Municipal Policemen's and Firemen's Pension and Relief Funds of West Virginia

Consolidated Actuarial Valuation Report for the Year Beginning July 1, 2017

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October 31, 2018

Mr. Blair Taylor
Executive Director
West Virginia Municipal Pensions Oversight Board
301 Eagle Mountain Road, Suite 251
Charleston, West Virginia 25311

Subject: Consolidated Actuarial Valuation Report for the Year Beginning July 1, 2017

Dear Mr. Taylor:

Upon the request of the Municipal Pensions Oversight Board, we performed an actuarial valuation as of July 1, 2017, for each of the Municipal Policemen's and Firemen's Pension and Relief Funds ("the Funds") in the State of West Virginia. These actuarial valuations have been performed in accordance with the West Virginia Code Chapter 8, Article 22, Sections 16 through 28, inclusive. This consolidated report summarizes the results of the 53 individual Actuarial Valuations.

The primary purpose of the actuarial valuation is to assess the adequacy of the funding policy currently in use by each participating Fund as defined in West Virginia Code §8-22-20, which states the "minimum standard for actuarial soundness." The assessment of the adequacy of the current funding policy was based on individual actuarial valuations as of July 1, 2017, for each participating Fund and the actuarial valuations performed in six prior plan years. The four statutory funding policies currently available to Plan Sponsors include the Standard funding policy as defined in West Virginia Code §8-22-20(c)(1), the Alternative funding policy as defined in West Virginia Code §8-22-20(c)(1), the Optional funding policy as defined in West Virginia Code §8-22-20(e), and the Conservation funding policy as defined in West Virginia Code §8-22-20(f).

The individual actuarial valuations were performed using a consistent and uniform set of actuarial assumptions and methods in order to establish a basis for comparing the actuarial soundness of the Funds. West Virginia Code §8-22-20(c)(4) requires (1) a review of the actuarial assumptions and methods at least once every five years and (2) a report by the actuary to the Oversight Board with recommendations on any changes to the actuarial process. Such a review was performed for the period July 1, 2009, through June 30, 2014. The assumptions and methods developed in that review were (1) recommended by the actuary in the report *2016 Experience Review for the Years July 1, 2009, to July 1, 2014*, (2) approved by the Municipal Pensions Oversight Board, and (3) first applied in the July 1, 2015, actuarial valuation cycle.

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This consolidated report also reviews, for Plan Sponsors currently using the Standard funding policy, the impact of switching to the Optional funding policy and for Plan Sponsors currently using the Alternative funding policy, the impact of switching to either the Optional funding policy or the Conservation funding policy.

We did not review the investment policy or the administrative practices of the individual pension Funds.

Each actuarial valuation is based upon:

Asset Values – Reconciliation of the market value of assets during the plan year ending June 30, 2017, and the market value of assets held as of June 30, 2017, by investment category, as provided by the sponsor of each participating Fund.

Plan Provisions – A summary of the key plan provisions valued is set forth in Section VI of the report: Summary of Principal Funding Policies and Plan Provisions.

Actuarial Methods – Fund liabilities were measured using the Entry-Age Normal Actuarial Cost Method. The actuarial valuations were based on the market value of assets. The actuarial methods used in the actuarial valuations are set forth in Section V of this report: Actuarial Assumptions and Methods.

Actuarial Assumptions – The actuarial assumptions used in the actuarial valuations are set forth in Section V of this report: Actuarial Assumptions and Methods.

The actuarial valuation results disclosed in this report are based on (1) plan membership data and asset values provided by each of the individual plan sponsors, (2) actuarial assumptions and actuarial methods described in Section V of this report, and (3) the provisions of the Funds as defined in the West Virginia Code Chapter 8, Article 22, Sections 16 through 28, inclusive. Based on these items, we certify these results to be true and correct.

To the best of our knowledge, this actuarial statement is complete and accurate, and has been prepared in accordance with generally accepted actuarial principles and practices.

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.

This report should not be relied on for any purpose other than the purpose stated.

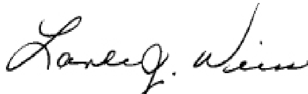
This report was prepared at the request of the Board and is intended for use by the Funds and those designated or approved by the Board. This report may be provided to parties other than the Funds only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report.

Alex Rivera and Lance J. Weiss are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

The signing individuals are independent of the plan sponsor.

Respectfully submitted,

Alex Rivera, FSA, EA, MAAA, FCA



Lance J. Weiss, EA, MAAA, FCA

SECTION I

EXECUTIVE SUMMARY

Executive Summary

Upon the request of the Municipal Pensions Oversight Board ("MPOB"), we performed an actuarial study as of July 1, 2017, of the Municipal Policemen's and Firemen's Pension and Relief Funds ("the Funds") of West Virginia. The primary objective of the study is to perform individual actuarial valuations for each Fund in order to provide each plan sponsor information on:

- The funding requirements for fiscal year ending June 30, 2019;
- The Fund's eligibility to receive an allocation of the premium tax for fiscal year ending June 30, 2019;
- The Fund's eligibility to provide Supplemental Benefits for the plan year beginning July 1, 2019, and;
- The advantages and disadvantages of switching to one of the available funding policy options, including the Optional funding policy and Conservation funding policy as defined in West Virginia Code §8-22-20.

The individual actuarial valuation reports have been delivered to each plan sponsor. Appendix B contains a summary of the key actuarial valuation results for each Fund.

Another objective of the study is to review the overall adequacy of the current and available funding policies. For this purpose, we reviewed the actuarial valuations as July 1, 2017, actuarial projections of the current and available funding policy options, and historical actuarial valuation results.

The four funding policies available to plan sponsors are summarized below:

- West Virginia Code §8-22-20(c)(1) defines the Standard funding policy. Under this policy, employer contributions equal the net employer normal cost, plus an amortization of the unfunded actuarial liability, less the State premium tax allocation applicable to the plan year. The amortization is based on a 40-year closed period from July 1, 1991, using a level dollar amortization (14 years remaining as of July 1, 2017). The Standard funding policy is consistent with generally accepted actuarial standards of practice.

- West Virginia Code §8-22-20(c)(1) defines the Alternative funding policy. Under this policy, employer contributions equal 107% of the prior year's employer contribution. The Alternative funding policy is not consistent with generally accepted actuarial standards of practice because the policy does not reflect emerging experience gains and losses, and may not produce an actuarially sound pattern of contributions or funded ratio.

- West Virginia Code §8-22-20(e)(1) defines the Optional funding policy, which allows plan sponsors, using either the Standard funding policy or Alternative funding policy, to close the current local Plan, and finance obligations on an actuarially determined basis as follows: The actuarially determined employer contribution is equal to the net employer normal cost, plus an amortization of the unfunded actuarial liability, less the State premium tax allocation applicable to the plan year. The closed amortization period as of July 1, 2017, is 14 years for sponsors who previously used the Standard funding policy and 32.5 years for sponsors who previously used the Alternative funding policy. Members hired after the adoption date of the Optional funding policy are covered in the statewide pension plan – The Municipal Police Officers and Firefighters Retirement System.

- West Virginia Code §8-22-20(f)(1) defines the Conservation funding policy, which allows plan sponsors using the Alternative funding policy, to close the current local Plan, and finance obligations on a pay-as-you-go basis. Sponsors using the Conservation funding policy are required to assign a portion of the State premium tax allocation and member contributions to an accumulation account that is projected to grow to 100% of the remaining actuarial liabilities at the end of a 35-year projection period. Members hired after the adoption date of the Conservation funding policy are covered in the statewide pension plan – the Municipal Police Officers and Firefighters Retirement System. This policy is not consistent with generally accepted actuarial principles.

The details of the Standard, Alternative, Optional, and Conservation funding policies are presented in Section VI of the report.

The discount rate assumption was developed by reviewing the Plan's current funded ratio, the 15-year projected funded ratio, the ratio of assets to benefits, the percentage of assets allocated to equities and the funding policy selected. The interest rate used to discount liabilities remained the same for 43 plans.

The following table outlines the factors used to determine the discount rate:

Funded Ratio as of Valuation Date [1]	Liquidity Ratio [2]	Equity Exposure [3]	Projected Funded Ratio after 15 Years [1]	Discount Rate
60% or more	10	50% or more	70% or more	6.5%
40% or more	8	40% or more	60% or more	6.0%
30% or more	6	30% or more	50% or more	5.5%
15% or more	4	n/a	40% or more	5.0%
Less than 15%	n/a	n/a	15% or more	4.5%
Less than 15%	n/a	n/a	Less than 15%	4.0%

[1] *Funded ratios based on a 6.0% investment return assumption for plans using an actuarially sound policy (standard or optional) and a 5.5% investment return assumption for other plans (alternative or conservation).*
[2] *Liquidity ratio equals assets as of the actuarial valuation date divided by expected benefit payments for the year.*
[3] *Based on investment policy.*

The key findings of the actuarial study include:

- Standard plans (five plans as of July 1, 2017) or former Standard plans that selected the Optional funding policy (10 plans as of July 1, 2017) are projected to be 100% funded by the end of the 15-year projection period. This contribution policy is consistent with generally accepted actuarial standards of practice.

- As of July 1, 2017, 14 former Alternative plans have selected the Optional funding policy. These plans are projected to be fully funded as of 2050. This group includes six large underfunded plans.

- As of July 1, 2017, four former Alternative plans have selected the Conservation funding policy. This policy may provide near-term contribution relief; however, because the contributions are based on pay-as-you-go funding, the contributions could be more volatile.

- In general, the Alternative funding policy produces contributions that grow at an annual rate of 7%, which is 3.25 percentage points higher than the assumed wage inflation assumption of 3.75%. This policy produces an ever-increasing contribution pattern for which it may be difficult to budget. As of July 1, 2017, twenty (20) of the 53 plans are still using the Alternative funding policy.

- Star City Policemen's Pension and Relief Fund closed their plan to new entrants during fiscal year end 2017. This plan is financed using the Optional funding policy as of July 1, 2017, a change from the Alternative funding policy as of July 1, 2016.

- Fairmont Policemen's Pension and Relief Fund and Fairmont Firemen's Pension and Relief Fund elected to close the plans to new members and adopted the Conservation funding policy as of January 1, 2018.

- **At the end of 30 years, only 4 out of 20 Alternative plans are projected to have contribution rates that are less than 40% of pay. In addition, only 7 out of 20 Alternative plans are projected to have funded ratios that exceed 80%.**

- **One key concern of the Alternative funding policy is the level of required annual contributions relative to the net employer normal cost and amortization of the unfunded actuarial liability. A sound funding policy generally finances, on an annual basis, the normal cost plus a portion, generally 6% or more of the unfunded actuarial liability.**

The following table shows a distribution of FY 2019 and projected FY 2039 Alternative funding policy contributions, made by the sponsor and State, expressed in terms of the net normal cost plus a percentage of the unfunded actuarial liability.

