

**CITY OF JOLIET FIREFIGHTERS' PENSION FUND**  
**2008 EXPERIENCE REVIEW FOR THE YEARS**  
**JANUARY 01, 2001, THROUGH DECEMBER 31, 2007**

October 3, 2008

The Pension Board  
City of Joliet Firefighters' Pension Fund  
Joliet, Illinois

**Subject: Experience Review for the Years January 01, 2001, through December 31, 2007**

Dear Board Members:

We have reviewed recent demographic and economic experience for the City of Joliet Firefighters' Pension Fund in order to recommend updates to the assumptions used in the actuarial valuation. Our analysis was based on census information for plan years 2001 through 2007, as provided by the Fund. The impact of the proposed changes was measured using the results of the actuarial valuation as of January 1, 2007. The following experience and assumptions were reviewed:

- Investment return
- Wage inflation
- Seniority and merit salary increases
- Mortality
- Disability
- Withdrawal
- Retirement

A summary of the study is presented in Section I of the report. Section II contains an analysis of the experience and proposed assumptions. Section III contains details of the cost impact.

Both of the undersigned are Members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries (MAAA) to render the actuarial opinion contained herein.

Respectfully yours,



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Senior Consultant



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Senior Consultant

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**SECTION I**  
**SUMMARY**

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**CITY OF JOLIET FIREFIGHTERS' PENSION FUND**  
**EXPERIENCE REVIEW SUMMARY**  
**SECTION I SUMMARY**

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**Summary**

For any retirement system, actuarial assumptions are selected that are intended to provide reasonable estimates of future expected events. These assumptions, along with an actuarial cost method, the employee census data, and the provisions outlined in the statutes are used to determine the overall funding requirements for the system. The true cost to the retirement system over time will be the actual benefit payments and expenses required by the statutes for the participant group under the system. To the extent the actual experience deviates from the assumptions, experience gains and losses will occur. These gains (losses) then serve to reduce (increase) future contribution levels. The actuarial assumptions should be reasonable and should be reviewed periodically to ensure that they remain appropriate. The actuarial cost method used, however, automatically adjusts contributions over time for differences between what is assumed and the true experience under the system.

The actuarial assumptions are usually divided into two groups:

- The economic assumptions include:
  - The long-term rate of return on investments
  - General wage increases
  - General inflation

These assumptions are generally chosen on the basis of the actuary's expectations as to the effect of future economic conditions on the operation of the system.

- The demographic assumptions include the following rates:
  - Mortality
  - Retirement
  - Disablement
  - Withdrawal (other termination of employment)
  - Salary increases relating to seniority and promotions

Demographic assumptions are generally based on the system's own experience, taking into account emerging trends. Rates of salary increase due to promotion and longevity are also related to the system's experience.

The accuracy and extent of the data is an important consideration in assessing demographic experience. The accuracy of the data for this study was good, but the relatively small size of the group is a limiting factor. For this reason, we do not necessarily give full credibility to the recent experience under the system, but also factor in general experience among a wider universe of retirement systems. For instance, a very large amount of data is required to develop a credible mortality table. The selection of a mortality table is largely independent of the system's experience. Instead, we look to general trends among retirement systems.

**CITY OF JOLIET FIREFIGHTERS' PENSION FUND**  
**EXPERIENCE REVIEW SUMMARY**  
**SECTION I SUMMARY (CONT'D)**

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We have performed an experience study of the City of Joliet Firefighters' Pension Fund for the period January 1, 2001, through December 31, 2007. The primary purpose of the study was to compare the demographic and economic experience against the actuarial assumptions used in the annual valuations. Our study was based on the information used to perform the annual valuations for plan years 2001 through 2007, as provided by the System.

Following is a summary of our key findings and recommendations:

