Gabriel Roeder Smith & Company
Consultants & Actuaries

NORTH DAKOTA

RETIREE HEALTH INSURANCE CREDIT FUND

ACTUARIAL VALUATION AS OF JULY 1, 2016

CONTENTS

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October 19, 2016

Board Members
North Dakota Retiree Health Insurance Credit Fund
Bismarck, North Dakota

Members of the Board:

We are pleased to provide our formal annual Actuarial Valuation Report as of July 1, 2016, for the North Dakota Retiree Health Insurance Credit Fund ("RHIC"). The actuarial valuation was performed at the request of the Board and is intended for use by the Board and RHIC and those designated by the Board and RHIC. This report may be provided to parties other than the Board and RHIC only in its entirety and only with the permission of the Board and RHIC.

This report provides, among other things, the employer actuarial contribution rate for the RHIC for the Plan Year commencing July 1, 2016, and ending on July 1, 2017, and a comparison to the employer statutory contribution rate. This report should not be relied on for any purpose other than the purpose described.

The actuarial valuation was based upon information furnished by the North Dakota Public Employees' Retirement System ("NDPERS") Staff, concerning benefits provided by the North Dakota Retiree Health Insurance Credit Fund, financial transactions, plan provisions and census data for active members, terminated members, retirees and beneficiaries as of July 1, 2016. We checked for internal and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by the NDPERS Staff.

The actuarial assumptions used were based on an experience review for the five-year period ending July 1, 2014, which was performed by the prior actuary, and were first adopted for use commencing with the July 1, 2015, valuation.

The plan provisions have remained unchanged since the last actuarial valuation, performed as of July 1, 2015. The plan was changed to no longer require enrollment in the NDPERS health insurance plan. Although a change in the participation rate for future retirees was reflected in the 2015 valuation, a change in the expected number of current retirees participating in the Plan was first reflected in the 2016 valuation.

To the best of our knowledge the information contained in this report is accurate and fairly presents the actuarial position of the North Dakota Retiree Health Insurance Credit Fund as of the valuation date. All calculations have been made in conformity with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board.

Lance J. Weiss and Amy Williams are Members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein.

The signing actuaries are independent of the plan sponsor.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law.

We will be pleased to review this report with you at your convenience.

Respectfully submitted,

Gabriel, Roeder, Smith & Company

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cc: Mr. Sparb Collins, NDPERS
Ms. Sharon Schiermeister, NDPERS
Mr. Bryan Reinhardt, NDPERS

SECTION A

VALUATION RESULTS

COMMENTS ON THE VALUATION

Purpose
At your request, we have performed an actuarial valuation of the North Dakota Retiree Health Insurance Credit Fund as of July 1, 2016.

The purposes of this actuarial valuation are as follows:

- To determine the funding status of the Fund as of the valuation date;
- To determine the employer actuarial contribution rate for the fiscal year beginning July 1, 2016; and
- To provide other data required for RHIC.

Membership Data
We received the data from the NDPERS Staff. We performed certain checks for reasonableness and found the data to be complete and reliable for actuarial valuation purposes. However, we did not audit the data.

A total of 23,664 active members were included in the actuarial valuation as of July 1, 2016. Between the 2015 and 2016 actuarial valuations, the number of active employees increased by 427 members, or 1.8 percent. The average annual valuation pay increased by 5.8 percent, from $42,608 to $45,075 between the 2015 and 2016 actuarial valuations.

The number of benefit recipients increased from 5,212 to 10,320, or 98.0 percent, since the last actuarial valuation. The plan was changed to no longer require enrollment in the NDPERS health insurance plan. Only those retirees enrolled in the NDPERS health insurance plan were included in the 2015 actuarial valuation. All eligible retirees were included in the 2016 actuarial valuation.

The average monthly benefit decreased by 17.4 percent, from $121 to $100.

Section C summarizes the membership data.

Plan Provisions
Section E outlines the principal benefit provisions of the System. There were no changes since the previous valuation.

Actuarial Assumptions and Methods
The actuarial assumptions used in the actuarial valuation as of July 1, 2016, were based on an experience review for the five-year period ending July 1, 2014, which was performed by the prior actuary. The assumptions were first adopted for use commencing with the July 1, 2015, actuarial valuation. The assumptions used in the North Dakota Retiree Health Insurance Credit Fund are the same as those used in the North Dakota Public Employees' Retirement System and North Dakota Highway Patrolmen's Retirement System valuations for members participating in those Systems.

Section D outlines the actuarial assumptions and methods used in the actuarial valuation. The assumption for administrative expenses is equal to the prior years' administrative expenses, adjusted for inflation. In total, the administrative expense assumption has increased from $225,619 to $446,386.

Under the current asset valuation method to calculate the actuarial value of assets, interest and dividends are immediately recognized and the total appreciation or depreciation from the current year (net change in fair value of investments) is recognized over a five-year period.

The current asset valuation method has a systematic bias toward the actuarial value of assets being lower than the market value of assets.

The actuarial contribution rate is calculated using a 40-year closed (beginning July 1, 1990) level-percentage of pay amortization of the unfunded liability. The remaining amortization period is 14 years as of the actuarial valuation date.

The assumptions were provided by, and are the responsibility of, the NDPERS Board. GRS was unable to judge the reasonableness of the assumptions and methods without performing a substantial amount of additional work beyond the scope of the assignment, and did not do so.

We recommend reviewing the current asset valuation method along with the economic assumptions (rate of inflation, investment return, payroll growth assumption) before the July 1, 2017, actuarial valuation.

Gain/Loss Analysis
During the plan year ending June 30, 2016, the unfunded actuarial accrued liability ("UAAL") increased from $39,506,015 as of July 1, 2015, to $78,810,783 as of July 1, 2016, which is an increase of $39,304,768. The key factor contributing to the increase in the UAAL was the increase in the number of benefit recipients from 5,212 to 10,320, or 98.0 percent. The unfunded actuarial accrued liability based on the market value of assets is $73,671,832.

