



**Municipal Pensions
Oversight Board**

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

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

Bolton

Submitted by:

James Ritchie, ASA, EA, FCA, MAA

Senior Consulting Actuary

443.573.3924

jritchie@boltonusa.com

Jordan McClane, FSA, EA

Actuary

667.218.6935

jmcclane@boltonusa.com

October 21, 2019

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

Corporal Gary Daniels
Pension Board Secretary
City of Charleston, West Virginia
Policemen's Pension and Relief Fund

Re: City of Charleston, West Virginia Policemen'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 Policemen'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 3.73%. 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 Policemen'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	\$ 209,117,290
Plan fiduciary net position	(24,603,586)
Employer's net pension liability	<u>\$ 184,513,704</u>
Plan fiduciary net position as a percentage of the total pension liability	11.77%

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)	4.4170%
Single discount rate (EOY)	3.7300%
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 2.73%	Current Discount Rate 3.73%	1% Increase 4.73%
Employer's net pension liability	\$ 221,430,574	\$ 184,513,704	\$ 155,600,388

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



Changes in the Net Pension Liability

	Total Pension Liability (a)	Increase (Decrease) Plan Fiduciary Net Position (b)	Net Pension Liability (a) - (b)
Balances at 6/30/18	\$ 179,287,576	\$ 22,407,738	\$ 156,879,838
Changes for the year:			
Service cost	4,337,479		4,337,479
Interest	7,761,028		7,761,028
Changes of benefit terms	-		-
Differences between expected and actual experience	3,780,602		3,780,602
Changes of assumptions	21,109,488		21,109,488
Contributions - employer (including Premium Tax Allocation)		7,514,119	(7,514,119)
Contributions - member		510,010	(510,010)
Net investment income		1,342,285	(1,342,285)
Benefit payments, including refunds of member contributions	(7,158,883)	(7,158,883)	-
Administrative expense		(7,349)	7,349
Other		(4,334)	4,334
Net Changes	<u>29,829,714</u>	<u>2,195,848</u>	<u>27,633,866</u>
Balances at 6/30/19	<u>\$ 209,117,290</u>	<u>\$ 24,603,586</u>	<u>\$ 184,513,704</u>
Return on Investments		5.9%	

City of Charleston, West Virginia Policemen'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	\$ 4,337,479
B	Interest on the total pension liability	7,761,028
A	Changes of benefit terms	-
C	Differences between expected and actual experience	(1,491,397)
C	Changes of assumptions	4,682,296
A	Employee contributions	(510,010)
D	Projected earnings on pension plan investments	(1,027,553)
C	Differences between expected and actual earnings on plan investments	(384,654)
A	Pension plan administrative expense	7,349
A	Other changes in fiduciary net position	4,334
Total Pension Expense		\$ 13,378,872

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	\$ 179,287,576	100%	4.42%	\$ 7,919,132
Service Cost (End of Year)	4,337,479	0%	4.42%	-
Benefit payments, including refunds of employee contributions	(7,158,883)	50%	4.42%	(158,104)
Total interest on the total pension liability				\$ 7,761,028

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	\$ 22,407,738	100%	4.50%	\$ 1,008,348
Employer contributions	7,514,119	50%	4.50%	169,068
Employee contributions	510,010	50%	4.50%	11,475
Benefit payments, including refunds of employee contributions	(7,158,883)	50%	4.50%	(161,075)
Administrative expense and other	(11,683)	50%	4.50%	(263)
Total Projected Earnings				\$ 1,027,553

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



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	\$ 2,520,401	\$ 1,408,329
Changes of assumptions	14,072,992	1,233,007
Net difference between projected and actual earnings on pension plan investments	-	1,047,858
Total	\$ 16,593,393	\$ 3,689,194

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	\$ 5,271,219
2021	7,889,163
2022	(193,235)
2023	(62,948)
2024	-
Thereafter	-

