046	238	23	16	8	24	786	59	16,874	1,539	18,438	5,214	2,868	18,422	5,209	2,866
2047	238	23	16	8	24	786	59	16,878	1,540	18,442	4,981	2,681	18,426	4,977	2,679
2048	238	23	16	8	24	786	59	16,882	1,540	18,446	4,759	2,507	18,430	4,755	2,504
2049	238	23	16	8	24	787	59	16,886	1,541	18,451	4,546	2,343	18,435	4,542	2,341
2050	238	23	16	8	24	787	59	16,891	1,541	18,455	4,343	2,190	18,439	4,339	2,189
2051	238	23	16	8	24	787	59	16,895	1,541	18,460	4,149	2,048	18,444	4,146	2,046
2052	239	23	16	8	24	787	59	16,899	1,542	18,464	3,964	1,914	18,448	3,960	1,912
2053	239	23	16	8	24	787	59	16,903	1,542	18,468	3,787	1,789	18,452	3,783	1,788
2054	239	23	16	8	24	788	59	16,907	1,542	18,473	3,618	1,673	18,457	3,615	1,671
Total			481	234	715			547,349	50,076	598,139	267,425	194,938	597,658	267,225	194,799

TABLE A-64

Revenues
Juneau - Haines & Skagway
Alternative 4C - Monohull Auke Bay
(2016 $000)

			Highway Fuel Taxes				AMHS Revenues: Fares			Total Revenues			State Revenues		
											Present Value as of 7/1/18 @			Present Value as of 7/1/18 @	
Fiscal Year	AADT	Average Road Miles	Federal (18.4¢/gal)	State (8.95¢/gal)	Total	Annual Average Daily Users	Average Fares per User	Total Fares	On-Board Services	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2019	77	2	0	0	1	255	74	6,909	653	7,563	7,391	7,311	7,562	7,391	7,311
2020	77	2	0	0	1	256	74	6,938	656	7,595	7,090	6,862	7,595	7,089	6,862
2021	78	2	0	0	1	257	74	6,968	659	7,628	6,801	6,441	7,628	6,800	6,441
2022	78	2	1	0	1	258	74	6,998	662	7,661	6,523	6,045	7,660	6,523	6,045
2023	78	2	1	0	1	259	74	7,028	665	7,694	6,257	5,674	7,693	6,257	5,674
2024	79	2	1	0	1	260	74	7,058	668	7,727	6,002	5,326	7,726	6,002	5,325
2025	96	2	1	0	1	316	76	8,730	681	9,412	6,983	6,063	9,412	6,983	6,063
2026	96	2	1	0	1	316	76	8,732	681	9,415	6,671	5,668	9,414	6,671	5,668
2027	96	2	1	0	1	316	76	8,734	682	9,417	6,373	5,298	9,416	6,373	5,298
2028	96	2	1	0	1	316	76	8,736	682	9,419	6,089	4,953	9,418	6,088	4,953
2029	96	2	1	0	1	316	76	8,739	682	9,421	5,817	4,630	9,421	5,816	4,630
2030	96	2	1	0	1	316	76	8,741	682	9,424	5,557	4,328	9,423	5,556	4,328
2031	96	2	1	0	1	316	76	8,743	682	9,426	5,309	4,046	9,425	5,308	4,046
2032	96	2	1	0	1	316	76	8,745	682	9,428	5,072	3,782	9,427	5,071	3,782
2033	96	2	1	0	1	316	76	8,747	683	9,430	4,845	3,536	9,430	4,845	3,535
2034	96	2	1	0	1	316	76	8,749	683	9,433	4,629	3,305	9,432	4,628	3,305
2035	96	2	1	0	1	316	76	8,751	683	9,435	4,422	3,090	9,434	4,422	3,089
2036	96	2	1	0	1	316	76	8,753	683	9,437	4,224	2,888	9,436	4,224	2,888
2037	96	2	1	0	1	316	76	8,755	683	9,439	4,036	2,700	9,439	4,036	2,700
2038	96	2	1	0	1	317	76	8,757	683	9,442	3,856	2,524	9,441	3,855	2,524
2039	96	2	1	0	1	317	76	8,759	683	9,444	3,683	2,359	9,443	3,683	2,359
2040	96	2	1	0	1	317	76	8,761	684	9,446	3,519	2,205	9,445	3,519	2,205

TABLE A-64

Revenues
Juneau - Haines & Skagway
Alternative 4C - Monohull Auke Bay
(2016 $000)

							AMHS Revenues			Total Revenues			State Revenues		
			Highway Fuel Taxes				Fares				Present Value as of 7/1/18 @			Present Value as of 7/1/18 @	
Fiscal Year	AADT	Average Road Miles	Federal (18.4¢/gal)	State (8.95¢/gal)	Total	Annual Average Daily Users	Average Fares per User	Total Fares	On-Board Services	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2041	96	2	1	0	1	317	76	8,764	684	9,448	3,362	2,062	9,448	3,361	2,062
2042	96	2	1	0	1	317	76	8,766	684	9,451	3,212	1,927	9,450	3,211	1,927
2043	96	2	1	0	1	317	76	8,768	684	9,453	3,068	1,802	9,452	3,068	1,801
2044	96	2	1	0	1	317	76	8,770	684	9,455	2,931	1,684	9,454	2,931	1,684
2045	96	2	1	0	1	317	76	8,772	684	9,457	2,800	1,574	9,457	2,800	1,574
2046	96	2	1	0	1	317	76	8,774	685	9,460	2,675	1,472	9,459	2,675	1,472
2047	96	2	1	0	1	317	76	8,776	685	9,462	2,556	1,376	9,461	2,555	1,376
2048	96	2	1	0	1	317	76	8,778	685	9,464	2,442	1,286	9,464	2,441	1,286
2049	96	2	1	0	1	317	76	8,780	685	9,466	2,332	1,202	9,466	2,332	1,202
2050	96	2	1	0	1	317	76	8,782	685	9,469	2,228	1,124	9,468	2,228	1,124
2051	96	2	1	0	1	318	76	8,785	685	9,471	2,129	1,051	9,470	2,129	1,050
2052	96	2	1	0	1	318	76	8,787	686	9,473	2,034	982	9,473	2,034	982
2053	96	2	1	0	1	318	76	8,789	686	9,476	1,943	918	9,475	1,943	918
2054	96	2	1	0	1	318	76	8,791	686	9,478	1,856	858	9,477	1,856	858
Total			24	11	35			304,714	24,470	329,219	156,715	118,354	329,196	156,704	118,346

TABLE A-65

Revenues
Juneau - Haines & Skagway
Alternative 4D - Monohull Berners Bay
(2016 $000)