Plan Asset Return
On a market value basis, NDPERS assets had an investment return of approximately 0.79 percent (net of investment expenses). Recognition of deferred asset gains from fiscal years ending 2012 through 2015 were partially offset by recognition of the fiscal year end 2016 investment losses (decrease in the fair value of investments), which resulted in an estimated net asset rate of return of 5.90 percent on an actuarial value of assets basis, which compares to the assumed rate of return of 8.00 percent.

The actuarial value of assets is currently 95 percent of the market value of assets. There is $5,138,951 in net asset gains currently being deferred that will be phased into the actuarial value of assets over the next four years.

Funded Ratio
The funded ratio measures the portion of the actuarial accrued liability (calculated based on the actuarial assumptions disclosed in this report) that is currently funded. The funded ratio is 55.4 percent on an actuarial value of assets basis and 58.3 percent on a market value of assets basis.

The funded ratio and unfunded actuarial accrued liability are appropriate for assessing the need for and the amount of future unfunded liability contributions (excludes normal cost contributions). They are not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the System's benefit obligations.

Employer Contributions

The actuarially determined contribution rate is calculated as the normal cost contribution (to fund benefits accruing during the year) plus a contribution to amortize the unfunded liability. The unfunded liability contribution rate is calculated using a 40-year closed (beginning July 1, 1990) level-percentage of pay amortization of the unfunded liability. The remaining amortization period is 14 years as of the actuarial valuation date. If employers contributed the actuarial contribution rate, the contribution rate would be expected to remain level using a 40-year closed amortization period (assuming the actuarial assumptions are realized, including an 8.00 return on the actuarial value of assets). A closed amortization period is expected to increase the funded ratio to 100 percent by the end of the closed period (assuming no actuarial gains or losses).

The contributions that are made by employers are based on fixed contribution rates that are set by statute (and not based on the actuarially determined rate). The statutory contribution rate is higher than the actuarial contribution rate.

The portion of the statutory contribution that is applied toward the unfunded liability is the statutory contribution rate minus the employer normal cost rate. The unfunded liability contribution rate from the statutory contribution is higher than the rate calculated using the 14-year level percentage of payroll amortization period. (The equivalent amortization period of the unfunded liability rate from the statutory contribution rate is 11.3 years based on the actuarial value of assets and 10.5 years based on the market value of assets.)

Historical Trends

The funded ratio has increased during the past 10 years from 45.6 percent in 2007, to 68.7 percent in 2015, down to the current funded ratio of 55.4 percent. The actuarial contribution rates have decreased as the funded ratio has increased.

SUMMARY OF ACTUARIAL VALUATION RESULTS

	Valuation as of July 1, 2015[2]		Valuation as of July 1, 2016	
	Total	% of Payroll[3]	Total	% of Payroll[3]
Active Members				
Number	23,237		23,664	
Average Age	46.3		46.2	
Average Years of Benefit Service	9.6		9.5	
Average Years of Vesting Service	9.7		9.6	
Total Payroll	$ 990,087,194		$ 1,066,653,605	
Projected Annual Compensation	1,052,657,242		1,142,375,949	
Retired Members and Beneficiaries				
Number	5,212		10,320	
Total Benefits	$ 7,580,838		$ 12,369,833	
Total Membership	28,449		33,984	
Actuarial Accrued Liability				
Active Members	$ 62,632,863		$ 63,793,708	
Retired Members and Beneficiaries	66,307,150		112,799,199	
Total	128,940,013		176,592,907	
Actuarial Value of Assets	89,433,998		97,782,124	
Unfunded Actuarial Accrued Liability	39,506,015		78,810,783	
Funded Ratio (Actuarial Value of Assets)	69.4%		55.4%	
Annual Gross Normal Cost				
Benefits	$ 3,905,835	(0.37%)	$ 4,066,415	(0.35%)
Expenses of Administration	225,619	(0.02%)	446,386	(0.04%)
Total	4,131,454	(0.39%)	4,512,801	(0.39%)
Amortization of Unfunded Liability[1]	3,412,289	(0.33%)	7,183,649	(0.63%)
Actuarial Contribution	7,543,743	(0.72%)	11,696,450	(1.02%)
Statutory Employer Contribution	12,000,293	(1.14%)	13,023,086	(1.14%)
Statutory Contribution Deficit/(Surplus)	(4,456,550)	-(0.42%)	(1,326,636)	-(0.12%)
Amortization Period from Statutory Rate (Years)	5.6		11.3	
Results Based on Market Value of Assets				
Market Value of Assets	$ 99,142,050		$ 102,921,075	
Unfunded Actuarial Accrued Liability	29,797,963		73,671,832	
Funded Ratio (Market Value of Assets)	76.9%		58.3%	
Total Annual Gross Normal Cost	4,131,454	(0.39%)	4,512,801	(0.39%)
Amortization of Unfunded Liability[1]	2,573,767	(0.25%)	6,715,231	(0.59%)
Actuarial Contribution	6,705,221	(0.64%)	11,228,032	(0.98%)
Statutory Employer Contribution	12,000,293	(1.14%)	13,023,086	(1.14%)
Statutory Contribution Deficit/(Surplus)	(5,295,072)	-(0.50%)	(1,795,054)	-(0.16%)
Amortization Period from Statutory Rate (Years)	4.1		10.5	

[1] Amortization as a level percentage of payroll over a 40-year closed period from July 1, 1990. 14 years and 15 years are remaining in the amortization period as of July 1, 2016, and July 1, 2015, respectively. Total payroll assumed to increase by 4.50%.
[2] Results from prior actuary.
[3] Rates are calculated as a percentage of projected annual compensation.

