

**MICHIGAN PUBLIC SCHOOL EMPLOYEES  
RETIREMENT SYSTEM**

**Report on Actuarial Valuation  
as of September 30, 2002**

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Submitted by  
The Segal Company  
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## **I. INTRODUCTION**

Actuarial valuations of the Michigan Public School Employees' Retirement System (the "System") are prepared annually to determine the actuarial condition of the System and the employer contribution rate required to fund the System on an actuarial reserve basis. The calculated employer contribution rates derived from this actuarial valuation as of September 30, 2002 take account of the provisions of the System, as governed by Public Act 300 of 1980, as amended.

A total of 476,030 System members is included in this 2002 actuarial valuation. The total membership is comprised of 326,350 active members, 14,403 inactive vested members, and 135,277 retirees and beneficiaries. As of September 30, 2002, the total assets of the System amounted to approximately \$30.33 billion at market value. Of this total, the portion used to fund pension benefits was \$29.66 billion at market value and \$38.38 billion at actuarial value.

In addition to utilizing current membership and financial data, an actuarial valuation requires the use of a series of assumptions regarding uncertain future events. The assumptions used in the 2002 actuarial valuation of the System are the same as those used in 2001. These assumptions were first adopted by the Retirement Board and the Department of Management and Budget for the 1998 valuation, based on an actuarial experience investigation covering the period from September 30, 1992 through September 30, 1997.

Based on the results of this valuation, the total (employee and employer) contribution rate for pension benefits increased from 11.11% reported last year to 12.27% this year. The corresponding employer contribution rate increased from 7.22% to 8.37%. More details concerning these calculations are shown in Section II.

## **II. RESULTS OF ACTUARIAL VALUATION**

Our actuarial valuation of the Michigan Public School Employees' Retirement System as of September 30, 2002 is based on four major elements:

1. The present benefit provisions of the System, as governed by Public Act 300 of 1980, as amended (see Section VI).
2. The characteristics of active and inactive System members as of September 30, 2002 (see Section IV).
3. The assets attributable to System members, which amounted to a total of approximately \$30.33 billion at market value (\$29.66 billion for pension benefits, \$352 million in a stabilization subaccount and \$320 million for retiree health) as of September 30, 2002. The actuarial value of pension assets was \$38.38 billion (see Section III).
4. The actuarial assumptions (including an investment yield rate of 8%) and funding method described in Section V. New actuarial assumptions were adopted for the 1998 valuation, based on the results of an actuarial experience investigation covering the period from September 30, 1992 through September 30, 1997. These assumptions remain in effect for the 2002 valuation.

The employer contribution rate has been determined based on the entry age normal funding method. Table 1 presents the actuarially-determined employer contribution rate for the current and prior year. Under the entry age normal cost funding method, the total employer contribution is comprised of the normal cost plus the level annual percentage of payroll payment required to amortize any unfunded actuarial accrued liability over 40 years from October 1, 1996 (34 years remaining from October 1, 2002). The employer normal cost is, for each employee, the level percentage of payroll contribution (from entry age to retirement) required to accumulate sufficient assets at the member's retirement to pay for his or her projected benefit.

The actuarial accrued liability represents the difference between the present value of all future benefits and the present value of future normal costs. The unfunded actuarial accrued liability (*i.e.*, the actuarial accrued liability less assets accumulated as of the valuation date), is then amortized as noted above. Any overfunded actuarial accrued liability is credited to a stabilization subaccount. Each of these components of the employer contribution rate (*i.e.*, normal cost and amortization payment) is shown separately in Table 1.

The employer contribution rate (net of member contributions) for all pension benefits increased from 7.22% to 8.37% of total payroll between the 2001 and 2002 actuarial valuations. The 1.15% payroll increase in the rate resulted from a 0.01% decrease in the employer normal cost rate (6.46% to 6.45%), which was more than offset by a 1.16% increase in the amortization payment as a percentage of payroll (0.76% to 1.92%). Table 1 provides further details concerning the components of the employer contribution rate for the 2000, 2001 and 2002 valuations.

Under the entry age normal funding method, actuarial gains or losses affect the actuarial accrued liability and, therefore, the amortization payment on the unfunded actuarial accrued liability. Table 2 shows the unfunded (overfunded) actuarial accrued liability for pension benefits for each of the past two fiscal years, and the derivation of the actuarial gain or loss for each year. Note that, for fiscal 2002, an experience loss of \$2.096 billion was realized. This compares to a loss of \$1.259 million in the prior year. The fiscal 2002 loss consists of a \$1.985 billion investment loss, as well as a \$110.9 million loss from demographic factors. The fiscal 2001 loss was comprised of a \$601.3 million investment loss in addition to a \$657.6 million demographic loss.

Table 3 shows the actuarially-determined percent of payroll employer contribution rates over the past 26 years. Also shown are the actual contribution and actual payroll for each year. Table 4 presents an actuarial balance sheet for the System (pension benefits) as of September 30, 2002 and 2001.

There is no single all-encompassing test for measuring a retirement system's funding progress and current funded status. However, some common indicators of the progress that a system has achieved in funding their obligations include observing the changes over time in the following items:

1. The ratio of valuation assets to actuarial accrued liabilities.
2. The pattern of the unfunded actuarial accrued liability as a percentage of active payroll.
3. The ratio of valuation assets to the actuarial present value of vested benefits (computed as if the System were terminated on the valuation date).
4. A comparison of the plan's present assets (at actuarial value) with (1) active member contributions on deposit, (2) liabilities for future benefits to retired lives, and (3) the actuarial accrued liabilities for service already rendered by active members.

Table 5 presents the historical changes in the first two funding measures over the past 18 years. Table 6 shows the funding progress achieved in measure 3 indicated above. Finally, Table 7 indicates the historical change in funding measure 4.

**Table 1**

**Contribution Rates as a Percentage of Payroll**

**Pension Benefits Only**

	<b>October 1, 2002 Valuation</b>	<b>October 1, 2001 Valuation</b>	<b>October 1, 2000 Valuation</b>
Normal Cost	10.35%	10.35%	10.23%
Amortization payment	<u>1.92</u>	<u>0.76</u>	<u>0.14</u>
Total Contribution requirement	12.27%	11.11%	10.37%
Member contributions	3.90%	3.89%	3.89%
Employer contributions	8.37%	7.22%	6.48%
Payroll used in deriving contribution rates (in millions)	\$9,707.3	\$9,264.2	\$8,984.7

**Table 2**

**Unfunded Actuarial Accrued Liability and Actuarial Gain (Loss)**  
**Pension Benefits Only**

	Unfunded Actuarial Accrued Liability as of	
	September 30, 2002	September 30, 2001
1. Actuarial accrued liability	\$41,957,229,539	\$39,773,742,986
2. Valuation assets	<u>38,382,189,323</u>	<u>38,399,142,454</u>
3. Unfunded (overfunded) actuarial accrued liability = (1) - (2)	\$ 3,575,040,216	\$ 1,374,600,532
	Derivation of Actuarial Gain (Loss) Years Ended	
	September 30, 2002	September 30, 2001
4. Unfunded actuarial accrued liability (UAAL) at start of year	\$ 1,374,600,532	\$ 246,201,996
5. Normal cost	958,720,379	919,387,537
6. Actual employer and member contributions	1,017,113,198	1,133,082,405
7. Transfer from (to) stabilization subaccount	(16,370,295)	(33,908,638)
8. Expected UAAL at end of year = (4) + (5) - (6) - (7), adjusted for interest	1,479,213,965	115,695,978
9. Change from revisions in actuarial assumptions	none	none
10. Expected UAAL after changes = (8) + (9)	1,479,213,965	115,695,978
11. Actual UAAL at end of year	3,575,040,216	1,374,600,532
12. Gain (loss) = (10) - (11)	\$ (2,095,826,251)	\$ (1,258,904,554)
13. Gain (loss) as percent of pension actuarial accrued liabilities at start of year (\$39,773,742,986 and \$37,139,129,717 as of September 30, 2001 and September 30, 2000, respectively)	-5.27%	-3.39%



