Alaska Railroad Corporation
Pension Plan

January 1, 2020 Actuarial Valuation
For Calendar Year 2020 Funding

Final Results

June 12, 2020

ACTUARIAL VALUATION

ALASKA RAILROAD CORPORATION PENSION PLAN

We are pleased to present the results of our January 1, 2020 actuarial valuation of the Alaska Railroad Corporation (ARRC) Pension Plan (Plan).

The purpose of this valuation is to:

- Determine the Plan's January 1, 2020 Funded Status, and
- Calculate the 2020 calendar year Actuarially Determined Contribution.

The information in this report may not be appropriate for purposes other than Plan funding but may be useful to ARRC for the Plan's financial management. Future valuations may differ significantly if ARRC's experience differs from the assumptions or if there are changes in plan design, actuarial methods or actuarial assumptions. The project scope did not include an analysis of this potential variation.

The valuation is based on the Plan's benefit provisions summarized in Section 8, participant data, and on the Plan's financial information, all furnished by ARRC. We reviewed the financial and participant data for reasonableness, including comparing to prior year data, but did not perform an audit.

Effective December 31, 2014 and 2015, the Plan and ARRC respectively are required to account for the Plan and its obligations in accordance with GASB Statements 67 and 68. The required accounting information for December 2020 will be provided separately.

To the best of our knowledge, this report is complete and accurate and has been conducted using generally accepted actuarial principles and practices. As members of the American Academy of Actuaries, meeting Academy Qualification Standards, we certify the actuarial results and opinions herein.

Respectfully submitted,

Mary Elizabeth Redding

Mary Elizabeth Redding, FSA, MAAA, EA, FCA
Vice President
Bartel Associates, LLC
June 12, 2020

Katherine Moore

Katherine Moore, ASA, MAAA
Associate Actuary
Bartel Associates, LLC
June 12, 2020

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SECTION 1
EXECUTIVE SUMMARY

Following are the valuation results. See discussion following the tables. (Note that numbers throughout the report may not add due to rounding.)

($ amounts in millions)

	January 1, 2020	January 1, 2019	% change
■ **Participant Counts**			
• Actives	602	588	2%
• Layoffs	69	58	19%
• Deferred (Vested and Refund)	375	365	3%
• Retirees, Disabled & Beneficiaries	313	296	6%
• Total	1,359	1,307	4%
■ **Projected Payroll for Contribution Year**	$ 51.79	$ 48.71	6%
■ **Assets**			
• Market Value of Assets	$ 211.84	$ 177.87	19%
• Approximate Annual Rate of Return	18.3%	(4.3%)	
• Actuarial Value of Assets	$ 205.21	$ 191.52	7%
• Approximate Annual Rate of Return	6.6%	4.9%	
■ **Plan Funded Status**			
• Actuarial Accrued Liability	$ 237.06	$ 227.54	4%
• Actuarial Value of Plan Assets	205.21	191.52	7%
• Unfunded Actuarial Accrued Liability	31.86	36.03	(12%)
• Funded Ratio, Actuarial Value Basis	86.6%	84.2%	3%
• Funded Ratio, Market Value Basis	89.4%	78.2%	14%

	2020	2019	% change
■ **Actuarially Determined Contribution (ADC) – End of Year**			
• Total Normal Cost plus Expenses	$ 6.77	$ 6.77	(0%)
- as a % of expected payroll	13.07%	13.90%	(6%)
• Expected Employee Contributions	$ 4.83	$ 4.54	6%
- as a % of expected payroll	9.32%	9.32%	0%
• Net Employer Normal Cost	$ 1.94	$ 2.23	(13%)
• Amortization of Unfunded Liability	2.68	2.99	(10%)
• Total Employer ADC	4.62	5.22	(12%)
- as a % of expected payroll	8.92%	10.72%	(17%)

Discussion of Plan Risks

Actuarial Standard of Practice No. 51, Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions, requires the actuary to assess and disclose the risk that actual future measurements may differ significantly from expected future measurements. This plan is not considered a mature pension plan since less than half of its liabilities are for retirees.

($ amounts in millions)

	January 1, 2020	January 1, 2019
■ **Risk Measures – Market Value of Assets**		
• Actuarial Accrued Liability	$ 237.06	$ 227.54
• Market Value of Assets	211.84	177.87
• Unfunded AAL (on MVA)	25.22	49.67
• Funded Ratio (MVA/AAL)	89.4%	78.2%
• UAAL (on MVA)/Payroll	48.7%	102.0%
■ **Payroll for Year Following Valuation Date**	$ 51.79	$ 48.71
■ **Risk Measures – Actuarial Value of Assets**		
• Actuarial Accrued Liability	$ 237.06	$ 227.54
• Actuarial Value of Assets	205.21	191.52
• Unfunded AAL (on AVA)	31.86	36.03
• Funded Ratio (AVA/AAL)	86.6%	84.2%
• UAAL (on AVA)/Payroll	61.5%	74.0%
■ **Volatility Ratios**		
Commentary: Higher volatility ratios mean that changes in plan assets have a larger impact on contributions than for lower ratios.		
• Asset Volatility Index (MVA/Payroll)	4.1	3.7
• Liability/Full funding Volatility Index (AAL/Payroll)	4.6	4.7
• Maturity Ratio (Inactive Count/Total Count)	50.6%	50.6%
• Maturity Ratio (Inactive AAL/Total AAL)	44.7%	43.8%
■ **Risk Measures – Cash Flow Ratios**		
Commentary: Contributions larger than benefit payments mean the plan has a positive cash flow. A negative cash flow may amplify investment risk.		
• Benefit Payments & Expenses /Market Value of Assets	4.7%	4.0%
• (Contributions minus benefit payments & expenses)/MVA	0.8%	0.3%
• (Benefit payments & expenses)/contributions	86.2%	93.4%