ACTUARIAL VALUATION RESULTS
GAIN/LOSS ANALYSIS

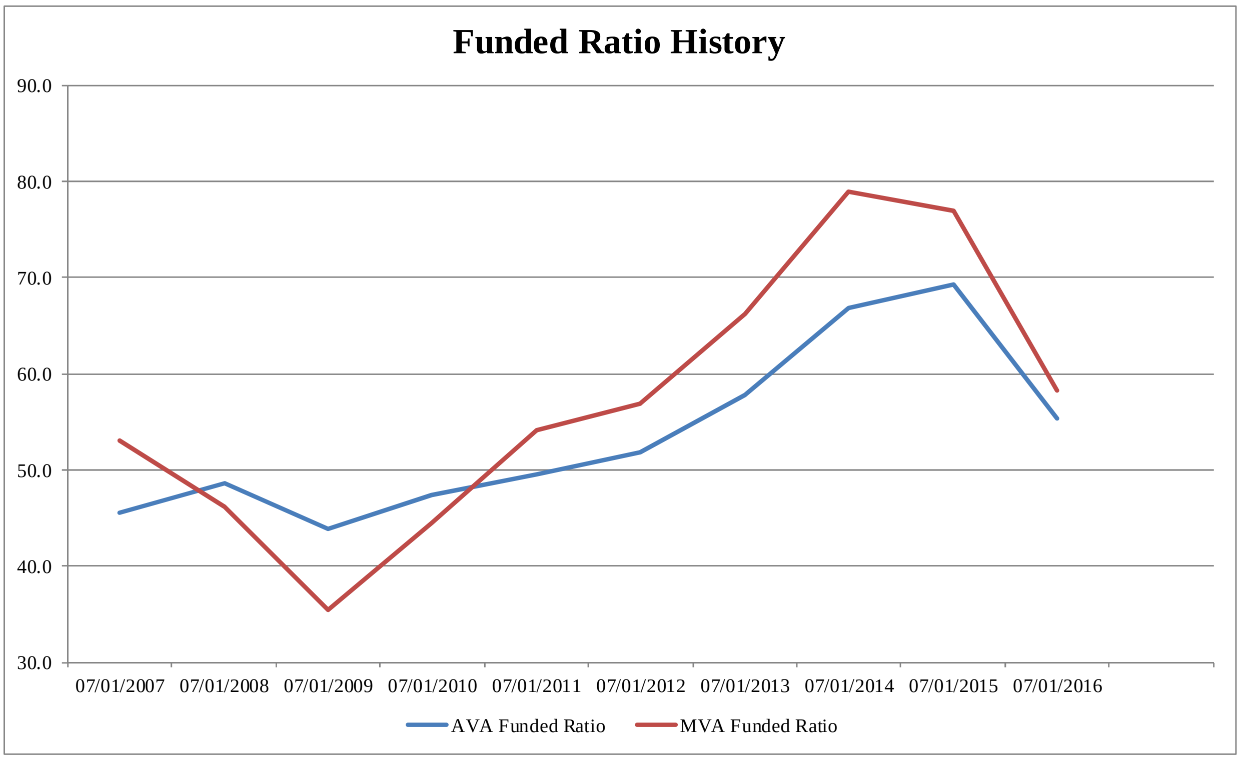
Unfunded liability at previous valuation	$	39,506,015
Unfunded liability at previous valuation - GRS replication results	$	40,767,475
Expected unfunded liability at current valuation		
Normal cost for plan year		4,225,270
Interest on unfunded liability and normal cost		3,427,157
Contributions using actuarial rate with interest to current valuation date		8,050,416
Total expected change in unfunded liability at current valuation		(397,989)
Total expected unfunded liability at current valuation		40,369,486
Change due to:		
Amount and timing of contributions (based on statutory rate)		(4,801,268)
Amount and timing of administrative expenses		213,741
Recognition of asset (gains)/losses		1,510,912
Salary experience		-
Retirement experience		(82,418)
Withdrawal experience		(2,205,453)
Disability experience		(64,330)
Death in Service experience		(135,947)
Death After Retirement experience		2,747,519
New entrants		622,038
Data changes and other experience [1]		40,636,503
Change in actuarial assumptions		-
Changes in plan provisions		-
Total change		38,441,297
Unfunded liability at current valuation	$	78,810,783

FY 2016 Actuarial Employer Contribution	0.72%
GRS Replication Results FY 2016 Actuarial Employer Contribution	0.73%
Expected FY 2017 Actuarial Employer Contribution	0.73%
Change due to:	
Amount and timing of contributions	-0.04%
Amount and timing of administrative expenses	0.02%
Recognition of asset (gains)/losses	0.01%
Salary experience	0.00%
Retirement experience	0.00%
Withdrawal experience	-0.02%
Disability experience	0.00%
Death in Service experience	0.00%
Death After Retirement experience	0.03%
New entrants	-0.03%
Data changes and other experience [1]	0.32%
Change in actuarial assumptions	0.00%
Changes in plan provisions	0.00%
Total change	0.29%
FY 2017 Actuarial Employer Contribution	1.02%
FY 2017 Statutory Contribution Rate	1.14%

[1] *Includes the impact of an increase in the covered number of retirees as a result of no longer requiring enrollment in the NDPERS health insurance plan. The participation rates that apply to future retirees were changed in the actuarial valuation as of July 1, 2015, in conjunction with this Plan change. The change for current retirees was first reflected in the actuarial valuation as of July 1, 2016.*

