# Maryland Transit Administration
# Pension Plan
# Actuarial Valuation
# As of July 1, 2017
# -Revised-

**Date of Report:** **November 27, 2017**

**Prepared By:** **Bolton Partners, Inc.**
**36 S. Charles St, Suite 1000**
**Baltimore, MD 21201**

November 27, 2017

Heidi Tarleton
Deputy Chief Financial Officer
Maryland Transit Administration
6 St. Paul Street, 8th Floor
Baltimore, MD 21202

Dear Heidi:

The following sets forth the actuarial valuation of the Maryland Transit Administration Pension Plan as of July 1, 2017. The report has been revised to reflect amended market value of assets as of 07/01/2017. Section 1 of the report provides the executive summary while Sections 2 through 6 contains the development of the actuarially determined contribution for the 2018 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,

Kevin Binder, FSA, EA, MAAA
Senior Actuary
(443) 703-2512
kbinder@boltonpartners.com

Kristopher Seets, FSA, EA
Actuary
(443) 573-3911
kseets@boltonpartners.com

# Table of Contents

# 1. Executive Summary

## Background

Bolton Partners, Inc. has prepared the following report that sets forth the actuarial determined contribution of the Maryland Transit Administration Pension Plan as of July 1, 2017.

## Actuarially Determined Contribution (ADC)

The actuarially determined contribution increased this year. The primary cause for the increase was lower than expected contributions to the plan that increased the ADC $2.0 million. There was also an increase due to the plan change for the Local 2 Union that eliminated the dollar per month cap for participants effective July 1, 2016 and awarded COLA's for current retirees for a 4 year period. This increased the ADC $0.25 million. Demographic losses including salary increases which were more than assumed increased the ADC $2.0 million.

| Actuarially Determined Contribution | FYE 2017 | FYE 2018 |
|---|---|---|
| Actuarially Determined Contribution | $62,217,185 | $66,495,406 |
| Percent of total payroll | 45.36% | 45.60% |

## Summary of Plan Results

| | 7/1/2016 | 7/1/2017 | % Change |
|---|---|---|---|
| Participant Counts | | | |
| Active | 2,652 | 2,654 | 0.08% |
| Participants Receiving a Benefit | 1,777 | 1,844 | 3.77% |
| Terminated Vested Participants | 486 | 509 | 4.73% |
| Total | 4,915 | 5,007 | 1.87% |
| Annual Pay of Active Members | $137,153,770 | $145,833,561 | 6.33% |
| **Assets and Liabilities** | | | |
| Actuarial Liability | 670,528,571 | 706,246,613 | 5.33% |
| Actuarial Value of Assets | 268,413,355 | 290,605,477 | 8.27% |
| Unfunded Actuarial Liability | 402,115,216 | 415,641,136 | 3.36% |
| Funded Ratio | 40.03% | 41.15% | 2.79% |
| **Contributions** | | | |
| Employer Normal Cost | $7,759,540 | $8,398,089 | 8.23% |
| Amortization Payment | $54,457,645 | $58,097,317 | 6.68% |
| Actuarially Determined Contribution | $62,217,185 | $66,495,406 | 6.88% |
| Assumed Payment Date | 09/01/2016 | 09/01/2017 | |

# 1. Executive Summary (cont)

## Experience Analysis

The following factors affected the actuarially determined contribution:

- There was an asset and contribution loss of over $20 million for FYE 2017. This increased the actuarially determined contribution $2.0 million.
- The elimination of the dollar per month maximum benefit for Local 2 Union participants effective 7/1/2016 and COLA awards for current retirees for a 4 year period increased the ADC $0.25 million.
- Demographic losses including salary increases which were more than assumed increased the ADC $2.0 million.

## 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 are reflected in this valuation:

- The dollar per month maximum benefit was eliminated for Local 2 employees who retire on or after July 1, 2016.
- Pensionable earnings are limited to 2,392 pay hours in any calendar year for Local 2 Union employees effective July 1, 2016.
- COLA awards were granted for Local 2 Union retirees and beneficiaries who have been receiving payments for at least 13 months on August 1, 2014, August 1, 2015, August 1, 2016, and August 1, 2017.
- All Local 2 Union employees contribute 2% of earnings to the plan effective July 1, 2016.
- Benefit eligibility for participants in the Local 2 Union was increased to 10 years of service for participants hired on or after 7/1/2016.