**Table 3**  
**Recommended and Actual State Contributions: Pension Benefits Only (Dollar Amounts in Millions)**

Fiscal Year	Valuation Date September 30	Actual Contributions	Actual Payroll	% of Payroll Contributions	
				Computed	Actual
1977-1978	1976	\$285.3	\$2,809.2	12.34%	10.16%
1978-1979	1977	438.2	3,065.2	13.57	14.30
1979-1980	1978	451.7	3,332.0	13.50	13.56
1980-1981	1979	473.8	3,554.4	13.20	13.33
1981-1982	1980	-	-	13.11	-
1981-1982	1980 <sup>1</sup>	413.7	3,686.7	10.98	11.22
1982-1983	1981	438.3	3,842.1	11.17	11.41
1983-1984	1982	450.0	3,968.7	11.39	11.34
1984-1985	1983	486.4	4,220.3	11.62	11.53
1985-1986	1984	-	-	12.13	-
1985-1986	1984 <sup>2</sup>	567.9	4,561.4	9.42	8.96
1986-1987	1985	-	-	9.20	-
1986-1987	1986	-	-	9.12	-
1986-1987	1986 <sup>4</sup>	515.5	4,739.6	7.85	8.05
1987-1988	1987	597.1	5,248.3	7.55	8.70
1988-1989	1988	566.3	5,403.4	8.01	7.86
1989-1990	1989	-	-	8.11	-
1989-1990	1989 <sup>3</sup>	-	-	8.20	-
1989-1990	1989 <sup>1</sup>	654.2	5,818.3	7.70	8.11
1990-1991	1990	502.4	6,248.2	8.06	8.04
1991-1992	1991	546.9	6,592.8	8.69	8.30
1992-1993	1992	612.2	7,014.7	9.06	8.73
1993-1994	1993	-	-	8.75	-
1993-1994	1993 <sup>4</sup>	809.8	7,319.5	8.62	11.06
1994-1995	1994	769.9	7,433.5	10.91	10.36
1995-1996	1995	829.6	7,732.5	11.21	10.73
1996-1997	1996 <sup>5</sup>	904.9	8,028.6	10.97	11.27
1997-1998	1997	-	-	10.22	-
1997-1998	1997 <sup>1</sup>	674.7	8,226.1	6.70	8.20
1998-1999	1998	-	-	6.96	-
1998-1999	1998 <sup>1</sup>	574.4	8,447.7	7.18	6.80
1999-2000	1999	655.3	9,169.3	6.63	7.15
2000-2001	2000	756.0	9,374.8	6.48	8.06
2001-2002	2001	604.0	9,719.6	7.22	6.21
2002-2003	2002	-	-	8.37	-

<sup>1</sup> Revised actuarial assumptions and/or methods. <sup>2</sup> Revised actuarial assumptions and/or methods; benefit changes. <sup>3</sup> Benefit changes. <sup>4</sup> Revised asset valuation method.  
<sup>5</sup> Amortization period changed from rolling 50 years to declining 40 years effective 10-1-96.

**Table 4**

**Actuarial Balance Sheet as of September 30, 2002 and 2001**  
**Pension Benefits Only**

	<b>Present Resources and Expected Future Resources</b>	
	<b>2002</b>	<b>2001</b>
<b>A. Valuation assets</b>		
1. Net assets from system financial statement (market value)	\$29,655,593,676	\$34,605,769,223
2. Valuation asset adjustment	<u>8,726,595,647</u>	<u>3,793,373,231</u>
3. Valuation assets	38,382,189,323	38,399,142,454
<b>B. Present value of expected future employer contributions</b>		
1. For normal costs	\$ 4,700,527,450	\$ 4,514,835,918
2. For unfunded (overfunded) actuarial accrued liabilities	<u>3,575,040,216</u>	<u>1,374,600,532</u>
3. Total	\$ 8,275,567,666	\$ 5,889,436,450
<b>C. Present value of expected future member contributions</b>	3,472,290,143	3,299,882,267
<b>D. Total present and expected future resources</b>	<u>\$50,130,047,132</u>	<u>\$47,588,461,171</u>
	<b>Present Value of Expected Future Benefit Payments and Reserves</b>	
<b>A. To retirees and beneficiaries</b>	\$22,480,420,600	\$20,942,872,155
<b>B. To vested terminated members</b>	654,938,675	756,223,818
<b>C. To present active members</b>		
1. Allocated to service rendered prior to the valuation date	18,821,870,264	18,074,647,013
2. Allocated to service expected to be rendered after the valuation date	<u>8,172,817,593</u>	<u>7,814,718,185</u>
3. Total	\$26,994,687,857	\$25,889,365,198
<b>D. Reserves</b>		
1. Allocated to retirees and beneficiaries	none	none
2. Unallocated investment income and adjustments	none	none
3. Total	none	none
<b>E. Total present value of expected future benefit payments and reserves</b>	<u>\$50,130,047,132</u>	<u>\$47,588,461,171</u>

Table 5

**Historical Funding Levels for Actuarial Accrued Liabilities**  
**Pension Benefits Only**  
**(Dollar Amounts in Millions)**

Valuation Date September 30	Actuarial Accrued Liability	Valuation Assets	Funded Ratio	Unfunded (Overfunded) Accrued Liability	Active Member Payroll <sup>5</sup>	Unfunded (Overfunded) As % of Active Payroll
1984	\$ 8,945	\$ 6,774	75.7%	\$2,171	\$3,969	54.7%
1985 <sup>1</sup>	9,487	7,559	79.7	1,928	4,220	45.7
1986 <sup>2</sup>	10,257	9,645	94.0	612	4,561	13.4
1987 <sup>3</sup>	11,240	10,930	97.2	310	4,739	6.5
1988	14,029	11,823	84.3	2,206	5,248	42.0
1989 <sup>4</sup>	14,382	12,971	90.2	1,411	5,403	26.1
1990	15,766	13,746	87.2	2,020	5,818	34.7
1991	18,032	14,653	81.3	3,379	6,248	54.1
1992	19,563	15,333	78.4	4,230	6,593	64.2
1993 <sup>2</sup>	21,699	16,999	78.3	4,700	7,070	66.5
1994	23,500	18,503	78.7	4,997	7,344	68.0
1994 <sup>6</sup>	25,014	18,503	74.0	6,511	7,344	88.7
1995	27,402	20,455	74.6	6,947	7,565	91.8
1996	28,571	22,529	78.9	6,042	7,807	77.4
1997	30,179	25,485	84.4	4,694	8,027	58.5
1997 <sup>7</sup>	29,792	30,051	100.9	(259)	8,027	(3.2)
1998	32,137	31,870	99.2	267	8,265	3.2
1998 <sup>6</sup>	32,863	31,870	97.0	993	8,265	12.0
1999	34,348	34,095	99.3	253	8,644	2.9
2000	37,139	36,893	99.3	246	8,985	2.7
2001	39,774	38,399	96.5	1,375	9,264	14.8
2002	41,957	38,382	91.5	3,575	9,707	36.8

<sup>1</sup> Revised actuarial assumptions/methods and benefit changes. <sup>2</sup> Revised asset valuation method.