			Highway Fuel Taxes				AMHS Revenues: Fares			Total Revenues			State Revenues		
											Present Value as of 7/1/18 @			Present Value as of 7/1/18 @	
Fiscal Year	AADT	Average Road Miles	Federal (18.4¢/gal)	State (8.95¢/gal)	Total	Annual Average Daily Users	Average Fares per User	Total Fares	On-Board Services	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2019	77	2	0	0	1	255	74	6,909	653	7,563	7,391	7,311	7,562	7,391	7,311
2020	77	2	0	0	1	256	74	6,938	656	7,595	7,090	6,862	7,595	7,089	6,862
2021	78	2	0	0	1	257	74	6,968	659	7,628	6,801	6,441	7,628	6,800	6,441
2022	78	2	1	0	1	258	74	6,998	662	7,661	6,523	6,045	7,660	6,523	6,045
2023	78	2	1	0	1	259	74	7,028	665	7,694	6,257	5,674	7,693	6,257	5,674
2024	79	2	1	0	1	260	74	7,058	668	7,727	6,002	5,326	7,726	6,002	5,325
2025	221	25	16	8	24	731	57	15,237	1,443	16,703	12,392	10,760	16,687	12,380	10,750
2026	221	25	16	8	24	731	57	15,240	1,443	16,707	11,839	10,058	16,691	11,827	10,049
2027	222	25	16	8	24	731	57	15,244	1,443	16,711	11,310	9,403	16,695	11,299	9,394
2028	222	25	16	8	24	731	57	15,248	1,444	16,715	10,805	8,790	16,699	10,795	8,781
2029	222	25	16	8	24	731	57	15,251	1,444	16,719	10,322	8,217	16,703	10,312	8,209
2030	222	25	16	8	24	731	57	15,255	1,445	16,723	9,861	7,681	16,707	9,852	7,673
2031	222	25	16	8	24	732	57	15,258	1,445	16,727	9,421	7,180	16,711	9,412	7,173
2032	222	25	16	8	24	732	57	15,262	1,445	16,731	9,000	6,712	16,715	8,991	6,705
2033	222	25	16	8	24	732	57	15,266	1,446	16,735	8,598	6,274	16,719	8,590	6,268
2034	222	25	16	8	24	732	57	15,269	1,446	16,739	8,214	5,865	16,723	8,206	5,860
2035	222	25	16	8	24	732	57	15,273	1,446	16,743	7,847	5,483	16,727	7,840	5,478
2036	222	25	16	8	24	733	57	15,277	1,447	16,747	7,497	5,125	16,731	7,490	5,120
2037	222	25	16	8	24	733	57	15,280	1,447	16,751	7,162	4,791	16,735	7,155	4,787
2038	222	25	16	8	24	733	57	15,284	1,447	16,755	6,842	4,479	16,739	6,836	4,475
2039	222	25	16	8	24	733	57	15,288	1,448	16,759	6,537	4,187	16,743	6,530	4,183
2040	222	25	16	8	24	733	57	15,291	1,448	16,763	6,245	3,914	16,747	6,239	3,910

TABLE A-65

Revenues
Juneau - Haines & Skagway
Alternative 4D - Monohull Berners Bay
(2016 $000)

			Highway Fuel Taxes				AMHS Revenues: Fares			Total Revenues			State Revenues		
											Present Value as of 7/1/18 @			Present Value as of 7/1/18 @	
Fiscal Year	AADT	Average Road Miles	Federal (18.4¢/gal)	State (8.95¢/gal)	Total	Annual Average Daily Users	Average Fares per User	Total Fares	On-Board Services	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2041	222	25	16	8	24	733	57	15,295	1,448	16,767	5,966	3,659	16,751	5,960	3,655
2042	222	25	16	8	24	734	57	15,299	1,449	16,771	5,699	3,420	16,755	5,694	3,417
2043	222	25	16	8	24	734	57	15,302	1,449	16,775	5,445	3,197	16,759	5,439	3,194
2044	222	25	16	8	24	734	57	15,306	1,449	16,779	5,202	2,989	16,763	5,197	2,986
2045	222	25	16	8	24	734	57	15,310	1,450	16,783	4,969	2,794	16,767	4,964	2,791
2046	223	25	16	8	24	734	57	15,313	1,450	16,787	4,747	2,612	16,771	4,743	2,609
2047	223	25	16	8	24	734	57	15,317	1,450	16,791	4,535	2,441	16,775	4,531	2,439
2048	223	25	16	8	24	735	57	15,320	1,451	16,795	4,333	2,282	16,779	4,329	2,280
2049	223	25	16	8	24	735	57	15,324	1,451	16,799	4,139	2,133	16,783	4,135	2,131
2050	223	25	16	8	24	735	57	15,328	1,451	16,803	3,954	1,994	16,787	3,951	1,992
2051	223	25	16	8	24	735	57	15,331	1,452	16,807	3,778	1,864	16,791	3,774	1,863
2052	223	25	16	8	24	735	57	15,335	1,452	16,811	3,609	1,743	16,795	3,606	1,741
2053	223	25	16	8	24	736	57	15,339	1,452	16,815	3,448	1,629	16,799	3,444	1,628
2054	223	25	16	8	24	736	57	15,342	1,453	16,819	3,294	1,523	16,803	3,291	1,521
Total			486	236	722			500,585	47,398	548,705	247,073	180,860	548,219	246,872	180,720

TABLE A-66

Revenues
Haines - Skagway
Alternative 1 - No Action
(2016 $000)

Fiscal Year	AADT	Average Road Miles	Highway Fuel Taxes			AMHS Fares			Total Revenues			State Revenues		
										Present Value as of 7/1/18 @			Present Value as of 7/1/18 @	
			Federal (18.4¢/gal)	State (8.95¢/gal)	Total	Annual Average Daily Users	Average Fare Costs/User	Total Fares	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2019	24	4	0	0	0	56	18	367	367	359	355	367	359	355
2020	24	4	0	0	0	56	18	367	367	343	332	367	343	332
2021	24	4	0	0	0	56	18	367	367	328	310	367	327	310
2022	24	4	0	0	0	56	18	367	367	313	290	367	313	290
2023	24	4	0	0	0	56	18	367	367	299	271	367	299	271
2024	24	4	0	0	0	56	18	367	367	285	253	367	285	253
2025	24	4	0	0	0	56	18	367	367	273	237	367	272	236
2026	24	4	0	0	0	56	18	367	367	260	221	367	260	221
2027	24	4	0	0	0	56	18	367	367	249	207	367	248	207
2028	24	4	0	0	0	56	18	367	367	237	193	367	237	193
2029	24	4	0	0	0	56	18	367	367	227	181	367	227	180
2030	24	4	0	0	0	56	18	367	367	217	169	367	216	169
2031	24	4	0	0	0	56	18	367	367	207	158	367	207	158
2032	24	4	0	0	0	56	18	367	367	198	147	367	197	147
2033	24	4	0	0	0	56	18	367	367	189	138	367	189	138
2034	24	4	0	0	0	56	18	367	367	180	129	367	180	129
2035	24	4	0	0	0	56	18	367	367	172	120	367	172	120
2036	24	4	0	0	0	56	18	367	367	164	112	367	164	112
2037	24	4	0	0	0	56	18	367	367	157	105	367	157	105
2038	24	4	0	0	0	56	18	367	367	150	98	367	150	98
2039	24	4	0	0	0	56	18	367	367	143	92	367	143	92
2040	24	4	0	0	0	56	18	367	367	137	86	367	137	86