FUNDED RATIO HISTORY

Actuarial Valuation Date	Actuarial Value of Assets (AVA) (a)	Actuarial Accrued Liability (AAL) (b)	AVA Unfunded AAL (UAAL) (b – a)	AVA Funded Ratio (a / b)	Market Value of Assets (MVA) (c)	MVA Unfunded AAL (UAAL) (b – c)	MVA Funded Ratio (a / b)
07/01/2007	$ 38,881,121	$ 85,342,012	$ 46,460,891	45.6 %	$ 45,278,720	$ 40,063,292	53.1 %
07/01/2008	42,543,140	87,592,818	45,049,678	48.6	40,423,019	47,169,799	46.1
07/01/2009	44,829,007	102,191,552	57,362,545	43.9	36,148,791	66,042,761	35.4
07/01/2010	48,723,475	102,805,439	54,081,964	47.4	45,778,797	57,026,642	44.5
07/01/2011	53,730,426	108,384,942	54,654,516	49.6	58,737,636	49,647,306	54.2
07/01/2012	58,307,298	112,373,231	54,065,933	51.9	63,900,953	48,472,278	56.9
07/01/2013	65,972,463	114,052,953	48,080,490	57.8	75,556,001	38,496,952	66.2
07/01/2014	77,925,234	116,633,623	38,708,389	66.8	92,013,709	24,619,914	78.9
07/01/2015	89,433,998	128,940,013	39,506,015	69.4	99,142,050	29,797,963	76.9
07/01/2016	97,782,124	176,592,907	78,810,783	55.4	102,921,075	73,671,832	58.3



SECTION B

ASSET EXHIBITS

STATEMENT OF FIDUCIARY NET POSITION

	Fiscal Year Ending	
Assets	**June 30, 2015**	**June 30, 2016**
Cash	$ 286,999	$ 478,157
Receivables		
Contribution receivable	859,924	962,713
Interest receivable	87,940	97,862
Due from other fiduciary funds	14,004	14,004
Due from Uniform Group Insurance Plan	360,319	359,259
Due from other state agencies	0	335
Total receivables	1,322,187	1,434,173
Investments		
Equities	59,124,528	59,903,215
Fixed income	38,458,592	41,622,146
Real estate	-	-
Mutual funds	-	-
Annuities	-	-
Alternative Investments		
Invested cash	-	-
Total Investments	97,583,120	101,525,361
Capital assets (net of depreciation/ amortization)	196,448	162,495
Total assets	99,388,754	103,600,186
Liabilities		
Salaries payable	-	-
Accounts payable	77,357	367,190
Due to other fiduciary funds	169,219	311,921
Due to Uniform Group Insurance Plan	-	-
Due to other state agencies	128	-
Accrued compensated absences	-	-
Total liabilities	246,704	679,111
Net position restricted for postemployment healthcare benefits	$ 99,142,050	$ 102,921,075

STATEMENT OF CHANGES IN FIDUCIARY NET POSITION

	Fiscal Year Ending	
	June 30, 2015	June 30, 2016
Additions:		
Contributions:		
From employer	$ 11,478,599	$ 12,349,883
From employee	12,625	16,655
Total contributions	11,491,224	12,366,538
Investment income		
Net change in fair value of investments	936,842	(1,185,174)
Interest and dividends	2,105,589	2,271,699
Less investment expense	(281,478)	(292,820)
Net investment income	2,760,953	793,705
Repurchase service credit	347,238	383,089
Total additions	14,599,415	13,543,332
Deductions:		
Benefits paid to participants	-	-
Refunds	6,994	3,135
Prefunded credit applied	7,246,091	9,329,881
Health premiums paid	-	-
	7,253,085	9,333,016
Administrative expenses	217,989	431,291
Total deductions	7,471,074	9,764,307
Change in net position	7,128,341	3,779,025
Net position restricted for postemployment healthcare benefits		
Beginning of year	92,013,709	99,142,050
End of year	$ 99,142,050	$ 102,921,075

DEVELOPMENT OF ACTUARIAL VALUE OF ASSETS

Fiscal Year Ending	2015	2016	2017	2018	2019	2020
Beginning of Year:						
(1) Market Value of Assets	$ 92,013,709	$ 99,142,050				
(2) Actuarial Value of Assets	77,925,235	89,433,998				
End of Year:						
(3) Market Value of Assets	99,142,050	102,921,075				
(4a) Contributions (Incl. repurchase svc credit)	11,838,462	12,749,627				
(4b) Interest and Dividends	2,105,589	2,271,699				
(4c) Net Disbursements	7,471,074	9,764,307				
(4d) Investment Expense	281,478	292,820				
(4e) Net Cash Flow (Excl. change in fair value of investments)						
=(4a)+(4b)-(4c)-(4d)	6,191,499	4,964,199				
(5) Net change in fair value of investments						
=(3)-(1)-(4e)	936,842	(1,185,174)				
(6) Projected Rate of Return	8.00%	8.00%				
(7) Projected Investment Income						
=(1)x(6)+([1+(6)]^.5-1)x(4a-4c)	7,532,431	8,048,480				
(8) Asset Adjustment	0	0				
(9) Investment Income						
=(4b)-(4d)+(5)	2,760,953	793,705				
(10) Excess Investment Income Recognized						
This Year (5 year recognition)						
(10a) From This Year	187,368	$ (237,035)				
(10b) From One Year Ago	2,124,091	187,368	$ (237,035)			
(10c) From Two Years Ago	1,276,802	2,124,091	187,368	$ (237,035)		
(10d) From Three Years Ago	32,701	1,276,802	2,124,091	187,368	$ (237,035)	
(10e) From Four Years Ago	1,696,302	32,701	1,276,802	2,124,091	187,370	$ (237,034)
(10f) Total Recognized Investment Gain/(Loss)	5,317,264	3,383,927	3,351,226	2,074,424	(49,665)	(237,034)
(11) Change in Actuarial Value of Assets						
=(4e)+(8)+(10f)	11,508,763	8,348,126				
End of Year:						
(3) Market Value of Assets	**$ 99,142,050**	**$ 102,921,075**				
(12) Final Actuarial Value of Assets as of 6/30 = (2)+(11)	**$ 89,433,998**	**$ 97,782,124**				
(13) Difference Between Market & Actuarial Values	9,708,052	5,138,951				
(14) Estimated Market Value Rate of Return on Total Plan Assets	2.93%	0.79%				
(15) Actuarial Value Rate of Return	8.91%	5.90%				
(16) Ratio of Actuarial Value to Market Value	90.2%	95.0%				

