



**Municipal Pensions  
Oversight Board**

**City of Charleston, West Virginia  
Firemen's Pension and Relief Fund**

GASB68 Actuarial Information for the  
Measurement Period Ending  
06/30/2019

**Bolton**

Submitted by:

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October 21, 2019

Honorable Victor Grigoraci  
City Treasurer  
City of Charleston  
501 Virginia Street, East  
Charleston, WV 25301

Deputy Chief Robert "Scott" Fisher  
Pension Board Secretary  
City of Charleston, West Virginia  
Firemen's Pension and Relief Fund

Re: City of Charleston, West Virginia Firemen's Pension and Relief Fund - GASB68 Actuarial  
Information for the Measurement Period Ending June 30, 2019

Dear Victor

The following report contains the GASB 67 and GASB 68 actuarial information for the City of Charleston Firemen's Pension and Relief Fund to be included in the City's financial statements for FY2019. The GASB67 information has been provided as of the June 30, 2019 (the GASB 68 measurement date for FY2019).

### Methodology, Reliance and Certification

This report is prepared for the City. The report contains the actuarial information to be included with the City's financial statements for the year ending June 30, 2019 (the City's fiscal year end date) as required by GASB68. This information has been prepared for use in the financial statements of the City. This information is not intended for, nor should it be used for, any additional purposes.

The total pension liability is based on the July 1, 2018 actuarial valuation rolled forward to June 30, 2019. The methods, assumptions, and participant data used are detailed in the July 1, 2018 actuarial valuation report with the exception of the actuarial cost method. These calculations are based on the Entry Age Normal cost method as required by GASB67. The calculation of the Actuarially Determined Contribution for the fiscal year ended June 30, 2019 is contained in the July 1, 2018 actuarial valuation report.

The Plan currently uses the Conservation funding policy as described in WV Code §8-22-20. Under this funding policy, the City makes contributions to two separate accounts: the Benefit Payment Account and the Accumulation Account. The Benefit Payment Account is used to pay benefits on a pay-as-you-go basis while the Accumulation Account cannot be used to pay benefits and expenses until assets equal or exceed actuarial liabilities.

The included calculations are based on a blended discount rate of 3.71%. A long-term expected rate of investment return of 4.5% has been blended with the 3.13% yield corresponding to the 20-year maturity on a municipal general obligation AA bond yield curve published on Fidelity's Fixed Income Market Data webpage as of June 30, 2019. We assumed benefits are discounted at the municipal bond rate when paid from the Benefit Payment Account, or at the long-term rate of return when paid from the Accumulation Account. The development of the blended discount rate is included within this report.

### Methodology, Reliance and Certification (cont.)

The included calculations assume that the members and the City will continue to make all required contributions in accordance with the City's funding policy.

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.

The City is responsible for selecting the plan's funding policy based on four methods allowed for under state law. The actuarial valuation methods are chosen by the actuary in accordance with actuarial standards of practice promulgated by the actuarial standards board of the American Academy of Actuaries and as required by GASB 67 & 68. The MPOB selects the asset valuation methods and assumptions; these selections are reviewed by a qualified actuary no less than every five years. The actuary shall provide a report to the oversight board with recommendations on any changes to the actuarial process. The policies, methods and assumptions used in this valuation are those that have been so prescribed and are described in this report. The City and MPOB are solely responsible for communicating to Bolton Partners, Inc. any changes required thereto.

The City 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.

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 City or in this case a measure of accounting expense. It does not affect the cost of the plan. As the experience of the plan evolves, it is normal for the level of contributions and expense of the plan to change.

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 the City. 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.



Methodology, Reliance and Certification (cont.)

The City 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 City.

The information in this report was prepared for the internal use of the City, the plan and their auditors in connection with our actuarial valuations of the pension plan as required by GASB68. 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 information 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, an assumption based on the expected long-term rate of return on plan investments is used. If the plan is expected to become insolvent, the return assumption is blended with a long-term municipal bond rate. Using a lower discount rate assumption, such as a rate solely based on long-term bond yields, could substantially increase the estimated present value of future and accrued liabilities.

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.

The undersigned enrolled actuaries meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. The July 1, 2018 actuarial valuation report contains information that is integral to the results contained herein and a copy may be provided upon request.

Sincerely,



James Ritchie, ASA, EA, FCA, MAAA



Jordan McClane, FSA, EA, MAAA



City of Charleston, West Virginia Firemen's Pension and Relief Fund  
 Actuarial Information to Include in the Financial Statements  
 for the June 30, 2019 Measurement Date



Net Pension Liability of the Employer

The components of the net pension liability of the Employer at June 30, 2019, were as follows:

Total pension liability	\$ 218,420,916
Plan fiduciary net position	(22,233,766)
Employer's net pension liability	<u>\$ 196,187,150</u>
Plan fiduciary net position as a percentage of the total pension liability	10.18%

Actuarial assumptions. The total pension liability was determined by an actuarial valuation as of July 1, 2018 rolled forward to June 30, 2019 using the following actuarial assumptions, applied to all periods included in the measurement:

Inflation	2.75 percent
Salary increases	Rates vary by years of service
Single discount rate (BOY)	4.3847%
Single discount rate (EOY)	3.7100%
Investment rate of return	4.50 percent, net of pension plan investment expense, including inflation
Long-term municipal bond rate (BOY)	3.62%
Long-term municipal bond rate (EOY)	3.13%
Mortality	RP-2014 Blue Collar Mortality Table with generational projection using Scale MP-2014
Year Fund is projected to be fully funded	2046
Year assets are expected to be depleted for a closed plan	N/A

The above is a summary of key actuarial assumptions. Full descriptions of the actuarial assumptions are available in the July 1, 2018 actuarial valuation report.

