Maryland Transit Administration Pension Plan

Actuarial Valuation
As of July 1, 2018

Date of Report: September 28, 2018

Submitted by:

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Bolton
Employee Benefits, Actuarial & Investment Consulting

September 28, 2018

Heidi Tarleton
Deputy Chief Financial Officer
Maryland Transit Administration
6 St. Paul Street, 8th Floor
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Dear Heidi:

The following sets forth the actuarial valuation of the Maryland Transit Administration Pension Plan as of July 1, 2018. Section 1 of the report provides the executive summary while Sections 2 through 6 contains the development of the actuarially determined contribution for the 2019 fiscal year along with a summary of the census and asset data, plan provisions, assumptions and actuarial methods. Section 7 provides a glossary of many of the terms used in this report. The appendices of the report provide information for financial reporting as well as a 10-year projection of benefit payments and an actuarial certification.

We are available to answer any questions regarding the material in this report or to provide explanations or further details as appropriate. The undersigned credentialed actuaries meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained in this report. We are not aware of any direct or material indirect financial interest or relationship, including investments or other services that could create a conflict of interest, that would impair the objectivity of our work.

Respectfully submitted,

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Table of Contents

Section I. Executive Summary

Background

Bolton Partners, Inc. has prepared the following report that sets forth the actuarial determined contribution for FYE 2019 for the Maryland Transit Administration Pension Plan.

Actuarially Determined Contribution (ADC)

The actuarially determined contribution decreased this year. The decrease was largely due to the full amortization of a prior amortization base which was established in the July 1, 2016 valuation for past COLAs granted to retirees. The final installment of $4.9 million for that amortization base was recognized in the FYE 2018 ADC. Additionally, since negotiations for the Local 1300 Union have entered arbitration, no COLAs have been granted as of July 1, 2018.

The amortization base becoming fully amortized and no future COLA's being assumed has decreased the ADC $4.9 million. The decrease in the ADC was partially offset by lower than expected investment returns and contributions to the plan, which increased the ADC $2.6 million. There was also an increase in the ADC of $0.2 million due to the plan change for the Local 1859 Union that eliminated the dollar per month cap for participants effective October 27, 2017. Decreasing the discount rate from 7.55% to 7.50% to keep in line with the State assumption increased the ADC $0.5 million. Demographic gains including salary increases which were less than assumed decreased the ADC $0.2 million.

Actuarially Determined Contribution	FYE 2018	FYE 2019
Actuarially Determined Contribution	$66,495,406	$64,648,783
Percent of total base payroll[1]	45.60%	43.55%

[1] Although the ADC is shown here as a percentage of base payroll, Plan benefits are based on total remuneration including overtime, limited to 2,392 pay hours in each calendar year.

Section I. Executive Summary

Summary of Plan Results

	7/1/2017	7/1/2018	% Change
Participant Counts			
Active	2,654	2,638	(0.06%)
Participants Receiving a Benefit	1,844	1,933	4.83%
Terminated Vested Participants	509	521	2.36%
Total	**5,007**	**5,092**	**1.70%**
Annual Base Pay of Active Members	$145,833,561	$148,444,632	1.79%
Assets and Liabilities			
Actuarial Liability	706,246,613	735,810,303	4.19%
Actuarial Value of Assets	290,605,477	316,454,023	8.89%
Unfunded Actuarial Liability	415,641,136	419,356,280	0.89%
Funded Ratio	41.15%	43.01%	4.52%
Contributions			
Employer Normal Cost	$8,398,089	$8,614,037	2.57%
Amortization Payment	$58,097,317	$56,034,746	(3.55%)
Actuarially Determined Contribution	$66,495,406	$64,648,783	(2.78%)
Assumed Payment Date	09/01/2017	09/01/2018	

Experience Analysis

The following factors affected the actuarially determined contribution:

- The final installment of an amortization base established in the July 1, 2016 valuation for granting past COLAs to retirees was recognized in the FYE 2018 ADC, and therefore, it is not included in the amortization component of the FYE 2019 ADC. Since negotiations for the Local 1300 Union have entered arbitration, no COLAs have been granted as of July 1, 2018. The full amortization of the amortization base and the assumption of no future COLAs decreased the ADC $4.9 million.
- Demographic gains including salary increases, which were less than assumed, decreased the ADC $0.2 million.
- There was an asset and contribution loss of over $31 million for FYE 2018. This increased the actuarially determined contribution $2.6 million.
- Lowering the discount rate from 7.55% to 7.50% to keep in line with the State assumption increased the ADC $0.5 million.
- The elimination of the dollar per month maximum benefit for Local 1859 Union participants increased the ADC $0.2 million.

Section I. Executive Summary

Demographic Assumptions

The demographic assumptions were reviewed as part of the 2015 experience study. All changes that were proposed in the experience study report dated February 10, 2016 were incorporated into this valuation. A detailed summary of these assumptions can be found in Section 6.

Economic Assumptions

The economic assumptions were reviewed as part of the 2015 experience study. All changes that were proposed in the experience study report dated February 10, 2016 were incorporated into this valuation. A detailed summary of these assumptions can be found in Section 6.

Changes in Method, Assumptions, and Plan Amendments

The following changes to actuarial assumptions and methods and plan provisions are reflected in this valuation:

- The dollar per month maximum benefit was eliminated for Local 1859 employees who retire on or after October 27, 2017.
- Pensionable earnings are limited to 2,392 pay hours in any calendar year for Local 1859 Union employees effective October 27, 2017.
- All Local 1859 Union employees contribute 2% of earnings to the plan effective October 27, 2017.
- Benefit eligibility for participants in the Local 1859 Union was increased to 10 years of service for participants hired on or after October 27, 2017.

Projection of Expected Benefit Payments

The projection of expected benefit payments is shown in Appendix 3.

Sources of Information

The July 1, 2018 participant data and market value of assets were provided by, or at the direction of, the MTA. While we have reviewed this data for consistency and completeness, we have not audited this data.

Actuarial Statement

We are available to answer any questions on the material in this report or to provide explanations or further details as appropriate. As noted in the Actuarial Certification in Appendix 3, we believe that the actuarial assumptions and methods used in this report are reasonable and appropriate for the purposes of this report, and fairly present the current financial situation of the Plan.

Section II. Actuarial Costs

Liabilities

Below is a summary of the actuarial accrued liability of future benefits expected to be paid from the Plan.