Risks that this plan is subject to include:

- Investment risk (the potential that investment returns will be different than expected);
- Asset/liability mismatch risk (the potential that changes in asset values are not matched by changes in the value of liabilities);
- Longevity and other demographic risks (the potential that mortality or other demographic experience will be different than expected);
- Contribution risk (the potential that contributions will not be paid to the plan as necessary); and
- Lump sum risk. A large number of inactive employees are eligible to withdraw the value of their contributions upon request, which could cause a negative cash flow. Approximately $14M of employee contribution account balances are eligible for immediate withdrawal. Only about $5 million could be withdrawn without reducing the total value of pension benefits to be received.

While these risks are inter-related, we believe investment risk is the most significant, since poor returns reduce the plan's funded status and increase required contributions. The potential variability in investment returns could produce much larger changes in recommended plan contributions than could be caused by other demographic factors.

The scope of this valuation did not include a risk assessment – a numerical evaluation of the potential impacts of these factors on the plan's funded status or projected employer contributions. However, we have included a table of expected benefit payments for the next 20 years to assist in the plan's management, as well as charts showing historical information in the separate Dashboard.

SECTION 1
EXECUTIVE SUMMARY

Purpose of Actuarial Valuation

The actual costs of a defined benefit plan are determined entirely by the amount of the benefit promise, the actual salaries and service of the plan participants, and how long they and their beneficiaries live to receive payments. An actuarial valuation is a mathematical model which attempts to quantify this actual cost by setting assumptions that will predict reality as closely as possible. In addition, the actuarial funding methodology provides a reasonable plan, or method, towards funding the expected plan costs in a logical manner taking into account the often conflicting needs of stakeholders.

The information in this report on the valuation is to assist the ARRC in making informed decisions regarding Plan, benefits and investments.

Discussion of Results

Changes since the prior valuation and their effects on the Plan's unfunded actuarial accrued liability are detailed in Section 5 of the report.

During 2019, Plan investments earned approximately 18.3% on a market value basis and 6.6% on the smoothed actuarial asset value basis used to determine the Plan's contribution amount. This actuarial loss on the smoothed actuarial value of assets increased the unfunded actuarial accrued liability by approximately $1.2 million. There was also a net gain of approximately $1.2 million due to demographic experience being more favorable overall than assumed in the prior valuation.

Actuarial Assumptions and Methods

The actuarial valuation was performed using the actuarial assumptions and methods selected by the ARRC or recommended by Bartel Associates.

- Discount rate: The discount rate remained unchanged at 7.25%. The 7.25% discount rate was selected by the ARRC. Bartel Associates believes it is reasonable. We estimate that a passively managed portfolio with a similar asset allocation would exceed 7.25% investment return about 40%-45% of the time.
- Mortality: The mortality tables were updated based on the 2013-2017 Alaska PERS experience study for non-teachers, to reflect the tables as implemented by Alaska PERS. This assumption was selected to reflect current and recent observed mortality among a group similar to the ARRC population. Continuous future improvement in longevity is reflected by applying the Society of Actuaries' most current fully generational projection Scale MP-2019 beginning from the date of the State plan's experience study.
- Expenses: The administrative expenses assumption was changed from $400,000 per year to $325,000 per year based on recent experience.

Overall, we believe the actuarial assumptions selected for this valuation are reasonable and appropriate. We will continue to monitor them in the future.

Accounting

Effective December 31, 2014 and 2015, the Plan and ARRC respectively were required to account under GASB Statements 67 and 68. Plan and Employer accounting information is not included in this report.

SECTION 2
LIABILITY INFORMATION & FUNDED STATUS

A comparison of the Present Value of Benefits, Actuarial Accrued Liability, Employer Normal Cost, and the Funded Ratio for the current and prior valuations are shown below.

	January 1, 2020	January 1, 2019
Present Value of Projected Benefits		
• Active Employees	$ 179,172,623	$ 175,424,454
• Deferred Participants	17,988,222	17,308,248
• Service Retirees	82,179,183	76,864,002
• Disabled Participants	909,718	603,976
• Beneficiaries	4,789,724	4,838,558
• Total	285,039,471	275,039,238
Actuarial Accrued Liability		
• Active Employees	$ 131,197,235	$ 127,928,030
• Deferred Participants	17,988,222	17,308,248
• Service Retirees	82,179,183	76,864,002
• Disabled Participants	909,718	603,976
• Beneficiaries	4,789,724	4,838,558
• Total	237,064,083	227,542,814

	2020	2019
Normal Cost (payable end of contribution year)		
• Total Normal Cost	$ 6,443,694	$ 6,370,026
• Expected Expenses	325,000	400,000
• Employee Normal Cost	(4,826,839)	(4,540,492)
• Total Employer Normal Cost	1,941,855	2,229,534

	January 1, 2020	January 1, 2019
Plan Funded Status		
• Total Actuarial Accrued Liability	$ 237,064,083	$ 227,542,814
• Actuarial Value of Assets	205,207,593	191,515,238
• Unfunded Actuarial Accrued Liability	31,856,490	36,027,576
• Funded Ratio	86.6%	84.2%

SECTION 3
ASSET INFORMATION

Assets for the Plan are held in trust. Trust monies may be used to pay benefits to Plan participants and their beneficiaries. The trust is managed under the direction of ARRC. Asset information is provided by the ARRC, and has been audited.