TABLE A-66

Revenues
Haines - Skagway
Alternative 1 - No Action
(2016 $000)

										Total Revenues			State Revenues		
			Highway Fuel Taxes				AMHS Fares			Present Value as of 7/1/18 @			Present Value as of 7/1/18 @		
Fiscal Year	AADT	Average Road Miles	Federal (18.4¢/gal)	State (8.95¢/gal)	Total	Annual Average Daily Users	Average Fare Costs/User	Total Fares	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2041	24	4	0	0	0	56	18	367	367	131	80	367	131	80
2042	24	4	0	0	0	56	18	367	367	125	75	367	125	75
2043	24	4	0	0	0	56	18	367	367	119	70	367	119	70
2044	24	4	0	0	0	56	18	367	367	114	65	367	114	65
2045	24	4	0	0	0	56	18	367	367	109	61	367	109	61
2046	24	4	0	0	0	56	18	367	367	104	57	367	104	57
2047	24	4	0	0	0	56	18	367	367	99	53	367	99	53
2048	24	4	0	0	0	56	18	367	367	95	50	367	95	50
2049	24	4	0	0	0	56	18	367	367	91	47	367	90	47
2050	24	4	0	0	0	56	18	367	367	86	44	367	86	44
2051	24	4	0	0	0	56	18	367	367	83	41	367	83	41
2052	24	4	0	0	0	56	18	367	367	79	38	367	79	38
2053	24	4	0	0	0	56	18	367	367	75	36	367	75	36
2054	24	4	0	0	0	56	18	367	367	72	33	367	72	33
Total			11	5	16			13,209	13,226	6,468	4,954	13,215	6,462	4,950

TABLE A-67

Revenues
Haines - Skagway
Alternative 1B - Enhanced Service
(2016 $000)

Fiscal Year	AADT	Average Road Miles	Highway Fuel Taxes			AMHS Fares			Total Revenues			State Revenues		
										Present Value as of 7/1/18 @			Present Value as of 7/1/18 @	
			Federal (18.4¢/gal)	State (8.95¢/gal)	Total	Annual Average Daily Users	Average Fare Costs/User	Total Fares	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2019	24	4	0	0	0	56	14	294	294	287	284	294	287	284
2020	24	4	0	0	0	56	14	294	294	274	266	294	274	265
2021	24	4	0	0	0	56	14	294	294	262	248	294	262	248
2022	24	4	0	0	0	56	14	294	294	250	232	294	250	232
2023	24	4	0	0	0	56	14	294	294	239	217	294	239	217
2024	24	4	0	0	0	56	14	294	294	228	203	294	228	202
2025	24	4	0	0	0	56	14	294	294	218	189	294	218	189
2026	24	4	0	0	0	56	14	294	294	208	177	294	208	177
2027	24	4	0	0	0	56	14	294	294	199	165	294	199	165
2028	24	4	0	0	0	56	14	294	294	190	155	294	190	154
2029	24	4	0	0	0	56	14	294	294	182	144	294	181	144
2030	24	4	0	0	0	56	14	294	294	173	135	294	173	135
2031	24	4	0	0	0	56	14	294	294	166	126	294	165	126
2032	24	4	0	0	0	56	14	294	294	158	118	294	158	118
2033	24	4	0	0	0	56	14	294	294	151	110	294	151	110
2034	24	4	0	0	0	56	14	294	294	144	103	294	144	103
2035	24	4	0	0	0	56	14	294	294	138	96	294	138	96
2036	24	4	0	0	0	56	14	294	294	132	90	294	131	90
2037	24	4	0	0	0	56	14	294	294	126	84	294	126	84
2038	24	4	0	0	0	56	14	294	294	120	79	294	120	79
2039	24	4	0	0	0	56	14	294	294	115	73	294	115	73
2040	24	4	0	0	0	56	14	294	294	110	69	294	109	69

TABLE A-67

Revenues
Haines - Skagway
Alternative 1B - Enhanced Service
(2016 $000)

Fiscal Year	AADT	Average Road Miles	Highway Fuel Taxes			AMHS Fares			Total Revenues			State Revenues		
										Present Value as of 7/1/18 @			Present Value as of 7/1/18 @	
			Federal (18.4¢/gal)	State (8.95¢/gal)	Total	Annual Average Daily Users	Average Fare Costs/User	Total Fares	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2041	24	4	0	0	0	56	14	294	294	105	64	294	104	64
2042	24	4	0	0	0	56	14	294	294	100	60	294	100	60
2043	24	4	0	0	0	56	14	294	294	95	56	294	95	56
2044	24	4	0	0	0	56	14	294	294	91	52	294	91	52
2045	24	4	0	0	0	56	14	294	294	87	49	294	87	49
2046	24	4	0	0	0	56	14	294	294	83	46	294	83	46
2047	24	4	0	0	0	56	14	294	294	79	43	294	79	43
2048	24	4	0	0	0	56	14	294	294	76	40	294	76	40
2049	24	4	0	0	0	56	14	294	294	72	37	294	72	37
2050	24	4	0	0	0	56	14	294	294	69	35	294	69	35
2051	24	4	0	0	0	56	14	294	294	66	33	294	66	33
2052	24	4	0	0	0	56	14	294	294	63	30	294	63	30
2053	24	4	0	0	0	56	14	294	294	60	28	294	60	28
2054	24	4	0	0	0	56	14	294	294	58	27	294	58	27
Total			11	5	16			10,568	10,584	5,176	3,964	10,573	5,170	3,960

TABLE A-68

Revenues
Haines - Skagway
Alternative 2B - East Lynn Highway
(2016 $000)

Fiscal Year	AADT	Average Road Miles	Highway Fuel Taxes			AMHS Fares			Total Revenues			State Revenues		
										Present Value as of 7/1/18 @			Present Value as of 7/1/18 @	
			Federal (18.4¢/gal)	State (8.95¢/gal)	Total	Annual Average Daily Users	Average Fare Costs/User	Total Fares	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2019	24	4	0	0	0	56	18	367	367	359	355	367	359	355
2020	24	4	0	0	0	56	18	367	367	343	332	367	343	332
2021	24	4	0	0	0	56	18	367	367	328	310	367	327	310
2022	24	4	0	0	0	56	18	367	367	313	290	367	313	290
2023	24	4	0	0	0	56	18	367	367	299	271	367	299	271
2024	24	4	0	0	0	56	18	367	367	285	253	367	285	253
2025	24	4	0	0	0	56	20	399	400	297	258	400	296	257
2026	24	4	0	0	0	56	20	399	400	283	241	400	283	241
2027	24	4	0	0	0	56	20	399	400	271	225	400	270	225
2028	24	4	0	0	0	56	20	399	400	258	210	400	258	210
2029	24	4	0	0	0	56	20	399	400	247	197	400	247	196
2030	24	4	0	0	0	56	20	399	400	236	184	400	236	184
2031	24	4	0	0	0	56	20	399	400	225	172	400	225	172
2032	24	4	0	0	0	56	20	399	400	215	160	400	215	160
2033	24	4	0	0	0	56	20	399	400	205	150	400	205	150
2034	24	4	0	0	0	56	20	399	400	196	140	400	196	140
2035	24	4	0	0	0	56	20	399	400	187	131	400	187	131
2036	24	4	0	0	0	56	20	399	400	179	122	400	179	122
2037	24	4	0	0	0	56	20	399	400	171	114	400	171	114
2038	24	4	0	0	0	56	20	399	400	163	107	400	163	107
2039	24	4	0	0	0	56	20	399	400	156	100	400	156	100
2040	24	4	0	0	0	56	20	399	400	149	93	400	149	93