City of Charleston, West Virginia Policemen'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	\$ 4,337,479	\$ 3,766,725	\$ 4,344,855	\$ 3,313,221	\$ 3,292,778	\$ 3,209,021	\$ -	\$ -	\$ -	\$ -
Interest	7,761,028	7,612,050	7,255,244	7,209,972	7,332,999	7,461,048	-	-	-	-
Changes of benefit terms	-	-	-	-	-	-	-	-	-	-
Differences between expected and actual experience	3,780,602	(4,059,168)	(3,481,866)	(2,127,001)	(1,897,115)	-	-	-	-	-
Changes of assumptions	21,109,488	(1,852,553)	(14,823,343)	26,684,740	8,006,116	6,439,111	-	-	-	-
Benefit payments, including refunds of member contributions	(7,158,883)	(7,068,435)	(7,008,249)	(7,059,677)	(7,035,461)	(6,688,132)	-	-	-	-
Net change in total pension liability	29,829,714	(1,601,381)	(13,713,359)	28,021,255	9,699,317	10,421,048	-	-	-	-
Total pension liability - beginning	179,287,576	180,888,957	194,602,316	166,581,061	156,881,744	146,460,696	-	-	-	-
Total pension liability - ending (a)	\$ 209,117,290	\$ 179,287,576	\$ 180,888,957	\$ 194,602,316	\$ 166,581,061	\$ 156,881,744	\$ -	\$ -	\$ -	\$ -
Plan fiduciary net position	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
Contributions - employer (including Premium Tax Allocation)	\$ 7,514,119	\$ 7,380,065	\$ 7,498,088	\$ 6,858,876	\$ 6,530,016	\$ 6,448,555	\$ -	\$ -	\$ -	\$ -
Contributions - member	510,010	525,513	574,939	556,799	592,173	648,924	-	-	-	-
Net investment income	1,342,285	1,540,163	1,864,923	695,811	766,556	1,415,864	-	-	-	-
Benefit payments, including refunds of member contributions	(7,158,883)	(7,068,435)	(7,008,249)	(7,059,677)	(7,035,461)	(6,688,132)	-	-	-	-
Administrative expense	(7,349)	(11,765)	(10,119)	(13,087)	(12,349)	(22,264)	-	-	-	-
Other	(4,334)	196	-	-	-	-	-	-	-	-
Net change in plan fiduciary net position	\$ 2,195,848	\$ 2,365,737	\$ 2,919,582	\$ 1,038,722	\$ 840,935	\$ 1,802,947	\$ -	\$ -	\$ -	\$ -
Plan fiduciary net position - beginning	22,407,738	20,042,001	17,122,419	16,083,697	15,242,762	13,439,815	-	-	-	-
Plan fiduciary net position - ending (b)	\$ 24,603,586	\$ 22,407,738	\$ 20,042,001	\$ 17,122,419	\$ 16,083,697	\$ 15,242,762	\$ -	\$ -	\$ -	\$ -
Employer's net pension liability - ending (a)-(b)	<u>\$ 184,513,704</u>	<u>\$ 156,879,838</u>	<u>\$ 160,846,956</u>	<u>\$ 177,479,897</u>	<u>\$ 150,497,364</u>	<u>\$ 141,638,982</u>	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>
Plan fiduciary net position as a percentage of the total pension liability	11.77%	12.50%	11.08%	8.80%	9.66%	9.72%	0.00%	0.00%	0.00%	0.00%
Covered payroll	\$ 6,815,851	\$ 6,805,977	\$ 6,876,181	\$ 7,194,432	\$ 7,849,996	\$ 8,257,284	\$ -	\$ -	\$ -	\$ -
Employer's net pension liability as a percentage of covered payroll	2707.13%	2305.03%	2339.19%	2466.91%	1917.16%	1715.32%	0.00%	0.00%	0.00%	0.00%
Expected average remaining service years of all participants	3.00	2.89	3.14	3.38	3.61	3.93	-	-	-	-

Notes to Schedule:

Benefit changes: There were no changes for FY2019.

Changes of assumptions: The discount rate changed from 4.4170% to 3.7300%.