# 1. Executive Summary (cont)

## Projection of Expected Benefit Payments

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

## Sources of Information

The July 1, 2017 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.

# 2. 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, 2017 | | |
| a. Active participants | $ | 340,876,725 |
| b. Vested terminated participants | | 19,316,638 |
| c. Retired participants, QDRO's, and beneficiaries | | 294,551,678 |
| d. Disabled participants and disabled beneficiaries | | 51,501,572 |
| e. Total | | 706,246,613 |
| 2. Actuarial asset value at July 1, 2017 | | 290,605,477 |
| 3. Unfunded actuarial liability at July 1, 2017 (1.e. - 2.) | | 415,641,136 |
| 4. Funded ratio on July 1, 2017 (2. ÷ 1.e) | | 41.15% |

**Reconciliation of Unfunded Liability**

| | | |
|---|---|---|
| 1. Unfunded actuarial liability at July 1, 2016 | $ | 402,115,216 |
| 2. Normal cost at July 1, 2016 | | 7,665,978 |
| 3. Interest on (1. + 2.) to June 30, 2017 at 7.55% per annum | | 30,938,480 |
| 4. Expected contribution | | 62,217,185 |
| 5. Interest on contribution to June 30, 2017 at 7.55% (contribution is assumed to be made as of September 1st) | | 3,890,564 |
| 6. Projected unfunded actuarial liability at July 1, 2017 (1. + 2. + 3. - 4. - 5.) | | 374,611,925 |
| 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 (retirement, termination, salary assumptions and discount rate change) | | 0 |
| 9. Change in unfunded actuarial liability due to elimination of DPM Cap and addition of Employee Cont. for the Local 2 Union | | 1,085,537 |
| 10. Change in unfunded actuarial liability due to COLA award for the Local 2 Union | | 272,820 |
| 11. Expected unfunded actuarial liability at July 1, 2017 (6. + 7. + 8. + 9. + 10.) | | 375,970,282 |
| 12. Actual unfunded actuarial liability at July 1, 2017 | | 415,641,136 |
| 13. Actuarial gain/(loss) at July 1, 2017 (11. - 12.) | | (39,670,854) |

# 2. Actuarial Costs (cont)

## Normal Cost

| Normal Cost | FYE 2017 | FYE 2018 |
|---|---|---|
| 1. Retirement benefits | $ 6,706,506 | $ 7,373,358 |
| 2. Vested termination benefits | 611,684 | 663,130 |
| 3. Preretirement death benefits | 140,454 | 150,783 |
| 4. Disability benefits | 2,577,245 | 2,793,667 |
| 5. Employee Contributions | (2,369,911) | (2,684,110) |
| 6. Total normal cost (1. + 2. + 3. + 4. + 5.) | 7,665,978 | 8,296,828 |
| 7. Interest on normal cost to September 1 | 93,562 | 101,261 |
| 8. Projected normal cost for plan year (6. + 7.) | 7,759,540 | 8,398,089 |

## 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 | $ 7,759,540 | $ 8,398,089 |
| 2. Amortization amount | 54,457,645 | 58,097,317 |
| 3. Actuarially determined contribution (1. + 2.) | 62,217,185 | 66,495,406 |
| 4. Covered payroll | 137,153,770 | 145,833,561 |
| 5. Contribution as a percentage of payroll | 45.36% | 45.60% |