Sensitivity of the net pension liability to changes in the discount rate

	1% Decrease 2.71%	Current Discount Rate 3.71%	1% Increase 4.71%
Employer's net pension liability	\$ 234,410,709	\$ 196,187,150	\$ 166,233,783

City of Charleston, West Virginia Firemen's Pension and Relief Fund  
 Actuarial Information to Include in the Financial Statements  
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Changes in the Net Pension Liability

	Total Pension Liability (a)	Increase (Decrease) Plan Fiduciary Net Position (b)	Net Pension Liability (a) - (b)
<b>Balances at 6/30/18</b>	\$ 191,791,397	\$ 20,062,367	\$ 171,729,030
<b>Changes for the year:</b>			
Service cost	4,191,779		4,191,779
Interest	8,242,853		8,242,853
Changes of benefit terms	-		-
Differences between expected and actual experience	230,664		230,664
Changes of assumptions	21,564,458		21,564,458
Contributions - employer (including Premium Tax Allocation)		8,035,292	(8,035,292)
Contributions - member		509,721	(509,721)
Net investment income		1,232,322	(1,232,322)
Benefit payments, including refunds of member contributions	(7,600,235)	(7,600,235)	-
Administrative expense		(301)	301
Other		(5,400)	5,400
<b>Net Changes</b>	<u>26,629,519</u>	<u>2,171,399</u>	<u>24,458,120</u>
<b>Balances at 6/30/19</b>	<u>\$ 218,420,916</u>	<u>\$ 22,233,766</u>	<u>\$ 196,187,150</u>
Return on Investments		6.0%	

City of Charleston, West Virginia Firemen's Pension and Relief Fund  
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Components of Employer's Pension Expense for the Fiscal Year Ended June 30, 2019

Note	Description	Amount
A	Service Cost	\$ 4,191,779
B	Interest on the total pension liability	8,242,853
A	Changes of benefit terms	-
C	Differences between expected and actual experience	(567,406)
C	Changes of assumptions	6,851,088
A	Employee contributions	(509,721)
D	Projected earnings on pension plan investments	(923,937)
C	Differences between expected and actual earnings on plan investments	(371,365)
A	Pension plan administrative expense	301
A	Other changes in fiduciary net position	5,400
<b>Total Pension Expense</b>		<b>\$ 16,918,992</b>

Notes:

A Provided in the Changes in Net Pension Liability exhibit.

B Based on the following calculation:

	Amount for Period (a)	Portion of Period (b)	Projected Rate of Return (c)	Projected Earnings (a) x (b) x (c)
Beginning total pension liability	\$ 191,791,397	100%	4.38%	\$ 8,409,477
Service Cost (End of Year)	4,191,779	0%	4.38%	-
Benefit payments, including refunds of employee contributions	(7,600,235)	50%	4.38%	(166,624)
<b>Total interest on the total pension liability</b>				<b>\$ 8,242,853</b>

C Provided in the Schedules of Deferrals.

D Based on the following calculation:

	Amount for Period (a)	Portion of Period (b)	Projected Rate of Return (c)	Projected Earnings (a) x (b) x (c)
Beginning plan fiduciary net position	\$ 20,062,367	100%	4.50%	\$ 902,807
Employer contributions	8,035,292	50%	4.50%	180,794
Employee contributions	509,721	50%	4.50%	11,469
Benefit payments, including refunds of employee contributions	(7,600,235)	50%	4.50%	(171,005)
Administrative expense and other	(5,701)	50%	4.50%	(128)
<b>Total Projected Earnings</b>				<b>\$ 923,937</b>

City of Charleston, West Virginia Firemen’s Pension and Relief Fund  
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Deferred Outflows of Resources and Deferred Inflows of Resources Related to Pensions

At June 30, 2019, the Employer reported deferred outflows of resources and deferred inflows of resources related to pensions from the following sources:

	Deferred Outflows of Resources	Deferred Inflows of Resources
Differences between expected and actual experience	\$ 115,332	\$ 309,107
Changes of assumptions	10,782,229	418,151
Net difference between projected and actual earnings on pension plan investments	-	1,006,784
<b>Total</b>	<b>\$ 10,897,561</b>	<b>\$ 1,734,042</b>

Amounts reported as deferred outflows of resources and deferred inflows of resources related to pensions will be recognized in pension expense as follows:

Year ended June 30:	
2020	\$ 9,792,211
2021	(382,863)
2022	(184,152)
2023	(61,677)
2024	-
Thereafter	-



City of Charleston, West Virginia Firemen's Pension and Relief Fund  
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Changes in the Employer's Net Pension Liability and Related Ratios  
 Last 10 Fiscal Years