Employer Contributions Plus State Premium Tax Allocation	Number of Alternative Plans Satisfying Conditions in	
	FY 2019	**FY 2039**
80% to 90% of the Net Normal Cost	4	0
90% to 100% of the Net Normal Cost	2	0
100% of Net Normal Cost plus 0% to 2% of Unfunded Actuarial Liability	7	9
100% of Net Normal Cost plus 2% to 4% of Unfunded Actuarial Liability	6	3
100% of Net Normal Cost plus 4% to 6% of Unfunded Actuarial Liability	1	1
100% of Net Normal Cost plus 6% or more of Unfunded Actuarial Liability (Sound Policy)	0	7

- For FY 2019 no Alternative plans are expected to be contributing at a level that approximates a sound funding basis. This increases to seven out of the 20 Alternative plans when we look at projected contributions in Fiscal Year 2039. (However, that takes into account 20 years of 7% increases in the annual contribution requirement.)

- For purposes of evaluating the Optional and Conservation funding policies, we performed open group projections for Standard and Alternative plans, and assumed the sponsor would select either the Optional or Conservation funding policy in the year that employer contributions are lower under these policies. Based on this rule, all Standard plans would experience a reduction in employer contribution if the Optional funding policy was adopted in FY 2019. This occurs because the net employer normal cost rate for the local plan is higher than the statutory contribution rate of 8.5% to 10.5% of pay under the Municipal Police Officers and Firefighters Retirement System.

- For the Alternative plans, the year that Optional or Conservation funding policy contributions are lower was not as apparent. The following table shows the year when contributions under the Optional or Conservation funding policy are expected to be lower than contributions under the Alternative funding policy:

	Number of Alternative Plans	
Year Municipality Contributions are lower	**If Optional Policy is selected**	**If Conservation Policy is selected**
2019	0	4
2020	0	1
2021 to 2030	1	3
2031 to 2040	4	7
2041 to 2050	2	5
Never	13	0

- This table shows that none of the Alternative plans are projected to receive immediate contribution relief if the Optional funding policy is selected in 2019. This table also shows that four Alternative plans are projected to receive immediate contribution relief if the Conservation funding policy is selected in 2019.

- *The Optional funding policy is based on sound actuarial principles and is projected to produce a reasonable pattern of contributions and funded ratios. The Conservation funding policy depends on the level of actual retirements and benefit payments made during the year, and could produce significant contribution volatility for the sponsor. The volatility is even greater for smaller plans that have fewer active members. For example, one or two unexpected retirements could significantly increase the sponsor's pay-go contribution.*

- *The Optional and Conservation funding policies may not be viable options for many of the Alternative plans. In addition, we strongly encourage plan sponsors to consider not only the affordability of the funding policy but also the projected patterns of contributions and funded ratios in future years.*

- ***Sponsors using the Alternative funding policy may want to consider making additional contributions in excess of the statutory minimum to ensure a reasonable pattern of growth in the funded ratio.***

- Certain plans satisfied the minimum standard for "actuarial soundness" or "solvency" as defined in the statues. We understand that the minimum requirement to satisfy the statutory solvency test includes a demonstration that assets are projected to be greater than zero over a 15-year period. However, a plan could satisfy the minimum statutory standard for solvency during the first 15 years and may either (i) run out assets after the initial 15-year period, or (ii) have very low funded ratios during the projection period. We recommend that such plans make additional contributions over the statutory minimum requirement.

- The solvency projections assume the sponsor will make the minimum statutory requirement. However, a few plans have a history of making less than the statutory minimum and have forfeited State contributions provided through the premium tax allocation. For such plans, we recommend projecting sponsor contributions for purposes of the 15-year solvency test, based on the sponsor's recent experience, unless the sponsor has adopted a formal policy to correct the statutory funding deficiency.

- There were 49 out of 53 Plans who experienced favorable asset returns during the plan year ended June 30, 2017. The aggregate average annual return was 8.8% compared to the average annual assumed return of 5.1%.

Other observations include:

- A plan that is at least 125% funded on a present value of future benefit basis may have a sufficient margin for future adverse experience. West Virginia Code §8-22-20(c)(3) was recently amended to allow a municipality to make no contribution for a fiscal year if the actuarial valuation report determines the funded ratio to be at least 125% and the MPOB's actuary provides a recommendation that the normal cost does not need to be paid for that fiscal year. Three plans with a funded ratio in excess of 100% as of July 1, 2017, are projected to experience an increasing funded ratio. At some point, the sponsor may have the option of not making normal cost contributions. The following plans have funded ratios above 100% as of July 1, 2017:
    - Elkins Firemen's Pension and Relief Fund
    - Oak Hill Policemen's Pension and Relief Fund
    - Welch Policemen's Pension and Relief Fund

- One of the key factors used to set the discount rate is the percentage of assets allocated to equities. If available, we used the target equity asset allocation contained in the Plan's investment policy. Otherwise, we used the percentage of assets invested in equities as of the actuarial valuation date. Our preference is to use the target allocation in the investment policy. We strongly encourage that all plans provide a copy of their investment policy.

- One plan needs additional employer contributions to satisfy the 15-year solvency test:
    - **St. Albans Firemen's Pension and Relief Fund**

- As of June 30, 2017, two plans have members participating in a Deferred Retirement Option Plan (DROP):
    - St. Albans Firemen's Pension and Relief Fund

- Wheeling Firemen's Pension and Relief Fund

- The discount rate increased for nine plans:
  - Beckley Policemen's Pension and Relief Fund
  - Bluefield Firemen's Pension and Relief Fund
  - Fairmont Policemen's Pension and Relief Fund
  - Huntington Firemen's Pension and Relief Fund
  - Moundsville Firemen's Pension and Relief Fund
  - Parkersburg Policemen's Pension and Relief Fund
  - Princeton Policemen's Pension and Relief Fund
  - Weston Policemen's Pension and Relief Fund
  - Williamson Firemen's Pension and Relief Fund

- The discount rate decreased for one plan:
  - Princeton Firemen's Pension and Relief Fund

- GASB Statement No. 67 replaced GASB Statement No. 25 for pension plan financial reporting requirements (effective in fiscal year ending June 30, 2014) and GASB Statement No. 68 replaced GASB Statement No. 27 for employer financial reporting (effective in fiscal year ending June 30, 2015). For plans that are projected to have zero assets in the future, on a closed group basis, the discount rate used for GASB Statement Nos. 67 and 68 financial reporting purposes will be based on a blended rate of the long-term investment return rate and a 20-year tax-exempt municipal bond index rate. Under the new accounting standards, the unfunded actuarial liability will need to be recognized on the plan sponsor's balance sheet. The new accounting standards will not impact the current contribution policies. GRS will be providing a separate GASB Statement Nos. 67 and 68 report to each plan sponsor.

The remainder of the report provides additional details supporting the preceding findings and observations.

SECTION II

ACTUARIAL VALUATION RESULTS

Actuarial Valuation Results as of July 1, 2017

Actuarial Valuation Methodology

- Individual actuarial valuations as of July 1, 2017, were performed for each Fund that participated in the study. We received usable census and asset information for all 53 Funds in the State. The table on page II-9 shows a summary of the key actuarial valuation results as of July 1, 2017, for the participating Funds. The results are broken out among Funds that have elected the Standard, Alternative, Optional or Conservation funding policies.

- The actuarial valuations were based on assumptions and methods recommended by GRS, in the report *2016 Experience Review for the Years July 1, 2009, to July 1, 2014*, and approved by the Municipal Pensions Oversight Board.

- A gain/loss analysis of changes in assets and liabilities from the previous valuation was performed. In addition, the actuarial projections from the current valuation were analyzed and trends were reviewed.

- Actuarial projections (40-year open group) were performed assuming the employer would make contributions under the funding policy selected by the Plan sponsor – either the Standard funding policy, the Alternative funding policy, the Optional funding policy or the Conservation funding policy.

- *The key indicators used to assess the funding adequacy were the funded ratio and the employer contribution expressed as a percentage of payroll. The funded ratio is defined as the market value of assets divided by the actuarial accrued liability. In our opinion, a Fund that has a funded ratio of less than 70% or a required contribution rate in excess of 30% of payroll could be at financial risk of not being sustainable at some point in the future – i.e., not being able to pay the promised benefits, or of having a contribution requirement that is too large to be affordable.*

Key Findings for Plans using the Standard Funding Policy

- Five plans, (or about 9.4% of all 53 participating Funds), covering only 1.8% of plan participants, and 1.1% of total liabilities are financed using the Standard funding policy.

- For Funds using the Standard funding policy, the funded ratios as of July 1, 2017, range from 35% to 77%.

- Four Funds using the Standard funding policy are open to new entrants. For these four Funds, the employer contribution rates range from 36% to 63% of payroll for fiscal year end 2018 and 33% to 63% of payroll for fiscal year end 2019. The average employer contribution rate is 44% of payroll for fiscal year end 2018 and 41% of payroll for fiscal year end 2019.

- For the one Fund using the Standard funding policy that is closed to new entrants, the employer contribution rate is 93% of expected benefit payments for fiscal year end 2018, and 81% of expected benefit payments for fiscal year end 2019.

- The average dollar-weighted funded ratio for all Standard plans is 65%. The unfunded actuarial accrued liability for Funds using the Standard funding policy is approximately $6.0 million or 0.5% of the total unfunded liabilities for all Funds.

- On a projected basis, the funded ratio for all Funds using the Standard funding policy increases steadily and approaches 100% by 2031 (as required by State Statutes). In addition, the projected contribution rates are generally level or decline steadily. These relationships are a direct consequence of the funding method and are consistent with the historical actuarial valuation results.

Key Findings for Plans using the Alternative Funding Policy

- Twenty plans (or about 37.7% of all 53 participating Funds), covering 38.0% of plan participants, are financed using the Alternative funding policy.

- The average dollar-weighted employer contribution rate is 31% of payroll for FY 2018 and 31% of payroll for FY 2019.

- The average dollar-weighted funded ratio is only 24%. The unfunded actuarial accrued liability for Funds using the Alternative policy is approximately $414.9 million or 36.2% of the total unfunded liabilities for all Funds.

- **After 30 years only 7 out of 20 Alternative Plans are projected to be at least 80% funded.**

- **This policy is not consistent with generally accepted actuarial principles.**

Key Findings for Plans that Switched from the Alternative Funding Policy to the Optional Funding Policy

- Fourteen plans that were previously using the Alternative funding policy (or about 26.4% of all 53 participating Funds), covering 34.2% of plan participants, are now financed using the Optional funding policy.