# 2. Actuarial Costs (cont)

## Amortizations

| Description | Date Established | Initial Amount | Initial Amortization Years | 7/1/2017 Outstanding Balance | Remaining Amortization Years | 9/1/2017 Amortization Amount |
|---|---|---|---|---|---|---|
| Initial | 6/30/2002 | 124,187,444 | 17 | 23,996,313 | 2 | 12,586,373 |
| Plan Amendment | 6/30/2002 | 14,399,897 | 25 | 8,969,902 | 10 | 1,232,691 |
| Experience Loss | 6/30/2002 | 6,345,365 | 25 | 3,952,618 | 10 | 543,190 |
| Method Change | 6/30/2002 | (2,078,078) | 25 | (1,294,463) | 10 | (177,892) |
| Plan Amendment | 6/30/2003 | 4,360,440 | 25 | 2,890,676 | 11 | 372,807 |
| Experience Loss | 6/30/2003 | 4,538,537 | 25 | 3,008,742 | 11 | 388,034 |
| Plan Amendment | 6/30/2004 | 4,418,159 | 25 | 3,092,802 | 12 | 377,289 |
| Experience Loss | 6/30/2004 | 17,337,872 | 25 | 12,136,864 | 12 | 1,480,569 |
| Experience Gain | 6/30/2005 | (458,689) | 25 | (336,856) | 13 | (39,124) |
| Plan Amendment | 6/30/2006 | 23,569,806 | 25 | 18,060,401 | 14 | 2,008,175 |
| Experience Loss | 6/30/2006 | 10,757,586 | 25 | 8,243,014 | 14 | 916,558 |
| Assumption Change | 6/30/2007 | 8,008,848 | 25 | 6,373,269 | 15 | 681,630 |
| Plan Amendment | 6/30/2007 | 762,523 | 25 | 606,800 | 15 | 64,898 |
| Experience Loss | 6/30/2007 | 7,007,396 | 25 | 5,576,333 | 15 | 596,396 |
| Experience Gain | 6/30/2008 | (235,799) | 25 | (194,190) | 16 | (20,058) |
| Experience Loss | 6/30/2009 | 11,377,550 | 25 | 9,663,341 | 17 | 967,310 |
| Plan Amendment | 6/30/2010 | 83,039,793 | 25 | 72,515,760 | 18 | 7,056,424 |
| Experience Gain | 6/30/2010 | (5,618,484) | 25 | (4,906,427) | 18 | (477,439) |
| Method Change | 6/30/2011 | (9,372,548) | 25 | (8,392,923) | 19 | (796,059) |
| Experience Gain | 6/30/2011 | (13,418,790) | 25 | (12,016,249) | 19 | (1,139,728) |
| Assumption Change | 6/30/2011 | 15,465,597 | 25 | 13,849,122 | 19 | 1,313,574 |
| Experience Loss | 6/30/2012 | 16,238,515 | 25 | 14,876,100 | 20 | 1,378,577 |
| Experience Loss | 6/30/2013 | 13,697,669 | 25 | 12,810,620 | 21 | 1,162,348 |
| Assumption Change | 6/30/2013 | 2,292,023 | 25 | 2,143,593 | 21 | 194,495 |
| Plan Amendment | 6/30/2013 | 29,352,563 | 25 | 27,451,715 | 21 | 2,490,781 |
| Experience Loss | 6/30/2014 | 10,541,610 | 25 | 10,047,260 | 22 | 894,236 |
| Assumption Change | 6/30/2014 | 2,530,438 | 25 | 2,411,773 | 22 | 214,655 |
| Plan Amendment | 6/30/2014 | 1,437,364 | 25 | 1,369,959 | 22 | 121,930 |
| Assumption Change | 6/30/2015 | 33,129,847 | 25 | 32,129,069 | 23 | 2,809,767 |
| Experience Loss | 6/30/2015 | 5,314,039 | 25 | 5,153,513 | 23 | 450,688 |
| Plan Amendment (DPM + EE Cont) | 6/30/2016 | 91,171,693 | 12 | 86,237,691 | 11 | 11,121,985 |
| Plan Amendment (COLA Award) | 6/30/2016 | 9,296,905 | 2 | 4,817,548 | 1 | 4,876,345 |
| Assumption Change | 6/30/2016 | (3,781,060) | 25 | (3,725,840) | 24 | (320,640) |
| Experience Loss | 6/30/2016 | 13,288,139 | 25 | 13,094,073 | 24 | 1,126,856 |
| Plan Amendment (COLA Award) | 6/30/2017 | 272,820 | 2 | 272,820 | 2 | 143,098 |
| Plan Amendment (DPM + EE Cont) | 6/30/2017 | 1,085,537 | 12 | 1,085,537 | 12 | 132,424 |
| Experience Loss | 6/30/2017 | 39,670,854 | 25 | 39,670,854 | 25 | 3,364,154 |
| **Total** | | | | **415,641,136** | | **58,097,317** |