TABLE A-68

Revenues
Haines - Skagway
Alternative 2B - East Lynn Highway
(2016 $000)

Fiscal Year	AADT	Average Road Miles	Highway Fuel Taxes			AMHS Fares			Total Revenues			State Revenues		
										Present Value as of 7/1/18 @			Present Value as of 7/1/18 @	
			Federal (18.4¢/gal)	State (8.95¢/gal)	Total	Annual Average Daily Users	Average Fare Costs/User	Total Fares	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2041	24	4	0	0	0	56	20	399	400	142	87	400	142	87
2042	24	4	0	0	0	56	20	399	400	136	82	400	136	81
2043	24	4	0	0	0	56	20	399	400	130	76	400	130	76
2044	24	4	0	0	0	56	20	399	400	124	71	400	124	71
2045	24	4	0	0	0	56	20	399	400	118	67	400	118	67
2046	24	4	0	0	0	56	20	399	400	113	62	400	113	62
2047	24	4	0	0	0	56	20	399	400	108	58	400	108	58
2048	24	4	0	0	0	56	20	399	400	103	54	400	103	54
2049	24	4	0	0	0	56	20	399	400	99	51	400	98	51
2050	24	4	0	0	0	56	20	399	400	94	47	400	94	47
2051	24	4	0	0	0	56	20	399	400	90	44	400	90	44
2052	24	4	0	0	0	56	20	399	400	86	41	400	86	41
2053	24	4	0	0	0	56	20	399	400	82	39	400	82	39
2054	24	4	0	0	0	56	20	399	400	78	36	400	78	36
Total			11	5	16			14,184	14,201	6,869	5,232	14,189	6,864	5,227

TABLE A-69

Revenues
Haines - Skagway
Alternative 3 - West Lynn Highway
(2016 $000)

Fiscal Year	AADT	Average Road Miles	Highway Fuel Taxes			AMHS Fares			Total Revenues			State Revenues		
										Present Value as of 7/1/18 @			Present Value as of 7/1/18 @	
			Federal (18.4¢/gal)	State (8.95¢/gal)	Total	Annual Average Daily Users	Average Fare Costs/User	Total Fares	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2019	24	4	0	0	0	56	18	367	367	359	355	367	359	355
2020	24	4	0	0	0	56	18	367	367	343	332	367	343	332
2021	24	4	0	0	0	56	18	367	367	328	310	367	327	310
2022	24	4	0	0	0	56	18	367	367	313	290	367	313	290
2023	24	4	0	0	0	56	18	367	367	299	271	367	299	271
2024	24	4	0	0	0	56	18	367	367	285	253	367	285	253
2025	30	4	0	0	1	69	18	454	454	337	293	454	337	292
2026	30	4	0	0	1	69	18	454	454	322	273	454	322	273
2027	30	4	0	0	1	69	18	454	454	307	256	454	307	255
2028	30	4	0	0	1	69	18	454	454	294	239	454	293	239
2029	30	4	0	0	1	69	18	454	454	280	223	454	280	223
2030	30	4	0	0	1	69	18	454	454	268	209	454	268	208
2031	30	4	0	0	1	69	18	454	454	256	195	454	256	195
2032	30	4	0	0	1	69	18	454	454	244	182	454	244	182
2033	30	4	0	0	1	69	18	454	454	233	170	454	233	170
2034	30	4	0	0	1	69	18	454	454	223	159	454	223	159
2035	30	4	0	0	1	69	18	454	454	213	149	454	213	149
2036	30	4	0	0	1	69	18	454	454	203	139	454	203	139
2037	30	4	0	0	1	69	18	454	454	194	130	454	194	130
2038	30	4	0	0	1	69	18	454	454	185	121	454	185	121
2039	30	4	0	0	1	69	18	454	454	177	113	454	177	113
2040	30	4	0	0	1	69	18	454	454	169	106	454	169	106

TABLE A-69

Revenues
Haines - Skagway
Alternative 3 - West Lynn Highway
(2016 $000)

Fiscal Year	AADT	Average Road Miles	Highway Fuel Taxes			AMHS Fares			Total Revenues			State Revenues		
										Present Value as of 7/1/18 @			Present Value as of 7/1/18 @	
			Federal (18.4¢/gal)	State (8.95¢/gal)	Total	Annual Average Daily Users	Average Fare Costs/User	Total Fares	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2041	30	4	0	0	1	69	18	454	454	162	99	454	161	99
2042	30	4	0	0	1	69	18	454	454	154	93	454	154	93
2043	30	4	0	0	1	69	18	454	454	147	87	454	147	87
2044	30	4	0	0	1	69	18	454	454	141	81	454	141	81
2045	30	4	0	0	1	69	18	454	454	134	76	454	134	76
2046	30	4	0	0	1	69	18	454	454	128	71	454	128	71
2047	30	4	0	0	1	69	18	454	454	123	66	454	123	66
2048	30	4	0	0	1	69	18	454	454	117	62	454	117	62
2049	30	4	0	0	1	69	18	454	454	112	58	454	112	58
2050	30	4	0	0	1	69	18	454	454	107	54	454	107	54
2051	30	4	0	0	1	69	18	454	454	102	50	454	102	50
2052	30	4	0	0	1	69	18	454	454	98	47	454	97	47
2053	30	4	0	0	1	69	18	454	454	93	44	454	93	44
2054	30	4	0	0	1	69	18	454	454	89	41	454	89	41
Total			13	6	20			15,812	15,832	7,541	5,697	15,818	7,535	5,692

TABLE A-70

Revenues
Haines - Skagway
Alternative 4A - Fast Ferry Auke Bay
(2016 $000)