Total pension liability	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
Service cost	\$ 4,191,779	\$ 3,812,937	\$ 4,558,952	\$ 3,402,390	\$ 3,160,914	\$ 3,139,576	\$ -	\$ -	\$ -	\$ -
Interest	8,242,853	8,083,617	7,563,985	7,426,782	7,516,367	7,715,345	-	-	-	-
Changes of benefit terms	-	-	-	-	-	-	-	-	-	-
Differences between expected and actual experience	230,664	(1,328,621)	(352,450)	(1,147,647)	(3,217,247)	-	-	-	-	-
Changes of assumptions	21,564,458	(1,797,321)	(15,608,155)	27,065,406	8,277,173	6,693,190	-	-	-	-
Benefit payments, including refunds of member contributions	(7,600,235)	(7,425,842)	(7,238,403)	(7,075,905)	(6,859,784)	(6,943,758)	-	-	-	-
Net change in total pension liability	26,629,519	1,344,770	(11,076,071)	29,671,026	8,877,423	10,604,353	-	-	-	-
Total pension liability - beginning	191,791,397	190,446,627	201,522,698	171,851,672	162,974,249	152,369,897	-	-	-	-
<b>Total pension liability - ending (a)</b>	<b>\$ 218,420,916</b>	<b>\$ 191,791,397</b>	<b>\$ 190,446,627</b>	<b>\$ 201,522,698</b>	<b>\$ 171,851,672</b>	<b>\$ 162,974,250</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>
Plan fiduciary net position	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
Contributions - employer (including Premium Tax Allocation)	\$ 8,035,292	\$ 7,843,092	\$ 7,685,081	\$ 6,906,802	\$ 6,561,849	\$ 6,735,846	\$ -	\$ -	\$ -	\$ -
Contributions - member	509,721	525,870	574,505	580,188	592,996	603,333	-	-	-	-
Net investment income	1,232,322	1,409,712	1,717,125	695,679	622,444	1,317,995	-	-	-	-
Benefit payments, including refunds of member contributions	(7,600,235)	(7,425,842)	(7,238,403)	(7,075,905)	(6,859,784)	(6,943,758)	-	-	-	-
Administrative expense	(301)	(6,890)	(7,603)	(9,741)	(5,864)	(8,132)	-	-	-	-
Other	(5,400)	203	-	-	-	-	-	-	-	-
Net change in plan fiduciary net position	\$ 2,171,399	\$ 2,346,145	\$ 2,730,705	\$ 1,097,023	\$ 911,641	\$ 1,705,284	\$ -	\$ -	\$ -	\$ -
Plan fiduciary net position - beginning	20,062,367	17,716,222	14,985,517	13,888,494	12,976,853	11,271,569	-	-	-	-
<b>Plan fiduciary net position - ending (b)</b>	<b>\$ 22,233,766</b>	<b>\$ 20,062,367</b>	<b>\$ 17,716,222</b>	<b>\$ 14,985,517</b>	<b>\$ 13,888,494</b>	<b>\$ 12,976,853</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>
Employer's net pension liability - ending (a)-(b)	\$ 196,187,150	\$ 171,729,030	\$ 172,730,405	\$ 186,537,181	\$ 157,963,178	\$ 149,997,396	\$ -	\$ -	\$ -	\$ -
Plan fiduciary net position as a percentage of the total pension liability	10.18%	10.46%	9.30%	7.44%	8.08%	7.96%	0.00%	0.00%	0.00%	0.00%
Covered payroll	\$ 6,419,737	\$ 6,725,992	\$ 7,038,745	\$ 7,273,171	\$ 7,364,910	\$ 7,872,875	\$ -	\$ -	\$ -	\$ -
Employer's net pension liability as a percentage of covered payroll	3056.00%	2553.21%	2453.99%	2564.73%	2144.81%	1905.24%	0.00%	0.00%	0.00%	0.00%
Expected average remaining service years of all participants	2.00	2.61	2.88	3.18	3.38	3.71	-	-	-	-

**Notes to Schedule:**

Benefit changes: There were no changes for FY2019.

Changes of assumptions: The discount rate changed from 4.3847% to 3.7100%.

City of Charleston, West Virginia Firemen's Pension and Relief Fund  
 Actuarial Information to Include in the Financial Statements  
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Schedule of Employer Contributions  
 Last 10 Fiscal Years

	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
Actuarially determined contribution	\$ 12,736,724	\$ 10,930,487	\$ 10,712,117	\$ 10,373,813	\$ 8,533,617	\$ 8,544,824	\$ 8,644,534	\$ -	\$ -	\$ -
Contributions in relation to the actuarially determined contribution										
Employer provided	6,253,683	6,107,953	5,974,752	5,300,143	5,004,065	5,191,340	4,935,630	-	-	-
State provided	1,781,609	1,735,139	1,710,329	1,606,659	1,557,784	1,544,506	1,958,353	-	-	-
Contribution deficiency (excess)	<u>\$ 4,701,432</u>	<u>\$ 3,087,395</u>	<u>\$ 3,027,036</u>	<u>\$ 3,467,011</u>	<u>\$ 1,971,768</u>	<u>\$ 1,808,978</u>	<u>\$ 1,750,551</u>	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>
Covered payroll	\$ 6,419,737	\$ 6,725,992	\$ 7,038,745	\$ 7,273,171	\$ 7,364,910	\$ 7,872,875	\$ 8,867,736	\$ -	\$ -	\$ -
Contributions as a percentage of covered employee payroll	125.17%	117.00%	109.00%	95.00%	89.00%	86.00%	78.00%	0.00%	0.00%	0.00%

Notes to Schedule

Valuation date:

Actuarially determined contribution amounts are calculated as of the beginning of the fiscal year (July 1) for the year immediately following the fiscal year. Actuarial valuations are performed every year.