# 3. Valuation Assets

## Reconciliation of Assets

Below is a reconciliation of assets from the prior valuation date of July 1, 2016 to the current valuation date of July 1, 2017.

| | | | **7/01/2016 to 6/30/2017** |
|---|---|---|---|
| (1) | Beginning of year assets | | |
| | (a) | Beginning of year assets | $244,775,653 |
| | (b) | Market Value Adjustment | (2,630,692) |
| | (c) | Adjusted beginning of year assets | $242,144,961 |
| (2) | Additions | | |
| | (a) | Employer contributions | $ 40,997,059 |
| | (b) | Employee contributions | 3,094,029 |
| | (c) | Investment income & Dividends | 16,375,474 |
| | (d) | Increase/(Decrease) in Market Value of Investments | 11,365,471 |
| | (e) | Total receipts [(a) + (b) + (c) + (d)] | $ 71,832,033 |
| (3) | Deductions | | |
| | (a) | Benefit payments | $ 39,062,347 |
| | (b) | Administrative expenses | 1,914,322 |
| | (c) | Investment expenses | 0 |
| | (d) | Total disbursements [(a) + (b) + (c)] | $ 40,976,669 |
| (4) | Net increase [2(e) – 3(d)] | | $ 30,855,364 |
| (5) | Net assets [1(c) + 4] | | $273,000,325 |

# 3. Valuation Assets (cont.)

## 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, 2016 | $ 268,413,355 |
| 2. | Contributions for the 2016 - 2017 plan year | 40,997,059 |
| 3. | Employee Contributions for the 2016 - 2017 plan year | 3,094,029 |
| 4. | Benefit payments during the 2016 - 2017 plan year | 39,062,347 |
| 5. | Expected return at 7.55% interest | 21,564,669 |
| 6. | Expected assets as of June 30, 2017 (1. + 2. + 3. – 4. + 5.) | 295,006,765 |
| 7. | Market value of assets as of June 30, 2017 | 273,000,325 |
| 8. | Asset gain/(loss) for 2016 - 2017 (7. – 6.) | $ (22,006,440) |
| 9. | Actuarial asset value as of July 1, 2017 (6. + (8. x 20%)) | $ 290,605,477 |
| 10. | Actuarial asset value as a percentage of market value (9. / 7.) | 106.45% |

# 4. 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, 2016 | July 1, 2017 |
|---|---|---|---|---|
| (1) | Actives | | | |
| | (a) | Number | 2,652 | 2,654 |
| | (b) | Average age | 48.33 | 48.21 |
| | (c) | Average service[1] | 13.38 | 13.03 |
| | (d) | Average salary | $ 51,717 | $ 54,949 |
| (2) | Service retirements and beneficiaries | | | |
| | (a) | Number | 1,326 | 1,397 |
| | (b) | Average age | 71.73 | 71.83 |
| | (c) | Total monthly benefits | $2,420,052 | $2,641,320 |
| (3) | Disability retirements | | | |
| | (a) | Number | 435 | 429 |
| | (b) | Average age | 63.64 | 63.12 |
| | (c) | Total monthly benefits | $ 458,715 | $ 460,635 |
| (4) | Vested terminations (including deferred transfers) | | | |
| | (a) | Number | 486 | 509 |
| | (b) | Average age | 54.27 | 54.55 |
| | (c) | Total monthly benefits | $ 293,718 | $ 313,265 |
| (5) | QDRO participants | | | |
| | (a) | Number | 16 | 18 |
| | (b) | Average Age | 65.81 | 65.56 |
| | (c) | Total monthly benefits | 12,302 | 14,414 |