SECTION C

VALUATION DATA

AGE/SERVICE/SALARY
AS OF JULY 1, 2016

RHIC	Vesting Service as of Valuation Date									
Current Age	**Under 5**	**5-9**	**10-14**	**15-19**	**20-24**	**25-29**	**30-34**	**35 and Over**	**Totals**	**Valuation Payroll**
Under 20	30	-	-	-	-	-	-	-	**30**	**$ 922,303**
20-24	888	4	-	-	-	-	-	-	**892**	**29,905,292**
25-29	1,822	237	3	-	-	-	-	-	**2,062**	**82,240,132**
30-34	1,620	715	147	-	-	-	-	-	**2,482**	**110,764,738**
35-39	1,390	664	426	135	-	-	-	-	**2,615**	**119,180,439**
40-44	1,090	636	381	378	84	2	-	-	**2,571**	**118,021,387**
45-49	1,029	631	365	343	265	141	6	1	**2,781**	**129,717,914**
50-54	962	622	480	406	309	298	170	20	**3,267**	**154,871,036**
55-59	838	670	474	473	317	315	245	205	**3,537**	**165,479,309**
60-64	473	451	349	362	271	226	169	240	**2,541**	**118,818,689**
65-69	126	142	91	120	57	49	31	52	**668**	**29,664,225**
70-74	34	42	28	15	8	7	4	19	**157**	**5,439,503**
75 and Over	11	13	12	12	2	3	3	5	**61**	**1,628,640**
Total	**10,313**	**4,827**	**2,756**	**2,244**	**1,313**	**1,041**	**628**	**542**	**23,664**	**$1,066,653,605**

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Previous Valuation		**Current Valuation**		**Change**
Average Age:	46.3	Average Age:	46.2	(0.1)
Average Vesting Service	9.7	Average Vesting Service	9.6	(0.1)
Average Annual Pay:	$42,608	Average Annual Pay:	$45,075	5.8%
Vested Participants	15,711	Vested Participants	16,008	297
Nonvested Participants	7,526	Nonvested Participants	7,656	130
Total Participants	23,237	Total Participants	23,664	427

HISTORICAL SCHEDULE OF ACTIVE AND RETIRED MEMBER DATA THROUGH JULY 1, 2016

Valuation Date 7/1	Number of Active Members*	Number of Retired Members	Average Annual Benefit	Number of Active Members Per Retiree
2007	18,826	3,922	$ 1,177	4.8
2008	19,675	3,935	1,200	5.0
2009	20,150	4,030	1,356	5.0
2010	20,936	4,105	1,377	5.1
2011	21,210	4,242	1,394	5.0
2012	21,322	4,442	1,416	4.8
2013	21,785	4,635	1,428	4.7
2014	22,642	4,828	1,428	4.7
2015	23,237	5,212	1,455	4.5
2016	23,664	10,320	1,199	2.3

**Number of active members prior to 7/1/2014 is approximated based on figures from the NDPERS Comprehensive Annual Financial Report.*

SUMMARY OF RETIRED MEMBER DATA
AS OF JULY 1, 2016

	Monthly Benefit Amount							
Age	**Under $30**	**$30-$59**	**$60-$89**	**$90-$119**	**$120-$149**	**$150-$179**	**$180 and over**	**Total**
Under 50	11	15	8	2	0	0	0	36
50 - 54	14	12	15	7	11	36	5	100
55 - 59	35	65	26	14	69	194	30	433
60 - 64	158	218	127	107	330	319	154	1,413
65 - 69	347	602	430	350	494	310	290	2,823
70 - 74	249	407	362	305	357	174	164	2,018
75 - 79	192	313	308	228	220	138	104	1,503
80 - 84	107	228	237	127	146	98	77	1,020
85 - 89	65	158	151	87	53	48	50	612
90 and Over	15	66	103	70	54	26	28	362
Total	**1,193**	**2,084**	**1,767**	**1,297**	**1,734**	**1,343**	**902**	**10,320**

	Previous Valuation	**Current Valuation**	**Change**
Average Age	73.3	72.2	-1.1
Average Monthly Benefit	$121	$100	($21)
Total Participants	5,212	10,320	5,108

SECTION D

VALUATION PROCEDURES

ACTUARIAL ASSUMPTIONS IN THE VALUATION PROCESS

Normal cost and the allocation of benefit values between service rendered before and after the valuation date were determined using the ***Projected Unit Credit*** actuarial cost method having the following characteristics:

- The normal cost for each individual active member equals the portion of the actuarial present value of projected benefits allocated to service earned during the current year.
- The actuarial accrued liability for each individual active member equals the portion of the actuarial present value of projected benefits allocated to service earned during prior plan years. The actuarial accrued liability for retired and inactive members equals the present value of benefits.

Financing of Unfunded Actuarial Accrued Liabilities. The unfunded actuarial accrued liability is amortized using 40-year closed (beginning July 1, 1990) level-percentage of pay amortization of the unfunded liability. The remaining amortization period is 14 years as of the actuarial valuation date.

Actuarial Value of Pension Plan Assets. The asset value is the actuarial value of assets which is calculated by recognizing 100 percent of the current year's interest and dividends and 20 percent of the current year and previous four years' total appreciation/(depreciation). The total appreciation/(depreciation) for a given year is fully recognized after a five year period.