Methods and assumptions used to determine contribution rates:

Actuarial cost method	Entry Age Normal
Amortization method	Level Dollar
Remaining amortization period	32.5 years
Asset valuation method	Market Value
Inflation	2.75 percent
Salary increases	Rates vary by years of service
Investment rate of return	4.50 percent, net of pension plan investment expense, including inflation
Retirement age	Rates vary by age
Mortality	RP-2014 Blue Collar Mortality Table with generational projection using Scale MP-2014

City of Charleston, West Virginia Firemen's Pension and Relief Fund  
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Schedule of Differences between Projected and Actual Earnings on Pension Plan Investments

In conformity with paragraph 33b of Statement 68, the effects of differences between projected and actual earnings on pension plan investments are recognized in pension expense using a systematic and rational method over a closed five-year period, beginning in the current reporting period. The following table illustrates the application of this requirement.

Increase (Decrease) in Pension Expense Arising from the Recognition of Differences between Projected and Actual Earnings on Plan Investments											
Year	Differences between Projected and Actual Earnings on Pension Plan Investments	Recognition Period (Years)	2015	2016	2017	2018	2019	2020	2021	2022	2023
2015	\$ 33,629	5	\$ 6,726	6,726	6,726	6,726	6,725				
2016	23,853	5		\$ 4,771	4,771	4,771	4,771	4,769			
2017	(993,557)	5			\$ (198,711)	(198,711)	(198,711)	(198,711)	(198,713)		
2018	(612,367)	5				\$ (122,473)	(122,473)	(122,473)	(122,473)	(122,475)	
2019	(308,385)	5					\$ (61,677)	(61,677)	(61,677)	(61,677)	(61,677)
Net increase (decrease) in pension expense							\$ (371,365)	\$ (378,092)	\$ (382,863)	\$ (184,152)	\$ (61,677)

Deferred Outflows of Resources and Deferred Inflows of Resources Arising from Differences between Projected and Actual Earnings on Pension Plan Investments

Year	Investment Earnings Less than Projected (a)	Investment Earnings Greater Than Projected (b)	Amounts Recognized in Pension Expense Through June 30, 2019 (c)	Balances at June 30, 2019	
				Deferred Outflows of Resources (a) - (c)	Deferred Inflows of Resources (b) - (c)
2015	\$ 33,629	\$ -	\$ 33,629	\$ -	\$ -
2016	23,853	-	19,084	4,769	-
2017	-	993,557	596,133	-	397,424
2018	-	612,367	244,946	-	367,421
2019	-	308,385	61,677	-	246,708
				\$ 4,769	\$ 1,011,553

City of Charleston, West Virginia Firemen's Pension and Relief Fund  
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Schedule of Differences between Expected and Actual Experience

In conformity with paragraph 33a of Statement 68, the effects of differences between expected and actual experience are recognized in pension expense, beginning in the current reporting period, using a systematic and rational method over a closed period equal to the average of the remaining service lives of all employees that are provided with pensions through the pension plan (active and inactive employees), determined as of the beginning of the measurement period. The following table illustrates the application of this requirement.

Increase (Decrease) in Pension Expense Arising from the Recognition of Differences between Expected and Actual Experience																
Year	Differences between Expected and Actual Experience	Recognition Period (Years)	Prior	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Thereafter	
Prior	\$ -		\$ -													
2014	-	3.711956		\$ -												
2015	(3,217,247)	3.378746			\$ (952,201)	(952,201)	(952,201)	(360,644)								
2016	(1,147,647)	3.180437				\$ (360,846)	(360,846)	(360,846)	(65,109)							
2017	(352,450)	2.882103					\$ (122,289)	(122,289)	(107,872)							
2018	(1,328,621)	2.606381						\$ (509,757)	(509,757)	(309,107)						
2019	230,664	2							\$ 115,332	115,332						
Net increase (decrease) in pension expense									\$ (567,406)	\$ (193,775)	\$ -	\$ -	\$ -	\$ -	\$ -	

Deferred Outflows of Resources and Deferred Inflows of Resources Arising from Differences between Expected and Actual Experience

Year	Experience Losses (a)	Experience Gains (b)	Amounts Recognized in Pension Expense Through June 30, 2019 (c)	Balances at June 30, 2019	
				Deferred Outflows of Resources (a) - (c)	Deferred Inflows of Resources (b) - (c)
Prior	\$ -	\$ -	\$ -	\$ -	\$ -
2014	-	-	-	-	-
2015	-	3,217,247	3,217,247	-	-
2016	-	1,147,647	1,147,647	-	-
2017	-	352,450	352,450	-	-
2018	-	1,328,621	1,019,514	-	309,107
2019	230,664	-	115,332	115,332	-
				\$ 115,332	\$ 309,107

City of Charleston, West Virginia Firemen's Pension and Relief Fund  
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Schedule of Changes of Assumptions

In conformity with paragraph 33a of Statement 68, the effects of changes of assumptions should be recognized in pension expense, beginning in the current reporting period, using a systematic and rational method over a closed period equal to the average of the remaining service lives of all employees that are provided with pensions through the pension plan (active and inactive employees), determined as of the beginning of the measurement period. The following table illustrates the application of this requirement.

