

**CITY OF TROY INCENTIVE PLAN FOR
VOLUNTEER FIREFIGHTERS**

34TH ANNUAL ACTUARIAL VALUATION - REVISED

DECEMBER 31, 2013

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September 26, 2014

Mr. Thomas Darling
Director of Financial Services
City of Troy
500 West Big Beaver Road
Troy, Michigan 48084

Dear Tom:

Submitted in this revised report are the results of the 34th Annual Actuarial Valuation of the assets, benefit values, reserves and contribution requirements associated with payments provided by the City of Troy Incentive Plan for Volunteer Firefighters. As requested, the revised valuation reflects material changes in benefits as well as reflecting an additional \$2 million contribution as of August 2014. The valuation was based upon data, furnished by your staff, concerning financial operations and individual participants and vested former participants. We checked for internal and year-to-year consistency, but did not otherwise audit the data. We are not responsible for the accuracy or completeness of the information.

The purpose of the valuation is to measure the Plan's funding progress, to determine the employer contribution rate for the fiscal year ending June 30, 2016, and to determine the actuarial reporting information. The results of the valuation may not be applicable for other purposes. The date of the valuation was December 31, 2013.

This report was prepared at the request of the Board. It may be shared with other interested parties, but only in its entirety and only with permission from the Board.

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 was prepared by actuaries who have substantial experience valuing public employee retirement plans and are independent of the plan sponsor. To the best of our knowledge, this report is complete and accurate and the valuation was conducted in accordance with standards of practice prescribed by the Actuarial Standards Board.

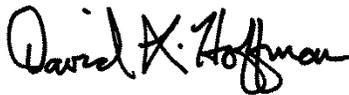
Mr. Thomas Darling
September 26, 2014
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Randall J. Dziubek is a Member of the American Academy of Actuaries (MAAA) and meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

Respectfully submitted,



Randall J. Dziubek
ASA, EA, MAAA



David L. Hoffman



Jeff Tebeau

RJD/DLH/JT:ah

1490

SUMMARY OF PLAN PROVISIONS VALUED (DECEMBER 31, 2013)

NORMAL PAYMENT CONDITIONS

Eligibility - Attainment of age 55 with 10 or more years of incentive service or 30 years of service regardless of age, or attainment of age 50 with 25 or more years of service.

Annual Amount –

Retiring	Fixed Annual Amount per Year of Incentive Service at Retirement
1/1/2005 - 12/31/2005	\$518.00
1/1/2006 - 12/31/2006	\$539.00
1/1/2007 - 12/31/2007	\$560.00
1/1/2008 - 12/31/2008	\$582.00
1/1/2009 - 6/30/2014	\$605.00
7/1/2014 - 6/30/2015	\$642.00
7/1/2015 - 6/30/2016	\$681.00
7/1/2016 - 6/30/2017	\$724.00
7/1/2017 - 6/30/2018	\$769.00
7/1/2018 and after	Assumed 1% increases

Optional forms of payment include a lump sum payment of the actuarial value.

VESTING

Eligibility - 10 years of incentive service. Payments commence at age 60.

Annual Amount - See above.

PAYMENTS IN EVENT OF PARTICIPANT'S DEATH

Eligibility - Death of an active participant after 10 years of incentive service.

Annual Amount - Widow receives the amount computed as above but reduced to reflect a 100% joint and survivor election.

**SUMMARY OF PLAN PROVISIONS VALUED
(DECEMBER 31, 2013)**

POST-RETIREMENT PAYMENT INCREASES

<u>Year</u>	<u>Ad-Hoc Increase</u>
1986	10.0% increase in each current payment
1987	10.0% increase in each current payment
1988	7.5% increase in each current payment
1989	7.5% increase in each current payment
1989	Prorated increase based on difference between actual incentive service and the 25-year maximum which was provided for Ordinance No. 62
1990-1994	\$10 per month increase in each current payment
1995	\$ 5 per month increase in each current payment
1996	\$15 per month increase in each current payment
1997-2009	\$10 per month increase in each current payment
2010-2013	None