- The average dollar-weighted employer contribution rate is 111% of payroll for FY 2018 and 106% of payroll for FY 2019.

- The average dollar-weighted funded ratio is only 32%. The unfunded actuarial accrued liability for these Funds is approximately $334.8 million or 29.2% of the total unfunded liabilities for all Funds.

- Under the Optional funding policy, all plans that switched from Alternative funding policy are by definition projected to be 100% funded by the end of the amortization period in 40 years. However, the funded ratios will increase at a very slow rate for many years which leave the plans vulnerable if there is another significant market downturn.

- Contributions to the closed local plans are projected to decrease in future years as new hires enter the Municipal Police Officers and Firefighters Retirement System.

Actuarial Valuation Results

Key Findings for Plans that Switched from the Standard Funding Policy to the Optional Funding Policy

- Ten plans, (or about 18.9% of all 53 participating Funds), covering only 2.4% of plan participants, and 1.8% of total liabilities, are now financed using the Optional funding policy that were previously using the Standard funding policy.
- The average dollar-weighted funded employer contribution rate is 71% of payroll for FY 2018 and 60% of payroll for FY 2019.
- The average dollar-weighted funded ratio for these ten plans is 75% and the unfunded actuarial accrued liability is approximately $7.0 million or 0.6% of the total unfunded liabilities for all Funds.
- On a projected basis, the funded ratio for these Funds increases steadily and approaches 100% by 2031 (as required by State Statutes). In addition, the projected contribution rates are generally level or decline steadily. These relationships are a direct consequence of the funding method and are consistent with the historical valuation results.

Key Findings for Plans using the Conservation Funding Policy

- Four plans (or about 7.5% of all 53 participating Funds), covering 23.6% of plan participants, are financed using the Conservation funding policy.
- The average dollar-weighted funded employer contribution rate is 87% of payroll for FY 2018 and 85% of payroll for FY 2019.
- The average dollar-weighted funded ratio is only 11%. The unfunded actuarial accrued liability for Funds using the Conservation funding policy is approximately $382.2 million or 33.4% of the total unfunded liabilities for all Funds.
- Employer contributions will be used directly to pay benefits not covered by member contributions or the premium tax allocation. As such, employer contributions for sponsors currently using the Conservation funding policy plans are projected to increase each year for the next 20 years as projected benefit payments increase.
- The Conservation funding policy defers contributions and produces virtually no significant growth in the funded ratio until the last ten years of the projection period.
- **This policy is not consistent with generally accepted actuarial principles.**

Historical Comparison of Funded Ratios and Contribution Rates by Funding Policy

Funds using the Alternative funding policy, in general, have much lower funded ratios, when compared to Funds using the Standard funding policy. The tables on the following page compare the historical averages of funded ratios and contribution rates at each respective actuarial valuation date:

Actuarial Valuation Results

Funded Ratio As of July 1	Standard Policy Plans		Alternative Policy Plans		Optional Policy Plans From Standard		Optional Policy Plans From Alternative		Conservation Policy Plans	
	Number	Average	Number	Average	Number	Average	Number	Average	Number	Average
2017	5	65%	20	24%	10	75%	14	32%	4	11%
2016	5	59%	25	21%	10	69%	11	30%	2	9%
2015	5	62%	26	22%	10	67%	10	28%	2	9%
2014	5	67%	28	26%	10	71%	8	29%	2	9%
2013	8	55%	31	25%	7	70%	5	23%	2	8%
2012	8	47%	31	23%	7	63%	5	20%	2	7%

As of the July 1, 2017 actuarial valuation, 10 Standard plans selected the Optional funding policy, 14 Alternative plans selected the Optional funding policy and four Alternative plans selected the Conservation funding policy.

Employer Contribution Rate[2] For FY Beginning July 1	Standard Policy Plans		Alternative Policy Plans		Optional Policy Plans From Standard		Optional Policy Plans From Alternative		Conservation Policy Plans	
	Number	Average[1]	Number	Average	Number	Average	Number	Average	Number	Average
2018	4	41%	20	31%	10	60%	14	106%	4	85%
2017	4	47%	20	31%	10	71%	14	111%	4	87%
2016	4	37%	25	37%	10	63%	11	106%	2	85%
2015	4	28%	26	35%	10	49%	10	86%	2	73%
2014	4	36%	28	34%	10	43%	8	88%	2	67%
2013	7	47%	31	36%	7	44%	5	101%	2	53%
2012	7	42%	31	33%	7	36%	5	95%	2	50%

[1] One outlying Standard funding policy Fund, excluded from this table, is closed to new employees, has four members in payment status, no active members and no payroll.
[2] As a percentage of payroll.

- Sponsors using the Standard funding policy and former Standard plans that selected the Optional funding policy are required to contribute the net normal cost plus a 14-year (from July 1, 2017) closed level dollar amortization of the unfunded actuarial liability. By definition, these Funding Policies produce a projected funded ratio of 100% at the end of 14 years and are consistent with generally accepted actuarial standards of practice.

- *Because the net employer normal cost rate for Standard plans (generally around 26% of pay) is higher than the statutory contribution rate of 8.5% to 10.5% of pay under the Municipal Police Officers and Firefighters Retirement System, all Standard plans would experience a reduction in employer contributions if the Optional funding policy was adopted, with no significant impact to the funded ratio.* In fact, ten Standard plans recognized this relationship and converted from the Standard funding policy to the Optional funding policy prior to the July 1, 2017 actuarial valuation.

- *Sponsors using the Alternative funding policy are required to contribute 107% of the prior year's contribution. The Alternative funding policy is not consistent with generally accepted actuarial standards of practice because the policy does not reflect emerging gains and losses and may not produce an actuarially sound pattern of contributions and funded ratio. As a direct result of this funding policy, Alternative plans are on average less than half as well funded as Standard plans.*

- Unlike Standard plans, Alternative plans are generally not expected to receive immediate contribution relief from switching to the Optional funding policy because the Alternative funding policy contributions in many cases are considerably lower than the actuarially based contributions defined under the Optional policy. However, plan sponsors currently using the Alternative funding policy may find it more affordable in the long run to switch to the Optional funding policy even if it means an increase in the employer contributions in the short term.

- **As an alternative to switching to the Optional funding policy, sponsors of Alternative plans may want to consider making additional contributions in excess of the statutory minimum to ensure a reasonable pattern of growth in the funded ratio.**

- Standard plans and former Standard plans that have selected the Optional funding policy are projected to be 100% funded by the end of the 14-year amortization period in 2031. Under the Alternative funding policy, no plans are projected to be fully funded by 2031.

- The following table compares the percentage of funds that are projected to be fully funded by 2031 for each historical valuation:

Valuation As of July 1	Percentage of Plans that are Projected to be Fully Funded by 2031				
	Standard	Alternative	Optional from Standard	Optional from Alternative [a]	Conservation
2017	100%	0%	100%	7%	0%
2016	100%	4%	100%	0%	0%
2015	100%	4%	100%	0%	0%
2014	100%	18%	100%	13%	0%
2013	100%	19%	100%	0%	0%
2012	100%	10%	100%	0%	0%
2011	100%	10%	100%	20%	0%

[a] Former Alternative plans that selected the Optional funding policy are projected to be fully funded by 2050.

Comparison of Historical Actuarial Valuation Results

The following table compares basic historical data for plans that have participated in the actuarial valuation studies. Pay has historically decreased slightly over the last four actuarial valuation cycles, and total benefits paid have increased by approximately 3% to 4% per year.

($ in Millions)	**2017**	**2016**	**2015**	**2014**	**2013**
Participating Plans	53	53	53	53	53
Payroll (Expected for 2018)	$76.7	$76.2	$76.4	$77.8	$78.6
Benefits Paid	$66.1	$64.1	$62.0	$59.5	$57.9

The following table compares historical actuarial information. The key observation is that the normal cost rate remained approximately the same over the last three years.

($ in Millions as of July 1)	**2017**	**2016**	**2015**	**2014**	**2013**
Assets	$369.9	$329.4	$321.2	$308.0	$272.3
Liability	$1,514.8	$1,503.8	$1,481.5	$1,272.9	$1,258.9
Funded Ratio	24%	22%	22%	24%	22%
Net Employer Normal Cost % of Pay	41%	41%	41%	29%	29%

The following table compares historical contributions. The employer contribution rates have increased primarily because contributions under the Alternative funding policy increase at an annual rate of 7% while payroll has increased by between approximately 3% to 6% annually. The State contributions depend on the premium volume for property casualty insurance.

(Plan year beginning July 1) **($ in Millions)**	**2018**	**2017**	**2016**	**2015**	**2014**
Net Employer Contributions	$50.1	$51.9	$46.7	$41.2	$41.1
(% of 2018 Expected Pay)	65%	68%	61%	54%	53%
State Premium Tax Allocation	$18.5	$18.2	$17.7	$16.8	$16.5
(% of 2018 Expected Pay)	24%	24%	23%	22%	21%

Actuarial Valuation Results

The following table compares the funded ratios and the employer contribution rates under the various funding policies. In general, some funded ratios changed due to economic and/or demographic experience. The changes in funded ratios and contribution rates were also impacted by plans that switched from either the Alternative or Standard funding policy to the Optional funding policy. During the plan year ended June 30, 2017, five Alternative plans and no Standard plans switched to the Optional funding policy.

Funded Ratio as of July 1	**2018**	**2017**	**2016**	**2015**	**2014**
- Standard Plans	NA	65%	59%	62%	67%
- Alternative Plans	NA	24%	21%	22%	26%
- Optional from Standard	NA	75%	69%	67%	71%
- Optional from Alternative	NA	32%	30%	28%	29%
- Conservation Plans	NA	11%	9%	9%	9%
Contributions Rates % of Pay (Plan Year Beginning July 1)					
- Standard Plans	41%	47%	37%	28%	36%
- Alternative Plans	31%	31%	37%	35%	34%
- Optional from Standard	60%	71%	63%	49%	43%
- Optional from Alternative	106%	111%	106%	86%	88%
- Conservation Plans	85%	87%	85%	73%	67%

The details of the historical actuarial valuations are shown in Appendix A in Section VII. A gain/loss analysis, reconciling the unfunded liability from June 30, 2016 to June 30, 2017, is shown on pages II-11 and II-12. During the plan year ending June 30, 2017, the Funds, in aggregate, experienced an investment return on the market value of assets of approximately 8.9%, which compares to an expected return of approximately 4.8%. The table on the following page compares the contribution requirements between the FYE 2018 and FYE 2019.