Increase (Decrease) in Pension Expense Arising from the Effects of Changes of Assumptions															
Year	Changes of Assumptions	Recognition Period (Years)	Prior	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Thereafter
Prior	\$ -		\$ -	-	-	-	-	-	-	-	-	-	-	-	-
2014	6,693,190	3.711956		\$ 1,803,144	1,803,144	1,803,144	1,283,758								
2015	8,277,173	3.378746			\$ 2,449,777	2,449,777	2,449,777	927,842							
2016	27,065,406	3.180437				\$ 8,509,965	8,509,965	8,509,965	1,535,511						
2017	(15,608,155)	2.882103					\$ (5,415,544)	(5,415,544)	(4,777,067)						
2018	(1,797,321)	2.606381						\$ (689,585)	(689,585)	(418,151)					
2019	21,564,458	2							\$ 10,782,229	10,782,229					
Net increase (decrease) in pension expense									\$ 6,851,088	\$ 10,364,078	\$ -	\$ -	\$ -	\$ -	\$ -

Deferred Outflows of Resources and Deferred Inflows of Resources Arising from Changes of Assumptions

Year	Increases in the Total Pension Liability (a)	Decreases in the Total Pension Liability (b)	Amounts Recognized in Pension Expense Through June 30, 2019 (c)	Balances at June 30, 2019	
				Deferred Outflows of Resources (a) - (c)	Deferred Inflows of Resources (b) - (c)
Prior	\$ -	\$ -	\$ -	\$ -	\$ -
2014	6,693,190	-	6,693,190	-	-
2015	8,277,173	-	8,277,173	-	-
2016	27,065,406	-	27,065,406	-	-
2017	-	15,608,155	15,608,155	-	-
2018	-	1,797,321	1,379,170	-	418,151
2019	21,564,458	-	10,782,229	10,782,229	-
				\$ 10,782,229	\$ 418,151

City of Charleston, West Virginia Firemen's Pension and Relief Fund  
 Actuarial Information to Include in the Financial Statements  
 for the June 30, 2019 Measurement Date



Projection of Pension Plan's Fiduciary Net Position (Dollar amounts in thousands)