Asset Reconciliation – Market Value of Assets

Following reconciles the January 1, 2018 through December 31, 2019 market value of assets.

	2019	2018
■ Beginning of Year Balance:	$ 177,871,494	$ 185,423,712
■ Additions		
• Employee Contributions	4,476,526	4,340,511
• Employer Contributions	5,219,810	3,555,037
• Investment Income	32,627,961	(8,075,058)
• Total Additions	42,324,297	(179,511)
■ Deductions		
• Benefit Payments	(8,085,839)	(7,061,725)
• Administrative and Investment Consulting Expenses	(269,365)	(310,982)
• Total Deductions	(8,355,204)	(7,372,707)
■ Net Assets at End of Year	211,840,588	177,871,494
■ Approximate Return on Assets	18.3%	(4.3%)

SECTION 3
ASSET INFORMATION

Asset Allocation – Market Value of Assets

The target trust asset allocation and the real rates of return of broad asset classes are shown below. This information is provided by the plan's investment advisor, Hyas Group.

	Target Allocation	Real Rate of Return - Intermediate Term	Real Rate of Return - Long Term
■ Cash	0.00%	n/a	n/a
■ US TIPS	5.00%	2.80%	1.94%
■ Total Bond Return	13.00%	2.70%	2.43%
■ Global Bond	5.00%	3.05%	2.43%
■ High Yield Bond	7.00%	4.72%	3.88%
■ Domestic Large Cap	20.00%	4.87%	6.80%
■ Domestic Mid Cap	12.00%	5.60%	7.77%
■ Domestic Small Cap	8.00%	5.85%	8.74%
■ International Equity	13.00%	5.36%	7.04%
■ Commodities	2.00%	4.62%	1.46%
■ Real Estate	15.00%	5.11%	4.61%

SECTION 3
ASSET INFORMATION

Development of Actuarial Value of Assets

The Actuarial Value of Assets is based upon a five year smoothing of market assets. This method reduces volatility in contribution rates, and also reduces volatility in the size of the actuarial gains and losses due to asset returns.

	2019
■ Market Value of Assets January 1, 2019	$ 177,871,494
• Contributions (Employee + Employer)	9,696,336
• Expected Earnings at 7.25%	12,944,299
• Benefit Payments, Administrative and Investment Consulting Expenses	(8,355,204)
■ Expected Market Value of Assets January 1, 2020	192,156,926
■ Market Value of Assets January 1, 2020	211,840,588
■ Difference between MVA & Expected MVA	19,683,662

Year	**Asset Gain/(Loss)**	**Percentage Not Yet Recognized as of January 1, 2020**	**Amount Not Yet Recognized as of January 1, 2020**
2015	$ (11,179,151)	0%	$ -
2016	628,442	20%	125,688
2017	9,903,108	40%	3,961,243
2018	(22,001,443)	60%	(13,200,866)
2019	19,683,662	80%	15,746,929

(1) Total Amount Not Yet Recognized as of January 1, 2020	6,632,995
(2) Net Market Value of Assets	211,840,588
(3) Preliminary Actuarial Value of Assets (2) – (1)	205,207,593
(4) Minimum: 80% of Market Value	169,472,470
(5) Maximum: 120% of Market Value	254,208,705
(6) Actuarial Value of Assets: (3), but not less than (4) or more than (5)	205,207,593
(7) Approximate return on Actuarial Value of Assets	6.6%

SECTION 4
CONTRIBUTION DEVELOPMENT

Actuarially Determined Contribution

Following is the development of the 2020 Actuarially Determined Contribution. The 2019 Actuarially Determined Contribution, which was calculated in the January 1, 2019 actuarial valuation, is shown for comparison.

Contribution Year	2020	2019
■ Actuarially Determined Contribution at End of Year		
• Total Normal Cost	$ 6,443,694	$ 6,370,026
• Expected Administrative Expenses	325,000	400,000
• Total Normal Cost plus Expected Expenses	6,768,694	6,770,026
• Employee Normal Cost	(4,826,839)	(4,540,492)
• Employer Normal Cost	1,941,855	2,229,534
• Amortization of Unfunded Liability	2,676,916	2,990,276
• Total Employer Actuarially Determined Contribution	4,618,771	5,219,810
■ Projected Payroll for Contribution Year	51,787,103	48,714,889
■ Actuarially Determined Contribution (ADC) (as a percent of Plan payroll)		
• Total Normal Cost	12.44%	13.08%
• Expected Expenses	0.63%	0.82%
• Total Normal Cost plus Expected Expenses	13.07%	13.90%
• Employee Normal Cost	(9.32%)	(9.32%)
• Employer Normal Cost	3.75%	4.58%
• Amortization of Unfunded Liability	5.17%	6.14%
• Total Employer Actuarially Determined Contribution	8.92%	10.72%

Amortization of the Unfunded Liability

Following is the development of the amortization of the unfunded actuarial accrued liability (UAAL). The UAAL as of January 1, 2018 is amortized as a level dollar payment over a closed 30-year period. Each subsequent year's actuarial gain or loss is amortized over a new closed 30-year period, also as a level dollar payment. This methodology is a change from prior valuations that amortized the entire UAAL over a rolling (open) 30-year period.

Note that neither the current or previous amortization methods created "negative amortization." Each year's amortization payment is greater than interest on the unfunded actuarial accrued liability.