	Standard Policy	Alternative Policy	Optional Policy From Standard	Optional Policy From Alternative	Conservation Policy	All Plans [a]
Participating Plans	5	20	10	14	4	53
FYE 2018 Contributions						
Employer Contributions [a]	$808,184	$10,567,157	$1,061,046	$24,563,291	$14,852,943	$51,852,621
State Premium Tax Allocation	$349,785	$6,745,182	$653,729	$6,156,744	$4,283,571	$18,189,011
Employee Contributions	$137,736	$2,863,756	$115,118	$1,641,461	$1,372,507	$6,130,578
FYE 2019 Contributions						
Employer Contributions [a]	$735,422	$11,010,866	$890,884	$23,098,522	$14,389,602	$50,125,296
State Premium Tax Allocation	$352,040	$6,919,355	$722,081	$6,170,354	$4,353,363	$18,517,193
Employee Contributions	$145,030	$3,006,250	$113,794	$1,609,718	$1,367,911	$6,242,703

[a] For plans under the Alternative funding policy, includes any additional contributions required to satisfy both 15-year solvency tests.

Summary of Key Valuation Results as of July 1, 2017

	Standard Policy	Alternative Policy	Optional Policy From Standard	Optional Policy From Alternative	Conservation Policy	All Plans[a]
Participating Plans	5	20	10	14	4	53
Plan Membership						
(a) Actives	38	662	33	441	302	1,476
(b) Annuitants	26	714	54	796	551	2,141
(c) Inactives	0	12	1	13	7	33
(d) Total	64	1,388	88	1,250	860	3,650
Payroll (Expected for 2018)	$1,727,328	$34,132,548	$1,497,402	$22,172,387	$17,129,740	$76,659,405
Expected Benefit Payments	$779,504	$21,875,660	$1,368,964	$24,414,911	$17,694,484	$66,133,523
Actuarial Accrued Liabilities						
(a) Actives	$7,196,090	$198,276,269	$8,049,516	$145,984,631	$137,516,615	$497,023,121
(b) Annuitants	$10,048,892	$342,894,670	$19,313,891	$339,355,639	$284,900,085	$996,513,177
(c) Inactives	$0	$7,328,672	$359,112	$8,283,531	$5,293,188	$21,264,503
(d) Total Liabilities	$17,244,982	$548,499,611	$27,722,519	$493,623,801	$427,709,888	$1,514,800,801
Market Value of Assets	$11,206,235	$133,565,255	$20,739,904	$158,868,825	$45,537,389	$369,917,608
Unfunded Liability	$6,038,747	$414,934,356	$6,982,615	$334,754,976	$382,172,499	$1,144,883,193
Funded Ratio	65%	24%	75%	32%	11%	24%
Net Employer Normal Cost	$457,190	$14,559,389	$459,139	$7,903,292	$7,866,855	$31,245,865
(% of Payroll)	26%	43%	31%	36%	46%	41%
FYE 2018 Contributions						
Employer Contributions [b]	$808,184	$10,567,157	$1,061,046	$24,563,291	$14,852,943	$51,852,621
(% of Payroll)	47%	31%	71%	111%	87%	68%
State Premium Tax Allocation	$349,785	$6,745,182	$653,729	$6,156,744	$4,283,571	$18,189,011
(% of Payroll)	20%	20%	44%	28%	25%	24%
Employee Contributions	$137,736	$2,863,756	$115,118	$1,641,461	$1,372,507	$6,130,578
(% of Payroll)	8.0%	8.4%	7.7%	7.4%	8.0%	8.0%
FYE 2019 Contributions						
Employer Contributions [b]	$735,422	$11,010,866	$890,884	$23,098,522	$14,389,602	$50,125,296
(% of Payroll)	41%	31%	60%	106%	85%	65%
State Premium Tax Allocation	$352,040	$6,919,355	$722,081	$6,170,354	$4,353,363	$18,517,193
(% of Payroll)	20%	20%	49%	28%	26%	24%
Employee Contributions	$145,030	$3,006,250	$113,794	$1,609,718	$1,367,911	$6,242,703
(% of Payroll)	8.1%	8.5%	7.7%	7.4%	8.1%	8.1%
Additional 2019 Solvency Cont.						
- To Receive State Allocation	NA	NA	NA	NA	NA	$0
- And to provide COLA Benefits	NA	$10,349	NA	NA	NA	$10,349

[a] All Funds participating in the Study.

[b] For plans under the Alternative funding policy, includes any additional contributions required to satisfy both 15-year solvency tests.

Summary of Key Valuation Results as of July 1, 2016

	Standard Policy	Alternative Policy	Optional Policy From Standard	Optional Policy From Alternative	Conservation Policy	All Plans[a]
Participating Plans	5	25	10	11	2	53
Plan Membership						
(a) Actives	38	846	40	339	239	1,502
(b) Annuitants	27	987	53	629	458	2,154
(c) Inactives	0	10	0	11	6	27
(d) Total	65	1,843	93	979	703	3,683
Payroll (Expected for 2017)	$1,722,068	$41,906,201	$1,838,931	$16,790,477	$13,914,926	$76,172,603
Expected Benefit Payments	$733,253	$29,030,022	$1,299,184	$18,500,450	$14,498,134	$64,061,043
Actuarial Accrued Liabilities						
(a) Actives	$8,008,341	$260,034,823	$9,458,903	$112,192,511	$108,607,370	$498,301,948
(b) Annuitants	$9,169,509	$458,352,014	$18,202,799	$263,109,418	$240,239,843	$989,073,583
(c) Inactives	$0	$5,836,562	$0	$5,900,245	$4,682,522	$16,419,329
(d) Total Liabilities	$17,177,850	$724,223,399	$27,661,702	$381,202,174	$353,529,735	$1,503,794,860
Market Value of Assets	$10,127,704	$152,878,977	$19,053,180	$115,237,754	$32,107,937	$329,405,552
Unfunded Liability	$7,050,146	$571,344,422	$8,608,522	$265,964,420	$321,421,798	$1,174,389,308
Funded Ratio	59%	21%	69%	30%	9%	22%
Net Employer Normal Cost	$451,236	$18,168,814	$567,352	$6,032,613	$6,258,019	$31,478,034
(% of Payroll)	26%	43%	31%	36%	45%	41%
FYE 2017 Contributions						
Employer Contributions [b]	$644,224	$15,381,727	$1,157,262	$17,738,072	$11,774,156	$46,695,441
(% of Payroll)	37%	37%	63%	106%	85%	61%
State Premium Tax Allocation	$348,114	$8,651,448	$624,756	$4,709,738	$3,409,013	$17,743,069
(% of Payroll)	20%	21%	34%	28%	24%	23%
Employee Contributions	$125,795	$3,517,682	$152,409	$1,169,186	$1,149,444	$6,114,516
(% of Payroll)	7.3%	8.4%	8.3%	7.0%	8.3%	8.0%
FYE 2018 Contributions						
Employer Contributions [b]	$808,184	$16,240,789	$1,061,047	$17,862,312	$12,202,524	$48,174,856
(% of Payroll)	45%	37%	59%	109%	88%	62%
State Premium Tax Allocation	$349,785	$8,979,407	$653,730	$4,733,319	$3,472,770	$18,189,011
(% of Payroll)	20%	21%	36%	29%	25%	23%
Employee Contributions	$140,964	$3,615,735	$139,397	$1,219,821	$1,113,194	$6,229,111
(% of Payroll)	7.9%	8.3%	7.7%	7.4%	8.0%	8.0%
Additional 2018 Solvency Cont.						
- To Receive State Allocation	NA	NA	NA	NA	NA	$0
- And to provide COLA Benefits	NA	$88,683	NA	NA	NA	$88,683

[a] All Funds participating in the Study.
[b] For plans under the Alternative funding policy, includes any additional contributions required to satisfy both 15-year solvency tests.

(Gain) / Loss Analysis

The Funds experienced an aggregate actuarial gain of $29,265,079 during the plan year ending June 30, 2017. The key factors contributing to the experience gain included:

- **Asset Performance:** The Funds, in the aggregate, experienced an investment return in excess of the average expected annual return of 5.1%. The difference in actual versus expected return produced an asset gain of $12,610,045.

- **Demographic Experience:** An actuarial valuation is based on the expectation of certain events such as salary increases, retirement, disability, mortality, and termination. Demographic or liability experience gains and losses are generated when the actual occurrence of such events are different from the expectation. Between June 30, 2016 and June 30, 2017, the Funds experienced an aggregate net liability gain of $16,654,922. The net liability gain of $16,654,922 (or 1.1% of expected liabilities) is within the range of reasonable variation and is primarily the result of the following factors:

  - Salary growth rates during the plan year July 1, 2016, to June 30, 2017, that were less than the assumed rate of approximately 5%; and
  - Cost-of-living adjustments during the plan year July 1, 2016, to June 30, 2017, that were less than the assumed rate of 2.75%.

(Gain) / Loss Analysis

Experience (gain) loss for plan year ending June 30, 2017

(For the 53 participating plans)

1.	(a) Liability as of 7/1/2016	$1,503,794,860
	(b) Normal Cost due 7/1/2016	37,295,521
	(c) Interest on (a) and (b) to 6/30/2017 [a]	72,511,847
	(d) Benefit Payments with interest to 6/30/2017 [a]	64,103,226
	(e) Effect of Assumption Changes	(18,043,279)
	(f) Expected Liability at 7/1/2017 [(a) + (b) + (c) - (d) + (e)]	1,531,455,723
	(g) Actual Liability at 7/1/2017	$1,514,800,801
	(h) Liability (Gain)/Loss [(g) - (f)]	**($16,654,922)**
2.	(a) Market Value of Assets as of 7/1/2016	$329,039,035
	(b) Interest on (a) and (b) to 6/30/2017 [a]	16,598,051
	(c) Contributions with interest to 6/30/2017 [a]	75,773,591
	(d) Benefit Payments with interest to 6/30/2017 [a]	64,103,226
	(e) Expected Assets at 6/30/2017 [(a) + (b) + (c) - (d)]	357,307,451
	(f) Actual Assets at 7/1/2017	$369,917,608
	(g) Asset (Gain)/Loss [(e) - (f)]	**($12,610,157)**
3.	Total (Gain)/Loss [1(h) + 2(g)]	**($29,265,079)**

[a] *Interest based on assumptions used for each specific plan as of June 30, 2017.*
[b] *13 plans restated their Market Value of Assets as of June 30, 2017 by $(366,517).*

Participants Summary

Active Participants	July 1, 2016	July 1, 2017
Number of Actives	1,502	1,476
Total Annual Pay	$76,540,808	$77,122,106
Average Age	39.3	39.3
Average Service	12.1	12.2

Inactive Participants	July 1, 2016		July 1, 2017	
Type	No.	Annual Benefit	No.	Annual Benefit
Retirees	1,362	$47,779,978	1,370	$49,004,941
Surviving Spouses	500	$7,028,451	491	$7,187,439
Disabled Members	292	$6,848,706	280	$6,767,782
Deferred Vested Members	27	$900,492	33	$1,216,438