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

# 4. Valuation Data (cont.)

## 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 pay for the plan year beginning July 1, 2017.

| | Years of Service | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **Under 1** | **1 - 4** | **5 -9** | **10 -14** | **15 - 19** | **20 - 24** | **25 - 29** | **30 - 34** | **35 +** | **Total** |
| **Under 25** | 11 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 |
| | 34,889 | 38,511 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 35,855 |
| **25 - 29** | 19 | 69 | 36 | 0 | 0 | 0 | 0 | 0 | 0 | 124 |
| | 37,653 | 39,161 | 52,429 | 0 | 0 | 0 | 0 | 0 | 0 | 42,782 |
| **30 - 34** | 29 | 61 | 136 | 15 | 0 | 0 | 0 | 0 | 0 | 241 |
| | 36,028 | 39,772 | 56,758 | 57,250 | 0 | 0 | 0 | 0 | 0 | 49,995 |
| **35 - 39** | 17 | 61 | 93 | 84 | 23 | 0 | 0 | 0 | 0 | 278 |
| | 38,098 | 38,449 | 55,324 | 58,269 | 60,523 | 0 | 0 | 0 | 0 | 51,888 |
| **40 - 44** | 14 | 67 | 88 | 51 | 64 | 11 | 0 | 0 | 0 | 295 |
| | 37,496 | 39,508 | 57,604 | 58,862 | 59,766 | 59,030 | 0 | 0 | 0 | 53,279 |
| **45 - 49** | 11 | 51 | 94 | 67 | 88 | 39 | 7 | 0 | 0 | 357 |
| | 36,128 | 38,989 | 56,817 | 58,591 | 59,779 | 61,100 | 61,481 | 0 | 0 | 55,255 |
| **50 - 54** | 10 | 33 | 89 | 70 | 106 | 68 | 56 | 20 | 0 | 452 |
| | 33,222 | 40,893 | 54,912 | 58,726 | 60,314 | 60,186 | 62,526 | 65,641 | 0 | 57,477 |
| **55 - 59** | 6 | 28 | 84 | 63 | 101 | 54 | 78 | 46 | 13 | 473 |
| | 34,944 | 39,645 | 55,550 | 57,602 | 59,623 | 61,153 | 62,452 | 60,386 | 64,936 | 57,996 |
| **60 - 64** | 2 | 9 | 48 | 37 | 55 | 48 | 38 | 35 | 34 | 306 |
| | 42,831 | 48,653 | 52,920 | 59,058 | 59,935 | 61,664 | 61,621 | 64,668 | 63,981 | 59,757 |
| **65 - 69** | 0 | 3 | 13 | 10 | 17 | 8 | 16 | 5 | 19 | 91 |
| | 0 | 48,208 | 44,506 | 51,378 | 60,634 | 59,110 | 57,286 | 57,728 | 62,222 | 56,352 |
| **70 +** | 0 | 4 | 0 | 5 | 2 | 1 | 2 | 8 | 22 | 4 |
| | 0 | 42,266 | 0 | 52,320 | 60,549 | 64,771 | 61,578 | 63,552 | 56,732 | 42,266 |
| **Total** | 119 | 386 | 685 | 397 | 459 | 230 | 196 | 108 | 74 | 2,654 |
| | 36,484 | 39,651 | 55,479 | 58,236 | 59,873 | 60,787 | 61,867 | 62,646 | 63,651 | 54,949 |