City of Charleston, West Virginia Policemen's Pension and Relief Fund
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 for the June 30, 2019 Measurement Date



Schedule of Employer Contributions
 Last 10 Fiscal Years

	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
Actuarially determined contribution	\$ 11,932,575	\$ 10,273,775	\$ 10,113,252	\$ 9,998,469	\$ 8,371,076	\$ 8,290,897	\$ 8,265,968	\$ -	\$ -	\$ -
Contributions in relation to the actuarially determined contribution										
Employer provided	5,764,885	5,642,434	5,799,404	5,226,466	4,977,472	4,919,728	4,597,313	-	-	-
State provided	1,749,234	1,737,631	1,698,684	1,632,410	1,552,544	1,528,827	1,945,867	-	-	-
Contribution deficiency (excess)	<u>\$ 4,418,456</u>	<u>\$ 2,893,710</u>	<u>\$ 2,615,164</u>	<u>\$ 3,139,593</u>	<u>\$ 1,841,060</u>	<u>\$ 1,842,342</u>	<u>\$ 1,722,788</u>	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>
Covered payroll	\$ 6,815,851	\$ 6,805,977	\$ 6,876,181	\$ 7,194,432	\$ 7,849,996	\$ 8,257,284	\$ 9,149,170	\$ -	\$ -	\$ -
Contributions as a percentage of covered employee payroll	110.24%	108.00%	109.00%	95.00%	83.00%	78.00%	72.00%	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 Policemen'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	\$ (2,558)	5	\$ (512)	(512)	(512)	(512)	(510)				
2016	116,947	5		\$ 23,389	23,389	23,389	23,389	23,391			
2017	(1,071,480)	5			\$ (214,296)	(214,296)	(214,296)	(214,296)	(214,296)		
2018	(651,453)	5				\$ (130,291)	(130,291)	(130,291)	(130,291)	(130,289)	
2019	(314,732)	5					\$ (62,946)	(62,946)	(62,946)	(62,946)	(62,948)
Net increase (decrease) in pension expense							\$ (384,654)	\$ (384,142)	\$ (407,533)	\$ (193,235)	\$ (62,948)

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	\$ -	\$ 2,558	\$ 2,558	\$ -	\$ -
2016	116,947	-	93,556	23,391	-
2017	-	1,071,480	642,888	-	428,592
2018	-	651,453	260,582	-	390,871
2019	-	314,732	62,946	-	251,786
				\$ 23,391	\$ 1,071,249

City of Charleston, West Virginia Policemen'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	-	3.933882		\$ -												
2015	(1,897,115)	3.613363			\$ (525,028)	(525,028)	(525,028)	(322,031)								
2016	(2,127,001)	3.380973				\$ (629,109)	(629,109)	(629,109)	(239,674)							
2017	(3,481,866)	3.14005					\$ (1,108,857)	(1,108,857)	(1,108,857)	(155,295)						
2018	(4,059,168)	2.893068						\$ (1,403,067)	(1,403,067)	(1,253,034)						
2019	3,780,602	3							\$ 1,260,201	1,260,201	1,260,200					
Net increase (decrease) in pension expense									\$ (1,491,397)	\$ (148,128)	\$ 1,260,200	\$ -	\$ -	\$ -	\$ -	

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	-	1,897,115	1,897,115	-	-
2016	-	2,127,001	2,127,001	-	-
2017	-	3,481,866	3,326,571	-	155,295
2018	-	4,059,168	2,806,134	-	1,253,034
2019	3,780,602	-	1,260,201	2,520,401	-
				\$ 2,520,401	\$ 1,408,329

City of Charleston, West Virginia Policemen'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	6,439,111	3.933882		\$ 1,636,834	1,636,834	1,636,834	1,528,609								
2015	8,006,116	3.613363			\$ 2,215,697	2,215,697	2,215,697	1,359,025							
2016	26,684,740	3.380973				\$ 7,892,621	7,892,621	7,892,621	3,006,877						
2017	(14,823,343)	3.14005					\$ (4,720,735)	(4,720,735)	(4,720,735)	(661,138)					
2018	(1,852,553)	2.893068						\$ (640,342)	(640,342)	(571,869)					
2019	21,109,488	3							\$ 7,036,496	7,036,496	7,036,496				
Net increase (decrease) in pension expense									\$ 4,682,296	\$ 5,803,489	\$ 7,036,496	\$ -	\$ -	\$ -	\$ -

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	6,439,111	-	6,439,111	-	-
2015	8,006,116	-	8,006,116	-	-
2016	26,684,740	-	26,684,740	-	-
2017	-	14,823,343	14,162,205	-	661,138
2018	-	1,852,553	1,280,684	-	571,869
2019	21,109,488	-	7,036,496	14,072,992	-
				\$ 14,072,992	\$ 1,233,007