Unfunded Liability

1. Actuarial accrued liability at July 1, 2018		
a. Active participants	$	349,163,378
b. Vested terminated participants		21,019,531
c. Retired participants, QDRO's, and beneficiaries		316,195,690
d. Disabled participants and disabled beneficiaries		49,431,704
e. Total		735,810,303
2. Actuarial asset value at July 1, 2018		316,454,023
3. Unfunded actuarial liability at July 1, 2018 (1.e. - 2.)		419,356,280
4. Funded ratio on July 1, 2018 (2. ÷ 1.e)		43.01%

Section II. Actuarial Costs

Reconciliation of Unfunded Liability

1.	Unfunded actuarial liability at July 1, 2017	$ 415,641,136
2.	Normal cost at July 1, 2017	8,296,828
3.	Interest on (1. + 2.) to June 30, 2018 at 7.55% per annum	32,007,316
4.	Expected contribution	66,495,406
5.	Interest on contribution to June 30, 2018 at 7.55% (contribution is assumed to be made as of September 1st)	4,158,090
6.	Projected unfunded actuarial liability at July 1, 2018 (1. + 2. + 3. - 4. -5.)	385,291,784
7.	Change in unfunded actuarial liability due to changes in actuarial methods	0
8.	Change in unfunded actuarial liability due to changes in actuarial assumptions (discount rate change)	4,141,185
9.	Change in unfunded actuarial liability due to elimination of DPM Cap and addition of Employee Cont. for the Local 1859 Union	1,280,457
10.	Expected unfunded actuarial liability at July 1, 2018 (6. + 7. + 8. + 9.)	390,713,426
11.	Actual unfunded actuarial liability at July 1, 2018	419,356,280
12.	Actuarial gain/(loss) at July 1, 2018 (10. - 11.)	(28,642,854)

Section II. Actuarial Costs

Normal Cost

Normal Cost	FYE 2018	FYE 2019
1. Retirement benefits	$ 7,373,358	$ 7,661,313
2. Vested termination benefits	663,130	659,563
3. Preretirement death benefits	150,783	153,865
4. Disability benefits	2,793,667	2,811,505
5. Employee Contributions	(2,684,110)	(2,775,415)
6. Total normal cost (1. + 2. + 3. + 4. + 5.)	8,296,828	8,510,831
7. Interest on normal cost to September 1	101,261	103,206
8. Projected normal cost for plan year (6. + 7.)	8,398,089	8,614,037

Actuarially Determined Contribution

The breakdown of the actuarially determined contribution into normal cost and amortization payment is illustrated below.

Contributions are assumed to be made on September 1. The amortization payment for the unfunded actuarial liability is determined assuming payment as of September 1 of each year and the normal cost, which is determined as of July 1 is adjusted to September 1 as well.

Actuarially Determined Contribution	FYE 2017	FYE 2018
1. Normal cost	$ 8,398,089	$ 8,614,037
2. Amortization amount	58,097,317	56,034,746
3. Actuarially determined contribution (1. + 2.)	66,495,406	64,648,783
4. Base payroll[2]	145,833,561	148,444,632
5. Contribution as a percentage of base payroll	45.60%	43.55%

[2] Although the ADC is shown here as a percentage of base payroll, Plan benefits are based on total remuneration including overtime, limited to 2,392 pay hours in each calendar year.

Section II. Actuarial Costs

Amortizations

Description	Date Established	Initial Amount	Initial Amortization Years	7/1/2018 Outstanding Balance	Remaining Amortization Years	9/1/2018 Amortization Amount
Initial	6/30/2002	124,187,444	17	12,434,611	1	12,585,398
Plan Amendment	6/30/2002	14,399,897	25	8,337,356	9	1,230,580
Experience Loss	6/30/2002	6,345,365	25	3,673,884	9	542,259
Method Change	6/30/2002	(2,078,078)	25	(1,203,179)	9	(177,587)
Plan Amendment	6/30/2003	4,360,440	25	2,712,803	10	372,102
Experience Loss	6/30/2003	4,538,537	25	2,823,603	10	387,300
Plan Amendment	6/30/2004	4,418,159	25	2,925,427	11	376,510
Experience Loss	6/30/2004	17,337,872	25	11,480,046	11	1,477,510
Experience Gain	6/30/2005	(458,689)	25	(320,718)	12	(39,037)
Plan Amendment	6/30/2006	23,569,806	25	17,290,211	13	2,003,357
Experience Loss	6/30/2006	10,757,586	25	7,891,490	13	914,360
Assumption Change	6/30/2007	8,008,848	25	6,130,197	14	679,886
Plan Amendment	6/30/2007	762,523	25	583,657	14	64,732
Experience Loss	6/30/2007	7,007,396	25	5,363,656	14	594,871
Experience Gain	6/30/2008	(235,799)	25	(187,539)	15	(20,003)
Experience Loss	6/30/2009	11,377,550	25	9,365,125	16	964,544
Plan Amendment	6/30/2010	83,039,793	25	70,493,024	17	7,035,232
Experience Gain	6/30/2010	(5,618,484)	25	(4,769,568)	17	(476,005)
Method Change	6/30/2011	(9,372,548)	25	(8,180,750)	18	(793,558)
Experience Gain	6/30/2011	(13,418,790)	25	(11,712,478)	18	(1,136,147)
Assumption Change	6/30/2011	15,465,597	25	13,499,016	18	1,309,446
Experience Loss	6/30/2012	16,238,515	25	14,534,463	19	1,374,061
Experience Loss	6/30/2013	13,697,669	25	12,542,790	20	1,158,390
Assumption Change	6/30/2013	2,292,023	25	2,098,777	20	193,833
Plan Amendment	6/30/2013	29,352,563	25	26,877,785	20	2,482,300
Experience Loss	6/30/2014	10,541,610	25	9,855,673	21	891,080
Assumption Change	6/30/2014	2,530,438	25	2,365,785	21	213,897
Plan Amendment	6/30/2014	1,437,364	25	1,343,836	21	121,500
Assumption Change	6/30/2015	33,129,847	25	31,569,346	22	2,799,511
Experience Loss	6/30/2015	5,314,039	25	5,063,733	22	449,043
Plan Amendment (DPM + EE Cont)	6/30/2016	91,171,693	12	80,931,172	10	11,100,939
Assumption Change	6/30/2016	(3,781,060)	25	(3,666,450)	23	(319,433)
Experience Loss	6/30/2016	13,288,139	25	12,885,355	23	1,122,613
Plan Amendment (COLA Award)	6/30/2017	272,820	2	141,372	1	143,086
Plan Amendment (DPM + EE Cont)	6/30/2017	1,085,537	12	1,026,790	11	132,150
Experience Loss	6/30/2017	39,670,854	25	39,091,482	24	3,351,110
Assumption Change	6/30/2018	4,141,185	25	4,141,185	25	349,780
Plan Change (DPM + EE Cont)	6/30/2018	1,280,457	12	1,280,457	12	155,853
Experience Loss	6/30/2018	28,642,854	25	28,642,854	25	2,419,283
Total				**419,356,280**		**56,034,746**

Section III. Valuation Assets

Reconciliation of Assets

Below is a reconciliation of assets from the prior valuation date of July 1, 2017 to the current valuation date of July 1, 2018.