Fiscal Year	AADT	Average Road Miles	Highway Fuel Taxes			AMHS Fares			Total Revenues			State Revenues		
										Present Value as of 7/1/18 @			Present Value as of 7/1/18 @	
			Federal (18.4¢/gal)	State (8.95¢/gal)	Total	Annual Average Daily Users	Average Fare Costs/User	Total Fares	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2019	24	4	0	0	0	56	18	367	367	359	355	367	359	355
2020	24	4	0	0	0	56	18	367	367	343	332	367	343	332
2021	24	4	0	0	0	56	18	367	367	328	310	367	327	310
2022	24	4	0	0	0	56	18	367	367	313	290	367	313	290
2023	24	4	0	0	0	56	18	367	367	299	271	367	299	271
2024	24	4	0	0	0	56	18	367	367	285	253	367	285	253
2025	24	4	0	0	0	56	18	367	367	273	237	367	272	236
2026	24	4	0	0	0	56	18	367	367	260	221	367	260	221
2027	24	4	0	0	0	56	18	367	367	249	207	367	248	207
2028	24	4	0	0	0	56	18	367	367	237	193	367	237	193
2029	24	4	0	0	0	56	18	367	367	227	181	367	227	180
2030	24	4	0	0	0	56	18	367	367	217	169	367	216	169
2031	24	4	0	0	0	56	18	367	367	207	158	367	207	158
2032	24	4	0	0	0	56	18	367	367	198	147	367	197	147
2033	24	4	0	0	0	56	18	367	367	189	138	367	189	138
2034	24	4	0	0	0	56	18	367	367	180	129	367	180	129
2035	24	4	0	0	0	56	18	367	367	172	120	367	172	120
2036	24	4	0	0	0	56	18	367	367	164	112	367	164	112
2037	24	4	0	0	0	56	18	367	367	157	105	367	157	105
2038	24	4	0	0	0	56	18	367	367	150	98	367	150	98
2039	24	4	0	0	0	56	18	367	367	143	92	367	143	92
2040	24	4	0	0	0	56	18	367	367	137	86	367	137	86

TABLE A-70

Revenues
Haines - Skagway
Alternative 4A - Fast Ferry Auke Bay
(2016 $000)

Fiscal Year	AADT	Average Road Miles	Highway Fuel Taxes: Federal (18.4¢/gal)	Highway Fuel Taxes: State (8.95¢/gal)	Highway Fuel Taxes: Total	Annual Average Daily Users	AMHS Fares: Average Fare Costs/User	AMHS Fares: Total Fares	Total Revenues: Total	Total Revenues: PV as of 7/1/18 @ 4.7% State Govt Opportunity Cost	Total Revenues: PV as of 7/1/18 @ 7.0% Private Sector Rate of Return	State Revenues: Total	State Revenues: PV as of 7/1/18 @ 4.7% State Govt Opportunity Cost	State Revenues: PV as of 7/1/18 @ 7.0% Private Sector Rate of Return
2041	24	4	0	0	0	56	18	367	367	131	80	367	131	80
2042	24	4	0	0	0	56	18	367	367	125	75	367	125	75
2043	24	4	0	0	0	56	18	367	367	119	70	367	119	70
2044	24	4	0	0	0	56	18	367	367	114	65	367	114	65
2045	24	4	0	0	0	56	18	367	367	109	61	367	109	61
2046	24	4	0	0	0	56	18	367	367	104	57	367	104	57
2047	24	4	0	0	0	56	18	367	367	99	53	367	99	53
2048	24	4	0	0	0	56	18	367	367	95	50	367	95	50
2049	24	4	0	0	0	56	18	367	367	91	47	367	90	47
2050	24	4	0	0	0	56	18	367	367	86	44	367	86	44
2051	24	4	0	0	0	56	18	367	367	83	41	367	83	41
2052	24	4	0	0	0	56	18	367	367	79	38	367	79	38
2053	24	4	0	0	0	56	18	367	367	75	36	367	75	36
2054	24	4	0	0	0	56	18	367	367	72	33	367	72	33
Total			11	5	16			13,209	13,226	6,468	4,954	13,215	6,462	4,950

TABLE A-71

Revenues
Haines - Skagway
Alternative 4B - Fast Ferry Berners Bay
(2016 $000)

			Highway Fuel Taxes				AMHS Fares		Total Revenues			State Revenues		
										Present Value as of 7/1/18 @			Present Value as of 7/1/18 @	
Fiscal Year	AADT	Average Road Miles	Federal (18.4¢/gal)	State (8.95¢/gal)	Total	Annual Average Daily Users	Average Fare Costs/User	Total Fares	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2019	24	4	0	0	0	56	18	367	367	359	355	367	359	355
2020	24	4	0	0	0	56	18	367	367	343	332	367	343	332
2021	24	4	0	0	0	56	18	367	367	328	310	367	327	310
2022	24	4	0	0	0	56	18	367	367	313	290	367	313	290
2023	24	4	0	0	0	56	18	367	367	299	271	367	299	271
2024	24	4	0	0	0	56	18	367	367	285	253	367	285	253
2025	24	4	0	0	0	56	18	367	367	273	237	367	272	236
2026	24	4	0	0	0	56	18	367	367	260	221	367	260	221
2027	24	4	0	0	0	56	18	367	367	249	207	367	248	207
2028	24	4	0	0	0	56	18	367	367	237	193	367	237	193
2029	24	4	0	0	0	56	18	367	367	227	181	367	227	180
2030	24	4	0	0	0	56	18	367	367	217	169	367	216	169
2031	24	4	0	0	0	56	18	367	367	207	158	367	207	158
2032	24	4	0	0	0	56	18	367	367	198	147	367	197	147
2033	24	4	0	0	0	56	18	367	367	189	138	367	189	138
2034	24	4	0	0	0	56	18	367	367	180	129	367	180	129
2035	24	4	0	0	0	56	18	367	367	172	120	367	172	120
2036	24	4	0	0	0	56	18	367	367	164	112	367	164	112
2037	24	4	0	0	0	56	18	367	367	157	105	367	157	105
2038	24	4	0	0	0	56	18	367	367	150	98	367	150	98
2039	24	4	0	0	0	56	18	367	367	143	92	367	143	92
2040	24	4	0	0	0	56	18	367	367	137	86	367	137	86

TABLE A-71

Revenues
Haines - Skagway
Alternative 4B - Fast Ferry Berners Bay
(2016 $000)

Fiscal Year	AADT	Average Road Miles	Highway Fuel Taxes: Federal (18.4¢/gal)	Highway Fuel Taxes: State (8.95¢/gal)	Highway Fuel Taxes: Total	Annual Average Daily Users	AMHS Fares: Average Fare Costs/User	AMHS Fares: Total Fares	Total Revenues: Total	Total Revenues: Present Value as of 7/1/18 @ 4.7% State Govt Opportunity Cost	Total Revenues: Present Value as of 7/1/18 @ 7.0% Private Sector Rate of Return	State Revenues: Total	State Revenues: Present Value as of 7/1/18 @ 4.7% State Govt Opportunity Cost	State Revenues: Present Value as of 7/1/18 @ 7.0% Private Sector Rate of Return
2041	24	4	0	0	0	56	18	367	367	131	80	367	131	80
2042	24	4	0	0	0	56	18	367	367	125	75	367	125	75
2043	24	4	0	0	0	56	18	367	367	119	70	367	119	70
2044	24	4	0	0	0	56	18	367	367	114	65	367	114	65
2045	24	4	0	0	0	56	18	367	367	109	61	367	109	61
2046	24	4	0	0	0	56	18	367	367	104	57	367	104	57
2047	24	4	0	0	0	56	18	367	367	99	53	367	99	53
2048	24	4	0	0	0	56	18	367	367	95	50	367	95	50
2049	24	4	0	0	0	56	18	367	367	91	47	367	90	47
2050	24	4	0	0	0	56	18	367	367	86	44	367	86	44
2051	24	4	0	0	0	56	18	367	367	83	41	367	83	41
2052	24	4	0	0	0	56	18	367	367	79	38	367	79	38
2053	24	4	0	0	0	56	18	367	367	75	36	367	75	36
2054	24	4	0	0	0	56	18	367	367	72	33	367	72	33
Total			11	5	16			13,209	13,226	6,468	4,954	13,215	6,462	4,950