Fiscal Year	Active	Pay Status	Benefit Payment Account							Accumulation Account							Accrued Liability	Unfunded Liability	Funded Ratio
			Assets (BOY)	Net Benefit Pmts and Expenses	Employer Contributions	Employee Contributions	48.46% of Premium Tax Allocation	Investment Income	Transfer (To)/From Accumulation Account	Assets (BOY)	Net Benefit Pmts and Expenses	Employer Contributions	1.50% of Pay Employee Contributions	51.54% of Premium Tax Allocation	Investment Income				
2019	109	244	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 194,036,342	\$ 171,802,576	11%
2020	103	245	\$ (360,109)	\$ 7,965,992	\$ 6,609,273	\$ 410,450	\$ 946,269	\$ (16,205)	\$ 376,314	\$ 22,593,875	\$ -	\$ -	\$ -	\$ 94,665	\$ 1,006,246	\$ 1,041,222	\$ 197,976,220	\$ 173,616,526	12%
2021	95	249	\$ -	\$ 8,296,392	\$ 6,931,755	\$ 395,711	\$ 968,926	\$ -	\$ -	\$ 24,359,694	\$ -	\$ -	\$ -	\$ 91,261	\$ 1,030,339	\$ 1,121,145	\$ 201,634,506	\$ 175,032,067	13%
2022	87	254	\$ -	\$ 8,624,184	\$ 7,248,022	\$ 379,458	\$ 996,704	\$ -	\$ -	\$ 26,602,439	\$ -	\$ -	\$ -	\$ 87,505	\$ 1,059,878	\$ 1,222,642	\$ 204,988,492	\$ 176,016,028	14%
2023	79	258	\$ -	\$ 9,030,731	\$ 7,647,469	\$ 358,016	\$ 1,025,246	\$ -	\$ -	\$ 28,972,464	\$ -	\$ -	\$ -	\$ 82,549	\$ 1,090,229	\$ 1,329,858	\$ 207,897,156	\$ 176,422,056	15%
2024	71	263	\$ -	\$ 9,419,896	\$ 8,031,034	\$ 334,289	\$ 1,054,573	\$ -	\$ -	\$ 31,475,100	\$ -	\$ -	\$ -	\$ 77,078	\$ 1,121,415	\$ 1,443,049	\$ 210,339,471	\$ 176,222,829	16%
2025	63	267	\$ -	\$ 9,979,491	\$ 8,391,616	\$ 309,841	\$ 1,096,034	\$ -	\$ -	\$ 34,116,642	\$ -	\$ -	\$ -	\$ 71,438	\$ 1,165,505	\$ 1,562,774	\$ 212,297,534	\$ 175,381,175	17%
2026	55	271	\$ -	\$ 10,163,160	\$ 8,749,482	\$ 286,390	\$ 1,127,288	\$ -	\$ -	\$ 36,916,359	\$ -	\$ -	\$ -	\$ 66,034	\$ 1,198,739	\$ 1,689,380	\$ 213,770,700	\$ 173,900,188	19%
2027	49	273	\$ -	\$ 10,547,246	\$ 9,127,006	\$ 260,839	\$ 1,159,401	\$ -	\$ -	\$ 39,870,512	\$ -	\$ -	\$ -	\$ 60,123	\$ 1,232,888	\$ 1,822,946	\$ 214,706,559	\$ 171,720,090	20%
2028	41	277	\$ -	\$ 10,909,171	\$ 9,482,983	\$ 233,791	\$ 1,192,397	\$ -	\$ -	\$ 42,986,469	\$ -	\$ -	\$ -	\$ 53,900	\$ 1,267,976	\$ 1,963,806	\$ 215,091,373	\$ 168,819,222	22%
2029	36	278	\$ -	\$ 11,211,944	\$ 9,770,788	\$ 210,510	\$ 1,230,646	\$ -	\$ -	\$ 46,272,151	\$ -	\$ -	\$ -	\$ 48,529	\$ 1,308,649	\$ 2,112,447	\$ 211,121,184	\$ 149,806,736	23%
2030	30	279	\$ -	\$ 11,545,462	\$ 10,095,659	\$ 184,204	\$ 1,265,599	\$ -	\$ -	\$ 49,741,776	\$ -	\$ -	\$ -	\$ 42,449	\$ 1,345,816	\$ 2,269,272	\$ 214,316,046	\$ 160,916,733	25%
2031	25	280	\$ -	\$ 11,878,072	\$ 10,422,080	\$ 154,481	\$ 1,301,511	\$ -	\$ -	\$ 53,399,313	\$ -	\$ -	\$ -	\$ 35,593	\$ 1,384,006	\$ 2,434,559	\$ 213,029,979	\$ 155,776,508	27%
2032	19	281	\$ -	\$ 12,200,747	\$ 10,736,420	\$ 125,915	\$ 1,338,412	\$ -	\$ -	\$ 57,253,471	\$ -	\$ -	\$ -	\$ 29,010	\$ 1,423,245	\$ 2,608,722	\$ 211,121,184	\$ 149,806,736	29%
2033	15	281	\$ -	\$ 12,452,343	\$ 10,973,369	\$ 102,646	\$ 1,376,328	\$ -	\$ -	\$ 61,314,448	\$ -	\$ -	\$ -	\$ 23,648	\$ 1,463,564	\$ 2,792,244	\$ 208,681,569	\$ 143,087,665	31%
2034	12	280	\$ -	\$ 12,692,249	\$ 11,151,704	\$ 80,846	\$ 1,459,699	\$ -	\$ -	\$ 65,593,904	\$ -	\$ -	\$ -	\$ 18,615	\$ 1,552,219	\$ 2,986,681	\$ 205,714,120	\$ 135,562,701	34%
2035	8	279	\$ -	\$ 12,877,713	\$ 11,316,162	\$ 60,645	\$ 1,500,906	\$ -	\$ -	\$ 70,151,419	\$ -	\$ -	\$ -	\$ 13,968	\$ 1,596,039	\$ 3,192,640	\$ 202,265,608	\$ 127,311,542	37%
2036	6	276	\$ -	\$ 12,968,326	\$ 11,377,300	\$ 47,779	\$ 1,543,247	\$ -	\$ -	\$ 74,954,066	\$ -	\$ -	\$ -	\$ 11,008	\$ 1,641,063	\$ 3,409,696	\$ 198,468,874	\$ 118,453,041	40%