		7/01/2017 to 6/30/2018
(1)	**Beginning of year assets**	
	(a) Beginning of year assets	$273,000,325
	(b) Market Value Adjustment	0
	(c) Adjusted beginning of year assets	**$273,000,325**
(2)	**Additions**	
	(a) Employer contributions	$ 40,997,059
	(b) Employee contributions	3,315,683
	(c) Investment income & Dividends	19,579,635
	(d) Increase/(Decrease) in Market Value of Investments	970,655
	(e) Total receipts [(a) + (b) + (c) + (d)]	**$ 64,863,032**
(3)	**Deductions**	
	(a) Benefit payments	$ 37,203,253
	(b) Administrative expenses	2,213,277
	(c) Investment expenses	0
	(d) Total disbursements [(a) + (b) + (c)]	**$ 39,416,530**
(4)	Net increase [2(e) – 3(d)]	$ 25,446,502
(5)	**Net assets [1(c) + 4]**	**$298,446,827**

Section III. Valuation Assets

Calculation of Actuarial Asset Value

The actuarial asset value represents a "smoothed" value developed by the actuary to reduce the volatile results that could develop due to short-term fluctuations in the market value of assets. The actuarial value of assets is equal to the expected actuarial value of assets, plus one-fifth of the difference between the actual market value and the expected actuarial value of assets.

1.	Actuarial Value of Assets as of July 1, 2017	$ 290,605,477
2.	Contributions for the 2017 - 2018 plan year	40,997,059
3.	Employee Contributions for the 2017 - 2018 plan year	3,315,683
4.	Benefit payments during the 2017 - 2018 plan year	37,203,253
5.	Expected return at 7.55% interest	23,240,856
6.	Expected assets as of June 30, 2018 (1. + 2. + 3. – 4. + 5.)	320,955,822
7.	Market value of assets as of June 30, 2018	298,446,827
8.	Asset gain/(loss) for 2017 - 2018 (7. – 6.)	$ (22,508,995)
9.	Actuarial asset value as of July 1, 2018 (6. + (8. x 20%))	$ 316,454,023
10.	Actuarial asset value as a percentage of market value (9. / 7.)	106.03%

Section IV. Valuation Data

Counts

The following table summarizes the counts, ages and benefit information for plan participants used in this valuation. The previous valuation's data statistics have been provided for comparison purposes.

			July 1, 2017	July 1, 2018
(1)	**Actives**			
	(a)	Number	2,654	2,638
	(b)	Average age	48.21	48.22
	(c)	Average service[3]	13.03	12.89
	(d)	Average base salary	$ 54,949	$ 56,272
(2)	**Service retirements and beneficiaries**			
	(a)	Number	1,397	1,497
	(b)	Average age	71.83	71.65
	(c)	Total monthly benefits	$2,641,320	$2,804,835
(3)	**Disability retirements**			
	(a)	Number	429	415
	(b)	Average age	63.12	64.84
	(c)	Total monthly benefits	$ 460,635	$ 444,941
(4)	**Vested terminations (including deferred transfers)**			
	(a)	Number	509	521
	(b)	Average age	54.55	54.42
	(c)	Total monthly benefits	$ 313,265	$ 334,120
(5)	**QDRO participants**			
	(a)	Number	18	21
	(b)	Average age	65.56	65.48
	(c)	Total monthly benefits	14,414	19,532

[3] Does not include .4 years of additional service added to all participants' years of service to account for sick leave and prior military service.

Section IV. Valuation Data

Active Age/Service Distribution including Compensation

Shown below is the distribution of active participants based on age and service. The compensation shown is the average projected base pay for the plan year beginning July 1, 2018.

	Years of Service									
	Under 1	1 - 4	5 -9	10 -14	15 - 19	20 - 24	25 - 29	30 - 34	35 +	Total
Under 25	1	12	0	0	0	0	0	0	0	13
	37,378	39,296	0	0	0	0	0	0	0	39,149
25 - 29	18	63	23	0	0	0	0	0	0	104
	39,654	42,049	53,688	0	0	0	0	0	0	44,208
30 - 34	35	110	97	36	0	0	0	0	0	278
	38,912	42,082	58,433	61,072	0	0	0	0	0	49,847
35 - 39	20	80	78	86	19	0	0	0	0	283
	39,489	42,261	57,737	59,165	62,297	0	0	0	0	52,813
40 - 44	10	72	62	61	68	11	0	0	0	284
	40,258	41,239	59,915	60,095	61,718	60,630	0	0	0	54,986
45 - 49	20	64	72	75	78	44	2	0	0	355
	40,119	42,959	59,868	61,133	61,600	61,782	64,106	0	0	56,616
50 - 54	7	47	63	75	99	68	47	16	1	423
	35,048	42,071	56,570	59,609	61,770	62,820	64,149	65,466	64,875	58,562
55 - 59	6	28	66	76	90	78	67	38	10	459
	42,178	41,271	56,893	60,081	61,385	62,276	64,309	61,699	66,628	59,764
60 - 64	3	12	41	48	58	50	41	28	38	319
	39,097	43,725	57,057	59,356	61,743	63,565	64,361	64,843	65,027	61,176
65 - 69	1	3	12	13	15	12	17	5	21	99
	37,378	51,025	53,038	54,362	62,520	61,896	59,745	63,244	61,198	58,901
70 +	0	0	3	3	3	1	2	0	9	21
	0	0	51,002	55,169	51,743	64,043	64,147	0	67,152	60,497
Total	**121**	**491**	**517**	**473**	**430**	**264**	**176**	**87**	**79**	**2,638**
	39,346	**42,077**	**57,793**	**59,822**	**61,626**	**62,499**	**63,833**	**63,492**	**64,452**	**56,272**