	Original Amortization Bases			Remaining on 1/1/2020		Amortization Payment
Amortization Bases	**Established**	**Years**	**Amount**	**Years**	**Balance**	**2020**
1/1/18 UAAL	1/1/2018	30	$16,368,649	28	$ 16,032,610	$ 1,352,984
1/1/19 (Gain)/Loss	1/1/2019	30	19,817,232	29	19,616,689	1,637,292
1/1/20 (Gain)/Loss	1/1/2020	30	(3,792,809)	30	(3,792,809)	(313,360)
Total					31,856,490	2,676,916
Average Amortization Period						28.4 years

SECTION 4
CONTRIBUTION DEVELOPMENT

History of the Plan's Unfunded Actuarial Accrued Liability, Funded Ratio and Employer Contribution Rate

Actuarial Valuation Date	Actuarial Value of Assets	Actuarial Accrued Liability (AAL)	Unfunded AAL (UAAL)	Funded Ratio	Covered Payroll	UAAL as a Percentage of Covered Payroll	Employer Contribution Rate
1/1/03	$32,236,064	$37,541,025	$5,304,961	85.9%	$27,688,122	19.2%	N/A
1/1/04	43,568,440	44,757,340	1,188,900	97.3%	29,421,548	4.0%	N/A
1/1/05	51,322,172	46,274,709	(5,047,463)	110.9%	32,863,198	(15.4%)	N/A
1/1/06	57,459,341	50,299,124	(7,160,217)	114.2%	37,120,396	(19.3%)	N/A
1/1/07	65,582,100	57,283,541	(8,298,559)	114.5%	41,255,145	(20.1%)	N/A
1/1/08	73,717,628	65,890,057	(7,827,571)	111.9%	44,540,883	(17.6%)	N/A
1/1/09	76,615,182	75,114,597	(1,500,585)	102.0%	46,949,899	(3.2%)	N/A
1/1/10	82,425,351	82,970,543	545,192	99.3%	42,465,701	1.3%	N/A
1/1/11	89,611,949	93,673,671	4,061,722	95.7%	41,264,027	9.8%	N/A
1/1/12	97,024,758	105,859,391	8,834,633	91.7%	45,375,178	19.5%	7.88%
1/1/13	106,584,265	117,581,833	10,997,568	90.6%	45,871,632	24.0%	8.46%
1/1/14	124,171,611	127,804,753	3,633,142	97.2%	43,443,084	8.4%	7.59%
1/1/15	139,733,803	145,595,222	5,861,419	96.0%	45,547,057	12.9%	7.84%
1/1/16	152,530,430	173,498,173	20,967,743	87.9%	48,272,671	43.4%	8.62%
1/1/17	166,955,835	187,001,607	20,045,772	89.3%	47,764,910	42.0%	8.48%
1/1/18	182,280,181	198,648,830	16,368,649	91.8%	47,502,461	34.5%	7.69%
1/1/19	191,515,238	227,542,814	36,027,576	84.2%	48,714,889	74.0%	10.72%
1/1/20	205,207,593	237,064,083	31,856,490	86.6%	51,787,103	61.5%	8.92%

SECTION 5
ACTUARIAL GAIN/LOSS ANALYSIS

The gain/loss analysis of Plan assets, actuarial liability, and unfunded actuarial liability for the one year period between valuation dates is shown below.

	Actuarial Accrued Liability (Gain)/Loss	Actuarial Value of Assets Gain/(Loss)	Unfunded Accrued Liability (Gain)/Loss
■ **January 1, 2019 Actual Value**	$227,542,814	$191,515,238	$36,027,576
■ **January 1, 2020 Expected Value**	242,035,872	206,386,573	35,649,299
• 1/1/20 Retiree COLA (1.15%) less than expected	(203,387)	-	(203,387)
• Mortality change (to conform to Alaska PERS experience study and change to Scale MP-2019)	(3,600,419)	-	(3,600,419)
• Demographic gain	(1,167,983)	-	(1,167,983)
• Investment return less than expected on smoothed basis	-	(1,178,980)	1,178,980
■ **Total Gain or Loss**	(4,971,789)	(1,178,980)	(3,792,809)
■ **January 1, 2020 Actual Value**	237,064,083	205,207,593	31,856,490

■ **Sources of Demographic (Gain) or Loss**	
• Salary lower than expected	$ (224,285)
• Mortality different than expected	(631,264)
• Retirement timing different than expected	63,046
• Termination of employment different than expected	152,460
• Terminations from active status taking less valuable lump sums	(441,734)
• Vested participants not withdrawing contributions	(80,604)
• Other	(5,602)
■ **Total Demographic Gain (0.5% of expected AAL)**	(1,167,983)

SECTION 6
NORMAL COST BY TIER

Normal Cost by Tier

Following is the 2020 Normal Cost split by tier. Expenses are allocated in proportion to total Normal Cost.

	Tier 1	Tier 2	Total
■ Active Count at 1/1/2019	520	126	646
■ Active Count at 1/1/2020	484	187	671
■ 2020 Normal Cost at End of Year			
• Total Normal Cost	$5,338,911	$1,104,783	$6,443,694
• Expected Expenses	269,278	55,722	325,000
• Total Normal Cost plus Expected Expenses	5,608,190	1,160,505	6,768,694
• Employee Normal Cost	(3,843,602)	(983,237)	(4,826,839)
• Employer Normal Cost	1,764,588	177,268	1,941,855
■ Projected Payroll for Contribution Year	41,237,969	10,549,134	51,787,103
■ 2020 Normal Cost (as percent of plan payroll)			
• Total Normal Cost	12.95%	10.47%	12.44%
• Expected Expenses	0.65%	0.53%	0.63%
• Total Normal Cost plus Expected Expenses	13.60%	11.00%	13.07%
• Employee Normal Cost	(9.32%)	(9.32%)	(9.32%)
• Employer Normal Cost	4.28%	1.68%	3.75%

SECTION 7
PROJECTED BENEFIT PAYMENTS

Projected Benefit Payments

Following is a 20-year projection of the benefit payments as expected in accordance with the valuation assumptions. Total benefit payments include annuity payments plus expected lump sum distributions.