SECTION III

ACTUARIAL PROJECTIONS – FUNDING POLICY CHOICES

Actuarial Projections – Funding Policy Choices

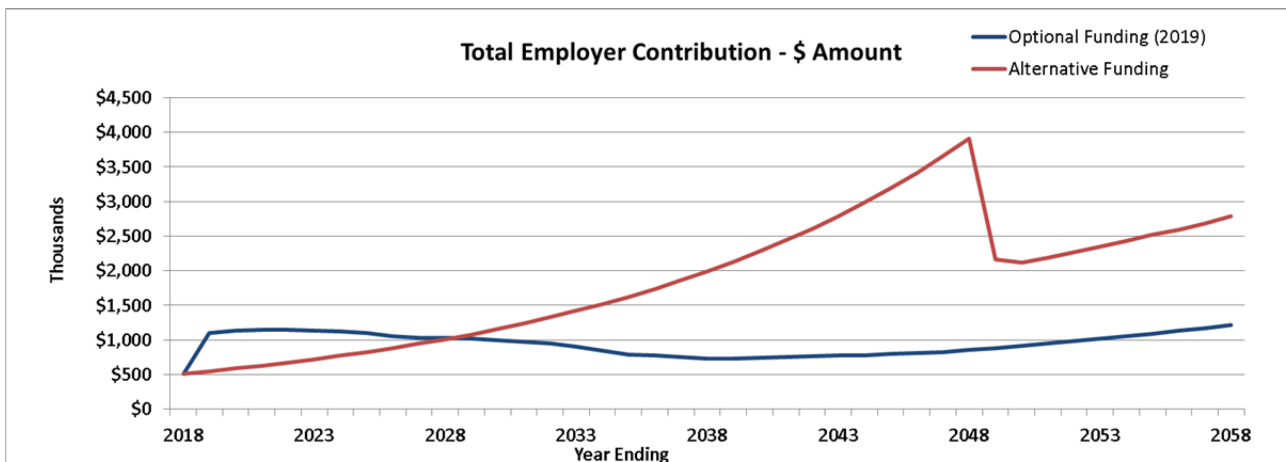
Impact of Optional Funding Policy under West Virginia Code §8-22-20(e)(1)

West Virginia Code §8-22-20(e)(1) allows Plan Sponsors using either the Standard or Alternative funding policy to close their current local police officers and firefighters pension Fund, and provide benefits to future members through the statewide cost sharing plan—the Municipal Police Officers and Firefighters Retirement System. The employer's contributions under the Municipal Police Officers and Firefighters Retirement System are fixed at 10.5% of pay, which is considerably less than the employer's normal cost rate. The key impact of West Virginia Code §8-22-20(e)(1) with respect to plan funding for Funds financing benefits under the Standard and Alternative funding policies is as follows:

- Sponsors financing benefits under the Standard funding policy are expected to receive immediate contribution relief by switching to the Optional funding policy with no significant impact to the projected funded ratio. This occurs because employer contributions for new entrants under the Municipal Police Officers and Firefighters Retirement System are fixed at 10.5% of pay, whereas the expected employer contributions for new entrants under the local plan are approximately equal to the higher net employer normal cost rate of pay.

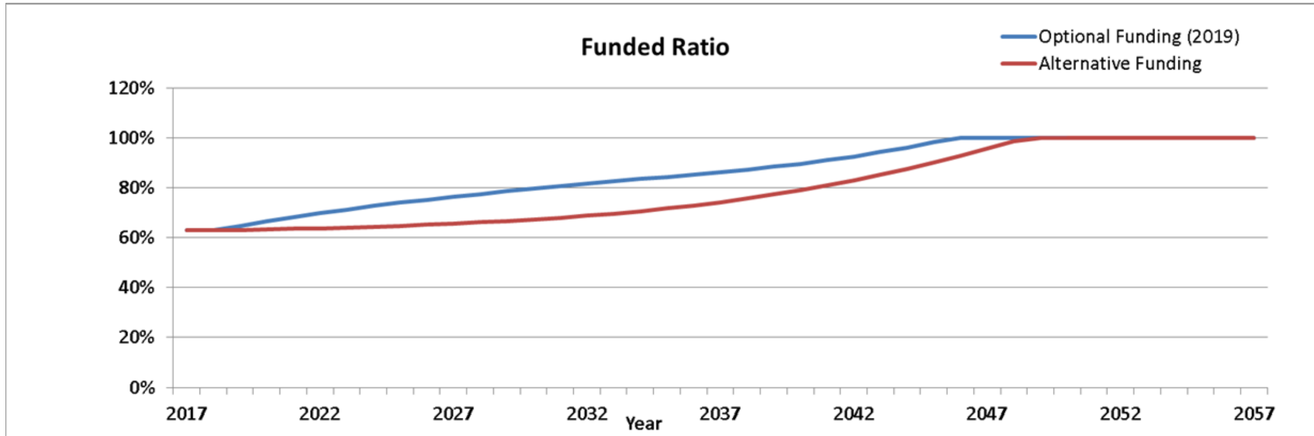
- Sponsors currently financing benefits under the Alternative policy are generally not expected to receive immediate contribution relief from switching to the Optional funding policy because the Alternative funding policy contributions in many cases are considerably lower than the actuarially based contributions defined under the Optional funding policy.

- Plan sponsors currently using the Alternative funding policy may find it more affordable in the long run to switch to the Optional funding policy even if it means an increase in the employer contributions in the short term. The following graph, for a typical Alternative funding policy plan, shows the difference in employer contributions between the two funding policies over the next 40 years:



As the above graph illustrates, contributing more under the Optional funding policy for the next 10 years produces significant cost reductions in the following 30 years.

The following graph for the average alternative plan shows the impact on the funded ratio between the two funding policies over the next 40 years:



The preceding graphs show: (i) Optional contributions are greater during the first 10 years but lower after the 10th year, and (ii) the Optional funding policy produces higher projected funding ratios when compared to the Alternative funding policy, on average. Some individual plans may not experience this situation.

Impact of Conservation Funding Policy under West Virginia §8-22-20 (f)(1)

West Virginia Code §8-22-20(f)(1) allows Plan Sponsors using the Alternative funding policy to close their current local police officers and firefighters pension Fund, and provide benefits to future members through the statewide cost sharing plan – the Municipal Police Officers and Firefighters Retirement System. The key impact of West Virginia Code §8-22-20(f)(1) with respect to plan funding for Funds currently financing benefits under the Alternative policy follows:

- Sponsors currently financing benefits under the Alternative funding policy are generally not expected to receive immediate contribution relief by switching to the Conservation funding policy because the Alternative funding policy contributions in many cases are considerably lower than the benefit payments (net of member contributions or the premium tax allocation) defined under the Conservation funding policy.

SECTION IV

CONCLUSIONS AND RECOMMENDATIONS

Conclusions and Recommendations

Based on the results of July 1, 2017 valuation and projections, we have the following general conclusions:

- Most Funds using the Standard funding policy, or former Standard plans that elected the Optional funding policy, are using a funding policy which is consistent with actuarial standards and is expected to provide a reasonable level of funding in a reasonable period of time. We recommend that these Funds continue to make contributions based on these policies.

- The other three funding policies available to Plan Sponsors (including the Alternative, Optional from Alternative, and Conservation funding policies) were designed to provide and offer Plan Sponsors additional contribution flexibility and/or affordability. As such, each of these funding policies has some disadvantages as compared to the Standard funding policy.

- The sponsor's initial Alternative contribution effective for plan year 1991 is the greater of 107% of the amount contributed for the plan year ending June 30, 1990, or the five-year average of contributions made since 1984. In many cases, this starting point contribution was so low that the current year's contributions, even with many years of 7% increases, is still significantly less than the normal cost. This means that switching to the Optional funding policy will likely require a large increase in annual contributions.

- *One key funding objective for public pension plans is to ensure the funding policy produces inter-generational equity among taxpayers. The Alternative funding policy generally defers the funding of plan costs into the future, creating a financial burden for future taxpayers.*

- *The Alternative funding policy assumes employer contributions will increase at a rate of 7%. In order to produce a level contribution rate, this funding method would require a 7% increase in payroll. In general, based on historical experience, we would expect annual payroll increases in the 3% to 6% range. Consequently, the Alternative funding policy can eventually produce contribution rates that exceed 100% of payroll.*

- *Many of the Funds using the Alternative funding policy are very poorly funded and will require a significantly higher level of contributions in the near future in order to bring the funded ratio to a more secure level. We recommend that these Funds consider immediately increasing their level of annual contributions.*

Conclusions and Recommendations

- **Certain underfunded Funds using the Alternative funding policy may satisfy the minimum statutory standard for solvency; i.e., assets are no less than one dollar over the next 15-year projection period, and therefore do not need additional contributions to provide supplemental COLA benefits. However, for the following plans, the funded ratio is at or projected to reach very low levels, and we strongly recommend that the plan sponsor make additional contributions in excess of the statutory minimum in order to improve the security of future benefits.**

    - Dunbar Firemen's Pension and Relief Fund
    - Martinsburg Firemen's Pension and Relief Fund
    - Princeton Firemen's Pension and Relief Fund
    - South Charleston Firemen's Pension and Relief Fund
    - South Charleston Policemen's Pension and Relief Fund
    - Saint Albans Firemen's Pension and Relief Fund
    - Weirton Policemen's Pension and Relief Fund

- One underfunded Plan, St. Albans Firemen's Pension and Relief Fund using the Alternative funding policy may not satisfy the minimum statutory standard for solvency; i.e., assets are less than one dollar over the next 15-year projection period, and therefore would need additional contributions to provide supplemental COLA benefits. We strongly recommend that the plan sponsor also make additional contributions in excess of the statutory minimum in order to improve the security of future benefits.

- Certain underfunded Funds have not received the minimum statutory contribution and have forfeited the premium tax allocation provided by the State. In our projections, we assume that such plans will eventually receive the statutory minimum contribution. Given the lack of funding for these Funds, we may no longer be able to support the assumption that the sponsor will make the statutory minimum contribution in our solvency projections, unless the sponsor adopts a formal policy to correct the statutory funding deficiency. These Funds include the following:

    - Logan Firemen's Pension and Relief Fund
    - Logan Policemen's Pension and Relief Fund
    - Point Pleasant Policemen's Pension and Relief Fund

  We understand the City of Point Pleasant has passed an ordinance increasing police fees which permits additional revenues into the local Police Plan.

- Under the Optional funding policy, contributions to the closed local plan are projected to decrease in future years as new hires enter the Municipal Police Officers and Firefighters Retirement System. At the same time, all Funds under the Optional funding policy by definition are projected to be 100% funded by the end of the amortization period in 40 years. However, the funded ratio for those Funds that are currently very poorly funded will increase at a very slow rate for many years and leave the Fund vulnerable if there is another significant market downturn.