TABLE A-72

Revenues
Haines - Skagway
Alternative 4C - Monohull Auke Bay
(2016 $000)

Fiscal Year	AADT	Average Road Miles	Highway Fuel Taxes			AMHS Fares			Total Revenues			State Revenues		
										Present Value as of 7/1/18 @			Present Value as of 7/1/18 @	
			Federal (18.4¢/gal)	State (8.95¢/gal)	Total	Annual Average Daily Users	Average Fare Costs/User	Total Fares	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2019	24	4	0	0	0	56	18	367	367	359	355	367	359	355
2020	24	4	0	0	0	56	18	367	367	343	332	367	343	332
2021	24	4	0	0	0	56	18	367	367	328	310	367	327	310
2022	24	4	0	0	0	56	18	367	367	313	290	367	313	290
2023	24	4	0	0	0	56	18	367	367	299	271	367	299	271
2024	24	4	0	0	0	56	18	367	367	285	253	367	285	253
2025	24	4	0	0	0	56	18	367	367	273	237	367	272	236
2026	24	4	0	0	0	56	18	367	367	260	221	367	260	221
2027	24	4	0	0	0	56	18	367	367	249	207	367	248	207
2028	24	4	0	0	0	56	18	367	367	237	193	367	237	193
2029	24	4	0	0	0	56	18	367	367	227	181	367	227	180
2030	24	4	0	0	0	56	18	367	367	217	169	367	216	169
2031	24	4	0	0	0	56	18	367	367	207	158	367	207	158
2032	24	4	0	0	0	56	18	367	367	198	147	367	197	147
2033	24	4	0	0	0	56	18	367	367	189	138	367	189	138
2034	24	4	0	0	0	56	18	367	367	180	129	367	180	129
2035	24	4	0	0	0	56	18	367	367	172	120	367	172	120
2036	24	4	0	0	0	56	18	367	367	164	112	367	164	112
2037	24	4	0	0	0	56	18	367	367	157	105	367	157	105
2038	24	4	0	0	0	56	18	367	367	150	98	367	150	98
2039	24	4	0	0	0	56	18	367	367	143	92	367	143	92
2040	24	4	0	0	0	56	18	367	367	137	86	367	137	86

TABLE A-72

Revenues
Haines - Skagway
Alternative 4C - Monohull Auke Bay
(2016 $000)

Fiscal Year	AADT	Average Road Miles	Highway Fuel Taxes			AMHS Fares			Total Revenues			State Revenues		
										Present Value as of 7/1/18 @			Present Value as of 7/1/18 @	
			Federal (18.4¢/gal)	State (8.95¢/gal)	Total	Annual Average Daily Users	Average Fare Costs/User	Total Fares	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2041	24	4	0	0	0	56	18	367	367	131	80	367	131	80
2042	24	4	0	0	0	56	18	367	367	125	75	367	125	75
2043	24	4	0	0	0	56	18	367	367	119	70	367	119	70
2044	24	4	0	0	0	56	18	367	367	114	65	367	114	65
2045	24	4	0	0	0	56	18	367	367	109	61	367	109	61
2046	24	4	0	0	0	56	18	367	367	104	57	367	104	57
2047	24	4	0	0	0	56	18	367	367	99	53	367	99	53
2048	24	4	0	0	0	56	18	367	367	95	50	367	95	50
2049	24	4	0	0	0	56	18	367	367	91	47	367	90	47
2050	24	4	0	0	0	56	18	367	367	86	44	367	86	44
2051	24	4	0	0	0	56	18	367	367	83	41	367	83	41
2052	24	4	0	0	0	56	18	367	367	79	38	367	79	38
2053	24	4	0	0	0	56	18	367	367	75	36	367	75	36
2054	24	4	0	0	0	56	18	367	367	72	33	367	72	33
Total			11	5	16			13,209	13,226	6,468	4,954	13,215	6,462	4,950

Revenues
Haines - Skagway
Alternative 4D - Monohull Berners Bay
(2016 $000)

Fiscal Year	AADT	Average Road Miles	Highway Fuel Taxes			AMHS Fares			Total Revenues			State Revenues		
										Present Value as of 7/1/18 @			Present Value as of 7/1/18 @	
			Federal (18.4¢/gal)	State (8.95¢/gal)	Total	Annual Average Daily Users	Average Fare Costs/User	Total Fares	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return	Total	4.7% State Govt Opportunity Cost	7.0% Private Sector Rate of Return
2019	24	4	0	0	0	56	18	367	367	359	355	367	359	355
2020	24	4	0	0	0	56	18	367	367	343	332	367	343	332
2021	24	4	0	0	0	56	18	367	367	328	310	367	327	310
2022	24	4	0	0	0	56	18	367	367	313	290	367	313	290
2023	24	4	0	0	0	56	18	367	367	299	271	367	299	271
2024	24	4	0	0	0	56	18	367	367	285	253	367	285	253
2025	24	4	0	0	0	56	18	367	367	273	237	367	272	236
2026	24	4	0	0	0	56	18	367	367	260	221	367	260	221
2027	24	4	0	0	0	56	18	367	367	249	207	367	248	207
2028	24	4	0	0	0	56	18	367	367	237	193	367	237	193
2029	24	4	0	0	0	56	18	367	367	227	181	367	227	180
2030	24	4	0	0	0	56	18	367	367	217	169	367	216	169
2031	24	4	0	0	0	56	18	367	367	207	158	367	207	158
2032	24	4	0	0	0	56	18	367	367	198	147	367	197	147
2033	24	4	0	0	0	56	18	367	367	189	138	367	189	138
2034	24	4	0	0	0	56	18	367	367	180	129	367	180	129
2035	24	4	0	0	0	56	18	367	367	172	120	367	172	120
2036	24	4	0	0	0	56	18	367	367	164	112	367	164	112
2037	24	4	0	0	0	56	18	367	367	157	105	367	157	105
2038	24	4	0	0	0	56	18	367	367	150	98	367	150	98
2039	24	4	0	0	0	56	18	367	367	143	92	367	143	92
2040	24	4	0	0	0	56	18	367	367	137	86	367	137	86

Revenues
Haines - Skagway
Alternative 4D - Monohull Berners Bay
(2016 $000)