Averages	
Age:	48.22
Service:	12.89

Section IV. Valuation Data

Age Distribution of Inactive Participants Currently Receiving Benefits

	Beneficiary		Disabled		QDRO		Retiree		Total	
Age	Count	Benefit	Count	Benefit	Count	Benefit	Count	Benefit	Count	Benefit
Under 35	2	1,374	2	604	0	0	1	380	5	2,358
35 - 39	3	2,688	3	2,470	0	0	0	0	6	5,158
40 - 44	3	3,311	12	6,634	0	0	4	3,443	19	13,388
45 - 49	4	3,045	15	7,280	0	0	2	1,804	21	12,129
50 - 54	3	3,738	29	21,004	1	722	13	25,757	46	50,499
55 - 59	13	12,891	51	55,050	2	2,171	51	115,961	117	186,073
60 - 64	21	25,477	75	80,619	4	3,631	133	342,028	233	451,755
65 - 69	24	25,345	97	124,351	9	9,293	322	653,003	452	811,992
70 - 74	36	44,221	65	80,951	4	3,396	326	642,410	431	770,978
75 - 79	40	37,959	42	46,065	1	320	251	480,964	334	565,308
80 - 84	16	20,794	15	11,309	0	0	115	212,734	146	244,837
85 - 89	14	10,520	7	7,648	0	0	61	91,713	82	109,881
90 - 94	6	5,139	2	957	0	0	27	32,214	35	38,310
95 & over	1	418	0	0	0	0	5	5,502	6	5,920
Total	**186**	**196,922**	**415**	**444,941**	**21**	**19,532**	**1,311**	**2,607,913**	**1,933**	**3,269,308**

Age Distribution of Inactive Deferred Vested Participants

Normal Retirement		
Age	Count	Benefit
Under 35	22	9,838
35 - 39	29	14,319
40 - 44	22	13,063
45 - 49	71	55,162
50 - 54	87	58,726
55 - 59	115	79,413
60 - 64	123	77,457
65 - 69	36	18,527
70 - 74	10	6,117
75 & over	6	1,498
Total	**521**	**334,120**

Section IV. Valuation Data

Participant Reconciliation

Shown below is the reconciliation of participants between the prior and current valuation date.

		Inactive Participants				
	Active Participants	Retirees & Beneficiaries	Disabled & Disabled Beneficiaries	Terminated Vested	QDRO	Total
Participants in last valuation	2,654	1,397	429	509	18	5,007
New participants	197	0	0	0	3	200
Return to active status	1	0	(1)	0	0	0
Non-vested termination	(67)	0	0	0	0	(67)
Vested termination	(37)	0	0	37	0	0
Retired/disabled	(105)	130	0	(25)	0	0
Lump sum payouts	0	0	0	0	0	0
Adjustments	0	(2)	0	1	1	0
New beneficiaries	0	23	0	0	0	23
Deceased	(5)	(51)	(13)	0	(1)	(70)
Pickups	0	0	0	(1)	0	(1)
Participants in this valuation	2,638	1,497	415	521	21	5,092

Section V. Summary of Principal Plan Provisions

Following is a summary of the major plan provisions used in the valuation of this Plan. The Maryland Transit Administration is solely responsible for the validity, accuracy, and comprehensiveness of this information. If any of the plan provisions shown below are not accurate and complete, the valuation results may differ significantly from those shown in this report and may require a revision of this report. Moreover, these plan provisions may be susceptible to different interpretations, each of which could be reasonable, and the different interpretations could lead to different valuation results.

Plan year

July 1 – June 30

Effective date of plan

January 8, 1950

Eligibility requirements

Any employee who is a member of The Amalgamated Transit Union, Local 1300, or the Office & Professional Employees International Union, Local No. 2, who is not included in the Maryland State Retirement and Pension System.

Any employee who is a member of the Police Local Union No. 1859, who is not included in the Law Enforcement Officers' Pension System (LEOPS) offered by the Maryland State Retirement and Pension System.

Any management employee who transferred from any of the bargaining units above. For purposes of this Plan, management employees are classified as Local 1300 employees

Eligible employees become participants immediately upon employment.

Normal form

Life annuity.

Vesting

The following table summarizes the vesting requirements for each bargaining unit:

Years of Service	Local 1300 & Management	Local 2	Police Local 1859
5	Hired before 5/18/2013	Hired before 7/1/2012	Hired before 1/1/2012
7	Hired on or after 5/18/2013 and before 7/1/2016	Hired on or after 7/1/2012 and before 7/1/2016	Hired on or after 1/1/2012 and before 10/27/2017
10	Hired on or after 7/1/2016	Hired on or after 7/1/2016	Hired on or after 10/27/2017

Participants are considered 100% vested upon the attainment of early or normal retirement eligibility.

Section V. Summary of Principal Plan Provisions

Normal retirement date

First of the month coincident with or immediately following the earlier of:

a. Attainment of age 65 and fully vested (as described above)
b. Attainment of age 52 with 30 years of service.

Normal retirement benefit

A monthly income payable for life that is equal to 1.70% of Average Compensation times years of service.

The above described benefit cannot be less than $625 per month at age 65 with 25 years of service for Management, Local 2, and Local 1300 and $450 per month for Local 1859.

The benefit is offset by a fixed amount for a group of former Allamerica Financial Program members.

Management members are also entitled to Minimum Alternate Benefits, if they are greater than the Plan benefit.

Compensation

Remuneration received as an MTA employee including overtime if eligible. Effective July 1, 2016 for Local 2 and Local 1300 and October 27, 2017 for Local 1859, participants' credited earnings shall not exceed the first 2,392 pay hours in any calendar year.

Average annual compensation

Average annual compensation is the average of the member's pensionable earnings for the three years over the last ten years of credited service that produces the highest average. Effective July 1, 2016 for Local 2 and Local 1300 and October 27, 2017 for Local 1859, credited earnings shall not exceed 2,392 pay hours in any calendar year.

Early retirement benefit eligibility

Attainment of age 55 with age plus years of service equal to at least 85.

Early retirement benefit

Normal Retirement Benefit calculated using credited service on the date of retirement (DOR), reduced by 4/12% each month preceding age 65(if >= 60 at DOR) and 5/12% for each month preceding age 65 (if < 60 at DOR).

Section V. Summary of Principal Plan Provisions

Disability retirement eligibility

Vested, and certification by the State Medical Director.

Disability benefit

Normal Retirement Benefit based on Average Annual Compensation and years of creditable service at termination date, but not less than the amounts in the table below:

Years of Service	Minimum Monthly Benefit
100% Vesting	$200
10	$360
20	$720

Termination benefits

Vested participants shall receive a benefit computed in the same manner as the Normal Retirement Benefit but the benefit is based on credited service, average compensation, and the benefit formula in effect on the date of termination. The benefit is paid monthly beginning at age 65 for the life of the member.