<sup>3</sup> Inclusion of MIP. <sup>4</sup> Benefit changes and revised actuarial assumptions.

<sup>5</sup> Valuation payroll includes payroll projection factor through 1994. <sup>6</sup> Revised actuarial assumptions.

<sup>7</sup> Revised actuarial assumptions and revised asset valuation method.

**Table 6**

**Funding Objective Achievement Indicators - Historical Comparison**  
**Pension Benefits Only**  
**(Dollar Amounts in Millions)**

Valuation September 30	Valuation Assets	Termination Indicator		Experience Indicator
		Actuarial Present Value of Vested Benefits	Funded Ratio	Actuarial Gain (Loss)
1993	\$16,767	\$15,892	105.5%	N/A
1993 <sup>1</sup>	16,999	15,892	107.0	N/A
1994	18,503	17,493	105.8	N/A
1994 <sup>2</sup>	18,503	18,488	100.1	N/A
1995	20,455	20,192	101.3	\$ (168.1)
1996	22,529	21,365	105.4	1,185.6
1997	25,485	23,413	108.8	1,563.0
1997 <sup>3</sup>	30,051	23,601	127.3	1,563.0
1998	31,870	25,838	123.3	(582.5)
1998 <sup>2</sup>	31,870	26,205	121.6	(582.5)
1999	34,095	27,755	122.8	903.7
2000	36,893	30,264	121.9	1.5
2001	38,399	32,755	117.2	(1,259)
2002	38,382	34,686	110.7	(2,096)

<sup>1</sup> Revised asset valuation method.

<sup>2</sup> Revised actuarial assumptions.

<sup>3</sup> Revised actuarial assumptions and asset valuation method.

Table 7

**Historical Funding Levels for Actuarial Accrued Liability  
Pension Benefits Only**

Valuation Date September 30	Actuarial Accrued Liability (\$ in Millions)			Valuation Assets (\$ in Millions)	Portion of Actuarial Accrued Liability Covered by Assets			
	(1)	(2)	(3)		(1)	(2)	(3)	(4)**
	Active Member Contributions	Retirants and Beneficiaries	Active and Inactive Members (Employer Financed Portion)					
1987++	\$ 735	\$ 4,012	\$ 6,493	\$10,930	100%	100%	95.2%	97.2%
1988	874	4,503	8,652	11,823	100	100	74.5	84.3
1989#@	1,003	6,046	7,333	12,971	100	100	80.8	90.2
1990	1,192	6,611	7,963	13,746	100	100	74.6	87.2
1991	1,365	7,505	9,162	14,653	100	100	63.1	81.3
1992	1,510	8,212	9,841	15,333	100	100	57.0	78.4
1993+	1,700	9,177	10,822	16,999	100	100	56.6	78.3
1994	1,892	10,051	11,557	18,502	100	100	56.8	78.7
1994@	1,892	10,312	12,810	18,502	100	100	49.2	74.0
1995	2,057	11,569	13,776	20,455	100	100	49.6	74.6
1996	2,261	12,590	13,720	22,529	100	100	56.0	78.9
1997	2,500	14,303	13,376	25,485	100	100	64.9	84.4
1997@+	2,500	14,303	12,989	30,051	100	100	102.0	100.9
1998	2,505	15,689	13,943	31,870	100	100	98.1	99.2
1998@	2,505	15,888	14,470	31,870	100	100	93.1	97.0
1999	2,706	17,291	14,351	34,095	100	100	98.2	99.3
2000	2,932	19,200	15,007	36,893	100	100	98.4	99.3
2001	3,244	20,943	15,587	38,399	100	100	91.2	96.5
2002	3,490	22,480	15,987	38,382	100	100	77.6	91.5

@ Revised actuarial assumptions. # Benefits amended. + Revised asset valuation method. \*\* Percents funded on a total valuation asset and total actuarial accrued liability basis. ++ After inclusion of Member Investment Plan.

### **III. FINANCIAL EXPERIENCE**

As of September 30, 2002, the market value of total System assets amounted to approximately \$30.33 billion. Of this total, \$320 million was set aside for health benefits and \$352 million was in the stabilization subaccount, leaving \$29.66 billion in pension assets. Table 8 shows the distribution of assets at market value by type of investment as of the current and preceding valuation dates.

Legislation adopted in late 1997 (Public Act 143 of 1997) provided that, for actuarial valuation purposes, market value would be used as of September 30, 1997. For investment gains or losses that occur after that date, a 5-year smoothing technique will be used. This is the same procedure as was used prior to September 30, 1997, and is described below.

The actuarial value of assets as of September 30, 1997 was market value. For valuations prior to 1997 and after 1997, the actuarial value of assets is determined on the basis of a valuation method that assumes the fund earns the expected rate of return of 8%, and includes an adjustment to reflect market value. This procedure is applied as follows:

- (i) The preliminary value is determined by taking the sum of the actuarial value at the beginning of the year and the excess of income over expenses during the year, assuming that the fund earns the assumed rate of 8% during the year.
- (ii) This value is written-up or written-down by taking 20% of each year's difference between actual and expected return for the next five years. Actual return for the year includes net interest, dividends, and asset appreciation or depreciation.

For the September 30, 2002 valuation, the actuarial value of pension assets is \$38.38 billion, which is approximately \$8.73 billion (29.4%) more than the market value of \$29.66 billion. Table 9 shows the historical growth in market value of the System's assets. Table 10 presents the details of the determination of the actuarial value of assets for the current and prior years.

**Table 8**

**Assets and Fund Balances at Market Value**

<b>Reported Assets (Market Value)</b>		
	<b>Assets September 30,</b>	
<b>Type of Asset</b>	<b>2002</b>	<b>2001</b>
Cash	\$ 106,810,466	\$ 96,868,380
Receivables	520,691,897	571,515,854
Short-term Investments	720,352,081	2,703,796,615
Bonds, Notes, Mortgages and Preferred Stock	7,074,829,641	6,974,546,565
Common Stock	12,593,337,636	14,338,964,544
Real Estate	2,938,910,979	3,172,623,210
Alternative Investments	4,277,788,660	5,217,511,296
International Investments	<u>2,265,839,812</u>	<u>2,271,316,068</u>
Total Assets	\$30,498,561,171	\$35,347,142,532
Less: Current Liabilities	<u>(170,730,557)</u>	<u>(216,570,560)</u>
Net Assets Available for Benefits	\$30,327,830,615	\$35,130,571,972
<b>Reported Fund Balance (Market Value)</b>		
	<b>Balance September 30,</b>	
<b>Description</b>	<b>2002</b>	<b>2001</b>
Reserve for Employees' Contributions (Employee Savings Fund)	\$ 1,209,818,426	\$ 1,072,009,070
Member Investment Plan	3,028,088,690	2,787,505,056
Reserve for Employer Contributions (Employer Accumulation Fund)	(267,613,939)	1,184,118,566
Reserve for Retired Benefit Payments (Pension Reserve Fund)	20,634,260,157	18,934,840,270
Reserve for Health Benefits	319,800,957	188,737,061
Reserve for Undistributed Investment Income (Income Fund)	5,051,040,344	10,627,296,263
Stabilization subaccount	<u>352,435,980</u>	<u>336,065,686</u>
Total Fund balances	<u>\$30,327,830,615</u>	<u>\$35,130,571,972</u>