Year	Total Benefit Payments	Annuity Benefit Payments
2020	$12,217,436	$8,133,651
2021	10,117,985	8,979,032
2022	10,779,742	9,922,037
2023	11,602,989	10,836,970
2024	12,491,119	11,827,433
2025	13,562,280	13,011,495
2026	14,694,947	14,119,625
2027	15,812,809	15,379,310
2028	17,087,927	16,536,614
2029	18,215,574	17,826,994
2030	19,842,412	19,070,233
2031	21,008,729	20,384,411
2032	21,986,583	21,619,449
2033	23,442,976	22,810,990
2034	24,367,802	23,945,792
2035	25,547,555	25,085,076
2036	26,550,361	26,203,667
2037	28,069,295	27,351,020
2038	28,930,151	28,431,773
2039	30,448,162	29,448,381

Discount Rate Sensitivity

Following is a sensitivity of the discount rate assumption. The present value of projected benefits, funded status and 2020 ADC are shown under the current valuation assumption of 7.25%. Results are also shown using a 7.00% and 6.75% discount rate sensitivities.

Discount Rate Assumption:	**Current Assumption 7.25%**	**Sensitivity Assumption 7.00%**	**Sensitivity Assumption 6.75%**
■ Present Value of Projected Benefits	$285,039,471	$296,798,021	$309,369,828
■ Plan Funded Status			
• Total Actuarial Accrued Liability	237,064,083	245,342,621	254,072,774
• Actuarial Value of Assets	205,207,593	205,207,593	205,207,593
• Unfunded Actuarial Accrued Liability	31,856,490	40,135,028	48,865,181
• Funded Ratio	86.6%	83.6%	80.8%
■ Actuarially Determined Contribution at End of Year			
• Employer Normal Cost	1,941,855	2,272,035	2,629,120
• Amortization of Unfunded Liability	2,676,916	3,280,199	3,886,212
• Total Employer Actuarially Determined Contribution	4,618,771	5,552,234	6,515,332
■ Projected Payroll for Contribution Year	51,787,103	51,787,103	51,787,103
■ Actuarially Determined Contribution (ADC) (as a percent of Plan payroll)			
• Employer Normal Cost	3.75%	4.39%	5.08%
• Amortization of Unfunded Liability	5.17%	6.33%	7.50%
• Total Employer Actuarially Determined Contribution	8.92%	10.72%	12.58%

SECTION 9
PLAN PROVISIONS SUMMARY

A. Plan Effective Date

Originally adopted September 1, 1985, and most recently restated on January 1, 2016.

B. Plan Year

January 1 to December 31

C. Participation

Tier 1: All non-represented permanent employees and employees of collective bargaining agreements which have an agreement to participate in the Plan and are not Tier 2 participants

Tier 2: Based on group and hire date:

Group[1]	Hire Date
Non-Union	On or after July 1, 2015
ARW	On or after July 1, 2015
TCU	On or after July 1, 2015
UTU	On or after March 4, 2016
IBT	On or after April 26, 2016

D. Employee Contributions

9% of base earnings

E. Cost of Living Increases:

Tier 1: All retirement benefits are adjusted annually by the lesser of 50% of the change in the average U.S. Consumer Price Index for all Urban Consumers (CPI-U) or 6%. The cost of living increase granted in January 2020 was 1.15%.

Tier 2: None

F. Eligibility to Normal Retirement

Tier 1: Age 62 and the earlier of five years of Vesting Service or the tenth anniversary of employment commencement

Tier 2: Age 65 and the earlier of five years of Vesting Service or the tenth anniversary of employment commencement

G. Vesting Service

All completed years and days of employment from hire date to severance date. Non-successive periods are aggregated. Includes temporary absences if return to work within one year, except probationary periods, periods of termination while probationary, and periods of layoff.

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1 ARW -The Alaska Railroad Workers/American Federation of Government Employees, AFL/CIO, Local 183
TCU - Carmen's Division of Transportation, Communication International Union, Lodge No. 6067, AFL/CIO, CLC
UTU - United Transportation Union, Local 1626, AFL/CIO
IBT - Teamsters Union Local 959 of the International Brotherhood of Teamsters

H. Vesting

Five years of Vesting Service

I. Credited Service

All contributory pay periods from participation to severance. Also includes unused sick leave at termination.

J. Final Average Earnings

Highest average earnings over any consecutive three Plan years during which the employee is a participant

UTU 2016 and 2017 pay increased 3.5% for calculating the final average earnings if those years are part of a retiring employee's Final Average Earnings.

K. Normal Retirement Benefit

Tier 1: 2.0% of Final Average Earnings × Credited Service plus

0.5% of Final Average Earnings × Credited Service earned after 2005 and after completing ten years of Credited Service

Tier 2: 2.0% of Final Average Earnings × Credited Service

L. Early Retirement Benefit

Tier 1: Age 55 and five years of Vesting Service.