| Averages | |
|---|---|
| Age: | 48.21 |
| Service: | 13.03 |

# 4. Valuation Data (cont.)

## 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 | 3 | 3,047 | 2 | 600 | 0 | 0 | 0 | 0 | 5 | 3,647 |
| 35 - 39 | 2 | 1,023 | 5 | 3,758 | 0 | 0 | 0 | 0 | 7 | 4,781 |
| 40 - 44 | 4 | 4,156 | 15 | 7,965 | 0 | 0 | 0 | 0 | 19 | 12,122 |
| 45 - 49 | 4 | 2,898 | 13 | 7,627 | 0 | 0 | 1 | 425 | 18 | 10,950 |
| 50 - 54 | 3 | 4,275 | 32 | 23,990 | 1 | 722 | 10 | 23,580 | 46 | 52,567 |
| 55 - 59 | 11 | 10,525 | 62 | 63,874 | 2 | 2,255 | 37 | 85,012 | 112 | 161,666 |
| 60 - 64 | 20 | 26,849 | 80 | 93,139 | 3 | 1,925 | 115 | 294,715 | 218 | 416,629 |
| 65 - 69 | 21 | 21,344 | 94 | 125,633 | 7 | 5,492 | 338 | 718,693 | 460 | 871,162 |
| 70 - 74 | 32 | 41,344 | 65 | 75,335 | 3 | 3,003 | 308 | 589,810 | 408 | 709,492 |
| 75 - 79 | 33 | 33,276 | 40 | 39,641 | 2 | 1,017 | 228 | 432,791 | 303 | 506,726 |
| 80 - 84 | 18 | 20,647 | 11 | 10,156 | 0 | 0 | 109 | 199,026 | 138 | 229,829 |
| 85 - 89 | 11 | 7,856 | 8 | 8,339 | 0 | 0 | 60 | 89,926 | 79 | 106,121 |
| 90 - 94 | 7 | 5,934 | 1 | 289 | 0 | 0 | 17 | 19,643 | 25 | 25,866 |
| 95 & over | 1 | 953 | 1 | 288 | 0 | 0 | 4 | 3,570 | 6 | 4,811 |
| **Total** | **170** | **184,128** | **429** | **460,635** | **18** | **14,414** | **1227** | **2,457,192** | **1844** | **3,116,370** |

## Age Distribution of Inactive Deferred Vested Participants

| Age | Count | Normal Retirement Benefit |
|---|---|---|
| Under 35 | 18 | 6,275 |
| 35 - 39 | 25 | 12,642 |
| 40 - 44 | 27 | 18,589 |
| 45 - 49 | 63 | 45,305 |
| 50 - 54 | 94 | 65,652 |
| 55 - 59 | 107 | 70,324 |
| 60 - 64 | 120 | 68,607 |
| 65 - 69 | 40 | 18,839 |
| 70 - 74 | 10 | 5,620 |
| 75 & over | 5 | 1,413 |
| **Total** | **509** | **313,265** |

# 4. Valuation Data (cont.)

## 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 Vesteds | QDRO | Total |
| Participants in last valuation | 2,652 | 1,326 | 435 | 486 | 16 | 4,915 |
| New Participants | 186 | 0 | 0 | 0 | 3 | 189 |
| Return to active status | 1 | 0 | (1) | 0 | 0 | 0 |
| Nonvested termination | (34) | 0 | 0 | 0 | 0 | (34) |
| Vested termination | (34) | 0 | 0 | 34 | 0 | 0 |
| Retired/Disabled | (101) | 97 | 13 | (9) | 0 | 0 |
| Lump Sum Payouts | 0 | 0 | 0 | 0 | 0 | 0 |
| Adjustments | 2 | (1) | 0 | (2) | 0 | (1) |
| New Beneficiaries | 0 | 18 | 0 | 0 | 0 | 18 |
| Deceased | (8) | (43) | (18) | 0 | (1) | (70) |
| Transfer Out | (10) | 0 | 0 | 0 | 0 | (10) |
| Participants in this valuation | 2,654 | 1,397 | 429 | 509 | 18 | 5,007 |

# 5. Summary of Principal Plan Provisions

Following is a summary of the major plan provisions used in the valuation of this report. 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.<br>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.<br>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<br>Eligible employees become participants immediately upon employment. |
| *Normal form* | Life annuity |
| *Vesting* | 100% with 5 or more years of credited service. 100% with 7 or more years of service for Local 1300 members hired on or after May 18, 2013 and Local 2 members hired from July 1, 2012 through June 30, 2016. 100% with 10 or more years of service for Local 2 and Local 1300 members hired on or after July 1, 2016. Participants are considered 100% vested upon the attainment of early or normal retirement eligibility. |
| *Normal retirement date* | First of the month coincident with or immediately following the earlier of:<br>a. Attainment of age 65 with 5 years of service (7 years of service for Local 2 participants hired from July 1, 2012 through June 30, 2016. 100% and 10 years of service for Local 2 members hired on or after July 1, 2016)<br>b. Attainment of age 52 with 30 years of service. |
| *Normal retirement benefit* | A monthly income payable for life that is the minimum of:<br>a. $80 per month times years of service (For Local 1300 and Local 2: $85 for retirements on or after July 1, 2012, $90 for retirements on or after July 1, 2013, $92 for retirements on or after July 1, 2014, $95 for retirements on or after July 1, 2015, and effective for retirements on or after July 1, 2016, the dollar per month benefit is eliminated.) |