Table 9

**Historical Growth of Assets at Market Value**

Year Ended September 30,	Revenues			Expenses			Net Assets at Market Value
	Member Contributions	Employer Contributions	Investment Income	Benefit Payments	Contribution Refunds	Administrative Expenses	
1978	\$ -	\$ -	N/A	\$ -	\$ -	\$ -	N/A
1979	4,371,642	453,326,089	N/A	208,627,316	10,496,482	2,291,412	N/A
1980	4,335,747	470,896,425	N/A	224,744,415	9,115,471	2,5414,313	N/A
1981	6,705,051	494,018,362	N/A	241,153,835	7,396,962	3,168,889	N/A
1982	3,413,290	441,061,814	N/A	287,565,834	6,309,515	3,657,465	N/A
1983	7,847,450	474,369,763	N/A	323,784,018	4,034,185	4,104,159	N/A
1984	4,527,101	492,725,287	N/A	347,047,646	3,676,715	4,556,693	N/A
1985	5,986,653	532,675,122	N/A	371,054,811	2,243,571	6,263,001	N/A
1986	16,765,728	567,879,458	N/A	621,025,615	1,861,920	7,436,516	N/A
1987	100,364,158	515,458,166	N/A	791,194,027	1,515,904	7,191,225	N/A
1988	141,662,530	597,092,668	N/A	616,882,022	1,560,025	8,184,566	N/A
1989	157,309,641	566,307,528	N/A	741,995,367	1,425,086	8,251,139	N/A
1990	174,658,758	654,221,516	N/A	821,705,321	2,418,522	9,162,434	N/A
1991	175,136,454	673,399,035	N/A	897,827,918	3,317,244	17,398,261	N/A
1992	208,791,106	751,909,882	N/A	1,002,123,397	3,453,421	25,990,432	\$16,498,623,006
1993	242,018,294	760,446,814	1,980,352,703	1,094,442,442	3,940,883	36,407,714	18,346,649,778
1994	264,638,521	877,409,856	444,815,417	1,208,331,304	5,457,370	45,812,746	18,673,912,152
1995	271,859,995	1,017,486,956	3,116,656,100	1,359,988,407	8,369,566	48,211,560	21,663,345,670
1996	279,052,573	1,110,808,092	3,299,263,857	1,533,696,715	186,1914,313	52,518,344	24,580,057,088
1997	278,789,985	1,222,326,910	5,766,520,214	1,650,304,796	17,904,603	41,833,668	30,137,651,130
1998	266,105,558	984,274,725	2,413,274,166	1,811,893,540	21,252,147	47,154,514	31,921,005,378
1999	549,259,484	920,601,920	5,104,774,748	1,955,626,410	15,585,460	51,061,591	36,473,368,069
2000	355,229,988	1,084,255,551	4,765,922,069	2,161,697,019	17,486,704	53,957,715	40,445,634,239
2001	415,565,528	1,260,006,294	(4,564,964,529)	2,347,069,816	19,908,136	58,691,608	35,130,571,972
2002	456,381,392	1,208,577,347	(3,823,824,261)	2,554,611,684	20,880,961	68,383,190	30,327,830,615

Note: Above figures include supplemental payments and health benefits, and administration fees for self-insured health benefits. Assets include pension, health and the stabilization subaccount.



**Table 10**  
**Derivation of Valuation Assets (Pension Only)**

	Year Ending September 30				
	2002	2001	2000	1999	1998
1. Beginning of Year Assets					
a) Market Value	\$34,605,769,223	\$40,010,183,836	\$36,069,097,608	\$31,850,033,400	\$30,050,729,894
b) Valuation Assets	38,399,142,454	36,892,927,721	34,095,136,260	31,870,381,076	30,050,729,894
2. End of Year Assets at Market Value	29,655,593,676	34,605,769,223	40,010,183,836	36,069,097,608	1,850,033,400
3. Net Additions to Market Value					
a) Member Contributions	413,163,871	377,080,269	321,557,145	518,861,555	238,395,914
b) Employer Contributions	603,949,327	756,002,136	655,258,923	574,436,928	674,716,330
c) Investment Income	(3,865,135,521)	(4,575,628,001)	4,755,962,438	5,021,347,154	2,370,901,925
d) Benefit Payments	(2,041,439,863)	(1,890,812,400)	(1,735,936,329)	(1,587,992,361)	(1,448,524,281)
e) Contribution Refunds/Transfers	(20,813,845)	(19,835,729)	(17,455,802)	(11,198,299)	(21,626,704)
f) Administrative Expenses	(23,529,221)	(17,312,250)	(15,918,143)	(16,615,725)	(14,559,678)
g) Transfer to stabilization subaccount	<u>(16,370,295)</u>	<u>(33,908,638)</u>	<u>(22,382,004)</u>	<u>(279,775,044)</u>	<u>-0-</u>
h) Total Additions to Market Value	(4,950,175,547)	(5,404,414,613)	3,941,086,228	4,219,064,208	1,799,303,506
4. Summary of Net Additions to Market Value					
a) Net Contributions and transfers = (3a) + (3b) + (3e) + (3g)	979,929,058	1,079,338,038	936,978,262	802,325,140	891,485,540
b) Net Investment Income = (3c) + (3f)	(3,888,664,742)	(4,592,940,251)	4,740,044,295	5,004,731,429	2,356,342,247
c) Benefit Payments = (3d)	<u>(2,041,439,863)</u>	<u>(1,890,812,400)</u>	<u>(1,735,936,329)</u>	<u>(1,587,992,361)</u>	<u>(1,448,524,281)</u>
d) Total Additions to Market Value	(4,950,175,547)	(5,404,414,613)	3,941,086,228	4,219,064,208	1,799,303,506
5. Average Valuation Assets = (1b) + .5 x [(4a) + (4c)]	37,868,387,052	36,487,190,540	33,695,657,226	31,477,547,465	29,772,210,524
6. Imputed Income at Valuation Rate = 8% x (5)	3,029,470,964	2,918,975,243	2,695,652,578	2,518,203,797	2,381,776,842
7. Gain (Loss) from Investments = (4b) - (6)	(6,918,135,706)	(7,511,915,494)	2,044,391,717	2,486,527,632	(25,434,595)
8. Portion of Gains (Losses) recognized from prior years					
a) From this year = .2 x (7)	(1,383,627,141)	(1,502,383,099)	408,878,343	497,305,526	(5,086,919)
b) From one year ago	(1,502,383,099)	408,878,343	497,305,526	(5,086,919)	N/A
c) From two years ago	408,878,343	497,305,526	(5,086,919)	N/A	N/A
d) From three years ago	497,305,526	(5,086,919)	N/A	N/A	N/A
e) From four years ago	<u>(5,086,919)</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
f) Total	(1,984,913,290)	(601,286,149)	901,096,950	492,218,607	(5,086,919)
9. Change in Valuation Assets = (4a) + (4c) + (6) + (8f)	(16,953,131)	1,506,214,733	2,797,791,461	2,224,755,184	1,819,651,182
10. End of Year Assets					
a) Market Value = (2)	29,655,593,676	34,605,769,223	40,010,183,836	36,069,097,608	31,850,033,400
b) Valuation Assets = (1b) + (9)	38,382,189,323	38,399,142,454	36,892,927,721	34,095,136,260	31,870,381,076
11. Actuarial Rate of Return	2.76%	6.35%	10.67%	9.56%	7.98%

Note: Due to enactment of Public Act 143 of 1997, the actuarial value of assets as of September 30, 1997 (item 10b) was reset to market value (item 10a).