Pre-Retirement death benefit eligibility

Death of participant before commencement of benefits and after eligibility for normal or early retirement.

Pre-Retirement death benefit

The spouse will receive an allowance of 75% (50% for Police Local Union No. 1859) of the normal or early retirement benefit the member would have received if they had retired on the day before death and elected a 75% (50% for Police Local Union No. 1859) joint and survivor benefit.

Optional forms

50%, 75% or 100% joint and survivor
50%, 75% or 100% joint and survivor with pop-up option
Partial lump sum of 5%, 10%, or 15% of accrued benefit plus a 50%, 75%, or 100% joint and survivor annuity.

Year of creditable service

Credited Service includes service with MTA, plus one month of service for every 20 days of unused sick leave. Part-time employees are credited service at the rate of one month for each 173 hours of work.

Section V. Summary of Principal Plan Provisions

COLA increases

Pensions of retirees and beneficiaries, excluding members who retire from deferred vested status, who have been receiving payments for at least 13 months shall be granted a COLA of each of the following dates: 8/1/2008, 8/1/2009, 8/1/2010, 8/1/2011, 8/1/2012 (Local 1300 and Local 2 only), 8/1/2013 (Local 1300 and Local 2 only), 8/1/2014 (Local 1300 and Local 2 only), 8/1/2015 (Local 1300 and Local 2 only), 8/1/2016 (Local 1300 and Local 2 only), and 8/1/2017 (Local 1300 and Local 2 only). The percentage increase is equal to the increase in the Consumer Price Index (CPI-U, U.S. City Average, 1967=100) for the preceding fiscal year (July 1 to June 30), subject to a maximum increase of 3% annually.

Employee Contributions

Effective July 1, 2016 for Local 2 and Local 1300 and effective October 27, 2017 for Local 1859, employees shall contribute 2% of pensionable earnings to the MTA Pension Plan. Contributions shall continue until such time as the plan actuary certifies that the market value funded ratio equals or exceeds 100%. Once the 100% funded ratio is reached, employee contributions shall cease. If the funded ratio falls below 95%, employee contributions shall resume until the funded ratio returns to 100%. Employees who separate before becoming eligible for a Normal, Early, Disability, or Deferred Vested pension benefit shall be entitled to a return of their contributions plus interest computed at 5.0% compounded annually.

Changes in plan provisions since prior valuation

- The dollar per month maximum benefit was eliminated for Local 1859 employees effective October 27, 2017.
- The vesting requirement was increased to 10 years for Local 1859 employees hired on or after October 27,2017.
- Pensionable earnings are limited to 2,392 pay hours in any calendar year for Local 1859 employees effective October 27, 2017.
- All Local 1859 employees will contribute 2% of earnings to the plan effective October 27, 2017.

Section VI. Valuation Assumptions and Methods

Economic Assumptions

Investment Rate of Return

The assumed annual net rate of return on investment (including appreciation and depreciation, realized and unrealized) is 7.50% (net of investment expenses). (7.55% for the prior year)

Salary Scale

Salaries are assumed to increase for individuals by 3.20% per year due to inflation, plus the following service based percentages due to merit and longevity:

Years of Service	Management	Maintenance/ Operators	All Others
0 – 5	0.50%	6.00%	3.00%
6 – 20	0.50%	0.25%	1.00%
21 – 29	0.50%	0.25%	1.00%
30+	0.50%	0.00%	0.50%

Pay increases are assumed to occur during the middle of the fiscal year.

Payroll Growth

The rate of annual growth of participant payroll is assumed to be 3.20%.

Inflation

Inflation as measured by the Consumer Price Index (CPI) will increase at the rate of 3.20% per year.

Cost-of-Living Adjustments

None assumed.

Section VI. Valuation Assumptions and Methods

Demographic Assumptions

Mortality

For Healthy Participants: RP-2014 Blue Collar table, fully generational, projected using scale MP-2014.

For Disabled Participants: RP-2014 Disabled table, fully generational, projected using scale MP-2014.

Projection to the year of the valuation is assumed to be current experience. The generational projection beyond the year of the valuation is assumed to account for future mortality improvements.

Retirement Rates

Retirement Rates are shown below:

Age	Management	Maintenance	All Others
52	15.00%	1.00%	5.00%
53	15.00%	1.00%	5.00%
54	15.00%	1.00%	5.00%
55	15.00%	1.00%	5.00%
56	15.00%	1.00%	5.00%
57	20.00%	1.00%	5.00%
58	20.00%	1.00%	5.00%
59	20.00%	5.00%	5.00%
60	20.00%	5.00%	10.00%
61	20.00%	5.00%	20.00%
62	25.00%	15.00%	20.00%
63	25.00%	20.00%	20.00%
64	25.00%	20.00%	20.00%
65	25.00%	25.00%	20.00%
66	25.00%	25.00%	25.00%
67	25.00%	25.00%	25.00%
68	25.00%	15.00%	25.00%
69	25.00%	15.00%	25.00%
70	100.00%	15.00%	100.00%
71 – 74	100.00%	15.00%	100.00%
75	100.00%	100.00%	100.00%

Section VI. Valuation Assumptions and Methods

Demographic Assumptions

Termination of employment

Withdrawal Rates are shown below:

Years of Service	Management	Maintenance	Operators	All Others
0	33.00%	15.00%	20.00%	20.00%
1	26.40%	7.00%	10.00%	20.00%
2	21.15%	5.00%	6.00%	15.00%
3	16.95%	5.00%	6.00%	7.00%
4	13.88%	5.00%	5.00%	6.00%
5	10.80%	5.00%	2.00%	6.00%
6	9.45%	3.00%	2.00%	6.00%
7	8.10%	0.50%	2.00%	6.00%
8	6.75%	0.50%	2.00%	6.00%
9	5.40%	0.50%	2.00%	6.00%
10	4.05%	0.50%	2.00%	6.00%
11	4.05%	0.00%	1.50%	6.00%
12	4.05%	0.00%	1.50%	6.00%
13	4.05%	0.00%	1.50%	2.00%
14	4.05%	0.00%	1.50%	2.00%
15	4.05%	0.00%	1.50%	2.00%
16	4.05%	0.00%	1.00%	2.00%
17	4.05%	0.00%	1.00%	2.00%
18	4.05%	0.00%	1.00%	2.00%
19	4.05%	0.00%	1.00%	2.00%
20	4.05%	0.00%	1.00%	0.00%
21	4.05%	0.00%	1.00%	0.00%
22	4.05%	0.00%	1.00%	0.00%
23	4.05%	0.00%	1.00%	0.00%
24	4.05%	0.00%	1.00%	0.00%
25+	0.00%	0.00%	0.00%	0.00%

Section VI. Valuation Assumptions and Methods

Demographic Assumptions

Disability Rates

Disability Rates are shown below:

Age	Annual Percentage of Disablement
20	0.19%
30	0.27%
40	0.46%
50	1.22%
60	1.98%

Marital status and age of spouse

85% of plan members are assumed to be married. Male spouses are assumed to be three years older than their wives.