ACTIVE PARTICIPANTS - DECEMBER 31, 2013
BY NEAR AGE AND YEARS OF SERVICE

Near Age	Years of Accrued Service							Totals No.
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	
20-24	12	1						13
25-29	13	5						18
30-34	5	5	6					16
35-39	9	5	8	4				26
40-44	5	5	2	3	3			18
45-49	3	6	2	1	3	5		20
50-54	2	4	5	5	4		1	21
55-59		1		2	1			4
60	1							1
61	1							1
64						1		1
67							1	1
Totals	51	32	23	15	11	6	2	140

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Group Averages:

Age: 39.3 years.
Service: 9.9 years.

**LEAVE OF ABSENCE PARTICIPANTS - DECEMBER 31, 2013
BY NEAR AGE AND YEARS OF SERVICE**

Near Age	Years of Accrued Service						Totals No.
	0-4	5-9	10-14	15-19	20-24	25-29	
20-24	2						2
25-29	4						4
30-34	1		1				2
35-39	1	1					2
50-54	1					1	2
Totals	9	1	1	0	0	1	12

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Group Averages:

Age: 32.6 years.

Service: 5.3 years.

INACTIVE PARTICIPANTS - BY NEAR AGES
DECEMBER 31, 2013

Near Ages	Current Payments		Deferred Payments	
	No.	Annual Payments	No.	Annual Payments
30-34			1	\$ 8,823
35-39			2	15,016
40-44				
45-49			3	12,945
50-54	5	\$ 63,848	12	55,109
55-59	12	146,216	7	25,779
60-64	11	96,953	2	3,726
65-69	8	44,389		
70-74	9	48,032		
75-79	20	91,075		
80+	15	59,088		
Totals	80	\$549,601	27	\$121,398

DEVELOPMENT OF FUNDING VALUE OF ASSETS

Year Ended December 31,	2011	2012	2013	2014	2015	2016
A. Funding Value Beginning of Year	\$ 5,709,574	\$ 6,356,765	\$ 5,983,106			
B. Market Value End of Year	6,383,185	5,823,408	5,940,674			
C. Market Value Beginning of Year	5,817,946	6,383,185	5,823,408			
D. Non-Investment Net Cash Flow (EE + ER cont.) - (Ret. Ben.+Refunds)	270,182	(765,451)	(137,866)			
E. Investment Income						
E1. Market Total: B - C - D	295,057	205,674	255,132			
E2. Assumed Rate	6.50%	6.50%	6.50%			
E3. Amount for Immediate Recognition: (D/2 + A)*E2	379,903	388,313	384,421			
E4. Amount for Phased-In Recognition: E1 - E3	(84,846)	(182,639)	(129,289)			
F. Phased-In Recognition of Investment Income						
F1. Current Year: 0.25 x E4	(21,212)	(45,660)	(32,322)			
F2. First Prior Year	19,704	(21,212)	(45,660)	\$ (32,322)		
F3. Second Prior Year	50,646	19,704	(21,212)	(45,660)	\$ (32,322)	
F4. Third Prior Year	(52,032)	50,647	19,703	(21,210)	(45,659)	\$ (32,323)
F5. Total Recognized Investment Gain/(Loss)	(2,894)	3,479	(79,491)	(99,192)	(77,981)	(32,323)
G. Funding Value: A + D + E3 + F5	6,356,765	5,983,106	6,150,170			
H. Difference Between Market & Funding Values	26,420	(159,698)	(209,496)			
I. Recognized Rate of Return	6.5%	6.6%	5.2%			
J. Market Rate of Return	5.0%	3.4%	4.4%			

The Funding Value of Assets recognizes assumed investment income (line E3) fully each year. Differences between actual and assumed investment income (line E4) are phased-in over a closed 4-year period. During periods when investment performance exceeds the assumed rate, Funding Value of Assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, Funding Value of Assets will tend to be greater than market value. The Funding Value of Assets is **unbiased** with respect to Market Value. At any time it may be either greater or less than Market Value. If actual and assumed rates of investment income are exactly equal for 3 consecutive years, the Funding Value will become equal to Market Value.