2037	5	273	\$ -	\$ 13,033,409	\$ 11,409,253	\$ 37,404	\$ 1,586,752	\$ -	\$ -	\$ 80,015,833	\$ -	\$ -	\$ -	\$ 8,611	\$ 1,687,326	\$ 3,638,451	\$ 194,356,707	\$ 109,006,486	44%
2038	3	269	\$ -	\$ 13,052,677	\$ 11,392,861	\$ 28,363	\$ 1,631,453	\$ -	\$ -	\$ 85,350,221	\$ -	\$ -	\$ -	\$ 6,533	\$ 1,734,861	\$ 3,879,510	\$ 189,972,826	\$ 99,001,701	48%
2039	2	264	\$ -	\$ 13,040,039	\$ 11,321,660	\$ 21,672	\$ 1,696,707	\$ -	\$ -	\$ 90,971,125	\$ -	\$ -	\$ -	\$ 4,989	\$ 1,804,251	\$ 4,133,961	\$ 185,355,105	\$ 88,440,779	52%
2040	2	259	\$ -	\$ 13,014,006	\$ 11,254,864	\$ 14,718	\$ 1,744,424	\$ -	\$ -	\$ 96,914,326	\$ -	\$ -	\$ -	\$ 3,386	\$ 1,854,992	\$ 4,402,498	\$ 180,506,390	\$ 77,331,188	57%
2041	1	254	\$ -	\$ 12,947,022	\$ 11,144,083	\$ 9,486	\$ 1,793,453	\$ -	\$ -	\$ 103,175,202	\$ -	\$ -	\$ -	\$ 2,183	\$ 1,907,129	\$ 4,685,371	\$ 175,470,819	\$ 65,700,934	63%
2042	1	249	\$ -	\$ 12,844,086	\$ 10,993,965	\$ 6,290	\$ 1,843,831	\$ -	\$ -	\$ 109,769,885	\$ -	\$ -	\$ -	\$ 1,448	\$ 1,960,699	\$ 4,983,307	\$ 170,291,390	\$ 53,576,051	69%
2043	0	243	\$ -	\$ 12,715,990	\$ 10,771,018	\$ 4,134	\$ 1,940,838	\$ -	\$ -	\$ 116,715,339	\$ -	\$ -	\$ -	\$ 951	\$ 2,063,855	\$ 5,298,137	\$ 164,994,599	\$ 40,916,317	75%
2044	0	237	\$ -	\$ 12,570,201	\$ 10,572,551	\$ 2,391	\$ 1,995,259	\$ -	\$ -	\$ 124,078,282	\$ -	\$ -	\$ -	\$ 550	\$ 2,121,725	\$ 5,630,748	\$ 159,596,319	\$ 27,765,014	83%
2045	0	231	\$ -	\$ 12,401,829	\$ 10,349,100	\$ 1,553	\$ 2,051,176	\$ -	\$ -	\$ 131,831,305	\$ -	\$ -	\$ -	\$ 358	\$ 2,181,187	\$ 5,980,953	\$ 154,121,567	\$ 14,127,764	91%
2046	0	225	\$ -	\$ 12,217,209	\$ 10,107,502	\$ 1,061	\$ 2,108,632	\$ -	\$ 14	\$ 139,993,803	\$ -	\$ -	\$ -	\$ 244	\$ 2,242,284	\$ 6,349,622	\$ 148,585,939	\$ -	100%
2047	0	218	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 148,585,939	\$ 12,020,951	\$ 13,330	\$ 627	\$ -	\$ 6,419,183	\$ 142,998,128	\$ -	\$ -	100%
2048	0	212	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 142,998,128	\$ 11,808,512	\$ 12,454	\$ 421	\$ -	\$ 6,172,434	\$ 137,374,925	\$ -	\$ -	100%
2049	0	206	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 137,374,925	\$ 11,584,811	\$ 11,314	\$ 156	\$ -	\$ 5,924,337	\$ 131,725,921	\$ -	\$ -	100%
2050	0	199	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 131,725,921	\$ 11,348,244	\$ 10,591	\$ -	\$ -	\$ 5,675,376	\$ 126,063,644	\$ -	\$ -	100%
2051	0	192	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 126,063,644	\$ 11,098,709	\$ 10,499	\$ -	\$ -	\$ 5,426,125	\$ 120,401,559	\$ -	\$ -	100%
2052	0	186	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 120,401,559	\$ 10,838,049	\$ 10,451	\$ -	\$ -	\$ 5,177,130	\$ 114,751,091	\$ -	\$ -	100%
2053	0	179	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 114,751,091	\$ 10,566,248	\$ 10,334	\$ -	\$ -	\$ 4,928,905	\$ 109,124,082	\$ -	\$ -	100%
2054	0	172	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 109,124,082	\$ 10,283,657	\$ 10,203	\$ -	\$ -	\$ 4,681,975	\$ 103,532,603	\$ -	\$ -	100%
2055	0	165	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 103,532,603	\$ 9,990,398	\$ 10,057	\$ -	\$ -	\$ 4,436,880	\$ 97,989,142	\$ -	\$ -	100%
2056	0	158	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 97,989,142	\$ 9,686,646	\$ 9,895	\$ -	\$ -	\$ 4,194,180	\$ 92,506,571	\$ -	\$ -	100%
2057	0	151	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 92,506,571	\$ 9,372,683	\$ 9,717	\$ -	\$ -	\$ 3,954,447	\$ 87,098,052	\$ -	\$ -	100%
2058	0	144	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 87,098,052	\$ 9,048,878	\$ 9,521	\$ -	\$ -	\$ 3,718,265	\$ 81,776,960	\$ -	\$ -	100%
2059	0	137	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 81,776,960	\$ 8,715,591	\$ 9,307	\$ -	\$ -	\$ 3,486,227	\$ 76,556,903	\$ -	\$ -	100%