Tier 2: Age 60 and five years of Vesting Service

The Service Retirement Benefit accrued to date of Early Retirement multiplied by the Early Retirement Factors below:

Retirement Age	Tier 1 Factor	Tier 2 Factor
55	82%	N/A
56	88%	N/A
57	94%	N/A
58	100%	N/A
59	100%	N/A
60	100%	70%
61	100%	76%
62	100%	82%
63	100%	88%
64	100%	94%
65	100%	100%

M. Termination Benefit

Non-vested: Return of contributions plus interest in a lump sum

Vested: Return of contributions plus interest in a lump sum, or a deferred benefit equal to the accrued benefit at termination payable at Normal or Early Retirement Age.

N. Disability Benefit

Service disability with 5 years of Vesting Service

Tier 1:

- Pre 62 Benefit: 40% of the greater of (a) Final Average Earnings, or (b) Earnings during the plan year preceding disability, reduced by any long term disability benefits provided by the employer
- Post 62 Benefit: Normal Retirement Benefit based on Credited Service and Final Average Earnings at date of disability

Tier 2:

- Pre 65 Benefit: Monthly disability benefit equals 2% times Final Average Earnings, times Credited Service, reduced by any long term disability benefits provided by the employer
- Post 65 Benefit: Normal Retirement Benefit based on Credited Service and Final Average Earnings at date of disability

O. Death Benefit – Before Termination or Retirement

Non-vested: Return of contributions plus interest in a lump sum

Vested Tier 1:

- Pre 62 Benefit: 40% of the greater of (a) Final Average Earnings, or (b) Earnings during the plan year in which death occurs
- Post 62 Benefit: benefit that would have been paid under the 100% J&S option, assuming cost of living increases were effective from date of death

Vested Tier 2: Benefit that would have been paid under the 100% J&S option at Normal Retirement based on Credited Service and Final Average Earnings at date of death. Benefit is payable from time of death.

P. Death Benefit – After Termination of a Married Vested Participant

Benefit that would have been paid under the 100% J&S option if participant had terminated, survived to earliest retirement date, and then died. Benefit is payable at the earliest retirement date.

Q. Normal Form of Payment

Straight Life Annuity

R. Optional Forms of Payment

- 100% Joint &Survivor Annuity
- 50% Joint & Survivor Annuity

S. Interest on Employee Contributions

- Tier 1: 4.5% per year after January 1, 2006 (7% per year before January 1, 2006)
- Tier 2: 3 month U.S. Treasury Constant Maturity Yield for the most recent December 31 or June 30. Interest is capped at 4.5% for participants covered under the UTU collective bargaining agreement.

SECTION 10
METHODS AND ASSUMPTIONS

Actuarial Cost Method

The actuarial cost method used for this valuation is the Entry Age Normal method.

The Present Value of Projected Benefits (PVPB) is the present value of all future benefits for current plan participants. It is computed by projecting the total future benefit payments from the plan using actuarial assumptions (i.e. probability of death, termination, or retirement), and discounting the payments to the valuation date using the valuation interest rate to determine the present value.

The Normal Cost is calculated by allocating each employee's PVPB as a level percent of pay from entry through the last expected retirement age. The Actuarial Accrued Liability (AAL) represents the portion of the PVPB attributable to past service and is calculated as the PVPB less the present value of all future Normal Costs.

Funding Policy

The Unfunded Actuarial Accrued Liability (UAAL) is amortized as a level dollar payment. The UAAL as of 1/1/18 is amortized over a closed 30-year period. Each subsequent year's actuarial gain or loss is amortized over a new closed 30-year period.

Contribution rates determined in the valuation are for the calendar year following the valuation date, and are determined as of the end of the year.

Asset Valuation Method

The Actuarial Value of Assets is a 5-year smoothed market value, with an 80% to 120% market value corridor. Gains and losses are recognized over a five year period.

The 5-year smoothed market value method was first adopted for the actuarial valuation as of December 31, 2009. Market value of assets was used in the previous valuations.

Data Quality

ARRC provided participant data as of 1/1/20. We reviewed the data, but did not perform an audit. We had no unresolved concerns and in our opinion, the data was of sufficient quality for use in this actuarial valuation without limitation.

Basis for Assumptions

The base mortality assumptions are based on the 2013-2017 Alaska PERS experience study for non-teachers, since the covered populations are similar. Mortality improvement is based on the Society of Actuaries most current table. All other demographic assumptions are as adopted by ARRC and are the same as determined by an experience study performed by Bartel Associates based on actual experience for the period 2010 through 2014, except for some assumptions which have been updated as noted on the following pages. Inflation is based on our estimate over the plan's very long term time horizon. The discount rate was selected by ARRC. Bartel Associates estimates that a passively managed portfolio with a similar asset allocation would exceed the selected rate about 40%-45% of the time. We have reviewed these assumptions and believe they are reasonable.

SECTION 10
METHODS AND ASSUMPTIONS

Actuarial Assumptions

Assumptions used in the actuarial valuation are the same as used in the 2019 actuarial valuation except where noted.