Fiscal Year	AADT	Average Road Miles	Highway Fuel Taxes Federal (18.4¢/gal)	Highway Fuel Taxes State (8.95¢/gal)	Highway Fuel Taxes Total	Annual Average Daily Users	AMHS Fares Average Fare Costs/User	AMHS Fares Total Fares	Total Revenues Total	Total Revenues PV as of 7/1/18 @ 4.7% State Govt Opportunity Cost	Total Revenues PV as of 7/1/18 @ 7.0% Private Sector Rate of Return	State Revenues Total	State Revenues PV as of 7/1/18 @ 4.7% State Govt Opportunity Cost	State Revenues PV as of 7/1/18 @ 7.0% Private Sector Rate of Return
2041	24	4	0	0	0	56	18	367	367	131	80	367	131	80
2042	24	4	0	0	0	56	18	367	367	125	75	367	125	75
2043	24	4	0	0	0	56	18	367	367	119	70	367	119	70
2044	24	4	0	0	0	56	18	367	367	114	65	367	114	65
2045	24	4	0	0	0	56	18	367	367	109	61	367	109	61
2046	24	4	0	0	0	56	18	367	367	104	57	367	104	57
2047	24	4	0	0	0	56	18	367	367	99	53	367	99	53
2048	24	4	0	0	0	56	18	367	367	95	50	367	95	50
2049	24	4	0	0	0	56	18	367	367	91	47	367	90	47
2050	24	4	0	0	0	56	18	367	367	86	44	367	86	44
2051	24	4	0	0	0	56	18	367	367	83	41	367	83	41
2052	24	4	0	0	0	56	18	367	367	79	38	367	79	38
2053	24	4	0	0	0	56	18	367	367	75	36	367	75	36
2054	24	4	0	0	0	56	18	367	367	72	33	367	72	33
Total			11	5	16			13,209	13,226	6,468	4,954	13,215	6,462	4,950

TABLE A-74

Present Value of Project Costs
as of 7/1/18
@ 7.0% Private Sector Rate of Return
(2016 $000)

Alternative	Total Funds Capital Costs	Total Funds Operating Costs	Total Funds Total Costs	Total Funds Revenue	Total Funds Net Costs	State Funds Capital Costs	State Funds Operating Costs	State Funds Total Costs	State Funds Revenue	State Funds Net Costs
1 - No Action	80,033	246,795	326,828	(109,006)	217,822	7,227	246,795	254,022	(108,995)	145,027
1B - Enhanced Service	168,809	358,729	527,538	(150,627)	376,911	15,243	358,729	373,973	(150,611)	223,362
2B - East Lynn Highway	557,534	269,980	827,514	(130,909)	696,605	50,345	269,980	320,325	(129,290)	191,035
3 - West Lynn Highway	491,692	279,675	771,367	(152,668)	618,699	44,400	279,675	324,075	(151,428)	172,647
4A - Fast Ferry Auke Bay	241,813	379,595	621,408	(162,927)	458,481	21,836	379,595	401,431	(162,912)	238,519
4B - Fast Ferry Berners Bay	307,390	375,452	682,842	(199,891)	482,950	27,757	375,452	403,210	(199,749)	203,461
4C - Monohull Auke Bay	141,379	284,951	426,330	(123,308)	303,023	23,931	284,951	308,883	(123,295)	185,587
4D - Monohull Berners Bay	166,675	298,324	464,999	(185,813)	279,186	24,064	298,324	322,388	(185,669)	136,719

TABLE A-75

Lynn Canal
Vehicle Link Volume
by Vessel
2012-2015

		Mainliners				
	Fairweather	Columbia	Matanuska	Taku	Total	Malaspina
2012						
Juneau - Haines	45	3,234	1,918	228	5,380	4,681
Haines - Juneau	90	3,350	2,252	217	5,819	4,485
Juneau - Skagwa	31				0	
Skagway - Junea	17			35	35	
2013						
Juneau - Haines	449	2,060	1,621	1,566	5,247	5,155
Haines - Juneau	458	2,202	2,038	1,626	5,866	4,988
Juneau - Skagway					0	
Skagway - Junea	38				0	
2014						
Juneau - Haines	336	1,321	1,514	996	3,831	5,400
Haines - Juneau	375	1,695	1,713	733	4,141	5,217
Juneau - Skagwa	44				0	
Skagway - Junea	42		26	71	97	
2015						
Juneau - Haines		1,957	1,414	1,742	5,113	3,566
Haines - Juneau		2,047	1,498	1,058	4,603	3,654
Juneau - Skagway					0	
Skagway - Juneau				372	372	
Total 2012 - 2015	1,925	17,866	13,994	8,644	40,504	37,146

Source: *Annual Traffic Volume Report 2012* through *2015* , Alaska Marine Highway System, Department of Transportation & Public Facilities, State of Alaska.

TABLE A-76

Lynn Canal
Stateroom & Passenger Services Revenue per Vehicle
by Vessel
FY 2012-2015
($ 000)

		Mainliners					Anchorage CPI-U	
	Fairweather	Columbia	Matanuska	Taku	Total	Malaspina	End of FY	2016 Change
FY 2012								
Staterooms[1]	0.0	108.9	98.7	0.5	208.1	79.4		
Passenger Services[1]	14.7	90.5	97.3	1.0	188.8	440.2	205.92	5.79%
Total	14.7	199.4	196.0	1.5	396.9	519.6		
FY 2013								
Staterooms[1]	0.0	210.4	115.1	17.0	342.5	99.1		
Passenger Services[1]	9.3	112.5	74.5	16.6	203.6	407.4	212.38	2.57%
Total	9.3	322.9	189.6	33.6	546.1	506.5		
FY 2014								
Staterooms[1]	0.0	72.5	80.3	51.0	203.8	327.1		
Passenger Services[1]	8.8	43.1	62.9	64.5	170.5	210.1	215.81	0.94%
Total	8.8	115.6	143.2	115.5	374.3	537.2		
FY 2015								
Staterooms[1]	0.0	135.1	50.4	63.8	249.3	343.0		
Passenger Services[1]	1.4	6.4	41.3	121.6	169.3	279.6	216.91	0.42%
Total	1.4	141.5	91.7	185.4	418.6	622.6		
FY 2012-2015 Revenue ($ 2016)								
Staterooms	0.0	526.9	344.5	132.3	1,003.7	848.6		
Passenger Services	35.4	261.1	284.3	205.3	750.7	1,376.4	217.83	
Total	35.4	788.0	628.8	337.6	1,754.4	2,225.0		
FY 2013-2016 Alcohol & Retail Sales proportion of Passenger Services Revenue[2]	15.6%	17.7%	12.5%	15.7%	15.2%	14.5%		
FY 2012-2015 Revenue ($ 2016), Net of Alcohol & Retail Sales								
Staterooms	0.0	526.9	344.5	132.3	1,003.7	848.6		
Passenger Services	29.9	215.0	248.9	173.1	636.9	1,176.4		
Total	29.9	741.9	593.4	305.4	1,640.6	2,025.0		
Vehicle Link Volume	1,925	17,866	13,994	8,644	40,504	37,146		
FY 2012-2015 Revenue per Vehicle ($ 2016)								
Staterooms	0				25	23		
Passenger Services	16				16	32		
Total	16				41	55		

Notes:

1. *Juneau Access Improvements Project, Preliminary Final Supplemental Environmental Impact Statement, Revised Appendix BB, Revenues and Expenditures Report for Lynn Canal, Fiscal Years 2005-2015* , prepared for Alaska Department of Transportation & Public Facilities, HDR, April 2017.

2. July 1, 2012 to June 30, 2016 net sales by vessel by sales category, including rooms & passage from spreadsheet, titled "Summary by Store" and tabbed as "On-Board Sales", attached to August 16, 2017 email from Jim Calvin, McDowell Group, to Milt Barker.