The current asset valuation method has a systematic bias toward the actuarial value of assets being lower than the market value of assets.

Valuation Assumptions
The contribution and benefit values of the Fund are calculated by applying actuarial assumptions to the benefit provisions and census information furnished, using the actuarial cost method described above.

The principal areas of financial risk which require assumptions about future experiences are:

- Long-term rates of investment return to be generated by the assets of the Plan;
- Rates of mortality among members, retirees and beneficiaries;
- Rates of withdrawal of active members;
- Rates of disability among members; and
- The age patterns of actual retirement.

In an actuarial valuation, the monetary effect of each assumption is calculated for as long as a present covered person survives; a period of time which can be as long as a century.

Actual experience of the Plan will not coincide exactly with assumed experience. Each actuarial valuation provides a complete recalculation of assumed future experience and takes into account all past differences between assumed and actual experience. The result is a continual series of adjustments (usually small) to the computed contribution rate.

From time-to-time it becomes appropriate to modify one or more of the actuarial assumptions, to reflect experience trends (but not random year-to-year fluctuations). Thus, an experience review of the Retiree Health Insurance Credit Fund for the period July 1, 2009, to July 1, 2014, was performed to compare the demographic and economic experience against the actuarial assumptions used in the actuarial valuation. The actuarial assumptions described in this section were adopted by the Board for use beginning with the July 1, 2015, valuation. Additional information regarding the rationale for the assumptions may be found in the 2015 experience review report. **The experience review was performed by the prior actuary.** All actuarial assumptions are expectations of future experience, not current market measures.

The actuarial assumptions were provided by, and are the responsibility of, the NDPERS Board. GRS was unable to judge the reasonableness of the assumptions and methods without performing a substantial amount of additional work beyond the scope of the assignment, and did not do so.

Current Actuarial Valuation Assumptions and Methods

The same actuarial assumptions used to value pension benefits for the covered members are used in this actuarial valuation. The Main System actuarial assumptions are used for the covered members of the Defined Contribution Plan.

The assumed rate of investment return used was 8.00%, net of expenses, annually.

The assumed rate of price inflation is 3.50 percent.

No Cost of Living Adjustments (COLA) are provided to benefits recipients. Therefore, there is no COLA assumption for this valuation.

The rates of annual salary increase used for individual members are in accordance with the following table. This assumption is used to project a member's current salary.

Service At Beginning of Year	State Employee	Non-State Employee	Law Enforcement	Judges
0	12.00%	15.00%	20.00%	
1	9.50%	10.00%	20.00%	
2	7.25%	8.00%	20.00%	
3			10.00%	
4			10.00%	
Age*				
Under 30	7.25%	10.00%	7.25%	4.00%
30-39	6.50%	7.50%	6.50%	4.00%
40-49	6.25%	6.75%	6.25%	4.00%
50-59	5.75%	6.50%	5.75%	4.00%
60+	5.00%	5.25%	5.00%	4.00%

Highway Patrol

Service At Beginning of Year	Increase Rate
0	15.00%
1	10.00%
2	8.00%
Age*	
Under 36	8.00%
36 - 40	7.50%
41 - 49	6.00%
50+	5.00%

**Age-based salary increase rates apply for employees with three or more years of service in the Main System and the Highway Patrolmen's Retirement System, five or more years of service in the Law Enforcement Systems and for all employees in the Judges System.*

The assumed rate of total payroll growth used in amortizing the unfunded liability as a level percentage of pay is 4.50 percent.

The mortality assumptions are as follows:

	Male Setback	Female Setback
RP-2000 Combined Healthy Mortality Table (healthy mortality)	2 years	3 years
RP-2000 Disabled Retiree Mortality Table (disabled post retirement)*	1 year	0 years

**Rates multiplied by 125 percent.*

To provide a margin for future mortality improvements, generational mortality improvements from the year 2014 using the Social Security Administration (SSA) 2014 Intermediate Cost scale were assumed.

Following is a table with the life expectancies by age as of the valuation date.

	Healthy Mortality		Disabled Mortality	
	Future Life Expectancy (years) in 2016		Future Life Expectancy (years) in 2016	
Age	**Men**	**Women**	**Men**	**Women**
20	67.65	72.06	32.27	49.75
25	62.25	66.64	30.36	45.90
30	56.86	61.22	28.35	41.98
35	51.49	55.82	26.21	37.97
40	46.17	50.44	23.85	33.83
45	40.91	45.11	21.15	29.52
50	35.70	39.83	18.27	25.27
55	30.58	34.64	15.76	21.51
60	25.63	29.56	13.57	18.22
65	20.97	24.71	11.54	15.22
70	16.74	20.23	9.58	12.45
75	12.92	16.11	7.73	9.95
80	9.60	12.46	6.12	7.79
85	6.86	9.28	4.81	5.97
90	4.78	6.69	3.63	4.49
95	3.40	4.89	2.55	3.40
100	2.59	3.85	1.92	2.76
105	2.15	3.13	1.60	2.14

Rates of separation from active membership are represented by the following table (rates do not apply to members eligible to retire and do not include separation on account of death or disability). This assumption measures the probabilities of members terminating employment.

Service Beginning of Year	Service and Age-Based Rates For First Five Years of Service					
	Main System			Law Enforcement		
	Age					
	Under 30	30-39	40+	Under 30	30-39	40+
0	22.00%	16.00%	12.00%	25.00%	20.00%	17.00%
1	18.00%	14.00%	10.00%	23.00%	17.00%	15.00%
2	16.00%	12.00%	10.00%	20.00%	15.00%	12.00%
3	14.00%	12.00%	8.00%	17.00%	13.00%	10.00%
4	14.00%	11.00%	7.00%	15.00%	11.00%	7.00%

Age	Age-Based Rates Only After First Five Years of Service	
	Main System	Law Enforcement
20-24	8.80%	8.80%
25-29	8.80%	8.80%
30-34	5.50%	5.50%
35-39	4.70%	4.70%
40-44	3.90%	3.90%
45-49	3.70%	3.70%
50-54	3.40%	3.40%
55-59	0.10%	0.10%
60+	0.20%	0.20%

No pre-retirement termination is assumed for Judges.