City of Charleston, West Virginia Policemen'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	49.09% 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	50.91% of Premium Tax Allocation	Investment Income				
2019	102	224	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 186,220,891	\$ 161,617,305	13%
2020	99	222	\$ 75,852	\$ 7,351,062	\$ 5,961,492	\$ 449,757	\$ 939,813	\$ 3,413	\$ (79,265)	\$ 24,527,734	\$ -	\$ -	\$ 103,757	\$ 974,723	\$ 1,127,747	\$ 190,694,117	\$ 163,880,891	14%	
2021	94	223	\$ -	\$ 7,599,647	\$ 6,193,845	\$ 443,584	\$ 962,218	\$ -	\$ -	\$ 26,813,226	\$ -	\$ -	\$ 102,300	\$ 997,961	\$ 1,231,079	\$ 195,060,366	\$ 165,915,800	15%	
2022	86	228	\$ -	\$ 8,016,885	\$ 6,600,597	\$ 427,355	\$ 988,933	\$ -	\$ -	\$ 29,144,566	\$ -	\$ -	\$ 98,559	\$ 1,025,667	\$ 1,336,522	\$ 199,061,559	\$ 167,456,245	16%	
2023	79	232	\$ -	\$ 8,475,498	\$ 7,047,536	\$ 411,580	\$ 1,016,382	\$ -	\$ -	\$ 31,605,314	\$ -	\$ -	\$ 94,918	\$ 1,054,136	\$ 1,447,808	\$ 202,643,324	\$ 168,441,148	17%	
2024	73	235	\$ -	\$ 8,859,109	\$ 7,424,654	\$ 389,869	\$ 1,044,586	\$ -	\$ -	\$ 34,202,176	\$ -	\$ -	\$ 89,906	\$ 1,083,387	\$ 1,565,207	\$ 205,814,199	\$ 168,873,523	18%	
2025	65	239	\$ -	\$ 9,232,734	\$ 7,778,540	\$ 369,363	\$ 1,084,831	\$ -	\$ -	\$ 36,940,676	\$ -	\$ -	\$ 85,176	\$ 1,125,127	\$ 1,689,263	\$ 208,576,168	\$ 168,735,926	19%	
2026	59	242	\$ -	\$ 9,577,314	\$ 8,114,475	\$ 347,952	\$ 1,114,887	\$ -	\$ -	\$ 39,840,242	\$ -	\$ -	\$ 80,227	\$ 1,156,301	\$ 1,820,327	\$ 210,931,516	\$ 168,034,419	20%	
2027	52	246	\$ -	\$ 9,921,516	\$ 8,450,711	\$ 325,035	\$ 1,145,770	\$ -	\$ -	\$ 42,897,097	\$ -	\$ -	\$ 74,948	\$ 1,188,331	\$ 1,958,480	\$ 212,847,809	\$ 166,728,953	22%	
2028	46	248	\$ -	\$ 10,265,145	\$ 8,786,594	\$ 301,048	\$ 1,177,503	\$ -	\$ -	\$ 46,118,856	\$ -	\$ -	\$ 69,405	\$ 1,221,242	\$ 2,104,069	\$ 214,295,800	\$ 164,782,228	23%	
2029	40	251	\$ -	\$ 10,659,716	\$ 9,173,521	\$ 271,785	\$ 1,214,410	\$ -	\$ -	\$ 49,513,572	\$ -	\$ -	\$ 62,647	\$ 1,259,519	\$ 2,257,532	\$ 215,159,539	\$ 162,066,269	25%	
2030	34	254	\$ -	\$ 11,045,595	\$ 9,557,723	\$ 239,849	\$ 1,248,023	\$ -	\$ -	\$ 53,093,270	\$ -	\$ -	\$ 55,282	\$ 1,294,381	\$ 2,419,230	\$ 215,401,485	\$ 158,539,322	26%	