DEVELOPMENT OF UNFUNDED ACTUARIAL ACCRUED LIABILITIES AS OF DECEMBER 31, 2013

Actuarial Accrued Liabilities for:	
Active Participants*	\$9,440,427
Inactive Participants	
Current payments	5,866,849
Deferred payments	<u>822,145</u>
Total Actuarial Accrued Liabilities	16,129,421
Funding Value of Assets	<u>6,150,170</u>
Unfunded Actuarial Accrued Liabilities	\$9,979,251

** Includes participants on leave of absence.*

MARKET VALUE INCOME STATEMENT FOR CALENDAR YEAR 2013

Plan Assets at Beginning of Year	\$5,823,408
plus Employer Contributions	1,078,500
plus Investment Income	266,090
less Monthly Retirement Benefits and Lump Sum Payments	1,216,366
less Investment Expenses	-
less Administrative Expenses	<u>10,958</u>
Plan Assets at End of Year	\$5,940,674

**CITY'S COMPUTED CONTRIBUTION FOR THE FISCAL YEAR
ENDING JUNE 30, 2016**

Contribution for:

NORMAL COST

Age and service payments	\$ 431,850
Death-in-service payments	15,629
Total	447,479

UNFUNDED ACCRUED LIABILITIES

Present recipients	0
Active participants and vested former participants*	653,153
Total	653,153

CITY'S TOTAL CONTRIBUTION FYE JUNE 2016 \$1,100,632

** Financed over an open period of 25 years. Includes the effects of the one and a half year lag between the valuation date and the contribution period as well as an additional \$2 million contribution in August 2014.*

Comment A: This Plan has a history of benefit increases and allows lump sums to be paid at retirement. The total contribution shown above assumes that the base benefit will increase to \$681 on July 1, 2015, \$724 on July 1, 2016 and \$769 on July 1, 2017. The total contribution also assumes that the base benefit would then increase by 1.0% per year. This Plan has a popular lump sum option, which can lead to negative cash flow which could exhaust the Plan assets in less than 10 years, if actuarial determined contribution requirements are not made on a timely basis. This would drive contributions to the level of expenditures, which would create extreme volatility and on average, much higher contributions.

Comment B: The Plan's current requested investment return assumption of 6.5% can be considered aggressive since the Plan has primarily invested in fixed income instruments. The Plan has averaged about 6.1% over the last five years and 5.7% over the last 10 years. If the current investment allocation remains the same, we recommend lowering the investment return assumption.

Comment C: The Plan's funded ratio decreased from 45.6% to 38.1% since last year's valuation. The decrease in the funded ratio was due to increasing the normal retirement benefit going forward, the adoption of updated mortality assumptions, and the addition of the benefit increase assumption. Absent the changes in benefit provisions and assumptions, the funded ratio would have been 47.1% at December 31, 2013. However, after reflection of the anticipated \$2 million contribution to be made after the valuation date, the funded ratio will be approximately 51%.

**DERIVATION OF ACTUARIAL GAIN/(LOSS)
PENSION BENEFITS
YEAR ENDED DECEMBER 31, 2013**

1)	UAAL at start of year	\$ 7,132,086
2)	Normal cost	287,010
3)	Actual employer contributions	1,078,500
4)	Interest accrual	437,862
5)	Expected UAAL before changes	6,778,458
6)	Change from benefit increases	1,650,405
7)	Change from revised actuarial assumptions/methods	1,428,686
8)	Expected UAAL after changes	9,857,549
9)	Actual UAAL at end of year	9,979,251
10)	Gain/(Loss): (8) - (9)	(121,702)
11)	Gain/(Loss) as percent of actuarial accrued liabilities at start of year	(0.9)%
	\$13,115,192	