Conclusions and Recommendations

- The Conservation funding policy is basically a "pay-as-you-go" funding method. In other words, employer contributions are based on actual retirements and disabilities. This method does not directly reflect any emerging experience gains or losses.

- Employer contributions under the Conservation funding policy are based on actual retirements and disabilities which could vary significantly from year to year based on actual plan experience. There is no mechanism under the Conservation funding policy to smooth out annual fluctuations in contribution requirements.

- A plan that is at least 125% funded on a present value of future benefit basis may have a sufficient margin for future adverse experience. West Virginia Code §8-22-20(c)(3) was recently amended to allow a municipality to make no contribution for a fiscal year if the actuarial valuation report determines the funded ratio to be at least 125% and the MPOB's actuary provides a recommendation that the normal cost does not need to be paid for that fiscal year. Three plans with a funded ratio in excess of 100% as of July 1, 2017, are projected to experience an increasing funded ratio. At some point, the sponsor may have the option of not making normal cost contributions. The following plans have funded ratios above 100% as of July 1, 2017:
    - Elkins Firemen's Pension and Relief Fund
    - Oak Hill Policemen's Pension and Relief Fund
    - Welch Policemen's Pension and Relief Fund

- We ask that the sponsor provide a copy of the fund's investment policy. The equity allocation is a factor in developing the equity return assumption. If the investment policy is not currently available, we recommend that the sponsor provide documentation on the fund's target asset allocation.

- GASB No. 67 replaced GASB No. 25 for pension plan financial reporting requirements (effective in fiscal year ending June 30, 2014) and GASB No. 68 replaced GASB No. 27 for employer financial reporting (effective in fiscal year ending June 30, 2015). For plans that are projected to have zero assets in the future, on a closed group basis, the discount rate used for GASB Nos. 67 and 68 financial reporting purposes will be based on a blended rate of the long-term investment return rate and a 20-year tax-exempt municipal bond index rate. Under the new accounting standards, the unfunded actuarial liability will need to be recognized on the plan sponsor's balance sheet. The new accounting standards will not impact the current statutory contribution policies. GRS provides separate GASB No. 67 and No. 68 reports to each plan sponsor.

SECTION V

ACTUARIAL ASSUMPTIONS AND METHODS

Discount Rate

The following table outlines the factors used to determine the discount rate:

Funded Ratio as of Valuation Date [1]	Liquidity Ratio [2]	Equity Exposure [3]	Projected Funded Ratio after 15 Years [1]	Discount Rate	Number of Plans Satisfying Conditions
60% or more	10	50% or more	70% or more	6.5%	10 [a]
40% or more	8	40% or more	60% or more	6.0%	9
30% or more	6	30% or more	50% or more	5.5%	7
15% or more	4	n/a	40% or more	5.0%	12
Less than 15%	n/a	n/a	15% or more	4.5%	8
Less than 15%	n/a	n/a	Less than 15%	4.0%	7

[1] Funded ratios based on a 6.0% investment return assumption for plans using an actuarially sound policy (Standard or Optional) and a 5.5% investment return assumption for other plans (Alternative or Conservation).
[2] Liquidity ratio equals assets as of the valuation date divided by expected benefits for the year.
[3] Based on investment policy.

Discount Rate	4.0% – 7.0% [a]

[a] *One plan, Town of Belle Policemen's Pension and Relief Fund, with a broad investment exposure of the assets invested in the West Virginia Investment Board is using a 7.00% discount rate assumption, as approved by the MPOB.*

The premium tax allocation is projected using the following methodology:

(1) The Base Allocation for all Pension and Relief Funds is a fixed amount equal to $8,709,689 in all future years. This amount is allocated to each individual Pension and Relief Fund in proportion to the number of eligible members, which includes active members covered in either the Pension and Relief Fund or the statewide plan, Municipal Police Officers and Firefighters Retirement System ("MPFRS").

(2) The Excess Allocation is equal to the excess of the current year premium tax assigned to all Pension and Relief Funds over the total Base Allocation. This amount is allocated to each individual Pension and Relief Fund in proportion to the number of eligible active and retired members covered in either the Pension and Relief Fund or the MPFRS.

(3) We have assumed all Pension and Relief Funds will make the minimum statutory contribution requirement and will receive 100% of both the Base Allocation and the Excess Allocation assigned to the individual plan. Consequently, the projections do not include any reallocation of Expired Premium Tax Allocation for plan years beginning on and after July 1, 2019.

(4) The total available premium tax allocation, net of expenses, as of September 1, 2018, includes a Base Allocation of $8,709,689, an Excess Allocation of $9,570,473, and an Expired Premium Tax Allocation of $237,031.

(5) Based on the average number of plan participants for the 12 month period ending June 30, 2018, all Pension and Relief Funds reported a total of 1,717 eligible active members, and 2,165 eligible retired members.

(6) The total premium tax allocation was assumed to increase by 2.75% in calendar years ending on and after 2019.

General Inflation	2.75%
Expected Salary Increase Service-based Increase:	General Inflation: 2.75% *plus* Wage Inflation increment: 1.00% *plus* Years of Service — Increase 1 — 20.00% 2 — 6.50% 3 — 3.50% 4 — 2.75% 5-9 — 2.50% 10-29 — 2.00% 30-34 — 1.25% after 34 years of service — 0.00%
Post-retirement COLA	2.75% on first $15,000 of Annual Benefit and on the accumulated supplemental pension amounts for prior years. Assumed to be payable to all members receiving benefits.
Increase in State Insurance Premium Tax Allocation	2.75% on and after year 1
Cost Method	Entry–Age–Normal Level–Percentage–of–Pay

Actuarial Assumptions and Methods

Amortization Policies:	
Alternative Plans and former Alternative Plans that selected the Conservation Policy	For GASB 67/68 Accounting: 30 – Year Closed Level-Percentage-of-Pay Amortization (from July 1, 2010 – 23 years remaining as of July 1, 2017).
Standard Plans and former Standard Plans that selected the Optional Policy	For funding and GASB 67/68 Accounting: 40-Year Closed Level-Dollar Amortization (from July 1, 1991 – 14 years remaining as of July 1, 2017).
Former Alternative Plans that selected the Optional Policy	For funding: 40-Year Closed Level-Dollar Amortization (from January 1, 2010 – 32.5 years remaining as of July 1, 2017). For GASB 67/68 Accounting: 30-Year Closed Level-Percentage-of-Pay Amortization (from July 1, 2010 – 23 years remaining as of July 1, 2017).
Asset Method	Market Value
Turnover	Sample Rates – Age / Rates 25 / 9% 35 / 4% 45 / 2% 50 / 0%
Retirement	Age / Rates[a] 50 / 45% 51-55 / 30% 56-59 / 35% 60 / 100% [a]*Terminated vested participants are assumed to retire at age 50.*

Mortality	Active: RP-2014 Blue Collar Healthy Employee[b] Post-Retirement: RP-2014 Blue Collar Healthy Annuitant Disabled: RP-2014 Blue Collar Healthy Annuitant set forward four years Tables above incorporate generational mortality improvement using MP-2014 2-dimensional mortality improvement scales. [b]*Assumes 10% of deaths are duty-related and 90% are non-duty related.*
Disability	Sample Rates – Age / Rates[c] 30 / 0.22% 40 / 0.50% 50 / 0.79% [c] *Assumes 60% duty related and 40% non-duty related. Also assumes 10% of non-duty disabled members receive a 20% reduction in benefits due to gainful employment.*
Percent Married	90%
Spouse Age	Females 3 years younger than males
Decrement Timing	Mid-Year

Administrative Expenses	Depending on the data provided, administrative expenses were assumed to be either: (i) Plan year end June 30, 2017 expense increased by general inflation assumption, (ii) 15% of all reported 2017 expenses, or (iii) 0.25% of expected pay plus 0.25% of expected benefits
Refunds Paid	Assumes non-vested inactive members as of July 1, 2017, with accumulated member contribution balances will receive a refund of their contributions during plan year end June 30, 2018.
Data Adjustments and Assumptions	Assumptions about individual data elements were made on a case-by-case basis and documented in each Plan's actuarial valuation report.
Child Beneficiaries	Future survivor widow benefits are loaded by 12% to estimate impact of benefits provided to survivor children. The load assumes 90% of members are married with two children at time of death, and benefits for each child are paid for approximately 8 years.
General Projection Methodology	Open group projections assume: Salaries will increase and members will decrement as specified in the actuarial assumption section. (i) Active members who retire, become disabled, die, or terminate during the year are replaced with new entrants such that the number of active members remains stable during the projections period. Pay for new entrants in future years is increased by the wage inflation assumption. The average age of a new entrant is based on observed experience over the last five years. (ii) Assets grow at the assumed rate of return. (iii) The sponsor makes the statutory required contribution on a monthly basis. (iv) Non-vested members with accumulated plan balances as of July 1, 2017, will receive a refund during plan year end June 30, 2018. Closed group projections are the same as the open group projections except active members who retire, become disabled, die, or terminate are <u>not</u> replaced with new entrants.

SECTION VI

SUMMARY OF PRINCIPAL FUNDING POLICIES AND PLAN PROVISIONS

Summary of Principal Funding Policies and Plan Provisions

Summary of Funding Policies

According to the West Virginia Code §8-22-20, Funds may satisfy the minimum standard for actuarial soundness by using one of the following policies:

Standard Funding Policy

Contributions under the Standard Funding Policy include:

- The employer contribution equals the normal cost, net of employee contributions, plus a 40-year amortization of the unfunded actuarial liability less the allocable portion of the State premium tax fund for municipal pension and relief funds. The amortization is based on a 40-year closed period commencing on July 1, 1991. As of June 30, 2017, there are 14 years left in the amortization period. The employer contribution cannot be less than the normal cost.

- The employee contributions equal 7.0% of pay for members hired before January 1, 2010, and 9.5% of pay if hired after January 1, 2010. However, if elected by the Board of Trustees of the Plan, member contributions may be increased up to 9.5% of pay.

- The State provides a premium tax allocation to the Fund based on the number of plan members and a demonstration that the actuarially determined contributions have been made on a timely basis.

Alternative Funding Policy

Contributions under the Alternative Funding Policy are determined as follows:

- The sponsor's initial Alternative contribution effective for plan year 1991 is the greater of 107% of the amount contributed for the plan year ending June 30, 1990, or the five-year average of contributions made since 1984.

- Sponsor contributions made in subsequent years cannot be less than 107% of the contribution made in the prior fiscal year.

- The actuary must certify in writing that the Fund is projected to be solvent under the Alternative funding policy for the next consecutive 15-year period. A plan is deemed to be solvent if projected assets are greater than zero over the 15-year projection period.