- **Investment return:** We recommend reducing the investment return assumption of 7.5 percent to 7.25 percent in order to reflect the statutory constraints on investments which limit the asset allocation to 45 percent in equities. Assuming a three percent general inflation assumption, implies that the Fund is expected to earn a real return of 4.25 percent.
- **Salary increase:** We reviewed recent collective bargaining agreements and salary experience for plan years 2001 through 2007. The bargaining agreements indicate significant increases during the first three years of service, lower seniority/promotional increases after three years, and ultimate increases of four percent. The historical observed data showed a similar pattern. Consequently, we recommend using a three-year select period, and ultimate salary increase of 5.25 percent after three years. The underlying salary scale would be based on a wage inflation assumption of four percent.
- **Standard mortality rates:** Currently, standard mortality is assumed to follow the 1983 Group Annuity Mortality Table. Although experience over the study period varied from the assumed table, we do not recommend changing these rates because the actual experience is not credible given the small size of the group. We believe the current mortality table continues to be appropriate.
- **Disabled mortality rates:** The current disabled mortality rates are based on the 1965 Railroad Retirement Board Disabled Annuitants mortality table. Although the actual experience is not credible given the small size of the group over the study period, we do not recommend continued use of these rates because the underlying definition of disability for the Railroad Retirement Board Disabled Annuitant mortality table may be more stringent than the definition of disability used by the Fund's board. We believe 110 percent of the current standard mortality table (1983 Group Annuity) would be more appropriate for the Fund's disabled members.
- **Retirement rates:** Actual rates of retirement have generally been slightly higher at ages 54 to 58 than the assumed rates and we recommend increasing the rates of retirement.
- **Disability rates:** Actual experience over the study period showed that, overall, there were more disabilities than expected at older ages. We recommend reducing the rates of disability by 50 percent prior to age 50 and increasing the rates of disability by 25 percent on and after age 50, and to replace the sex distinct tables with a single table for all participants.
- **Withdrawal rates:** Actual withdrawal rates over the study period showed that withdrawal rates were lower than the current assumptions. We recommend reducing the rates of withdrawal by 50 percent, replacing the sex distinct tables with a single table for all participants, and moving to a service-based table from the age-based table.

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**CITY OF JOLIET FIREFIGHTERS' PENSION FUND**  
**EXPERIENCE REVIEW SUMMARY**  
**SECTION I SUMMARY (CONT'D)**

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**Cost Impact**

The preceding recommended changes are expected to increase the contribution requirements for the fund. Section III of this report demonstrates what the impact would have been if the recommended assumptions had been used for the actuarial valuation as of January 1, 2007.

	<b>Current Assumptions</b>	<b>Proposed Assumptions 7.5% Discount</b>	<b>Proposed Assumptions 7.25% Discount</b>
<b>Actuarial Liability:</b>			
<b>Active Firefighters</b>	\$55,622,529	\$56,383,653	\$58,847,696
<b>Inactive Firefighters &amp; Beneficiaries</b>	\$73,366,628	\$75,729,945	\$77,502,936
<b>Total Actuarial Liability</b>	\$128,989,157	\$132,113,598	\$136,350,632
<b>Funded Ratio</b>	54.1%	52.8%	51.1%
<b>Gross Normal Cost</b>	\$4,237,808	\$4,369,571	\$4,647,556
<b>Employer Contributions</b>	\$6,632,030	\$7,587,490	\$8,045,028
<b>Percent of Pay</b>	41.4%	47.3%	50.2%

Changing the demographic assumptions increased the actuarial liability by 2.4 percent from \$129.0 million to \$132.1 million, decreased the funded ratio by 1.3 percentage points to 52.8 percent, and increased contributions by \$955,000 or 14.4 percent to \$7.59 million. Changing both the demographic assumptions and the discount rate to 7.25 percent increased the actuarial liability by 5.7 percent from \$129.0 million to \$136.4 million, decreased the funded ratio by 3.0 percentage points to 51.1 percent, and increased the contributions by \$1,413,000 or 21.3 percent to \$8.05 million.

At an assumed discount rate of 7.5 percent, the actuarial liabilities for active members increased by 1.4 percent primarily due to the change in disability rates. The actuarial liabilities for retirees, disabled members and beneficiaries increased by 3.2 percent due to the change in disability mortality which affected 28 disabled members.

The change in contributions includes an adjustment to the factor used to amortize the unfunded actuarial liability. The current valuation assumes costs will be spread over all pay including wage inflation, merit and seniority increases. The proposed method assumes costs will be spread over increases associated with wage inflation only. The proposed method assumes the active population remains relatively stable in the future; that is, as members retire they will be replaced with younger members so that total payroll increases by just wage inflation. This change increased the contribution rate, assuming 7.5 percent discount rate and updated demographic assumptions, by 3.2 percentage points from 44.1 percent to 47.3 percent.

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## **SECTION II**

### **EXPERIENCE ANALYSIS AND PROPOSED RATES**

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**CITY OF JOLIET FIREFIGHTERS' PENSION FUND**  
**EXPERIENCE REVIEW SUMMARY**  
**SECTION II EXPERIENCE ANALYSIS AND PROPOSED RATES**

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**Investment Return**

The investment return assumption depends on the long-term expectation of real returns plus the assumed general inflation assumption, which is assumed to be three percent.