Form of payment

All participants are assumed to elect payment in the form of a single life annuity.

Cost Method

The actuarial valuation is completed on the basis of the entry age normal cost method calculated on an individual basis with level dollar normal cost. The unfunded actuarial accrued liability (UAAL) is amortized with level payments over:

- 17 years for the initial UAAL that began on 06/30/2002
- 25 years for experience gains and losses after 2002
- 25 years for assumption and method changes
- COLA awards are amortized over the life of the contract in which they are negotiated
- Benefit awards and plan changes are amortized over the expected future working lifetime of the entire active population

Method for Determining Actuarial Value of Assets

The actuarial asset value represents a “smoothed” value developed by the actuary to reduce the volatile results which could develop due to short-term fluctuations in the market value of assets. The actuarial value of assets is equal to the expected actuarial value of assets, plus one-fifth of the difference between the actual market value and the expected actuarial value of assets. This method may result in a bias that is above or below the market value of assets.

Section VI. Valuation Assumptions and Methods

Other Assumptions

- An additional 0.4 years of service is assumed for all members to account for sick leave conversion and prior military time.
- An additional pay load is assumed to account for expected overtime. For Local 1300 members (as well as management personnel who bargain with the Local 1300 Union), the amount is assumed to be 15% of their salary, and for all others, the load is assumed to be 10% of salary. No overtime pay load is assumed for management members who are not in the Local 1300 Union.
- Part-time members are assumed to accrue one-half year of service credit each year.
- A 1% load is applied for retirees who have elected a joint and survivor option that includes a pop-up provision.
- The management personnel who bargain under the Local 1300 Union and are subject to the same plan provisions and benefits were identified for purposes of this valuation through a list provided by the MTA.
- The valuation salary was determined based on the Stat code field provided in the MTA data as follows

Stat Code	Payroll Status	Valuation Salary Calculation
AA	Bi-Weekly	Payrate x 26 Pay Periods
BA	Bi-Weekly	Payrate x 26 Pay Periods
NA	Bi-Weekly	Payrate x 26 Pay Periods
PA	Hourly – Part Time	Hourly Rate x 1,040 Hours
QA	Hourly – Part-Time	Hourly Rate x 1,040 Hours
WA	Hourly – Full Time	Hourly Rate x 2,080 Hours

Changes in Assumptions and Cost Method

- The assumption for the discount rate/investment return (net of investment expenses) was lowered from 7.55% to 7.50%.

Section VII. Glossary

Accumulated Plan Benefits Actuarial Gain or Loss:
Amortization payment/credit actuarial present value.

Actuarial Accrued Liability (AAL):
The difference between the Actuarial Present Value of Future Benefits and the Actuarial Present Value of Future Normal Costs or the portion of the present value of future benefits allocated to service before the valuation date in accordance with the actuarial cost method.

Actuarial Asset Valuation Method:
The method of determining the value of the assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets or a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the Actuarially Determined Contribution (ADC).

Actuarial Cost Method:
A procedure for allocating the Actuarial Present Value of Future Benefits and the Actuarial Present Value of Future Normal Costs and the Actuarial Accrued Liability. Also known as the "funding method".

Actuarial Present Value of Future Benefits (APVFB):
The Actuarial Present Value of amounts that are expected to be paid at various future times to active members, retired members, beneficiaries receiving benefits, and inactive, nonretired members entitled to either a refund or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would provide sufficient assets to pay all projected benefits and expenses when due.

Aggregate Cost Method:
An actuarial cost method that spreads the cost of all future benefits in excess of plan assets as a level percentage of future salary or service. The actuarial accrued liability is set to the value of assets in this method.

Actuarially Determined Contributions of the Employer(s) (ADC):
The employer's periodic contributions to a pension plan, calculated in accordance with the parameters.

Cost-of-Living Adjustment (COLA):

The annual increase in the amount of a retired participant's benefit, intended to adjust the benefit for inflation.

Covered Group:
Plan members who are included in an actuarial valuation.

Deferred Retirement Option Program (DROP):
A program allowing a participant, who is eligible to retire, to continue working for a fixed period of time, while accumulating the benefit payments he would have received if he had retired on his entry to DROP.

Section VII. Glossary

Demographic Assumption:
The assumptions regarding the future population of pension participants. This includes retirement, termination, disability, and mortality assumptions.

Economic Assumptions:
The assumptions regarding future economic factors, including COLA, salary improvement, change in average wages, changes in Social Security benefits, and investment returns.

Employer's Contributions:
The Contributions made in relation to the actuarially determined contributions of the employer (ADC). An employer has made a contribution in relation to the ADC if the employer has (a) made payments of benefits directly to or on behalf of a retiree or beneficiary, (b) made premium payments to an insurer, or (c) irrevocably transferred assets to a trust, or an equivalent arrangement, in which plan assets are dedicated to providing benefits to retirees and their beneficiaries in accordance with the terms of the plan and are legally protected from creditors of the employer(s) or plan administrator.

Entry Age Normal (EAN) Cost Method:
An actuarial cost method that spreads the cost for each individual's expected benefits over their career, either as a level percentage of pay or service. The actuarial accrued liability is the accumulated value of all past normal cost, and the unfunded accrued liability (surplus) is the excess of the AAL over the value of assets.

Expenses:
Plan expenses paid by the plan are divided into administrative and investment related expenses.

Funded Ratio:
The actuarial value of assets expressed as a percentage of the plan's actuarial accrued liability.

GASB:
Government Accounting Standards Board

GASB No. 25 and GASB No. 27:
These are the government accounting standards that set the accounting rules for public retirement systems and the employers that sponsor or contribute to them. Statement No. 27 sets the accounting rules for the employers that sponsor or contribute to public retirement systems while Statement No. 25 sets the rules for the systems themselves.

GASB No. 67 and GASB No. 68:
The government standards that replaced GASB 25 and 27. They are effective for plan years beginning after June 14, 2013 and employer fiscal years beginning after June 14, 2014.

Investment Return Assumption or Investment Rate of Return (Discount Rate):
The rate used to adjust a series of future payments to reflect the time value of money.