# 5. Summary of Principal Plan Provisions (cont)

| | |
|---|---|
| *Normal retirement benefit* | b. 1.70% of Average Compensation (effective July 1, 2008) times years of service.<br><br>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.<br><br>The benefit is offset by a fixed amount for a group of former Allamerica Financial Program members.<br><br>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 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 participants 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). |
| *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. |

# 5. Summary of Principal Plan Provisions (cont)

| | |
|---|---|
| *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<br>50%, 75% or 100% joint and survivor with pop-up option<br>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. |
| *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 Local 2 and Local 1300 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. |

# 5. Summary of Principal Plan Provisions (cont)

## Changes in plan provisions since prior valuation

- The dollar per month maximum benefit was eliminated for Local 2 employees who retire on or after July 1, 2016.
- The vesting requirement was increased to 10 years for Local 2 employees hired on or after July 1, 2016.
- Pensionable earnings are limited to 2,392 pay hours in any calendar year for Local 2 employees effective July 1, 2016.
- COLA awards were granted for Local 2 retirees and beneficiaries who have been receiving payments for at least 13 months on August 1, 2014, August 1, 2015, August 1, 2016, and August 1, 2017.
- All Local 2 Union employees contribute 2% of earnings to the plan effective July 1, 2016.

# 6. 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 7.55% (net of investment expenses).

### 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

The following COLA increases were assumed for the Local 1300 and Local 2 Union:

| COLA Award Date | COLA % |
|---|---|
| 8/1/2017 | 1.50% |

The COLA is awarded to all retirees and beneficiaries in the Local 1300 and Local 2 Union who were retired for at least 13 months as of the date listed above.

# 6. Valuation Assumptions and Methods (cont)

## 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% |

# 6. Valuation Assumptions and Methods (cont)

## Demographic Assumptions (cont.)

**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% |

# 6. Valuation Assumptions and Methods (cont)

## Demographic Assumptions (cont.)

**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.

# .6. Valuation Assumptions and Methods (cont)

## 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 benefit 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 following changes are reflected in this valuation:

- The 4 annual COLA awards negotiated for the Local 2 Union were included in the liabilities for valuation purposes.

# 7. 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.

# 7. Glossary (cont.)

**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.

**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.

# 7. Glossary (cont.)

**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.

**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.

# 7. Glossary (cont.)

**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.

**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 Payroll | (6) Unfunded Actuarial Accrued Liability as a Percentage of Covered 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% |

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 1 (cont.)

## 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 | 91.62% |
| 06/30/2017 | 62,217,185 | 44,091,088 | 70.87% |
| 06/30/2018 | 66,495,406 | 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 vs. Expected Actuarial Value) |
| Actuarial assumptions: | |
| Investment rate of return | 7.55% net of investment expenses |
| Projected salary increase | Refer to Actuarial Assumptions |
| Post-retirement cost-of-living adjustments | None Assumed |

# Appendix 2

## Benefit Payment Projection

The following table shows the estimated benefit payments from July 1, 2017 through June 30, 2027.

| Fiscal Year Ending | Benefits |
|---|---|
| 2018 | 35,121,000 |
| 2019 | 36,452,000 |
| 2020 | 37,827,000 |
| 2021 | 39,245,000 |
| 2022 | 40,781,000 |
| 2023 | 42,358,000 |
| 2024 | 43,849,000 |
| 2025 | 45,272,000 |
| 2026 | 46,751,000 |
| 2027 | 48,232,000 |

# Appendix 3

# 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.

# Appendix 3 (cont.)

## Actuarial Certification

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.

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.

# Appendix 3 (cont.)

## Actuarial Certification

The only purpose of this report is to:

- Provide the recommended employer contribution for the 2017 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.

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 3 (cont.)

# 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.

**Bolton Partners, Inc.**

Kevin Binder, FSA, EA, MAAA

Kristopher Seets, FSA, EA