City of Charleston, West Virginia Firemen's Pension and Relief Fund  
 Actuarial Information to Include in the Financial Statements  
 for the June 30, 2019 Measurement Date



Projection of Pension Plan's Fiduciary Net Position (Dollar amounts in thousands)

Fiscal Year	Projected BP	"Funded" Portion of BP	"Unfunded" Portion of BP	PV of "Funded" Portion of BP	PV of "Unfunded" Portion of BP	PV of BP Using a Single DR
2019	\$ 7,600,235	\$ -	\$ 7,600,235	\$ -	\$ 7,484,013	\$ 7,463,120
2020	\$ 7,957,785	\$ -	\$ 7,957,785	\$ -	\$ 7,598,269	\$ 7,534,813
2021	\$ 8,288,056	\$ -	\$ 8,288,056	\$ -	\$ 7,673,441	\$ 7,566,931
2022	\$ 8,615,693	\$ -	\$ 8,615,693	\$ -	\$ 7,734,685	\$ 7,584,801
2023	\$ 9,022,109	\$ -	\$ 9,022,109	\$ -	\$ 7,853,721	\$ 7,658,591
2024	\$ 9,411,116	\$ -	\$ 9,411,116	\$ -	\$ 7,943,713	\$ 7,703,157
2025	\$ 9,788,578	\$ -	\$ 9,788,578	\$ -	\$ 8,011,558	\$ 7,725,633
2026	\$ 10,154,113	\$ -	\$ 10,154,113	\$ -	\$ 8,058,503	\$ 7,727,576
2027	\$ 10,538,064	\$ -	\$ 10,538,064	\$ -	\$ 8,109,390	\$ 7,733,017
2028	\$ 10,899,854	\$ -	\$ 10,899,854	\$ -	\$ 8,133,229	\$ 7,712,509
2029	\$ 11,202,491	\$ -	\$ 11,202,491	\$ -	\$ 8,105,353	\$ 7,643,222
2030	\$ 11,535,904	\$ -	\$ 11,535,904	\$ -	\$ 8,093,268	\$ 7,589,276
2031	\$ 11,868,378	\$ -	\$ 11,868,378	\$ -	\$ 8,073,812	\$ 7,528,820
2032	\$ 12,190,950	\$ -	\$ 12,190,950	\$ -	\$ 8,041,551	\$ 7,456,928
2033	\$ 12,442,411	\$ -	\$ 12,442,411	\$ -	\$ 7,958,327	\$ 7,338,609
2034	\$ 12,682,182	\$ -	\$ 12,682,182	\$ -	\$ 7,865,498	\$ 7,212,570
2035	\$ 12,867,546	\$ -	\$ 12,867,546	\$ -	\$ 7,738,253	\$ 7,056,326
2036	\$ 12,958,061	\$ -	\$ 12,958,061	\$ -	\$ 7,556,179	\$ 6,851,880
2037	\$ 13,023,011	\$ -	\$ 13,023,011	\$ -	\$ 7,363,573	\$ 6,639,999
2038	\$ 13,042,224	\$ -	\$ 13,042,224	\$ -	\$ 7,150,622	\$ 6,412,023
2039	\$ 13,029,535	\$ -	\$ 13,029,535	\$ -	\$ 6,926,854	\$ 6,176,738
2040	\$ 13,003,416	\$ -	\$ 13,003,416	\$ -	\$ 6,703,160	\$ 5,943,942
2041	\$ 12,936,391	\$ -	\$ 12,936,391	\$ -	\$ 6,466,216	\$ 5,701,867
2042	\$ 12,833,377	\$ -	\$ 12,833,377	\$ -	\$ 6,220,038	\$ 5,454,209
2043	\$ 12,705,295	\$ -	\$ 12,705,295	\$ -	\$ 5,971,065	\$ 5,206,698
2044	\$ 12,559,483	\$ -	\$ 12,559,483	\$ -	\$ 5,723,396	\$ 4,962,908
2045	\$ 12,391,095	\$ -	\$ 12,391,095	\$ -	\$ 5,475,285	\$ 4,721,294
2046	\$ 12,206,466	\$ -	\$ 12,206,466	\$ -	\$ 5,230,003	\$ 4,484,645
2047	\$ 12,010,256	\$ 12,010,256	\$ -	\$ 3,425,611	\$ -	\$ 4,254,782
2048	\$ 11,797,825	\$ 11,797,825	\$ -	\$ 3,220,115	\$ -	\$ 4,030,081
2049	\$ 11,574,141	\$ 11,574,141	\$ -	\$ 3,023,026	\$ -	\$ 3,812,303
2050	\$ 11,337,653	\$ 11,337,653	\$ -	\$ 2,833,740	\$ -	\$ 3,600,880
2051	\$ 11,088,210	\$ 11,088,210	\$ -	\$ 2,652,052	\$ -	\$ 3,395,735
2052	\$ 10,827,598	\$ 10,827,598	\$ -	\$ 2,478,200	\$ -	\$ 3,197,359
2053	\$ 10,555,914	\$ 10,555,914	\$ -	\$ 2,311,979	\$ -	\$ 3,005,674
2054	\$ 10,273,454	\$ 10,273,454	\$ -	\$ 2,153,219	\$ -	\$ 2,820,651
2055	\$ 9,980,341	\$ 9,980,341	\$ -	\$ 2,001,708	\$ -	\$ 2,642,197
2056	\$ 9,676,751	\$ 9,676,751	\$ -	\$ 1,857,243	\$ -	\$ 2,470,223
2057	\$ 9,362,966	\$ 9,362,966	\$ -	\$ 1,719,635	\$ -	\$ 2,304,660
2058	\$ 9,039,357	\$ 9,039,357	\$ -	\$ 1,588,708	\$ -	\$ 2,145,447
2059	\$ 8,706,284	\$ 8,706,284	\$ -	\$ 1,464,276	\$ -	\$ 1,992,507