Section VII. Glossary

Level Percentage of Projected Payroll Amortization Method:
Amortization payments are calculated so that they are a constant percentage of the projected payroll of active plan members over a given number of years. The dollar amount of the payments generally will increase over time as payroll increases due to inflation; in dollars adjusted for inflation, the payments can be expected to remain level.

Normal Cost or Normal Actuarial Cost:
The portion of the Actuarial Present Value of pension plan benefits and expenses that is allocated to a valuation year by the Actuarial Cost Method.

Pay-as-you-go (PAYG):
A method of financing a benefits plan under which the contributions to the plan are generally made at about the same time and in about the same amount as benefit payments and expenses becoming due.

Payroll Growth Rate:
An actuarial assumption with respect to future increases in total covered payroll attributable to inflation; used in applying the level percentage of projected payroll amortization method.

Plan Liabilities:
Obligations payable by the plan at the reporting date, primarily including, benefits and refunds due and payable to plan members and beneficiaries, and accrued investment and administrative expenses. Plan liabilities do not include actuarial accrued liabilities for benefits that are not due and payable at the reporting date.

Plan Members:
The individuals covered by the terms of a Pension or OPEB plan. The plan membership generally includes employees in active service, terminated employees who have accumulated benefits but are not yet receiving them, and retired employees and beneficiaries currently receiving benefits.

Projected Unit Credit (PUC) Funding Method:
An actuarial cost method that spreads the employee's benefit over their career, as a level percentage of service. The normal cost is the present value of the portion of the benefit assigned to the current year. The actuarial accrued liability is the accumulated value of all past normal cost, and the unfunded accrued liability (surplus) is the excess of the AAL over the value of assets.

Post-employment:
The period between termination of employment and retirement as well as the period after retirement.

Salary Improvement:
An actuarial assumption regarding the increase in employees' salaries, reflecting cost-of-living, merit, and longevity increases.

Section VII. Glossary

Select and Ultimate Rates:

Actuarial assumptions that contemplate different rates for successive years. Instead of a single assumed rate with respect to, for example, the investment return assumption, the actuary may apply different rates for the early years of a projection and a single rate for all subsequent years. For example, if an actuary applies an assumed investment return of 8 percent for year 2000, 7.5 percent for 2001, and 7 percent for 2002 and thereafter, then 8 percent and 7.5 percent are select rates, and 7 percent is the ultimate rate.

Unfunded Actuarial Accrued Liabilities:

The excess of the present value of prospective pension benefits, as of the date of a pension plan valuation, over the sum of (1) the actuarial value of the assets of the plan and (2) the present value of future normal costs determined by any of several actuarial cost methods. For plans that define an accrued liability, this amount equals the excess of the accrued liability over plan assets.

Vested Plan Benefits:

All benefits to which current participants have a vested right. They are based on pay and service through the valuation date. A participant has a vested right to a benefit if he/she would still be eligible to receive that benefit if their employment was terminated on the valuation date.

Appendix 1

Summary of Funding Progress

Valuation Date	(1) Actuarial Value of Assets	(2) Actuarial Accrued Liability	(3) Percentage Funded (1) / (2)	(4) Unfunded Actuarial Accrued Liability (2) - (1)	(5) Annual Covered Base Payroll	(6) Unfunded Actuarial Accrued Liability as a Percentage of Base Payroll (4) / (5)
7/1/2009	143,319,538	337,667,125	42.4%	194,347,587	151,559,520	128.2%
7/1/2010	162,755,825	426,040,805	38.2%	263,284,980	145,028,614	181.5%
7/1/2011	187,917,728	433,637,216	43.3%	245,719,488	147,474,199	166.6%
7/1/2012	200,259,694	451,288,292	44.4%	251,028,598	152,276,494	164.9%
7/1/2013	210,736,651	495,100,701	42.6%	284,364,050	137,596,326	206.7%
7/1/2014	230,072,392	515,327,523	44.6%	285,255,131	135,544,813	210.5%
7/1/2015	248,469,522	557,256,179	44.6%	308,786,657	137,427,168	224.7%
7/1/2016	268,413,355	670,528,571	40.0%	402,115,216	137,153,770	293.2%
7/1/2017	290,605,477	706,246,613	41.2%	415,641,136	145,833,561	285.0%
7/1/2018	316,454,023	735,810,303	43.0%	419,356,280	148,444,632	282.50%

Analysis of the dollar amounts of net assets available for benefits, actuarial accrued liability, and unfunded actuarial accrued liability in isolation can be misleading. Expressing the net assets available for benefits as a percentage of the actuarial accrued liability provides one indication of funding status on a going-concern basis. Analysis of this percentage over time indicates whether the Plan is becoming financially stronger or weaker. Generally, the greater this percentage, the stronger the Plan. Trends in unfunded actuarial accrued liability and annual covered payroll are both affected by inflation. Expressing the unfunded actuarial accrued liability as a percentage of annual covered payroll approximately adjusts for the effects of inflation and aids analysis of the MTA’s progress made in accumulating sufficient assets to pay benefits when due. Generally, the smaller this percentage, the stronger the Plan.

Appendix 2

Schedule of Employer Contributions

Plan Year Ending	Actuarially Determined Contribution	Actual Contribution	Percent Contributed
06/30/2010	$26,151,368	$37,760,833	144.4%
06/30/2011	33,928,274	47,528,274	140.1%
06/30/2012	32,859,285	32,859,285	100.0%
06/30/2013	34,582,249	29,518,757	85.4%
06/30/2014	39,748,933	39,748,933	100.0%
06/30/2015	40,807,270	35,400,000	86.75%
06/30/2016	44,736,075	40,997,059	91.64%
06/30/2017	62,217,185	40,997,059	65.89%
06/30/2018	66,495,406	40,997,059	61.65%
06/30/2019	64,648,783	TBD	TBD

The information presented in the required supplementary schedules was determined as part of the actuarial valuations at the dates indicated.

Actuarial cost method	Entry Age Normal, Level Dollar
Asset valuation method	5 Year open period smoothing (Actual Market Value vs. Expected Actuarial Value)
Actuarial assumptions:	
Investment rate of return	7.50% net of investment expenses
Projected salary increase	Refer to Actuarial Assumptions
Post-retirement cost-of-living adjustments	None Assumed

Appendix 3

Benefit Payment Projection

The following table shows the estimated benefit payments from July 1, 2018 through June 30, 2028.