COMPARATIVE SCHEDULE

Valuation Date December 31,	Fiscal Year Ending June 30,	Vested Former Participants				Accrued Liability	Actuarial Value of Assets	Percent Funded	Unfunded Accrued Liability	Computed City's Contribution
		Current Payments		Deferred Payments						
		No.	Annual \$	No.	Annual \$					
1997 *	1997	57	\$ 178,421	22	\$ 47,885	\$ 5,635,119	\$ 4,211,224	74.7 %	\$ 1,423,895	\$ 301,412
1998 *	2000	58	182,869	24	59,570	6,034,103	4,680,711	77.6	1,353,392	304,480
1999 *#	2001	58	189,829	24	59,570	6,789,910	5,051,720	74.4	1,738,190	349,404
2000 *	2002	60	201,427	27	73,879	7,397,365	5,137,078	69.4	2,260,287	413,432
2001 *	2003	62	225,030	28	79,743	8,160,180	5,109,422	62.6	3,050,758	512,973
2002 *	2004	61	232,881	28	86,384	9,598,244	5,720,336	59.6	3,877,908	623,348
2003 *	2005	63	246,090	26	79,680	11,786,697	6,083,672	51.6	5,703,025	795,904
2004 *	2006	64	263,767	26	82,834	11,936,051	6,261,188	52.5	5,674,863	774,795
2005 *	2007	67	302,477	27	92,676	12,052,272	6,571,524	54.5	5,480,748	762,121
2006 *	2008	70	346,539	25	79,601	11,931,905	6,006,600	50.3	5,925,305	788,742
2007 *	2009	73	372,705	23	75,828	13,239,695	6,412,626	48.4	6,827,069	885,365
2008 *	2010	74	403,828	24	89,238	13,037,843	6,272,677	48.1	6,765,166	864,167
2009 *	2011	79	477,636	27	110,008	12,625,243	5,325,404	42.2	7,299,839	873,691
2010	2012	77	491,385	27	110,008	12,925,065	5,709,574	44.2	7,215,491	873,354
2011	2013	79	507,267	26	105,942	13,476,184	6,356,765	47.2	7,119,419	868,074
2011	2014	79	507,267	26	105,942	13,476,184	6,356,765	47.2	7,119,419	858,472
2012	2015	80	535,321	25	102,542	13,115,192	5,983,106	45.6	7,132,086	843,872
2013	2016	80	549,601	27	121,398	13,050,330	6,150,170	47.1	6,900,160	663,890 &
2013 *#	2016	80	549,601	27	121,398	16,129,421	6,150,170	38.1	9,979,251	1,100,632

* After changes in benefit provisions.

After changes in actuarial assumptions.

& Reflects an anticipated \$2 million employer contribution to be made after the valuation date and before July 1, 2015.

COMMENT: It is the actuary's opinion that the required contribution amounts determined by the most recent actuarial valuation are sufficient to meet the Plan's financial objective, presuming continued timely receipt of required contributions when due, and the assumed ad-hoc increases to base benefit at retirement.

VALUATION ASSUMPTIONS

The **entry-age normal cost valuation method** was used in determining payment liabilities and costs.

The **interest rate** used in making the valuation was 6.5% per annum, compounded annually. This rate was first used for the December 31, 1999 valuation.

The **mortality table** used was the RP-2000 Mortality Table, projected to the year 2017 using Projection Scale BB, set back 0 years for men and 0 years for women. This table was first used for the December 31, 2013 valuation. A margin for future mortality improvements is included in these tables.

Sample Ages	Single Life Values			
	Present Value of		Future Life	
	\$1 Monthly for Life		Expectancy (Years)	
	Men	Women	Men	Women
50	\$159.46	\$163.65	32.66	35.29
55	150.22	155.46	28.05	30.61
60	138.97	145.17	23.61	26.04
65	125.69	132.82	19.42	21.70
70	110.44	118.72	15.53	17.68
75	93.53	103.13	12.00	14.02
80	75.85	86.36	8.93	10.76

Probabilities of retirement for members eligible for immediate incentive payments were:

Percent of Eligible Active Participants Separating within Next Year			
Age Based		Service Based	
Ages	Percent	Service	Percent
48	20%	30	20%
49	20%	31	20%
50	20%	32	20%
51	20%	33	20%
52	20%	34	20%
53	20%	35	20%
54	20%	36	20%
55	20%	37	20%
56	20%	38	20%
57	20%	39	20%
58	20%	40	100%
59	15%		
60	15%		
61	15%		
62	25%		
63	100%		