January 1, 2020 Valuation

■ **Discount Rate**
- 7.25%, net of investment but not administrative expenses

■ **Inflation**
- 2.8%

■ **Cost of Living Allowance**
- 1.4% for Tier 1
- None for Tier 2

■ **Salary Increases**
- 2.8% salary inflation plus
- Merit Increase Rate based on Alaska Railroad Corporation Pension and Post Retirement Health Care Plans 2010-2014 Experience Study. Sample rates:

Service	"Merit" Increase
0	8.00%
1	2.00%
2	6.50%
3	6.50%
4	6.50%
5	2.50%
6-10	1.50%
11-15	1.25%
16+	1.10%

- For UTU retirements between 1/1/2017 and 1/1/2020, salary in 3 final years of employment increased 3.5%

■ **Interest on Employee Contribution Account Balances**
- Tier 1: 4.5%
- Tier 2: 2.8%

■ **Expenses**
- $325,000 payable as of the last day of the plan year
- $400,000 payable as of the last day of the plan year in the prior valuation
- Amounts selected based on actual expenses in recent years

January 1, 2020 Valuation

- **Healthy Post-Retirement Mortality**
  - Society of Actuaries RP-2014 healthy annuitant table, rolled back to 2006 using MP-2014 and projected forward to 2015 using MP-2017, adjusted 91% for males and 96% for females. Based on the 2013-2017 AlaskaPERS Experience Study. Mortality projected fully generational from 2015 with Scale MP-2019.
  - The prior assumption was the Society of Actuaries RP-2014 healthy annuitant table adjusted 91% for males and 96% for females, projected fully generational with Scale MP-2018 from 2014.
  - Sample rates projected to 2020:

	New Assumption		Prior Assumption	
Age	Male	Female	Male	Female
30	0.06%	0.03%	0.05%	0.02%
40	0.07%	0.05%	0.07%	0.04%
50	0.38%	0.26%	0.35%	0.26%
60	0.75%	0.57%	0.72%	0.52%
70	1.58%	1.25%	1.50%	1.18%
80	4.24%	3.53%	3.87%	3.22%
90	13.08%	11.28%	11.88%	10.01%
100	29.03%	27.34%	27.66%	25.37%

- **Post-Retirement Disabled Mortality**
  - Society of Actuaries RP-2014 disabled retiree table rolled back to 2006 using MP-2014 and projected forward to 2015 using MP-2017. Based on the 2013-2017 Alaska PERS Experience Study. Mortality projected fully generational from 2015 with Scale MP-2019.
  - The prior assumption was the Society of Actuaries RP-2014 disabled retiree table projected fully generational with Scale MP-2018 from 2014.
  - Sample rates projected to 2020:

	New Assumption		Prior Assumption	
Age	Male	Female	Male	Female
30	1.06%	0.37%	0.92%	0.34%
40	1.41%	0.68%	1.26%	0.60%
50	2.08%	1.18%	1.96%	1.16%
60	2.83%	1.94%	2.70%	1.77%
70	4.17%	2.85%	3.95%	2.68%
80	7.97%	6.44%	7.29%	5.87%
90	18.30%	14.55%	16.62%	12.92%
100	33.19%	29.26%	31.63%	27.15%

January 1, 2020 Valuation

- **Pre-Retirement Mortality**
  - Society of Actuaries RP-2014 employee mortality table rolled back to 2006 using MP-2014 and projected forward to 2015 using MP-2017. Based on the 2013-2017 Alaska PERS Experience Study. Mortality projected fully generational from 2015 with Scale MP-2019.
  - The prior assumption was the Society of Actuaries RP-2014 employee mortality table projected fully generational with Scale MP-2018 from 2014.
  - Sample rates projected to 2020:

	New Assumption		Prior Assumption	
Age	Male	Female	Male	Female
25	0.06%	0.02%	0.05%	0.02%
30	0.06%	0.03%	0.05%	0.02%
35	0.07%	0.04%	0.06%	0.03%
40	0.08%	0.05%	0.07%	0.04%
45	0.11%	0.07%	0.10%	0.07%
50	0.17%	0.11%	0.16%	0.11%
55	0.28%	0.18%	0.27%	0.17%
60	0.50%	0.28%	0.48%	0.25%

- **Employment Termination**
  - Based on Alaska Railroad Corporation Pension and Post Retirement Health Care Plans 2010-2014 Experience Study. Rates vary based on service
  - Sample rates:

Service	Rate	Service	Rate
0	34.0%	6-7	8.0%
1	28.0%	8-11	6.0%
2	18.0%	12-17	5.0%
3	15.0%	18-19	3.0%
4	12.0%	20+	2.0%
5	10.0%		

January 1, 2020 Valuation

- **Retirement**
  - Tier 1 rates based on Alaska Railroad Corporation Pension and Post Retirement Health Care Plans 2010-2014 Experience Study. Tier 2 rates adjusted for expected later retirements of Tier 2 participants.
  - Rates vary based on age. Sample rates:

Age	Tier 1	Tier 2
55	6.0%	N/A
56	6.0%	N/A
57	12.5%	N/A
58	12.5%	N/A
59	20.0%	N/A
60	20.0%	10.0%
61	20.0%	10.0%
62	25.0%	15.0%
63	15.0%	15.0%
64	20.0%	20.0%
65	15.0%	25.0%
66	15.0%	25.0%
67	25.0%	25.0%
68	25.0%	25.0%
69	25.0%	25.0%
70	100.0%	100.0%

  - Deferred vested members are assumed to retire at age 58 for Tier 1 and age 62 for Tier 2

- **Disability**
  - Alaska PERS disablement rates for members other than Police or Firefighters as there is little Plan experience.
  - Rates vary based on age. Sample rates:

Age	Male	Female
20	0.03%	0.02%
25	0.03%	0.03%
30	0.04%	0.03%
35	0.04%	0.03%
40	0.05%	0.04%
45	0.07%	0.06%
50	0.11%	0.08%
55	0.18%	0.13%
60	0.37%	0.28%