Withdrawal rates end upon eligibility for early retirement.

Early retirement eligibility is as follows:

Main System: Earlier of (i) age 55 and 3 years of service, and (ii) eligibility for Rule of 85. For members hired on or after 1/1/2016, earlier of (i) age 55 and 3 years of service, and (ii) eligibility for Rule of 90.

Law Enforcement: Age 50 and 3 years of service.

Highway Patrol

Service Beginning of Year	Service and Age-Based Rates For First Five Years of Service Rates
0	10.00%
1	5.00%
2	5.00%
3	5.00%
4	5.00%

Age	Rates
Under 35	2.50%
35+	1.00%

Withdrawal rates end upon eligibility for early retirement.

Early retirement eligibility is as follows:

Highway Patrol: Age 50 and 10 years of service.

Rates of disability:

Before age 65:	Males: 20% of OASDI disability incidence rates.
	Females: 10% of OASDI disability incidence rates.
Age 65 and later:	0.25% per year.

Rates of disability were as follows:

	All Plans	
Age	**Male**	**Female**
20	0.0120%	0.0060%
25	0.0171%	0.0085%
30	0.0220%	0.0110%
35	0.0295%	0.0147%
40	0.0440%	0.0220%
45	0.0719%	0.0360%
50	0.1212%	0.0606%
55	0.2018%	0.1009%
60	0.3254%	0.1627%
65	0.2500%	0.2500%

VALUATION ASSUMPTIONS (CONTINUED)

Rates of retirement for members eligible to retire during the next year were as follows:

Age	Main System Reduced	Main System Unreduced	Law Enforcement Unreduced	Judges Unreduced
50		30.00%	25.00%	
51		10.00%	25.00%	
52		10.00%	25.00%	
53		10.00%	25.00%	
54		10.00%	25.00%	
55	1.00%	10.00%	10.00%	10.00%
56	1.00%	8.00%	10.00%	10.00%
57	1.00%	8.00%	10.00%	10.00%
58	1.00%	8.00%	10.00%	10.00%
59	1.00%	8.00%	10.00%	10.00%
60	2.00%	8.00%	10.00%	10.00%
61	5.00%	15.00%	10.00%	10.00%
62	10.00%	30.00%	50.00%	10.00%
63	10.00%	30.00%	50.00%	10.00%
64	10.00%	20.00%	50.00%	10.00%
65		30.00%	50.00%	20.00%
66		20.00%	20.00%	20.00%
67		15.00%	20.00%	20.00%
68		15.00%	20.00%	20.00%
69		15.00%	20.00%	20.00%
70		15.00%	20.00%	20.00%
71		15.00%	20.00%	20.00%
72		15.00%	20.00%	20.00%
73		15.00%	20.00%	20.00%
74		15.00%	20.00%	20.00%
75+		100.00%	100.00%	100.00%

Highway Patrol

Age	Rates
50	20.00%
51	20.00%
52	20.00%
53	20.00%
54	20.00%
55+	100.00%

VALUATION ASSUMPTIONS
(CONTINUED)

Assumed Service Credit: All active members (full time and part time) are assumed to earn one full year of service for each assumed future year of service.

Marital Status: It is assumed that 75 percent of participants in the Main System and Law Enforcement and 100 percent of Judges and Highway Patrol participants have an eligible spouse at the time of retirement or pre-retirement death. The male spouse is assumed to be three years older than the female spouse. Spouses are assumed to be the opposite sex of the employees and retirees. The relatively low rate of same-sex spouses does not have a material actuarial impact on the actuarial valuation results.

Form of Payment Election Assumption:

Form of Payment	Main System, Law Enforcement	Judges	Highway Patrol
Life Annuity	50%	0%	0%
50% Joint and Survivor	45%	100%	100%
Refund of Member Contributions	5%	0%	0%

Benefits are valued without reduction for the optional form of payment.

Participation Rate All eligible members are assumed to participate.

Benefit Service: Exact fractional years of service are used to determine the amount of benefit payable.

Decrement Timing: Retirement is assumed to occur at the beginning of the year. All decrements are assumed to occur at the middle of the year.

Decrement Operation: Turnover decrements do not operate after the member reaches retirement eligibility (early or normal).

Eligibility Testing: Eligibility for benefits is determined based upon the age nearest birthday and service on the date the decrement is assumed to occur.

Pay Increase Timing: Beginning of (fiscal) year.

Expenses: Assumed administrative expenses were added to the Normal Cost and are based on the prior year's expenses, adjusted for inflation. The assumed amount added to the Normal Cost is:

Expenses		
Assumed FY 2016	$	225,619
Actual FY 2016		431,291
Assumed FY 2017		446,386

Assumptions for Missing or Incomplete Data: Active members with annualized salaries that are less than $100 are assumed to have a salary equal $44,911.

Changes in Valuation Assumptions and Methods Since the Previous Valuation

There have been no changes in actuarial valuation assumptions or methods since the previous actuarial valuation as of July 1, 2015.

SECTION E

BENEFIT PROVISIONS

BRIEF SUMMARY OF PLAN PROVISIONS

This section summarizes the major benefit provisions of the North Dakota Public Employees Retirement System Retiree Health Insurance Credit Fund as included in the actuarial valuation. It is not intended to be, nor should it be, interpreted as a complete statement of all plan provisions.

1. ***Covered Employees:***

   Members of the Public Employees Retirement System, the Highway Patrolmen's Retirement System and the Defined Contribution Retirement Plan who elect coverage.