**SAMPLE RATES OF SEPARATION FROM ACTIVE EMPLOYMENT
BEFORE AGE 55**

Sample Ages	Years of Service	% of Active Participants Separating within Next Year
ALL	1	15.00 %
	2	10.00
	3	8.00
	4	7.00
	5	6.00
25	5 & Over	5.00
30		4.50
35		3.55
40		1.45
45		0.75
50		0.75

**SUMMARY OF ASSUMPTIONS USED
DECEMBER 31, 2013**

Pensions in an Inflationary Environment

**VALUE OF \$1,000/MONTH RETIREMENT BENEFIT
TO AN INDIVIDUAL WHO RETIRES AT AGE 55
IN AN ENVIRONMENT OF 4.00% INFLATION**

<u>Age</u>	<u>Value</u>
55	\$1,000
56	962
57	925
58	889
59	855
60	822
65	676
70	556
75	457
80	375

The life expectancy of a 55 year old male retiree is age 83. The life expectancy for a 55 year old female retiree is age 85. Half of the people will outlive their life expectancy. The effects of even moderate amounts of inflation can be significant for those who live to an advanced age.

SUMMARY OF ASSUMPTIONS USED
MISCELLANEOUS AND TECHNICAL ASSUMPTIONS
DECEMBER 31, 2013

Marriage Assumption. 100% of males and 100% of females are assumed to be married for purposes of death-in-service benefits.

Pay Increase Timing. Beginning of (Fiscal) year. This is equivalent to assuming that reported pays represent amounts paid to members during the year ended on the valuation date.

Decrement Timing. Decrements of all types are assumed to occur mid-year.

Eligibility Testing. Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.

Benefit Service. Exact fractional service is used to determine the amount of benefit payable.

Decrement Relativity. Decrement rates are used without adjustment for multiple decrement table effects.

Decrement Operation. Disability and mortality decrements do not operate during the first 5 years of service. Disability and withdrawal do not operate during retirement eligibility.

Normal Form of Benefit. The assumed normal form of benefit is the straight life form.

Optional Forms of Payment. 6.5% interest, 1983 Group Annuity male mortality for male members and 1983 Group Annuity female mortality for female members. There is no additional margin for future mortality improvement.

Incidence of Contributions. Contributions are assumed to be received continuously throughout the year based upon the computed dollar amounts shown in this report. New entrant normal cost contributions are applied to the funding of new entrant benefits.

Leave of Absence Members. All members indicated as on leave of absence as of the valuation date are assumed to return to full employment one year after the valuation date.

Ad-Hoc Increases to Base Benefit. After 7/1/2017, the base benefit amount is assumed to increase by 1.0% per year with no increase after retirement.

ACTUARIAL ACCRUED LIABILITY

The actuarial accrued liability is a measure intended to help users assess (i) a pension fund's funded status on a going-concern basis, and (ii) progress being made toward accumulating the assets needed to pay benefits as due. Allocation of the actuarial present value of projected benefits between past and future service was based on service using the individual entry-age actuarial cost method. Assumptions were the same as used to determine the Plan's level dollar annual required contribution between entry-age and assumed exit age. Entry-age was established by subtracting credited service from current age on the valuation date.

The preceding methods comply with the financial reporting standards established by the Governmental Accounting Standards Board.

The entry age actuarial accrued liability was determined as part of an actuarial valuation of the Plan as of December 31, 2013. Significant actuarial assumptions used in determining the actuarial accrued liability include (a) a rate of return on the investment of present and future assets of 6.5% per year compounded annually, and (b) the assumption that benefits will not increase after retirement.

Actuarial Accrued Liability	
Active members*	\$ 9,440,427
Retired members and beneficiaries currently receiving benefits	5,866,849
Vested terminated members not yet receiving benefits	<u>822,145</u>
Total Actuarial Accrued Liability	16,129,421
Actuarial Value of Assets (market value was \$5,940,674)	<u>6,150,170</u>
Unfunded Actuarial Accrued Liability	\$ 9,979,251

* Including members on leave of absence.