2031	28	256	\$ -	\$ 11,474,850	\$ 9,987,688	\$ 204,602	\$ 1,282,560	\$ -	\$ -	\$ 56,862,163	\$ -	\$ -	\$ 47,142	\$ 1,330,202	\$ 2,589,447	\$ 214,924,537	\$ 154,095,583	28%	
2032	22	258	\$ -	\$ 11,936,751	\$ 10,453,060	\$ 165,643	\$ 1,318,048	\$ -	\$ -	\$ 60,828,954	\$ -	\$ -	\$ 38,154	\$ 1,367,007	\$ 2,768,571	\$ 213,641,397	\$ 148,638,711	30%	
2033	16	259	\$ -	\$ 12,315,361	\$ 10,830,626	\$ 130,224	\$ 1,354,511	\$ -	\$ -	\$ 65,002,686	\$ -	\$ -	\$ 30,004	\$ 1,404,825	\$ 2,957,049	\$ 211,633,077	\$ 142,238,513	33%	
2034	12	259	\$ -	\$ 12,560,390	\$ 11,017,319	\$ 107,261	\$ 1,435,810	\$ -	\$ -	\$ 69,394,564	\$ -	\$ -	\$ 24,712	\$ 1,489,143	\$ 3,156,442	\$ 209,105,249	\$ 135,040,388	35%	
2035	10	257	\$ -	\$ 12,753,531	\$ 11,190,736	\$ 87,356	\$ 1,475,439	\$ -	\$ -	\$ 74,064,861	\$ -	\$ -	\$ 20,126	\$ 1,530,244	\$ 3,367,418	\$ 206,112,870	\$ 127,130,221	38%	
2036	7	254	\$ -	\$ 12,904,460	\$ 11,318,060	\$ 70,242	\$ 1,516,158	\$ -	\$ -	\$ 78,982,649	\$ -	\$ -	\$ 16,179	\$ 1,572,476	\$ 3,589,571	\$ 202,700,825	\$ 118,539,950	42%	
2037	5	251	\$ -	\$ 13,058,197	\$ 11,447,479	\$ 52,722	\$ 1,557,996	\$ -	\$ -	\$ 84,160,875	\$ -	\$ -	\$ 12,134	\$ 1,615,869	\$ 3,823,466	\$ 198,850,105	\$ 109,237,761	45%	
2038	4	248	\$ -	\$ 13,137,422	\$ 11,498,542	\$ 37,894	\$ 1,600,986	\$ -	\$ -	\$ 89,612,344	\$ -	\$ -	\$ 8,727	\$ 1,660,455	\$ 4,069,699	\$ 194,639,540	\$ 99,288,315	49%	
2039	2	244	\$ -	\$ 13,176,212	\$ 11,485,266	\$ 26,794	\$ 1,664,152	\$ -	\$ -	\$ 95,351,225	\$ -	\$ -	\$ 6,165	\$ 1,725,967	\$ 4,329,349	\$ 190,122,452	\$ 88,709,746	53%	
2040	2	239	\$ -	\$ 13,156,851	\$ 11,428,625	\$ 18,185	\$ 1,710,041	\$ -	\$ -	\$ 101,412,706	\$ -	\$ -	\$ 4,186	\$ 1,773,561	\$ 4,603,131	\$ 185,364,595	\$ 77,571,011	58%	
2041	1	234	\$ -	\$ 13,094,854	\$ 11,325,554	\$ 12,108	\$ 1,757,192	\$ -	\$ -	\$ 107,793,584	\$ -	\$ -	\$ 2,787	\$ 1,822,463	\$ 4,891,328	\$ 180,414,414	\$ 65,904,252	63%	
2042	1	229	\$ -	\$ 12,999,153	\$ 11,185,768	\$ 7,746	\$ 1,805,639	\$ -	\$ -	\$ 114,510,162	\$ -	\$ -	\$ 1,783	\$ 1,872,711	\$ 5,194,669	\$ 175,309,661	\$ 53,730,336	69%	
2043	0	223	\$ -	\$ 12,869,549	\$ 10,964,593	\$ 5,177	\$ 1,899,779	\$ -	\$ -	\$ 121,579,325	\$ -	\$ -	\$ 1,191	\$ 1,970,347	\$ 5,514,941	\$ 170,090,529	\$ 41,024,725	76%	
2044	0	217	\$ -	\$ 12,718,145	\$ 10,762,711	\$ 3,319	\$ 1,952,115	\$ -	\$ -	\$ 129,065,804	\$ -	\$ -	\$ 764	\$ 2,024,628	\$ 5,853,031	\$ 164,779,140	\$ 27,834,913	83%	