January 1, 2020 Valuation
■ **Marriage** • 75% of employees are assumed to be married. Wives are assumed to be four years younger than husbands.
■ **Optional benefit forms** • All participants are assumed to elect the most beneficial benefit between a life annuity based on the benefit formula or their contribution account balance as a lump sum. For current vested terminated participants who have terminated in the last two years and are calculated to elect the lump sum but who have not yet done so, 50% are assumed to take the lump sum immediately and 50% are assumed to defer the lump sum to age 58 for Tier 1 and age 62 for Tier 2. All other current vested terminated participants who are calculated to elect the lump sum are assumed to defer the lump sum to age 58 for Tier 1 and age 62 for Tier 2.
■ **Sick Leave** • Assume unpaid sick leave at termination is equal to accrued unpaid sick leave on valuation date.
■ **Layoffs** • Based on Alaska Railroad Corporation Pension and Post Retirement Health Care Plans 2010-2014 Experience Study. • Assumed to accrue 0.75 year of service each year after the valuation date.
■ **Limits on Benefits and Compensation** • IRS Limits: Assumed to increase 2.80% per year (CPI)
■ **Other** • Decrements are assumed to occur at the beginning of the year

SECTION 11
PARTICIPANT DATA

Data Summary

Following summarizes participant demographic information for the January 1, 2019 and January 1, 2020 actuarial valuations.

	January 1, 2020	January 1, 2019
Participant Counts		
• Actives	602	588
• Layoffs	69	58
• Deferred Members	375	365
• Service Retirees	280	269
• Disabled Participants	5	2
• Beneficiaries	28	25
• Total	1,359	1,307
Actives		
• Average Age	44.9	45.1
• Average Credited Service (years)[2]	10.8	10.9
• Salary		
➢ Total ($000s)	$ 47,126,000	$ 44,314,000
➢ Average	78,282	75,364
Layoffs		
• Average Age	34.9	36.0
• Average Credited Service (years)[2]	2.2	3.3
• Salary		
➢ Total ($000s)	$ 1,954,000	$ 1,902,000
➢ Average	28,313	32,795
Deferred Members		
• Average Age	44.5	44.1
• Total Contribution Balance ($000s)	$14,252,000	$13,424,000
Retirees, Disabled & Beneficiaries		
• Average Age	67.5	67.2
• Average Service Retirement Age	61.0	61.0
• Average Disabled Retirement Age	50.9	45.0
• Average Monthly Benefit	$ 1,944	$ 1,879

2 Includes sick leave credit

Section 11
Participant Data

Data Reconciliation
January 1, 2019 to January 1, 2020

	Actives	Layoffs	Deferred	Receiving Payments			Total
				Disabled	Benefic.	Retirees	
■ **January 1, 2019**	588	58	365	2	25	269	1,307
• New Entrants	64	23	12	-	-	-	99
• Rehired	15	(13)	(2)	-	-	-	-
• Disabled	-	-	-	-	-	-	-
• Terminated	(21)	(4)	25	-	-	-	-
• Layoff	(7)	9	(2)	-	-	-	-
• Cashed Out	(20)	(3)	(18)	-	-	-	(41)
• Deceased	(1)	-	(1)	-	-	(7)	(9)
• New Beneficiaries	-	-	-	-	2	-	2
• Alternate Payees (QDROs)	-	-	-	-	2	-	2
• Retired	(16)	(1)	(4)	-	-	21	-
• Adjustment	-	-	-	3	(1)	(3)	(1)
■ **January 1, 2020**	602	69	375	5	28	280	1,359

Actives and Layoffs Age/Service/Salary

Following are active and layoff participant counts by age and service groups with average salary.

	Credited Service								
Age	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25-29**	**30 & Over**	**Total Number**	**Average Salary**
Under 25	46	-	-	-	-	-	-	46	$32,671
25-29	44	11	-	-	-	-	-	55	$52,015
30-34	44	14	6	-	-	-	-	64	$57,936
35-39	42	26	20	3	-	-	-	91	$68,638
40-44	31	16	13	23	8	-	-	91	$73,247
45-49	16	25	17	22	11	1	-	92	$84,480
50-54	17	13	20	19	14	12	5	100	$90,099
55-59	10	12	16	19	12	1	10	80	$85,472
60-64	2	11	8	5	4	1	6	37	$90,414
65 & Over	2	6	2	2	3	-	-	15	$75,415
Total Number	254	134	102	93	52	15	21	671	$73,144
Average Salary	$53,822	$75,729	$82,259	$89,067	$98,127	$94,508	$98,434	$73,144	

SECTION 9
PARTICIPANT DATA

Retiree Age/Years of Retirement/Average Monthly Benefit

Following are service retiree and disabled retiree counts and average monthly benefit by age and years retired.

	Years of Retirement								
Age	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25-29**	**30 & Over**	**Total Number**	**Average Benefit**
Under 45	-	-	-	-	-	-	-	-	N/A
45-49	-	1	-	-	-	-	-	1	***
50-54	-	1	-	-	-	-	-	1	***
55-59	25	-	-	-	-	-	-	25	$2,539
60-64	55	21	-	-	-	-	-	76	$2,252
65-69	31	39	12	-	-	-	-	82	$2,226
70-74	9	17	26	4	-	-	-	56	$1,897
75-79	-	8	8	7	2	-	-	25	$1,120
80-84	1	-	2	4	2	1	-	10	$1,121
85 & Over	-	1	-	1	5	2	-	9	$1,270
Total Number	121	88	48	16	9	3	-	285	$2,029
Average Benefit	$2,546	$2,081	$1,237	$1,019	$987	***	N/A	$2,029	

*** Not shown if three or fewer participants