The investment return assumption is generally selected by simulating the asset portfolio into the future, and selecting an investment return rate that falls in between the 25<sup>th</sup> to 75<sup>th</sup> percentile. For example, selecting a rate that falls at the 75<sup>th</sup> percentile implies that the portfolio has less than a 25 percent likelihood of achieving the selected investment return. This is considered to be an aggressive assumption. The portfolio is simulated given a set of capital market assumptions, such as expected returns, standard deviation, the asset allocation, and any portfolio constraints. Under the Illinois compiled statutes, the equity exposure for “downstate” Police and Fire Pension Funds cannot exceed 45 percent which limits the range of the 25<sup>th</sup> to 75<sup>th</sup> percentile.

For illustration purposes, we have simulated a sample portfolio with the maximum equity exposure of 45 percent using the following assumptions:

	<b>Asset Allocation</b>	<b>Expected Return</b>	<b>Standard Deviation</b>
US Equity	35%	8.5%	15.0%
International Equity	10%	8.6%	15.0%
Fixed Income	55%	5.3%	4.3%
<b>Gross Portfolio Return</b>	<b>100%</b>	<b>6.7%</b>	<b>5.7%</b>

The preceding gross portfolio return should also be reduced for investment expenses. Assuming 30 basis points in investment expenses produces a net investment return of 6.3 percent.

The following table shows the percentiles of the simulated net investment returns, over a 30-year investment horizon, using the preceding capital market assumptions and asset allocation:

<b>Cumulative Net Investment Return</b>	<b>2008</b>	<b>2018</b>	<b>2028</b>	<b>2038</b>
75 <sup>th</sup> percentile	10.2%	7.9%	7.6%	<b>7.4%</b>
50 <sup>th</sup> percentile	6.0%	6.3%	6.3%	6.3%
25 <sup>th</sup> percentile	2.2%	4.6%	5.0%	5.2%

After 30 years, the portfolio has a 25 percent likelihood of attaining a return greater than 7.4 percent. Consequently, we recommend reducing the investment return assumption from 7.50 percent to 7.25 percent. This recommendation assumes the risk and return characteristics of the Plan’s portfolio is similar to the preceding sample portfolio.



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**SECTION II EXPERIENCE ANALYSIS AND PROPOSED RATES (CONT'D)**

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**Salary Increase**

Under the current assumption, a member's pay is expected to increase by 5.5 percent per year during their career. This simplified assumption implicitly includes components for wage inflation, seniority, and promotional increases. The bargaining agreements and recent experience show that members receive significant increases during their first three years of employment, and that they receive general wage inflation increases of four percent per year. Consequently, we recommend using a salary increase assumption comprised of a wage inflation assumption of 4.0 percent plus a seniority/promotion increase of 1.25 percent plus an additional seniority factor during their first three years of employment.

The following table compares the current and proposed salary increase assumption:

<b>Years of Service</b>	<b>Total</b>				
	<b>Expected</b>	<b>Actual</b>	<b>Actual vs. Expected</b>	<b>Proposed</b>	<b>Actual vs. Proposed</b>
1	5.5%	24.9%	451.8%	25.00%	99.4%
2	5.5%	17.6%	320.5%	15.00%	117.5%
3	5.5%	12.5%	227.5%	10.00%	125.1%
>=4	5.5%	5.6%	101.8%	5.25%	106.7%
<b>Total</b>	<b>5.5%</b>	<b>7.1%</b>	<b>129.4%</b>	<b>6.62%</b>	<b>107.6%</b>

**CITY OF JOLIET FIREFIGHTERS' PENSION FUND**  
**EXPERIENCE REVIEW SUMMARY**  
**SECTION II EXPERIENCE ANALYSIS AND PROPOSED RATES (CONT'D)**

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**Mortality Experience**

Currently, healthy or standard mortality is assumed to follow the 1983 Group Annuity Mortality Table. This assumption is used to measure the probabilities of members dying before retirement and the probabilities of each benefit payment being made after retirement. Disabled mortality is assumed to follow the 1965 Railroad Retirement Board Disabled Annuitants mortality table.

Comparing expected to actual mortality experience by age may not produce meaningful results given the size of this group. However, in the aggregate the current mortality for healthy lives appears to be reasonably modeling experience and we recommend no change to the Standard Mortality rates. But, we recommend changing the mortality table for disabled members to the Standard Mortality rates increased by 10 percent because the current table is based on a definition of disability administered by the Railroad Retirement Board which may be significantly different than the Fund's practice. Sample proposed rates follow:

<b>Sample Attained Ages</b>	<b>Standard Mortality</b>		<b>Disabled Mortality</b>	
	<b>Men</b>	<b>Women</b>	<b>Men</b>	<b>Women</b>
30	0.061%	0.034%	0.067%	0.038%
35	0.086%	0.048%	0.095%	0.052%
40	0.124%	0.067%	0.136%	0.073%
45	0.218%	0.101%	0.240%	0.111%
50	0.391%	0.165%	0.430%	0.181%
55	0.613%	0.254%	0.674%	0.280%
60	0.916%	0.424%	1.007%	0.467%
65	1.559%	0.706%	1.715%	0.777%
70	2.753%	1.239%	3.028%	1.362%
75	4.460%	2.399%	4.906%	2.639%
80	7.407%	4.295%	8.148%	4.724%

**CITY OF JOLIET FIREFIGHTERS' PENSION FUND**  
**EXPERIENCE REVIEW SUMMARY**  
**SECTION II EXPERIENCE ANALYSIS AND PROPOSED RATES (CONT'D)**

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**Retirement**

The Fund's retirement experience indicates that members from age 54 to 58 retire at higher rates when compared to current assumptions. For example, based on the group of eligible members at age 54 to 58, 24 members actually retired while our model assumed that only nine would retire. This suggests that our rates can be increased at ages 54 to 58. Following are the current and proposed rates along with comparative historical experience. In the aggregate, the proposed rates generate 31.5 expected retirements which is close to the actual number of retirements of 33 during the same period.

<b>Age Group</b>	<b>Current Rates</b>	<b>Expected Counts</b>	<b>Actual Rates</b>	<b>Actual Counts</b>	<b>Proposed Rates</b>	<b>Proposed Counts</b>
50	16.4%	2.8	0.0%	0.0	5.0%	0.9
51	13.5%	2.7	0.0%	0.0	5.0%	1.0
52	11.4%	2.5	0.0%	0.0	5.0%	1.1
53	9.9%	2.6	7.7%	2.0	10.0%	2.6
54	9.3%	2.4	19.2%	5.0	10.0%	2.6
55	9.3%	2.1	30.4%	7.0	10.0%	2.3
56	9.7%	1.5	46.7%	7.0	25.0%	3.8
57	11.1%	1.3	16.7%	2.0	25.0%	3.0
58	13.1%	1.6	25.0%	3.0	25.0%	3.0
59	15.6%	1.6	0.0%	0.0	25.0%	2.5
60	18.9%	1.9	10.0%	1.0	25.0%	2.5
61	22.8%	2.1	22.2%	2.0	25.0%	2.3
62	27.5%	1.7	16.7%	1.0	25.0%	1.5
63	32.7%	1.3	50.0%	2.0	50.0%	2.0
64	38.7%	0.4	100.0%	1.0	50.0%	0.5
65	45.3%	0.0	NA	0.0	100.0%	0.0
66	66.4%	0.0	NA	0.0	100.0%	0.0
67	100.0%	0.0	NA	0.0	100.0%	0.0
<b>Total</b>		<b>28.3</b>		<b>33.0</b>		<b>31.5</b>
<b>Average Retirement Age</b>		<b>55.8</b>		<b>56.8</b>		<b>57.1</b>

**CITY OF JOLIET FIREFIGHTERS' PENSION FUND**  
**EXPERIENCE REVIEW SUMMARY**  
**SECTION II EXPERIENCE ANALYSIS AND PROPOSED RATES (CONT'D)**

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**Disability**

The current disability rates generated 5.9 expected disability retirements during the experience period; however, ten members, nine over the age of 49, became disabled during the last seven years. Consequently, we recommend reducing the rates of disability by 50 percent prior to age 50 and increasing the rates of disability by 25 percent on and after age 50. Following are sample rates:

<b>Age</b>	<b>Current</b>		<b>Proposed</b>	
	<b>Male</b>	<b>Female</b>	<b>Male</b>	<b>Female</b>
25	0.19 %	0.18 %	0.10 %	0.10 %
30	0.20	0.19	0.10	0.10
35	0.24	0.21	0.12	0.12
40	0.30	0.26	0.15	0.15
45	0.41	0.34	0.21	0.21
50	0.62	0.48	0.78	0.78
55	1.09	0.76	1.36	1.36
60	1.84	1.38	2.30	2.30
65	2.95	2.21	0.00	0.00

**CITY OF JOLIET FIREFIGHTERS' PENSION FUND**  
**EXPERIENCE REVIEW SUMMARY**  
**SECTION II EXPERIENCE ANALYSIS AND PROPOSED RATES (CONT'D)**

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**Withdrawal**

We reviewed the pattern of withdrawal using two different approaches – withdrawal by age and withdrawal by service. The current withdrawal rates are based on age. The historical experience suggests that withdrawal is more closely linked to service than age and we recommend changing withdrawal to a service basis. The experience indicates that fewer members are terminating than expected and we propose decreasing current rates by 50 percent. The proposed rates produced 11.4 expected terminations which compares to eight actual terminations during the experience period.