#### IV. MEMBERSHIP CHARACTERISTICS

A total of 476,030 active, inactive vested, and retired members of the Michigan Public School Employees' System are included in this 2002 actuarial valuation.

Computer tapes containing membership data as of September 30, 2002 were provided to us by the Office of Retirement Services. For purposes of the actuarial valuation, we prepared various tabulations of the membership data recorded on the computer tapes. Summaries of these tabulations are presented in this section and in the tables which follow.

##### Active Employees

The 326,350 active employees covered by the System as of September 30, 2002 had a total reported payroll of \$9.71 billion and an average annual salary of \$29,745. The payroll figure used in the valuation was actual earnings for the year ended September 30, 2002 (annualized for members where the full year's salary had not yet been reported), but not less than the annual rate of pay as of September 30, 2002. Between the 2001 and 2002 actuarial valuations, the number of active members increased by 7,812, or 2.5%, while average age, service and salary changed, as shown below:

	<u>September 30,</u>	
	<u>2002</u>	<u>2001</u>
Number of Active Members	326,350	318,538
Average Age	43.6 years	43.6 years
Average Service	9.5 years	9.6 years
Reported Payroll*	\$9,707,280,750	\$9,264,183,066
Average Annual Pay	\$29,745	\$29,083

\* October 1 through September 30 payroll (annualized if full year not reported), but not less than the September 30 rate.

Table 11-A shows the average age, average years of service, and average salary of active employees as of September 30, 2002. Tables 11-B and 11-C show the information separately for MIP members and Basic members. Table 12 shows the distribution of employees as of September 30, 2002 by annual salary. Table 13 presents the characteristics of the active membership by type of plan.

Table 14 presents an historical comparison of the number and characteristics of active members reported for actuarial valuations since 1964.

The data for the active members included 14,990 with no year of birth and 15,138 with no sex indication. Last year the comparable figures were 14,111 and 15,634, respectively. The unknown data were adjusted by endowing them with an average entry age and the most common sex code (*i.e.*, female) of the group.

**Inactive Members**

The 2002 actuarial valuation also takes account of the actuarial liabilities for 14,403 reported inactive vested members, as compared to 14,313 in the 2001 valuation and 8,045 in 2000.

**Retirees and Beneficiaries**

As of September 30, 2002, the System was paying pensions to a total of 135,277 retirees and beneficiaries in an annual amount of approximately \$2,094 million. During fiscal 2002, the total number of benefit recipients increased by 4,487 as shown below.

	<u>September 30,</u>	
	<u>2002</u>	<u>2001</u>
Retirement Pensions	118,833	114,936
Survivor Pensions*	11,745	11,316
Disability Pensions	<u>4,699</u>	<u>4,538</u>
Total benefit recipients	135,277	130,790

\* Includes beneficiaries of disability retirees.

Table 15 shows a distribution of the 135,277 System benefit recipients as of September 30, 2002, by age, type and amount of benefit. Table 16 shows a similar distribution, by type of benefit and monthly amount categories. The average annual pension for all benefit recipients was \$15,482 as of September 30, 2002, after adjustment for optional benefit forms. During fiscal 2002, the average annual pension for all System benefit recipients increased from \$14,859 to \$15,482, or by 4.2%.

Table 17 presents a historical development of the growth in number and amount of benefit recipients in force, as well as the present value of their liabilities, since the 1962 valuation. Finally, Table 18 shows the number and annual pensions for each specific type of pension in force.

**Table 11-A**  
**Employees in Active Service as of September 30, 2002**  
**by Age and Years of Service**  
**ALL MEMBERS**

Age	Total	Years of Service								
		0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Total	326,350	152,894	54,642	35,901	27,137	19,677	19,481	13,278	2,956	384
Average Salary	\$29,745	\$13,098	\$32,103	\$40,036	\$45,765	\$50,420	\$59,013	\$66,700	\$72,716	\$75,849
Under 20	355	355								
	\$5,162	\$5,162								
20 - 24	18,885	18,745	139	1						
	\$8,624	\$8,519	\$22,506	\$52,972						
25 - 29	27,650	23,519	4,077	53	1					
	\$23,778	\$21,208	\$38,505	\$30,716	\$71,782					
30 - 34	32,373	17,943	11,487	2,827	116					
	\$28,159	\$16,238	\$41,791	\$48,019	\$38,202					
35 - 39	35,561	18,831	7,329	6,861	2,433	106			1	
	\$27,080	\$12,623	\$35,166	\$50,290	\$48,709	\$37,155			\$76,344	
40 - 44	59,558	36,024	9,484	5,798	5,790	2,201	244	13	4	
	\$21,699	\$10,206	\$28,433	\$41,115	\$52,532	\$46,171	\$40,461	\$50,384	\$85,230	
45 - 49	49,745	15,979	9,782	7,566	5,737	6,202	4,222	253	3	1
	\$32,628	\$12,690	\$27,628	\$36,593	\$46,730	\$56,282	\$57,609	\$50,267	\$27,588	\$26,428
50 - 54	52,276	10,055	6,741	7,480	6,841	5,587	9,718	5,768	83	3
	\$42,081	\$13,144	\$28,368	\$36,635	\$43,833	\$52,558	\$63,519	\$66,883	\$67,562	\$76,364
55 - 59	32,541	5,805	3,392	3,752	4,552	3,922	3,636	5,887	1,578	17
	\$41,970	\$11,941	\$25,205	\$32,825	\$40,907	\$45,233	\$55,549	\$68,962	\$72,934	\$66,748
60 - 64	11,938	3,010	1,382	1,135	1,314	1,349	1,355	1,084	1,127	182
	\$35,380	\$8,677	\$21,144	\$29,508	\$38,047	\$41,370	\$47,592	\$61,123	\$73,818	\$75,828
65 - 69	3,344	1,476	455	272	256	235	218	201	113	118
	\$22,857	\$6,366	\$14,600	\$23,496	\$31,376	\$36,100	\$44,772	\$53,557	\$68,807	\$77,869
70 and over	2,124	1,152	374	156	97	75	88	72	47	63
	\$14,569	\$5,063	\$10,124	\$16,338	\$26,824	\$28,655	\$34,155	\$48,493	\$59,177	\$75,340

**Table 11-B**  
**Employees in Active Service as of September 30, 2002**  
**by Age and Years of Service**  
**MIP MEMBERS**