- Beginning September 1, 2003, any municipality which elected the Alternative funding method has the option of reverting to the Standard funding policy if the plan has an unfunded actuarial liability of no more than twenty-five percent of fund assets. In this case, the standard minimum contribution equals the normal cost plus the amortization of the unfunded liability over a period of not more than 40 years commencing from July 1, 1991, less the allocable portion of the state premium tax fund for municipal pension and relief funds.

- Plan members hired before January 1, 2010, contribute 7.0% of pay; however, if elected by the Board of Trustees of the Plan, member contributions may be increased up to 9.5% of pay. Employees hired after January 1, 2010, contribute 9.5% of pay.
- The State provides a premium tax allocation to the Fund based on the number of plan members and a demonstration that the employer's statutory contributions have been made on a timely basis.

Optional Funding Policy

The Optional funding policy is defined in West Virginia Code §8-22-20(e)(1), and is effective for plan years beginning after January 1, 2010. The Optional funding policy is available to plan sponsors using either the Standard funding policy or Alternative funding policy. The key features of the Optional funding policy are summarized below:

The existing local Plan is closed, and new employees are covered in the Municipal Police Officers and Firefighters Retirement System. Contributions to the Municipal Police Officers and Firefighters Retirement System include:

- Employer contributions from 8.5% to 10.5% of pay. Currently, Employers contribute 8.5% of pay.

- Employee contributions of 8.5% of pay.

Contributions to the closed local Plan include:

- Employer contributions equal to the normal cost, net of employee contributions, plus a closed period amortization, on a level dollar basis, of the unfunded actuarial liability net of premium tax allocation applicable to the plan year. The closed amortization period, from July 1, 2017, equals 14 years for Standard Plans and 32.5 years for the Alternative Plans.

- Employee contributions of 7.0% of pay if hired before January 1, 2010, which may be increased by up to 2.5% of pay if elected by the Board of trustees of the Plan. Employees hired after January 1, 2010, contribute 9.5% of pay.

- The premium tax allocation assigned to the Fund for the plan year.

Conservation Funding Policy

The Conservation funding policy is defined in West Virginia Code §8-22-20(f)(1), and is effective for plan years beginning after April 1, 2011. The Conservation funding policy is available to plan sponsors using the Alternative funding policy. The key features of the Conservation funding policy are summarized below:

The existing local Plan is closed, and new employees are covered in the multiple employer statewide plan - Municipal Police Officers and Firefighters Retirement System. Contributions to the Municipal Police Officers and Firefighters Retirement System include:

- Employer contributions from 8.5% to 10.5% of pay. Currently, Employers contribute 8.5% of pay.

- Employee contributions of 8.5% of pay.

Contributions to the closed local Plan are made to two asset accounts as follows:

- The first asset account (Benefit Payment Account) is used to finance benefits and expenses for the fiscal year on a pay-as-you-go basis. Sources to pay current year benefits and expenses include minimum employee contributions of 6.5% of pay, a portion of the premium tax allocation not assigned to the accumulation account as defined below, and employer contributions (typically made from the City's general assets).

- The second account (Accumulation Account) cannot be used to pay benefits and expenses until assets exceed actuarial liabilities (i.e., the funded ratio exceeds 100%). Contributions to the accumulation account include employee contributions of 1.5% of pay and a percentage of premium tax allocation. The percentage of premium tax allocation is based on the amounts needed to produce 100% funding of liabilities in 35 years, from adoption, considering assets from both the benefit payment account and the accumulation account. This account also includes the Fund's assets prior to the adoption of Conservation funding policy.

Summary of Principal Plan Provisions

Employee Eligibility — All compensated employees of the Police and Fire Departments hired before July 1, 2017, provided their respective plan is not closed, are eligible to participate in the Policemen's or Firemen's Pension and Relief Funds respectively.

Average Annual Compensation — The average of any three twelve-consecutive-month periods of employment which produces the highest average annual compensation.

Each twelve-consecutive-month annual compensation is limited to 120% of the *Average Adjusted Salary* received by the member in the two consecutive twelve-consecutive-month periods immediately preceding the twelve-consecutive-month period used in determining benefits.

The *Average Adjusted Salary* is base salary (exclusive of all overtime and other pay) of the year used in determining benefits multiplied by the ratio of total salary (includes all overtime and other pay) to base salary from the respective preceding twelve-consecutive-month period.

Determining Years of Service Credit (Credited Service**)** — The number of years that the member has contributed to the employees retirement and benefit fund.

Current Military Service — Any current member who has been on qualified military service in the armed forces of the United States with an honorable discharge may, within six months from his or her date of discharge, be given credit for continuous service in the paid police or fire department.

Any member who has served in active duty with the armed forces of the United States, whether prior to or subsequent to becoming a member of a paid police or fire department, shall receive one

additional percent for each year so served in active military duty, up to a maximum of four additional percent.

Absence from the service because of sickness or injury for a period of two years or less shall not be construed as time out of service.

Contributions — Participating employees contribute from 7.0% to 9.5% of compensation. Participating employees hired on or after January 1, 2010 contribute 9.5% of pay.

Normal Retirement — Members are eligible at the earlier of age 50 with 20 years of credited service or age 65.

Benefit Commencement — Annual retirement pension benefits commence upon retirement or upon the member attaining age fifty, whichever is later, payable in twelve monthly installments.

Accrued Benefit — The annual retirement benefit equals 60% of average annual compensation, not less than $6,000, plus an additional percentage of average annual compensation for service over 20 years equal to 2% for each year of service between 20 and 25 and 1% for each year of service between 25 and 30 years. Employees serving in the military are eligible for an additional 1% of average annual compensation for each year of military service up to four years. The maximum benefit is limited to 75% of average annual compensation. Benefits continue for life.

Disability Retirement — Members are eligible after earning five years of service. No service requirement if disability is service related.

The monthly disability benefit equals the greater of 60% of monthly salary at disability or $500. Employees serving in the military are eligible for an additional benefit of 1% of monthly salary at disability for each year of military service up to four years. Disability benefits, when aggregated with monthly state workers compensation benefits, shall not exceed 100% of the member's monthly compensation at the time of disability. Benefits continue for life or until recovery.

Death Benefits — Members are eligible after earning five years of service. No service requirement if death is service related. Retirees and terminated vested participants are also eligible.

The benefit is equal to 60% of the participant's benefit, but not less than $300 per month, payable to the spouse until death or remarriage. Other dependents (children, parents, brothers, and sisters) are also eligible for death benefits. To each dependent child, twenty percent of the participant's benefit until the child attains eighteen or marries; to each dependent orphaned child, twenty-five percent of the participant's benefit until the child attains eighteen or marries; to each dependent parent, ten percent of the participant's benefit for life, and to each dependent brother or sister, the sum of fifty dollars per month (but a total not to exceed $100 per month) until such individual attains the age of eighteen years or marries.

In no case shall the payments to the surviving spouse and children be reduced below sixty-five percent of the total amount paid to all dependents.

Supplemental Pension Benefits — All retirees, surviving beneficiaries and disability pensioners are eligible for automatic cost-of-living benefits commencing on the first day of July following two years of retirement. The benefits equal the percentage increase in the Consumer Price Index, limited to 4% (2% for some disability retirees), multiplied by the sum of the allowable amount which is the first $15,000 of the total annual benefits paid and the accumulated supplemental pension amounts for prior years.

Termination Benefits — Any member who terminates employment prior to retirement will be entitled to a refund of contributions without interest.

Refunds — Any member who terminates from their department without receiving a retirement pension shall be refunded all deductions made from his salary, without interest. Any member who receives such a refund and subsequently wishes to reenter the department must repay to the pension fund all sums refunded with interest at the rate of eight percent annual.

SECTION VII

APPENDIX A – SUMMARY OF HISTORICAL ACTUARIAL VALUATION RESULTS

Appendix A – Summary of Historical Actuarial Valuation Results

	2011	2012	2013	2014	2015	2016	2017
Participating Plans	53	53	53	53	53	53	53
Plan Membership							
(a) Actives	1,714	1,690	1,664	1,622	1,538	1,502	1,476
(b) Annuitants	2,074	2,090	2,110	2,124	2,148	2,154	2,141
(c) Inactives	25	25	28	26	26	27	33
(d) Total	3,813	3,805	3,802	3,772	3,712	3,683	3,650
Payroll	$78,118,046	$80,114,788	$78,607,923	$77,845,809	$76,401,710	$76,172,603	$76,659,405
Expected Benefit Payments	$53,855,526	$56,066,495	$57,877,499	$59,547,956	$61,976,709	$64,061,043	$66,133,523
Actuarial Accrued Liabilities							
(a) Actives	$403,594,801	$424,847,317	$421,087,210	$425,164,275	$492,712,196	$498,301,948	$497,023,121
(b) Annuitants	$774,599,969	$807,298,819	$824,228,642	$835,001,178	$974,556,968	$989,073,583	$996,513,177
(c) Inactives	$10,604,350	$11,739,896	$13,559,276	$12,777,528	$14,207,793	$16,419,329	$21,264,503
(d) Total Liabilities	$1,188,799,120	$1,243,886,032	$1,258,875,128	$1,272,942,981	$1,481,476,957	$1,503,794,860	$1,514,800,801
Market Value of Assets	$236,082,159	$245,564,744	$272,316,700	$307,953,940	$321,230,770	$329,405,552	$369,917,608
Unfunded Liability	$952,716,961	$998,321,288	$986,558,428	$964,989,041	$1,160,246,187	$1,174,389,308	$1,144,883,193
Funded Ratio	20%	20%	22%	24%	22%	22%	24%
Net Employer Normal Cost	$24,154,570	$24,079,840	$22,820,768	$22,210,774	$31,420,163	$31,478,034	$31,245,865
(% of Payroll)	31%	30%	29%	29%	41%	41%	41%
FYE Contributions (Valuation Year + 1)							
Employer Contributions [a]	NA	$36,622,658	$39,564,082	$41,059,263	$41,154,901	$46,695,441	$51,852,621
(% of Payroll)	NA	46%	50%	53%	54%	61%	68%
State Premium Tax Allocation	NA	$17,046,498	$15,908,566	$16,459,873	$16,752,969	$17,743,069	$18,189,011
(% of Payroll)	NA	21%	20%	21%	22%	23%	24%
Employee Contributions	NA	$6,064,017	$6,016,571	$6,011,376	$6,000,086	$6,114,516	$6,130,578
(% of Payroll)	NA	7.6%	7.7%	7.7%	7.9%	8.0%	8%
FYE Contributions (Valuation Year + 2)							
Employer Contributions [a]	$36,077,218	$39,564,082	$39,966,817	$41,212,256	$46,528,612	$48,174,856	$50,125,296
(% of Payroll)	46%	50%	50%	53%	60%	62%	65%
State Premium Tax Allocation	$16,169,054	$15,908,566	$16,459,873	$16,752,970	$17,579,827	$18,189,011	$18,517,193
(% of Payroll)	21%	20%	21%	22%	23%	23%	24%
Employee Contributions	$5,833,387	$6,016,571	$6,142,903	$6,043,186	$6,120,009	$6,229,111	$6,242,703
(% of Payroll)	7.0%	7.7%	7.7%	7.8%	7.9%	8.0%	8.1%
Additional Solvency Cont.							
- To Receive State Allocation	NA	$26,100	$8,000	$5,300	NA	NA	NA
- And to provide COLA Benefits	NA	$342,400	$294,300	$164,400	$104,649	$88,683	$10,349