**Current Rates**

<b>Age</b>	<b>Male</b>	<b>Female</b>
25	3.4 %	3.9 %
30	2.6	3.1
35	1.8	2.2
40	1.1	1.5
45	0.6	0.9
50	0.3	0.5
55	0.0	0.2

<b>Service</b>	<b>Current Rates<sup>1</sup></b>	<b>Expected Counts</b>	<b>Actual Rates<sup>1</sup></b>	<b>Actual Counts</b>	<b>Proposed Rates<sup>1</sup></b>	<b>Proposed Counts</b>
0 - 4	2.6%	11.3	1.4%	6.0	1.3%	5.7
5 - 9	1.8%	6.4	0.0%	0.0	0.9%	3.2
10-14	1.2%	3.5	0.3%	1.0	0.6%	1.8
15-19	0.8%	1.2	0.0%	0.0	0.4%	0.6
20-24	0.5%	0.3	1.7%	1.0	0.2%	0.1
25-29	0.4%	0.0	0.0%	0.0	0.2%	0.0
30-34	0.0%	0.0	0.0%	0.0	0.0%	0.0
35-39	0.0%	0.0	0.0%	0.0	0.0%	0.0
<b>Total</b>		<b>22.7</b>		<b>8.0</b>		<b>11.4</b>

<sup>1</sup> Average rate within the service band.

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**SECTION III**  
COST IMPACT

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**CITY OF JOLIET FIREFIGHTERS' PENSION FUND**  
**EXPERIENCE REVIEW SUMMARY**  
**SECTION III COST IMPACT**

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**Comparisons of the experience study results with the  
Actuarial Valuation as of January 1, 2007**

	<b>Valuation</b>	<b>Experience Study 7.5%</b>	<b>Experience Study 7.25%</b>
Active Firefighters	209	209	209
Vested Terminations	1	1	1
Disabled Lives	28	28	28
Service Retirees	67	67	67
Beneficiaries	28	28	28
Total Annual Salaries of Firefighters	\$ 16,024,475	\$ 16,024,475	\$ 16,024,475
Average covered salary	\$ 76,672	\$ 76,672	\$ 76,672
Gross Annual Normal Cost	\$ 4,237,808	\$ 4,369,571	\$ 4,647,556
Less Expected Member Contributions (for Applicable Plan Year)	1,515,114	1,515,114	1,515,114
Net Annual Normal Cost (Municipality Paid)	\$ 2,722,694	\$ 2,854,457	\$ 3,132,442
Net Annual Normal Cost (As a percentage of pay)*	17.0 %	17.8 %	19.5 %
Gross Actuarial Accrued Liability:			
Active Firefighters	\$ 55,622,529	\$ 56,383,653	\$ 58,847,696
Retirees, Beneficiaries & Disabled	73,366,628	75,729,945	77,502,936
Total Actuarial Accrued Liability	\$ 128,989,157	\$ 132,113,598	\$ 136,350,632
Actuarial Value of Assets at Valuation Date	\$ 69,723,586	\$ 69,723,586	\$ 69,723,586
Unfunded (Overfunded) Actuarial Accrued Liability	\$ 59,265,571	\$ 62,390,012	\$ 66,627,046
<b>Funded Position of Plan's Gross Actuarial Accrued Liability**</b>	54.1 %	52.8 %	51.1 %

**CITY OF JOLIET FIREFIGHTERS' PENSION FUND**  
**EXPERIENCE REVIEW SUMMARY**  
**SECTION III COST IMPACT (CONT'D)**

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**Development of Contribution for Plan Year Beginning January 1, 2007**

	<u>Valuation</u>	<u>Experience Study 7.5%</u>	<u>Experience Study 7.25%</u>
Net Annual Normal Cost (Municipality Paid)	\$2,722,694	\$2,854,457	\$3,132,442
Annual Amortization Payments for Funding Unfunded Actuarial Accrued Liability Over 40 Years from July 1, 1993 as a level percentage of payroll	2,812,404	3,478,069	3,621,142
Interest Adjustment to Expected Date of Payment into the Fund (Optional)	<u>1,096,932</u>	<u>1,254,964</u>	<u>1,291,444</u>
Total Minimum Annual Contribution Requirement for the Current Plan Year	<u>\$6,632,030</u>	<u>\$7,587,490</u>	<u>\$8,045,028</u>
Minimum Annual Contribution (As a percentage of pay)	41.4%	47.3%	50.2%