Age	Total	Years of Service								
		0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Total	263,098	147,549	48,868	24,880	12,827	8,812	9,686	7,945	2,203	328
Average Salary	\$26,434	\$13,191	\$32,993	\$42,018	\$46,665	\$51,088	\$59,815	\$67,525	\$73,299	\$75,483
Under 20	355	355								
	\$5,162	\$5,162								
20 - 24	18,882	18,742	139	1						
	\$8,623	\$8,518	\$22,506	\$52,972						
25 - 29	27,540	23,459	4,036	44	1					
	\$23,769	\$21,213	\$38,537	\$30,502	\$71,782					
30 - 34	30,585	17,347	10,860	2,318	60					
	\$27,976	\$16,323	\$41,955	\$49,373	\$40,443					
35 - 39	30,293	17,943	6,476	4,839	1,002	32			1	
	\$24,978	\$12,566	\$35,282	\$51,381	\$52,600	\$39,909			\$76,344	
40 - 44	50,066	34,697	8,478	3,817	2,169	781	113	7	4	
	\$18,335	\$10,214	\$28,790	\$42,312	\$53,419	\$47,385	\$39,419	\$50,316	\$85,230	
45 - 49	35,826	15,112	8,650	5,076	2,403	2,410	2,003	168	3	1
	\$28,328	\$12,848	\$28,280	\$38,325	\$47,844	\$57,634	\$59,344	\$51,955	\$27,588	\$26,428
50 - 54	34,404	9,371	5,767	5,120	3,520	2,491	4,673	3,397	63	2
	\$38,549	\$13,349	\$29,556	\$39,063	\$45,720	\$53,918	\$64,396	\$67,690	\$70,033	\$78,354
55 - 59	22,232	5,355	2,839	2,611	2,603	2,103	1,906	3,612	1,188	15
	\$40,097	\$12,276	\$26,883	\$35,718	\$42,788	\$46,158	\$56,790	\$69,563	\$73,384	\$66,865
60 - 64	8,697	2,802	1,093	798	839	797	787	595	828	158
	\$33,638	\$8,881	\$23,799	\$31,717	\$39,403	\$43,159	\$48,224	\$62,717	\$74,350	\$76,290
65 - 69	2,610	1,357	325	166	168	148	148	117	83	98
	\$21,838	\$6,488	\$16,953	\$27,486	\$32,419	\$38,712	\$46,910	\$56,433	\$71,405	\$76,258
70 and over	1,608	1,009	205	90	62	50	56	49	33	54
	\$14,433	\$5,406	\$12,373	\$19,713	\$28,180	\$29,956	\$35,266	\$46,559	\$57,463	\$74,909

**Table 11-C**  
**Employees in Active Service as of September 30, 2002**  
**by Age and Years of Service**  
**BASIC MEMBERS**

Age	Total	Years of Service								
		0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Total	63,252	5,345	5,774	11,021	14,310	10,865	9,795	5,333	753	56
Average Salary	\$43,519	\$10,538	\$24,573	\$35,560	\$44,959	\$49,878	\$58,219	\$65,472	\$71,009	\$77,992
20 - 24	3	3								
	\$12,086	\$12,086								
25 - 29	110	60	41	9						
	\$26,094	\$18,965	\$35,282	\$31,760						
30 - 34	1,788	596	627	509	56					
	\$31,285	\$13,772	\$38,947	\$41,854	\$35,800					
35 - 39	5,268	888	853	2,022	1,431	74				
	\$39,167	\$13,760	\$34,285	\$47,677	\$45,985	\$35,964				
40 - 44	9,492	1,327	1,006	1,981	3,621	1,420	131	6		
	\$39,440	\$10,000	\$25,432	\$38,808	\$52,001	\$45,504	\$41,360	\$50,463		
45 - 49	13,919	867	1,132	2,490	3,334	3,792	2,219	85		
	\$43,696	\$9,926	\$22,652	\$33,062	\$45,927	\$55,423	\$56,042	\$46,929		
50 - 54	17,872	684	974	2,360	3,321	3,096	5,045	2,371	20	1
	\$48,881	\$10,340	\$21,335	\$31,367	\$41,833	\$51,463	\$62,708	\$65,726	\$59,778	\$72,383
55 - 59	10,309	450	553	1,141	1,949	1,819	1,730	2,275	390	2
	\$46,009	\$7,948	\$16,586	\$26,203	\$38,395	\$44,164	\$54,181	\$68,008	\$71,562	\$65,876
60 - 64	3,241	208	289	337	475	552	568	489	299	24
	\$40,056	\$5,923	\$11,105	\$24,278	\$35,653	\$38,787	\$46,716	\$59,185	\$72,346	\$72,780
65 - 69	734	119	130	106	88	87	70	84	30	20
	\$26,481	\$4,972	\$8,717	\$17,249	\$29,384	\$31,656	\$40,252	\$49,551	\$61,617	\$85,766
70 and over	516	143	169	66	35	25	32	23	14	9
	\$14,992	\$2,646	\$7,395	\$11,737	\$24,421	\$26,053	\$32,211	\$52,615	\$63,218	\$77,929

**Table 12**  
**Members in Active Service**  
**as of September 30, 2002 by Annual Salary**

	All Members	Type of Plan	
		MIP Members	Basic Members
Total .....	326,350	263,098	63,252
Under \$10,000 .....	98,976	92,312	6,664
\$10,000 - 14,999 .....	25,669	22,333	3,336
15,000 - 19,999 .....	21,571	17,569	4,002
20,000 - 24,999 .....	17,975	14,035	3,940
25,000 - 29,999 .....	19,463	14,906	4,557
30,000 - 34,999 .....	19,994	15,542	4,452
35,000 - 39,999 .....	18,250	14,908	3,342
40,000 - 44,999 .....	14,097	11,556	2,541
45,000 - 49,999 .....	12,641	10,017	2,624
50,000 - 54,999 .....	14,221	10,273	3,948
55,000 - 59,999 .....	13,650	9,050	4,600
60,000 - 64,999 .....	12,280	7,941	4,339
65,000 - 69,999 .....	10,784	6,697	4,087
70,000 - 74,999 .....	8,064	4,923	3,141
75,000 - 79,999 .....	8,728	5,133	3,595
80,000 - 84,999 .....	3,876	2,306	1,570
85,000 - 89,999 .....	2,268	1,341	927
90,000 - 94,999 .....	1,334	778	556
95,000 - 99,999 .....	833	507	326
100,000 and over .....	1,676	971	705



**Table 13**

**Active Member Statistics  
by Type of Plan**

	<b>September 30, 2002</b>		
	<b>MIP</b>	<b>Basic</b>	<b>Total</b>
Number of active members	263,098	63,252	326,350
Average age (years)	42.1	49.7	43.6
Average service (years)	7.3	18.4	9.5
Average annual pay	\$26,434	\$43,519	\$29,745
	<b>September 30, 2001</b>		
	<b>MIP</b>	<b>Basic</b>	<b>Total</b>
Number of active members	252,375	66,163	318,538
Average age (years)	42.1	49.1	43.6
Average service (years)	7.5	17.7	9.6
Average annual pay	\$25,758	\$41,767	\$29,083