2045	0	211	\$ -	\$ 12,546,873	\$ 10,538,936	\$ 2,046	\$ 2,005,891	\$ -	\$ -	\$ 136,944,227	\$ -	\$ -	\$ 471	\$ 2,080,401	\$ 6,208,795	\$ 159,395,404	\$ 14,161,510	91%	
2046	0	205	\$ -	\$ 12,359,342	\$ 10,297,083	\$ 1,106	\$ 2,061,146	\$ -	\$ 7	\$ 145,233,894	\$ -	\$ -	\$ 254	\$ 2,137,708	\$ 6,583,100	\$ 153,954,949	\$ -	100%	
2047	0	199	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 153,954,949	\$ 12,157,447	\$ 15,610	\$ 444	\$ -	\$ 6,657,797	\$ 148,471,353	\$ -	100%	
2048	0	193	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 148,471,353	\$ 11,937,066	\$ 15,047	\$ 297	\$ -	\$ 6,415,924	\$ 142,965,555	\$ -	100%	
2049	0	187	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 142,965,555	\$ 11,707,295	\$ 13,939	\$ -	\$ -	\$ 6,173,245	\$ 137,445,444	\$ -	100%	
2050	0	180	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 137,445,444	\$ 11,464,876	\$ 13,786	\$ -	\$ -	\$ 5,930,231	\$ 131,924,585	\$ -	100%	
2051	0	174	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 131,924,585	\$ 11,213,530	\$ 13,693	\$ -	\$ -	\$ 5,687,383	\$ 126,412,131	\$ -	100%	
2052	0	168	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 126,412,131	\$ 10,954,105	\$ 13,584	\$ -	\$ -	\$ 5,445,093	\$ 120,916,703	\$ -	100%	
2053	0	162	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 120,916,703	\$ 10,687,208	\$ 13,459	\$ -	\$ -	\$ 5,203,735	\$ 115,446,689	\$ -	100%	
2054	0	156	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 115,446,689	\$ 10,413,755	\$ 13,317	\$ -	\$ -	\$ 4,963,666	\$ 110,009,917	\$ -	100%	
2055	0	150	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 110,009,917	\$ 10,134,255	\$ 13,157	\$ -	\$ -	\$ 4,725,227	\$ 104,614,046	\$ -	100%	
2056	0	144	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 104,614,046	\$ 9,849,284	\$ 12,978	\$ -	\$ -	\$ 4,488,751	\$ 99,266,491	\$ -	100%	
2057	0	138	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 99,266,491	\$ 9,559,189	\$ 12,779	\$ -	\$ -	\$ 4,254,561	\$ 93,974,642	\$ -	100%	
2058	0	132	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 93,974,642	\$ 9,264,068	\$ 12,560	\$ -	\$ -	\$ 4,022,990	\$ 88,746,124	\$ -	100%	
2059	0	126	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 88,746,124	\$ 8,963,849	\$ 12,319	\$ -	\$ -	\$ 3,794,382	\$ 83,588,976	\$ -	100%	