Fiscal Year Ending	Benefits
2019	41,958,000
2020	43,726,000
2021	45,652,000
2022	47,547,000
2023	49,400,000
2024	51,438,000
2025	53,559,000
2026	55,711,000
2027	57,939,000
2028	60,134,000

Appendix 4

Actuarial Certification

This actuarial valuation sets forth our calculation of an estimate of the liabilities of the Maryland Transit Administration Pension Plan, together with a comparison of these liabilities with the value of the plan assets, as submitted by the Maryland Transit Administration (MTA). This calculation and comparison with assets is applicable for the valuation date only. The future is uncertain, and the Plan may become better funded or more poorly funded in the future. This valuation does not provide any guarantee that the Plan will be able to provide the promised benefits in the future.

This is a deterministic valuation in that it is based on a single set of assumptions. This set of assumptions is one possible basis for our calculations. Other assumptions may be equally valid. The future is uncertain and the Plan's actual experience will differ from those assumptions; these differences may be significant or material because these results are very sensitive to the assumptions made and, in some cases, to the interaction between the assumptions. We may consider that some factors are not material to the valuation of the Plan and may not provide a specific assumption for those factors. We may have used other assumptions in the past. We will likely consider changes in assumptions at a future date.

Different assumptions or scenarios within the range of possibilities may also be reasonable and results based on those assumptions would be different. As a result of the uncertainty inherent in a forward looking projection over a very long period of time, no one projection is uniquely "correct" and many alternative projections of the future could also be regarded as reasonable. Two different actuaries could, quite reasonably, arrive at different results based on the same data and different views of the future. A "sensitivity analysis" shows the degree to which results would be different if you substitute alternative assumptions within the range of possibilities for those utilized in this report. We have not been engaged to perform such a sensitivity analysis and thus the results of such an analysis are not included in this report. At the MTA's request, Bolton Partners, Inc. is available to perform such a sensitivity analysis.

MTA is responsible for selecting the Plan's funding policy, actuarial valuation methods, asset valuation methods, and assumptions. The policies, methods and assumptions used in this valuation are those that have been so prescribed and are described in this report. The MTA is solely responsible for communicating to Bolton Partners, Inc. any changes required thereto.

MTA could reasonably ask how the valuation would change if we used a different assumption set or if plan experience exhibited variations from our assumptions. This report does not contain such an analysis. This type of analysis would be a separate assignment.

In addition, decisions regarding benefit improvements, benefit changes, the trust's investment policy, and similar issues should not be based on this valuation. These are complex issues and other factors should be considered when making such decisions. These other factors might include the anticipated vitality of the local economy and future growth expectations, as well as other economic and financial factors.

Appendix 4

Actuarial Certification

The cost of this Plan is determined by the benefits promised by the Plan, the plan's participant population, the investment experience of the plan and many other factors. An actuarial valuation is a budgeting tool for the MTA. It does not affect the cost of the Plan. Different funding methods provide for different timing of contributions to the Plan. As the experience of the Plan evolves, it is normal for the level of contributions to the Plan to change. If a contribution is not made for a particular year, either by deliberate choice or because of an error in a calculation, that contribution can be made in later years. We will not be responsible for contributions that are made at a future time rather than an earlier time. The Plan sponsor is responsible for funding the cost of the Plan.

We make every effort to ensure that our calculations are accurately performed. These calculations are complex. Despite our best efforts, we may make a mistake. We reserve the right to correct any potential errors by amending the results of this report or by including the corrections in a future valuation report.

Because modeling all aspects of a situation is not possible or practical, we may use summary information, estimates, or simplifications of calculations to facilitate the modeling of future events in an efficient and cost-effective manner. We may also exclude factors or data that are immaterial in our judgment. Use of such simplifying techniques does not, in our judgment, affect the reasonableness of valuation results for the Plan.

This report is based on plan provisions, census data, and asset data submitted by MTA. We have relied on this information for purposes of preparing this report but have not performed an audit. The accuracy of the results presented in this report is dependent upon the accuracy and completeness of the underlying information. The Plan sponsor is solely responsible for the validity and completeness of this information.

MTA is solely responsible for selecting the Plan's investment policies, asset allocations and individual investments. Bolton Partners, Inc.'s actuaries have not provided any investment advice to the MTA.

The information in this report was prepared for the internal use of the MTA and its auditors in connection with our actuarial valuations of the pension plan. It is neither intended nor necessarily suitable for other purposes. Bolton Partners, Inc. is not responsible for the consequences of any other use or the reliance upon this report by any other party.

The only purpose of this report is to:

- Provide the recommended employer contribution for the 2019 fiscal year.

This report may not be used for any other purpose; Bolton Partners, Inc. is not responsible for the consequences of any unauthorized use or the reliance on this report by any other party.

Appendix 4

Actuarial Certification

The calculation of actuarial liabilities for valuation purposes is based on a current estimate of future benefit payments. The calculation includes a computation of the “present value” of those estimated future benefit payments using an assumed discount rate; the higher the discount rate assumption, the lower the estimated liability will be. For purposes of estimating the liabilities (future and accrued) in this report, you selected an assumption based on the expected long-term rate of return on Plan investments. Using a lower discount rate assumption, such as a rate based on long-term bond yields, could substantially increase the estimated present value of future and accrued liabilities.

Because valuations are a snapshot in time and are based on estimates and assumptions that are not precise and will differ from actual experience, contribution calculations are inherently imprecise. There is no uniquely “correct” level of contributions for the coming plan year.

This report provides certain financial calculations for use by the auditor. These values have been computed in accordance with our understanding of generally accepted actuarial principles and practices and fairly reflect the actuarial position of the Plan. The various actuarial assumptions and methods which have been used are, in our opinion, appropriate for the purposes of this report.

The report is conditioned on the assumption of an ongoing plan and is not meant to present the actuarial position of the Plan in the case of Plan termination. 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.

Appendix 4

Actuarial Certification

The MTA should notify Bolton Partners, Inc. promptly after receipt of this report if the MTA disagrees with anything contained in the report or is aware of any information that would affect the results of the report that has not been communicated to Bolton Partners, Inc. or incorporated therein. The report will be deemed final and acceptable to the MTA unless the MTA promptly provides such notice to Bolton Partners, Inc.

The undersigned credentialed actuaries meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. They are currently compliant with the Continuing Professional Development Requirement of the Society of Actuaries. We are not aware of any direct or material indirect financial interest or relationship, including investments or other services, that could create a conflict of interest that would impair the objectivity of our work.

We are available to answer any questions on the material in this report to provide explanations or further details as appropriate.

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Kevin Binder, FSA, EA, MAAA

Jordan McClane, ASA, EA