2. ***Eligibility:***

   Receiving a periodic payment from the Public Employees Retirement System, the Highway Patrolmen's Retirement System or the Defined Contribution Retirement Plan and incurring an eligible insurance premium expense.

3. ***Normal Retirement:***

Age requirement:

Main and DC Systems and Judges:

Age 65, or at any age with age plus service equal to at least 85 (Rule of 85).

For members enrolled after December 31, 2015, into the Main System, attainment of age 65, or at any age with age plus service equal to at least 90 (Rule of 90).

Highway Patrol:

Age 55, or at any age with age plus service equal to at least 80 (Rule of 80).

Law Enforcement:

Age 55, or if not National Guard, at any age with age plus service equal to at least 85 (Rule of 85). National Guard is eligible for Rule of 85 on August 1, 2015.

Service requirement:

Main and DC Systems and Judges:

None.

Highway Patrol:

Ten years.

Law Enforcement:

Three consecutive years.

Benefit amount:

A monthly stipend equal to $5.00 times service.

4. *Early Retirement:*

Age requirement:

Main and DC Systems and Judges:

Age 55.

Highway Patrol and Law Enforcement:

Age 50.

Service requirement:

Main and DC Systems and Law Enforcement:

Three years.

Judges:

Five years.

Highway Patrol:

Ten years.

Benefit amount:

Main and DC Systems and Judges:

The Normal Retirement Benefit reduced by 3% for retirements at age 64 and an additional 6% for each year by which retirement precedes age 64.

Benefits are unreduced upon the fulfillment of the Rule of 85.

Highway Patrol and Law Enforcement:

The Normal Retirement Benefit reduced by 3% for retirements at age 54 and an additional 6% for each year by which retirement precedes age 54.

Benefits are unreduced upon the fulfillment of the Rule of 80 for Highway Patrol and Rule of 85 for Law Enforcement.

5. *Disability Retirement:*

Age requirement:

None.

Service requirement:

Six months.

Other requirements:

As required by applicable pension plan.

Benefit amount:

Same as Normal Retirement Benefit.

6. <u>Pre-Retirement Death Benefit:</u>

Age requirement:

None.

Service requirement:

Main and DC Systems and Law Enforcement:
Three years.

Judges:
Five years.

Highway Patrol:
Ten years.

Benefit amount:

Same as Normal Retirement Benefit accrued to the date of the member's death, payable for as long as benefits are payable to the spouse from the Retirement System under the standard option.

7. <u>Post-Retirement Death Benefit:</u>

Following a retired member's death, the Retiree Health Insurance Credit Fund will: (1) continue benefits to the member's spouse if the spouse continues to receive a monthly pension from a member's Retirement System or (2) provide benefits to the member's spouse if the member selected a joint and survivor option from the Retiree Health Insurance Credit Fund.

8. <u>Alternative Options:</u>

If benefits from the member's Retirement System are paid under the single life, level Social Security, or 10 or 20 year term certain options (without a continuation to the spouse after the certain period ends), actuarially reduced health credit benefits may be elected for the spouse. Alternative options in the Retiree Health Insurance Credit Fund include 50% and 100% joint and survivor annuities.

9. <u>Service:</u>

Members receive credit for each year and month of employment.

10. <u>Contributions:</u>

The employer contributes 1.14% of covered salaries and wages for participating employees.

<u>Changes in Plan Provisions Since the Previous Valuation</u>

There have been no changes in plan provisions since the previous actuarial valuation as of July 1, 2015.

SECTION F

GLOSSARY OF TERMS

GLOSSARY OF TERMS

Actuarial Accrued Liability (AAL). The difference between (i) the actuarial present value of future plan benefits, and (ii) the actuarial present value of future normal cost. Sometimes referred to as "accrued liability" or "past service liability."

Actuarial Assumptions. Estimates of future plan experience such as investment return, expected lifetimes and the likelihood of receiving a pension from the Pension Plan. Demographic, or "people" assumptions, include rates of mortality, retirement and separation. Economic, or "money" assumptions, include expected investment return, inflation and salary increases.

Actuarial Cost Method. A mathematical budgeting procedure for allocating the dollar amount of the "actuarial present value of future plan benefits" between the actuarial present value of future normal cost and the actuarial accrued liability. Sometimes referred to as the "actuarial funding method."

Actuarial Present Value of Future Plan Benefits. The amount of funds presently required to provide a payment or series of payments in the future. It is determined by discounting the future payments at a predetermined rate of interest, taking into account the probability of payment.

Actuarial Value of Assets (AVA). Smoothed value of assets that recognizes the difference between the expected investment return using the valuation assumption of 7.50 percent and the actual investment return over a five-year period. Dampens volatility of asset value over time.

Amortization. Paying off an interest-bearing liability by means of periodic payments of interest and principal, as opposed to paying it off with a lump sum payment.

Annual Required Contribution. The sum of the normal cost and amortization of the unfunded actuarial accrued liability.

Asset Return. The net investment return for the asset divided by the mean asset value. Example: if $1.00 is invested and yields $1.08 after a year, the asset return is 8.00 percent.

Funded Ratio. The actuarial value of assets divided by the actuarial accrued liability. Measures the portion of the actuarial accrued liability that is currently funded.

Market Value of Assets (MVA). The value of assets currently held in the trust available to pay for benefits of the Pension Plan. Each of the investments in the trust is valued at market price which is the price at which buyers and sellers trade similar items in the open market.

Normal Cost (NC). The annual cost assigned, under the actuarial funding method, to current and subsequent plan years. Sometimes referred to as "current service cost." Any payment toward the unfunded actuarial accrued liability is not part of the normal cost.

Unfunded Actuarial Accrued Liability (UAAL). The difference between the actuarial accrued liability and valuation assets. Sometimes referred to as "unfunded accrued liability."