During the year ended December 31, 2013, the Plan experienced a net change of \$3,014,229 in the actuarial accrued liability, of which \$1,650,405 was attributable to changes in benefit provisions and \$1,428,686 to changes in actuarial assumptions (including an updated mortality assumption and the assumed annual 1% increase in base benefits).

REQUIRED SUPPLEMENTARY INFORMATION
SCHEDULE OF FUNDING PROGRESS
(\$ AMOUNTS IN THOUSANDS)

Actuarial Valuation Date December 31,	Actuarial Value of Assets# (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded AAL (b)-(a)	Funded Ratio (a)/(b)
2000 *	\$5,137	\$ 7,397	\$ 2,260	69.4 %
2001 *	5,109	8,160	3,051	62.6
2002 *	5,720	9,598	3,878	59.6
2003 *	6,084	11,787	5,703	51.6
2004 *	6,261	11,936	5,675	52.5
2005 *	6,572	12,052	5,481	54.5
2006 *	6,007	11,932	5,925	50.3
2007 *	6,413	13,240	6,827	48.4
2008 *	6,273	13,038	6,765	48.1
2009 *	5,325	12,625	7,300	42.2
2010	5,710	12,925	7,215	44.2
2011	6,357	13,476	7,119	47.2
2012	5,983	13,115	7,132	45.6
2013 * &	6,150	16,129	9,979	38.1

Prior to 1996, Book Value was used.
* After changes in benefit provisions.
& After changes in actuarial assumptions.

Analysis of the dollar amounts of actuarial value of assets, actuarial accrued liability, or actuarial accrued liability in isolation can be misleading. Expressing the actuarial value of assets as a percentage of the actuarial accrued liability provides one indication of the plan's funded status on a going-concern basis. Analysis of this percentage over time indicates whether the plan is becoming financially stronger or weaker. Generally, the greater this percentage, the stronger the plan. The unfunded actuarial accrued liability and annual covered payroll are both affected by inflation.

This information is presented in draft form for review by the City's auditor. Please let us know if there are any items that the auditor changes so that we may maintain consistency with the City's financial statements.

**REQUIRED SUPPLEMENTARY INFORMATION
SCHEDULE OF EMPLOYER CONTRIBUTIONS**

Fiscal Year Ending June 30,	Actuarial Valuation Date December 31,	Annual Required Contribution (in thousands)	Percent Contributed
2000	1998	\$330	100 %
2001	1999	360	100
2002	2000	413	100
2003	2001	513	100
2004	2002	623	100
2005	2003	796	100
2006	2004	775	105
2007	2005	762	104
2008	2006	789	101
2009	2007	885	100
2010	2008	864	100
2011	2009	874	100
2012	2010	873	100
2013	2011	868	100
2014	2011	858	NA
2015	2012	844	NA

**NOTES TO REQUIRED SUPPLEMENTARY INFORMATION
SUMMARY OF ACTUARIAL METHODS AND ASSUMPTIONS**

Valuation Date	12/31/2013
Actuarial Cost Method	Individual Entry-Age
Amortization Method	Level dollar, open
Remaining Amortization Period	25 years
Asset Valuation Method	4-year smoothed market
Actuarial Assumptions:	
Investment Rate of Return	6.50%
Projected Salary Increases	N/A

This information is presented in draft form for review by the City’s auditor. Please let us know if there are any items that the auditor changes so that we may maintain consistency with the City’s financial statements.

September 26, 2014

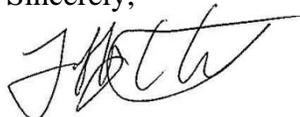
Mr. Thomas Darling
Director of Financial Services
City of Troy
500 West Big Beaver Road
Troy, Michigan 48084

Dear Tom:

Enclosed are fifteen copies of the revised report of the 34th Annual Actuarial Valuation of the City of Troy Incentive Plan for Volunteer Firefighters.

Please do not hesitate to contact us if you have any questions.

Sincerely,



Jeff Tebeau

JT:ah
Enclosures

cc: Rehmann Robson (1 report copy)