**Table 14**  
**Active Members Reported for Valuation: Historical Comparison**

Valuation Date <sup>1</sup>	Active Members					
	Number	Reported Payroll <sup>2</sup>	Average			
			Annual Pay	% Increase	Age (Years)	Service (Years)
12-31-1964	114,005	\$ 585,294	\$ 5,134	--	--	--
12-31-1965	109,716	627,510	5,719	11.4%	--	--
12-31-1966	113,429	687,884	6,064	6.0	--	--
12-31-1967	114,168	779,279	6,826	12.6	--	--
12-31-1968	135,946	893,572	6,573	(3.7)	--	--
12-31-1969	160,440	1,159,783	7,229	10.0	--	--
12-31-1970	131,295	1,132,580	8,626	19.3	42.9	12.4
12-31-1971	171,105	1,565,995	9,152	6.1	40.6	9.2
12-31-1972	182,297	1,727,432	9,476	3.5	40.3	9.1
6-30-1974	181,041	1,780,807	9,837	3.8	39.7	8.8
6-30-1975	196,545	1,971,686	10,032	2.0	39.2	8.4
9-30-1976	211,173	2,166,808	10,261	2.3	39.4	9.2
9-30-1977	220,557	2,245,893	10,183	(.8)	39.2	8.9
9-30-1978	231,299	2,466,929	10,666	4.7	39.3	8.8
9-30-1979	238,217	2,688,184	11,285	5.8	39.6	8.8
9-30-1980	303,971	3,231,137	10,630	(5.8)	39.9	7.4
9-30-1981	295,532	3,508,044	11,870	11.7	39.4	7.9
9-30-1982	278,067	3,616,807	13,007	9.6	40.0	8.5
9-30-1983	267,508	3,694,928	13,812	6.2	40.5	9.0
9-30-1984	274,204	3,953,854	14,419	4.4	40.6	9.1
9-30-1985	276,378	4,137,014	14,969	3.8	40.7	9.2
9-30-1986	277,534	4,444,349	16,014	7.0	40.7	9.1
9-30-1987	262,834	4,617,952	17,570	9.7	41.4	9.6
9-30-1988	285,992	4,989,959	17,448	(.7)	41.1	9.2
9-30-1989	287,750	5,284,205	18,364	5.2	41.0	9.4
9-30-1990	288,865	5,633,895	19,504	6.2	41.3	9.5
9-30-1991	293,503	6,032,513	20,553	5.4	41.5	9.6
9-30-1992	297,230	6,427,775	21,626	5.2	41.7	9.5
9-30-1993	296,585	6,897,924	23,258	7.5	42.2	9.8
9-30-1994	291,006	7,164,807	24,621	5.9	42.5	10.0
9-30-1995	294,911	7,564,876	25,651	4.2	43.4	10.1
9-30-1996	295,096	7,807,029	26,456	3.1	43.6	9.9
9-30-1997	295,691	8,027,450	27,148	2.6	43.6	10.0
9-30-1998	302,016	8,265,463	27,368	0.8	43.5	9.7
9-30-1999	309,324	8,643,718	27,944	2.1	43.6	9.5
9-30-2000	312,699	8,984,737	28,733	2.8	43.6	9.7
9-30-2001	318,538	9,264,183	29,083	1.2	43.6	9.6
9-30-2002	326,350	9,707,281	29,745	2.3	43.6	9.5

<sup>1</sup> Prior to 1974, Detroit data as of June 30 is combined with Outstate data as of the previous December 31.

<sup>2</sup> In thousands of dollars. Reported payroll for year ended September 30.

**Table 15**

**Pensions in Force on September 30, 2002  
By Age, Type and Amount of Pension**

Attained Age Groups	All Retirees and Beneficiaries		Age and Service Retirees		Disability Retirees		Surviving Beneficiaries*	
	Number	Annual Pensions	Number	Annual Pensions	Number	Annual Pensions	Number	Annual Pensions
Total	135,277	2,094,381,929	118,833	1,932,441,731	4,699	39,144,476	11,745	122,795,721
25 – 29	45	518,899	-	-	-	-	45	518,899
30 – 34	33	340,730	-	-	2	6,673	31	334,056
35 – 39	73	549,506	-	-	11	41,618	62	507,888
40 – 44	178	1,413,123	-	-	84	500,651	94	912,472
45 – 49	539	6,790,455	120	2,895,709	235	1,781,738	184	2,113,008
50 – 54	3,423	78,114,749	2,412	66,524,895	611	6,088,858	400	5,500,996
55 – 59	13,770	340,771,836	12,098	321,320,100	911	8,791,451	761	10,660,285
60 – 64	23,213	446,676,202	21,225	425,054,315	986	8,426,025	1,002	13,195,862
65 – 69	25,175	396,339,062	23,124	373,894,254	655	4,915,178	1,396	17,529,630
70 – 74	23,960	340,056,780	21,580	313,892,213	415	3,149,721	1,965	23,014,846
75 – 79	19,320	239,489,367	16,780	215,048,931	392	2,899,061	2,148	21,541,375
80 – 84	13,439	139,392,545	11,337	122,938,349	242	1,597,445	1,860	14,856,751
85 – 89	7,528	66,285,817	6,244	57,446,428	121	770,267	1,163	8,069,122
90 – 94	3,406	27,994,171	2,891	24,737,397	27	143,646	488	3,113,127
95 – 99	1,030	8,499,082	898	7,647,800	4	19,139	128	832,143
100 & over	145	1,149,605	124	1,041,340	3	13,005	18	95,261
Average Annual Pension		\$15,482.17		\$16,261.83		\$8,330.38		\$10,455.15

\* Includes beneficiaries of disability retirees.

**Table 16**

**Pensions in Force on September 30, 2002  
by Type and Amount of Pension**

Monthly Amount	Type of Pension			
	Total	Age and Service Retirees	Disability Retirees	Surviving Beneficiaries*
Total	135,277	118,833	4,699	11,745
Less than 200	13,889	11,955	532	1,402
200- 399	18,761	15,400	1,178	2,183
400- 599	13,808	11,157	872	1,779
600- 799	10,501	8,550	578	1,373
800- 999	8,651	7,161	430	1,060
1000-1199	7,329	6,170	323	836
1200-1399	6,796	5,803	261	732
1400-1599	6,468	5,715	194	559
1600-1799	6,577	5,968	139	470
1800-1999	6,947	6,453	90	404
2000-2199	7,287	6,916	54	317
2200-2399	6,881	6,632	28	221
2400-2599	5,951	5,806	10	135
2600-2799	4,743	4,643	6	94
2800-2999	3,352	3,281	2	69
3000-3199	2,415	2,374	1	40
3200-3399	1,618	1,595	1	22
3400-3599	1,055	1,033		22
3600-3799	667	660		7
3800-3999	496	491		5
4000-4199	333	329		4
4200-4399	217	213		4
4400-4599	170	167		3
4600-4799	116	116		0
4800-4999	71	70		1
5000 & over	178	175		3
Average Monthly Amount	\$1,290.18	\$1,355.15	\$694.20	\$871.26

\* Includes beneficiaries of disability retirees.