TABLE A-77

Annual Traffic Proportions
by Vessel Type
FY 2019-2054

Alternative	Vessel Types, excluding Shuttles: ACF (Day Boat) & FVF JUN-HNS	ACF (Day Boat) & FVF JUN-SGY	ACF (Day Boat) & FVF Average	Mainliners JUN-HNS	Mainliners JUN-SGY	Mainliners Average	Malaspina (Day Boat) JUN-HNS	Malaspina (Day Boat) JUN-SGY	Malaspina (Day Boat) Average	All, except Shuttles	Seasonal Traffic[3] JUN-HNS	Seasonal Traffic[3] JUN-SGY
1 - No Action												
Seasonal Capacity (by Link)												
Summer Capacity[1]	45	45		21	21						65%	64%
Winter Capacity[2]	23	23		8	8						35%	36%
Average Annual Capacity[4] (by Link)	38	37		17	17						100%	100%
Annual Traffic[5]	63%	37%	100%	63%	37%	100%						
Lynn Canal Average Annual Capacity[6]			37			17				54		
Annual Traffic, by Vessel Type[7]			69%			31%				100%		
1B - Enhanced Service												
Seasonal Capacity (by Link)												
Summer Capacity[1]	53	53		21	21		13	151			72%	80%
Winter Capacity[2]	23	23		8	8						28%	20%
Average Annual Capacity[4] (by Link)	44	47		18	19		9	120			100%	100%
Annual Traffic[5]	54%	46%	100%	54%	46%	100%	54%	46%	100%			
Lynn Canal Average Annual Capacity[6]			46			18			60	124		
Annual Traffic, by Vessel Type[7]			37%			15%			49%	100%		
2B - East Lynn Highway (Annual Traffic, by Vessel Type)			0%			0%			0%	0%		
3 - West Lynn Highway (Annual Traffic, by Vessel Type)			0%			0%			0%	0%		
4A - Fast Ferry Auke Bay												
Seasonal Capacity (by Link)												
Summer Capacity[1]	124	124		21	21						65%	65%
Winter Capacity[2]	62	62		8	8						35%	35%
Average Annual Capacity[4] (by Link)	102	102		17	17						100%	100%
Annual Traffic[5]	55%	45%	100%	55%	45%	100%						
Lynn Canal Average Annual Capacity[6]			102			17				119		
Annual Traffic, by Vessel Type[7]			86%			14%				100%		
4B - Fast Ferry Berners Bay												
Seasonal Capacity (by Link)												
Summer Capacity[1]	212	212		21	21						72%	72%
Winter Capacity[2]	106	106		8	8						28%	28%
Average Annual Capacity[4] (by Link)	182	183		18	18						100%	100%
Annual Traffic[5]	55%	45%	100%	55%	45%	100%						
Lynn Canal Average Annual Capacity[6]			182			18				200		
Annual Traffic, by Vessel Type[7]			91%			9%				100%		

TABLE A-77

Annual Traffic Proportions
by Vessel Type
FY 2019-2054

Alternative	Vessel Types, excluding Shuttles: ACF (Day Boat) & FVF JUN-HNS	ACF (Day Boat) & FVF JUN-SGY	ACF (Day Boat) & FVF Average	Mainliners JUN-HNS	Mainliners JUN-SGY	Mainliners Average	Malaspina (Day Boat) JUN-HNS	Malaspina (Day Boat) JUN-SGY	Malaspina (Day Boat) Average	All, except Shuttles	Seasonal Traffic[3] JUN-HNS	Seasonal Traffic[3] JUN-SGY
4C - Monohull Auke Bay												
Seasonal Capacity (by Link)												
Summer Capacity[1]	106	106		21	21						66%	65%
Winter Capacity[2]	53	53		8	8						34%	35%
Average Annual Capacity[4] (by Link)	88	88		17	17						100%	100%
Annual Traffic[5]	56%	44%	100%	56%	44%	100%						
Lynn Canal Average Annual Capacity[6]			88			17				104		
Annual Traffic, by Vessel Type[7]			84%			16%				100%		
4D - Monohull Berners Bay												
Seasonal Capacity (by Link)												
Summer Capacity[1]	212	212		21	21						78%	79%
Winter Capacity[2]	53	53		8	8						22%	21%
Average Annual Capacity[4] (by Link)	178	178		18	18						100%	100%
Annual Traffic[5]	56%	44%	100%	56%	44%	100%						
Lynn Canal Average Annual Capacity[6]			178			18				196		
Annual Traffic, by Vessel Type[7]			91%			9%				100%		

Notes:

1. Table A-13. Capacity is average daily round-trip vehicle capacity.
2. Table A-14. Capacity is average daily round-trip vehicle capacity.
3. Table A-6 for Juneau-Haines and Table A-10 for Juneau-Skagway.
4. Annual weighted-average daily round-trip vehicle capacity, weighted by seasonal traffic.
5. Table A-4.
6. Annual weighted-average daily round-trip vehicle capacity for both links, JUN-HNS and JUN-SGY, weighted by each link's percentage of annual traffic.
7. Assumes traffic proportions by vessel type are the same as the capacity proportions by vessel type.

TABLE A-78

Lynn Canal
Stateroom & Passenger Services Revenue per Vehicle
FY 2019-2054
(2016 $000)

	Vessel Types, excluding Shuttles			
	ACF (Day Boat) & FVF[1]	Mainliners	Malaspina (Day Boat)[2]	Average
FY 2012-2015 Revenue per Vehicle ($ 2016)				
Staterooms	$ 0	$ 25	$ 0	
Passenger Services	16	16	32	
Total	$ 16	$ 41	$ 32	
Alternative				
1 - No Action				
Annual Traffic, by Vessel Type[3]	69%	31%	0%	
Average Revenue per Vehicle				$ 23
1B - Enhanced Service				
Annual Traffic, by Vessel Type[3]	37%	15%	49%	
Average Revenue per Vehicle				$ 27
2B - East Lynn Highway	0%	0%	0%	$ 0
3 - West Lynn Highway	0%	0%	0%	$ 0
4A - Fast Ferry Auke Bay				
Annual Traffic, by Vessel Type[3]	86%	14%	0%	
Average Revenue per Vehicle				$ 19
4B - Fast Ferry Berners Bay				
Annual Traffic, by Vessel Type[3]	91%	9%	0%	
Average Revenue per Vehicle				$ 18
4C - Monohull Auke Bay				
Annual Traffic, by Vessel Type[3]	84%	16%	0%	
Average Revenue per Vehicle				$ 20
4D - Monohull Berners Bay				
Annual Traffic, by Vessel Type[3]	91%	9%	0%	
Average Revenue per Vehicle				$ 18

Notes:
1. ACF (Day Boat) and FVF revenue assumed to equal Fairweather FY 2012-2015 revenue per vehicle ($ 2016) from Table A-76.
2. Malaspina (Day Boat) revenue assumed to equal Malaspina FY 2012-2015 revenue per vehicle ($ 2016), excluding stateroom revenues from Table A-76.

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