City of Charleston, West Virginia Policemen'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	\$ 7,158,883	\$ -	\$ 7,158,883	\$ -	\$ 7,049,410	\$ 7,029,110
2020	\$ 7,340,167	\$ -	\$ 7,340,167	\$ -	\$ 7,008,554	\$ 6,948,183
2021	\$ 7,588,592	\$ -	\$ 7,588,592	\$ -	\$ 7,025,847	\$ 6,925,270
2022	\$ 8,005,633	\$ -	\$ 8,005,633	\$ -	\$ 7,187,008	\$ 7,043,384
2023	\$ 8,464,047	\$ -	\$ 8,464,047	\$ -	\$ 7,367,930	\$ 7,179,165
2024	\$ 8,847,457	\$ -	\$ 8,847,457	\$ -	\$ 7,467,941	\$ 7,234,767
2025	\$ 9,220,917	\$ -	\$ 9,220,917	\$ -	\$ 7,546,950	\$ 7,269,263
2026	\$ 9,565,292	\$ -	\$ 9,565,292	\$ -	\$ 7,591,203	\$ 7,269,837
2027	\$ 9,909,287	\$ -	\$ 9,909,287	\$ -	\$ 7,625,525	\$ 7,260,710
2028	\$ 10,252,748	\$ -	\$ 10,252,748	\$ -	\$ 7,650,373	\$ 7,242,477
2029	\$ 10,647,108	\$ -	\$ 10,647,108	\$ -	\$ 7,703,516	\$ 7,250,847
2030	\$ 11,032,774	\$ -	\$ 11,032,774	\$ -	\$ 7,740,286	\$ 7,243,558
2031	\$ 11,461,859	\$ -	\$ 11,461,859	\$ -	\$ 7,797,266	\$ 7,254,918
2032	\$ 11,923,591	\$ -	\$ 11,923,591	\$ -	\$ 7,865,192	\$ 7,276,034
2033	\$ 12,302,081	\$ -	\$ 12,302,081	\$ -	\$ 7,868,570	\$ 7,237,297
2034	\$ 12,546,943	\$ -	\$ 12,546,943	\$ -	\$ 7,781,622	\$ 7,116,164
2035	\$ 12,739,918	\$ -	\$ 12,739,918	\$ -	\$ 7,661,501	\$ 6,966,022
2036	\$ 12,890,787	\$ -	\$ 12,890,787	\$ -	\$ 7,516,949	\$ 6,795,288
2037	\$ 13,044,417	\$ -	\$ 13,044,417	\$ -	\$ 7,375,676	\$ 6,629,233
2038	\$ 13,123,484	\$ -	\$ 13,123,484	\$ -	\$ 7,195,174	\$ 6,429,807
2039	\$ 13,162,232	\$ -	\$ 13,162,232	\$ -	\$ 6,997,400	\$ 6,217,110
2040	\$ 13,142,779	\$ -	\$ 13,142,779	\$ -	\$ 6,775,000	\$ 5,984,893
2041	\$ 13,080,755	\$ -	\$ 13,080,755	\$ -	\$ 6,538,376	\$ 5,742,648
2042	\$ 12,984,975	\$ -	\$ 12,984,975	\$ -	\$ 6,293,514	\$ 5,495,797
2043	\$ 12,855,424	\$ -	\$ 12,855,424	\$ -	\$ 6,041,621	\$ 5,245,492
2044	\$ 12,704,022	\$ -	\$ 12,704,022	\$ -	\$ 5,789,263	\$ 4,997,482
2045	\$ 12,532,763	\$ -	\$ 12,532,763	\$ -	\$ 5,537,884	\$ 4,752,991
2046	\$ 12,345,256	\$ -	\$ 12,345,256	\$ -	\$ 5,289,469	\$ 4,513,677
2047	\$ 12,143,397	\$ 12,143,397	\$ -	\$ 3,463,586	\$ -	\$ 4,280,365
2048	\$ 11,923,065	\$ 11,923,065	\$ -	\$ 3,254,298	\$ -	\$ 4,051,713
2049	\$ 11,693,356	\$ 11,693,356	\$ -	\$ 3,054,164	\$ -	\$ 3,830,894
2050	\$ 11,451,090	\$ 11,451,090	\$ -	\$ 2,862,093	\$ -	\$ 3,616,746
2051	\$ 11,199,837	\$ 11,199,837	\$ -	\$ 2,678,750	\$ -	\$ 3,410,304
2052	\$ 10,940,521	\$ 10,940,521	\$ -	\$ 2,504,046	\$ -	\$ 3,211,660
2053	\$ 10,673,749	\$ 10,673,749	\$ -	\$ 2,337,787	\$ -	\$ 3,020,777
2054	\$ 10,400,438	\$ 10,400,438	\$ -	\$ 2,179,833	\$ -	\$ 2,837,681
2055	\$ 10,121,098	\$ 10,121,098	\$ -	\$ 2,029,939	\$ -	\$ 2,662,256
2056	\$ 9,836,306	\$ 9,836,306	\$ -	\$ 1,887,866	\$ -	\$ 2,494,390
2057	\$ 9,546,410	\$ 9,546,410	\$ -	\$ 1,753,327	\$ -	\$ 2,333,902
2058	\$ 9,251,508	\$ 9,251,508	\$ -	\$ 1,625,994	\$ -	\$ 2,180,546
2059	\$ 8,951,530	\$ 8,951,530	\$ -	\$ 1,505,523	\$ -	\$ 2,034,043