[a] *Includes additional contirbutions required to satisfy the 15-year solvency test.*

SECTION VIII

APPENDIX B – SUMMARY OF PLAN STATISTICS

Appendix B – Summary of Plan Statistics

Municipality	Plan	Plan Membership: Active	Ret	Inactive	Total	Funding Policy	Open/ Closed		Interest Rate	Estimated Return[a]	Asset Value	UAAL	Funded Ratio
Fairmont	Fire	40	55	0	95	Conservation		C	4.0%	9.0%	$2,131,934	$40,415,413	5%
South Charleston	Fire	43	40	1	84	Alternative	O		4.0%	9.0%	$2,306,918	$35,679,080	6%
Dunbar	Fire	10	23	0	33	Alternative	O		4.5%	7.3%	$805,463	$12,449,083	6%
Martinsburg	Fire	36	36	0	72	Alternative	O		4.0%	11.0%	$2,734,963	$33,558,939	8%
Charleston	Fire	118	235	2	355	Conservation		C	4.5%	10.4%	$17,716,222	$166,482,302	10%
South Charleston	Police	43	35	0	78	Alternative	O		4.0%	5.6%	$2,884,925	$25,587,307	10%
Charleston	Police	108	216	4	328	Conservation		C	4.5%	10.5%	$20,042,001	$152,893,053	12%
Saint Albans	Fire	20	26	0	46	Alternative	O		4.0%	8.6%	$2,576,530	$17,343,373	13%
Nitro	Fire	14	11	0	25	Alternative	O		4.5%	6.8%	$1,300,894	$8,494,958	13%
Weirton	Police	37	48	0	85	Alternative	O		4.0%	9.9%	$5,070,148	$32,060,083	14%
Point Pleasant	Police	6	6	0	12	Optional		C	5.0%	5.8%	$768,132	$3,631,139	17%
Fairmont	Police	36	45	1	82	Conservation		C	5.0%	9.0%	$5,647,232	$22,381,731	20%
Huntington	Fire	70	172	3	245	Optional		C	5.0%	6.7%	$23,716,201	$88,858,336	21%
Parkersburg	Police	71	75	1	147	Optional		C	5.0%	9.4%	$11,335,200	$42,318,463	21%
Clarksburg	Fire	42	51	0	93	Alternative	O		5.0%	9.6%	$6,944,559	$25,289,033	22%
Martinsburg	Police	44	39	0	83	Alternative	O		4.5%	7.2%	$8,337,546	$29,466,372	22%
Bluefield	Fire	16	40	1	57	Alternative	O		5.0%	9.4%	$4,219,912	$13,412,196	24%
Clarksburg	Police	44	46	4	94	Alternative	O		5.0%	11.3%	$6,888,363	$21,846,891	24%
Princeton	Fire	12	15	1	28	Alternative	O		4.0%	9.8%	$2,879,155	$9,124,817	24%
Morgantown	Police	72	63	0	135	Alternative	O		4.5%	9.7%	$15,181,765	$47,599,124	24%
Parkersburg	Fire	55	96	0	151	Optional		C	5.0%	6.8%	$14,870,359	$44,328,033	25%
Moundsville	Fire	4	14	0	18	Optional		C	5.0%	10.8%	$1,362,829	$3,739,565	27%
Morgantown	Fire	48	56	0	104	Alternative	O		4.5%	9.4%	$12,233,107	$33,529,245	27%
Nitro	Police	16	12	1	29	Alternative	O		5.0%	10.7%	$3,717,223	$7,634,398	33%
Huntington	Police	64	130	4	198	Optional		C	5.5%	7.1%	$33,533,797	$63,618,935	35%
Wheeling	Fire	69	127	3	199	Optional		C	5.5%	10.7%	$24,682,410	$46,125,541	35%
Logan	Police	7	2	0	9	Standard	O		5.5%	8.5%	$740,523	$1,364,787	35%
Charles Town	Police	0	4	0	4	Standard		C	5.0%	5.2%	$462,989	$849,571	35%
Beckley	Fire	41	58	0	99	Alternative	O		4.5%	8.4%	$17,744,129	$28,344,997	38%
Princeton	Police	21	19	1	41	Alternative	O		5.5%	9.3%	$4,177,903	$6,474,375	39%
Logan	Fire	8	2	0	10	Standard	O		6.0%	3.9%	$721,451	$1,055,735	41%
Wheeling	Police	50	107	1	158	Optional		C	5.5%	11.0%	$22,535,606	$32,970,803	41%
Williamson	Fire	5	11	0	16	Optional		C	6.0%	9.2%	$1,728,891	$2,131,900	45%
Saint Albans	Police	25	19	0	44	Alternative	O		5.5%	8.9%	$6,845,424	$8,042,082	46%
Bluefield	Police	24	28	1	53	Alternative	O		6.0%	9.6%	$5,633,794	$6,554,217	46%
Williamson	Police	4	7	0	11	Optional		C	5.0%	0.1%	$1,289,817	$1,436,802	47%
Weston	Fire	6	3	0	9	Optional		C	6.0%	9.0%	$957,723	$792,935	55%
Grafton	Fire	1	6	0	7	Optional		C	6.0%	6.1%	$1,608,182	$1,060,232	60%
Beckley	Police	54	49	2	105	Alternative	O		6.0%	7.1%	$21,082,534	$12,443,786	63%
Elkins	Police	5	11	0	16	Optional		C	6.0%	9.7%	$3,273,105	$1,848,185	64%
Grafton	Police	3	6	0	9	Optional		C	5.5%	4.0%	$1,510,545	$682,408	69%
Dunbar	Police	8	13	0	21	Optional		C	6.0%	7.1%	$5,790,106	$2,248,393	72%
Moundsville	Police	8	15	1	24	Optional		C	6.5%	11.3%	$5,373,640	$2,067,665	72%
Weirton	Fire	22	21	0	43	Optional		C	6.5%	11.1%	$10,140,907	$3,675,774	73%
Chester	Police	3	5	0	8	Standard	O		6.5%	6.4%	$1,677,396	$514,031	77%
Vienna	Police	20	13	0	33	Standard	O		6.5%	10.7%	$7,603,876	$2,254,623	77%
Star City	Police	5	5	0	10	Optional		C	6.5%	9.7%	$1,551,339	$441,831	78%
Belle	Police	1	5	0	6	Optional		C	7.0%	15.9%	$1,456,007	$367,854	80%
Weston	Police	3	4	0	7	Optional		C	6.0%	6.3%	$1,302,067	$187,674	87%
Westover	Police	2	4	1	7	Optional		C	6.5%	8.7%	$2,445,728	$226,120	92%
Elkins	Fire	3	2	0	5	Optional		C	6.5%	9.0%	$1,489,384	($101,785)	107%
Welch	Police	5	3	0	8	Optional		C	6.5%	7.8%	$2,593,532	($273,190)	112%
Oak Hill	Police	4	7	0	11	Optional		C	6.5%	8.3%	$4,293,222	($646,022)	118%
Total[b]		**1,476**	**2,141**	**33**	**3,650**		**24**	**29**	**4.8%**	**8.9%**	**$369,917,608**	**$1,144,883,193**	

[a] *Estimated return on assets assumes contributions, benefits and administrative expenses are paid uniformly throughout and reflects a time weighting factor of 50% for all cash flows.*

[b] *The total estimated return is weighted using the market value of assets as of July 1, 2016. The total interest rate is weighted using the actuarial liability as of July 1, 2017.*

SECTION IX

APPENDIX C – RECONCILIATION OF ASSETS AND INVESTMENT RETURN APPROXIMATION

Appendix C – Reconciliation of Assets and Investment Return Approximation as of June 30, 2017

The assumed long-term rate of investment return is used to discount future cash flows and must therefore be compared with observed rates of return on assets. This allows the actuary to distinguish which gains and losses arise from investment experience and which are the result of demographic factors. Because the exact timing of these cash flows is not known to the actuary, an approximation must be used to develop a measure for investment return in a given plan year which can be consistent over time. For this reason, the approximated return on assets provided in actuarial valuations will differ from those of investment managers.

A. Market Value of Assets Beginning of Year	$329,405,552
Adjustment to Market Value of Assets at Beginning of Year	($366,517)
Market Value of Assets Beginning of Year	$329,039,035
1. Revenue During Fiscal Year	
(a) Employee Contribution	$6,420,086
(b) Governmental Contribution	
(i) From Local Government	$44,247,074
(ii) From State Government	$16,283,644
(iii) Reallocation from State Government	$0
(iv) Total	$60,530,718
(c) Earnings on Investments	
(i) Net Appreciation/(Depreciation)	$19,574,138
(ii) Bond Interest	$2,331,536
(iii) Dividends	$4,918,523
(iv) Net Realized Gain (Loss) on Sale/Exchange	$3,591,716
(v) Other	$422,017
(vi) Less Investment Expense	($1,195,392)
(vii) Total	$29,642,538
(d) Other Revenue	$50,175
(e) Net Receivable Investment Income	$189,320
(f) Receivable Contribution [a]	
(i) From Employee Contributions	$62,908
(ii) From Local Government	$5,730,840
(iii) From State Government	$1,275,855
(iv) Total	$7,069,603
(g) Total Revenue (sum of (a) through (f))	$103,902,440
2. Expenditures During Fiscal Year	
(a) Benefits Paid	$61,155,407
(b) Withdrawals	$834,557
(c) Administrative Expenses	$391,173
(d) Payable Benefits and Withdrawals	$623,450
(e) Payable Administrative Expenses	$19,280
(f) Total Expenditures (sum of (a) through (e))	$63,023,867
B. Market Value of Assets End of Year [A + 1(g) - 2(f)]	$369,917,608
C. Approximate Return on Assets [b]	8.81%

[a] *Receivable contributions for plan year ending June 30, 2017.*

[b] *Estimated return on assets assumes contributions, benefits and administrative expenses are paid uniformly throughout and reflects a time weighting factor of 50% for all cash flows.*