**Table 17**  
**Retirees and Beneficiaries - Historical Comparison**

Valuation Date <sup>1</sup>	Retirees and Beneficiaries on Rolls					Discounted Value of Pensions	
	Number	Annual Pension <sup>2</sup>	Annual % Increase		Average Pension	Total <sup>2</sup>	Average
			Number	Annual Pension			
12-31-1962	14,632	\$ 24,835	-	-	\$ 1,697	\$ -	\$ -
12-31-1963	15,836	27,890	8.2%	12.3%	1,761	-	-
12-31-1964	17,326	31,482	9.4	12.9	1,817	-	-
12-31-1965	18,591	34,931	7.3	11.0	1,879	-	-
12-31-1966	20,131	39,127	8.3	12.0	1,944	-	-
12-31-1967	21,679	43,600	7.7	11.4	2,011	-	-
12-31-1968	23,620	49,686	9.0	14.0	2,104	-	-
12-31-1969	25,833	56,949	9.4	14.6	2,205	-	-
12-31-1970	27,931	64,587	8.1	13.4	2,312	637,480	22,823
12-31-1971	30,409	75,412	8.9	16.8	2,480	716,247	23,554
12-31-1972	32,877	85,871	8.1	18.9	2,612	818,946	24,909
6-30-1974	36,684	112,267	11.3	30.7	3,069	1,067,473	29,179
6-30-1975	37,484	129,684	2.5	15.5	3,460	1,174,863	31,343
9-30-1976	41,481	144,176	10.7	11.2	3,476	1,349,628	32,536
9-30-1977	43,835	170,355	5.7	18.2	3,886	1,607,977	36,682
9-30-1978	45,513	184,887	3.8	8.5	4,062	1,719,823	37,788
9-30-1979	48,195	199,371	5.9	7.8	4,137	1,825,670	37,881
9-30-1980	50,368	213,170	4.5	6.9	4,232	1,698,872	33,729
9-30-1981	52,887	231,512	5.0	8.6	4,378	1,843,382	34,855
9-30-1982	55,257	250,700	4.5	8.3	4,537	1,998,357	36,165
9-30-1983	57,854	273,840	4.7	9.2	4,733	2,189,263	37,841
9-30-1984	60,420	298,961	4.4	9.2	4,948	2,396,493	39,664
9-30-1985	63,184	326,691	4.6	9.3	5,170	2,644,192	41,849
9-30-1986	69,001	439,766	9.2	34.6	6,373	3,431,512	49,731
9-30-1987	73,316	500,353	6.3	13.8	6,825	4,012,058	54,723
9-30-1988	76,111	547,015	3.8	9.3	7,187	4,503,014	59,164
9-30-1989	79,917	611,424	5.0	11.8	7,651	5,196,570	65,025
9-30-1990	83,286	686,850	4.2	12.3	8,247	6,610,881	79,376
9-30-1991	86,253	749,717	3.6	9.2	8,692	7,305,158	84,695
9-30-1992	90,201	831,290	4.6	10.9	9,216	8,211,766	91,039
9-30-1993	93,574	911,686	3.7	9.7	9,743	9,177,364	97,211
9-30-1994	97,989	1,018,819	4.7	11.8	10,397	10,312,029	105,237
9-30-1995	103,151	1,141,972	5.3	12.1	11,071	11,568,988	112,156
9-30-1996	107,465	1,251,811	4.2	9.6	11,649	12,590,199	117,156
9-30-1997	111,842	1,371,479	4.1	9.6	12,263	14,302,668	127,883
9-30-1998	116,620	1,505,362	4.3	9.8	12,908	15,888,468	136,241
9-30-1999	120,913	1,639,825	3.7	8.9	13,562	17,290,954	143,003
9-30-2000	126,115	1,798,028	4.3	9.6	14,257	19,200,060	152,242
9-30-2001	130,790	1,943,444	3.7	8.1	14,859	20,943,464	160,130
9-30-2002	135,277	2,094,382	3.4	7.8	15,482	22,480,421	166,181

<sup>1</sup> Prior to 1974 Detroit data as of June 30 is combined with Outstate data as of the previous December 31.

<sup>2</sup> In thousands of dollars.

**Table 18**  
**Retirees and Beneficiaries Reported September 30, 2002**  
**By Type of Pension**

Type of Pension	Number	Annual Pension
<b>Age and Service</b>		
Straight Life	63,176	\$902,665,653
Diminishing Refund	38	456,474
Survivor Pension - 100%	18,376	317,371,824
Survivor Pension – 50%	19,812	365,635,827
Survivor Pension – 75%	1,657	39,833,403
Soc. Sec. Equated		
- Straight Life	8,141	150,815,523
- Survivor Pension - 100%	3,327	64,604,634
- Survivor Pension – 50%	4,075	84,038,577
- Survivor Pension – 75%	231	7,019,817
Beneficiaries	<u>7,520</u>	<u>76,069,657</u>
Subtotal	126,353	\$2,008,511,389
<b>Disability</b>		
Duty	350	\$1,806,782
Non-duty	2,779	22,587,908
Straight Life	10	45,094
Survivor Pension - 100%	1,043	9,644,684
Survivor Pension – 50%	474	4,483,768
Survivor Pension – 75%	43	576,240
Beneficiaries	<u>991</u>	<u>7,663,375</u>
Subtotal	5,690	\$46,807,851
<b>Survivors of Members</b>		
Duty	3	\$37,208
Non-Duty	<u>3,231</u>	<u>39,025,482</u>
Subtotal	<u>3,234</u>	<u>\$39,062,690</u>
<b>Total Pensions</b>	135,277	\$2,094,381,930

## **V. ACTUARIAL ASSUMPTIONS AND FUNDING METHOD**

### **Actuarial Assumptions**

To calculate System contribution requirements, assumptions are made about all of the future events that could affect the amount and timing of benefits to be paid and the assets to be accumulated. The assumptions include several economic and demographic predictions such as:

- o An assumed rate of investment return which is used to discount liabilities and project what plan assets will earn.
- o A mortality table projecting the number of employees who will die before retirement and the duration of benefit payments after retirement.
- o Assumed retirement rates projecting when employees will retire and commence receiving retirement benefits.
- o Withdrawal and disability rates to estimate the number of employees who will leave the work force before retirement.
- o Assumed rates of salary increases to project employees' compensation in future years.

Based on an actuarial experience investigation covering the period from September 30, 1992 through September 30, 1997, several changes in actuarial assumptions were adopted for use beginning with the 1998 valuation. The actuarial assumptions used in connection with this 2002 actuarial valuation of the System are identical to those used since 1998, and are summarized in the following paragraphs.

### **Investment Yield**

Funding the System on an actuarial reserve basis involves the accumulation of substantial reserves to pay benefits in the future. These reserves are invested and the net rate of investment earnings is a major factor in determining the contributions required to support the ultimate cost of benefits.

The net rate of investment yield is comprised of imputed income at the valuation interest rate, plus a write-up (down). This write-up (down) reflects 20% of the actual investment return (including interest, dividends, and asset appreciation or depreciation, less administrative expenses) in excess of (less than) this assumption, over each year during the current year and the subsequent four-year period.

For the 2002 actuarial valuation of the System, the long-term net investment yield rate is assumed to be 8.0%. The corresponding assumption in the 2001 valuation was also 8.0%.

The schedule below shows the approximate net investment yield rate on average total assets at actuarial value for each of the past 14 fiscal years (determined as investment income net of expenses, divided by the average actuarial value of assets during the year):

<b><u>Fiscal Year</u></b> <b><u>Ended September 30,</u></b>	<b><u>Net investment</u></b> <b><u>Yield rate</u></b>
2002	2.76%
2001	6.35
2000	10.67
1999	9.56
1998	7.98
1997*	13.93
1996	10.99
1995	10.95
1994	8.48
1993	11.04
1992	5.16
1991	7.00
1990	6.20
1989	10.00

\* Note that the above yield for 1997 excludes the additional write-up due to the resetting of actuarial value to market value as of September 30, 1997. If included, the net investment yield rate for fiscal 1997 would be 20.33% higher, or 34.26%.

### **Salary Increases**

Because System benefits are based on a member's final average compensation, it is necessary to make an assumption with respect to the salary progression of employees in the future. The



salary increase assumption used in this 2002 actuarial valuation projects annual salary increases of 4% representing inflation, plus a percentage based on an age-related scale to reflect merit, longevity and promotional salary increases. The current assumption was first instituted for the 1998 valuation.

The salary increase assumption projects the following salary increases for selected ages:

<u>Age</u>	<u>Assumed Percentage Increase in Salary</u>
20	13.50%
25	12.50
30	9.00
35	7.55
40	6.40
45	5.65
50	5.10
55	4.60
60	4.00
65	4.00

**Unknown Data**

Members with unknown sex were assumed to be female. Members with unknown dates of birth were assumed to have entry-age equal to 30.

**Withdrawal Rates**

The withdrawal rates used in an actuarial valuation project the percentage of employees at each age who are assumed to terminate employment before qualifying for retirement benefits. The withdrawal rates do not apply to members eligible to retire, and do not include separation on account of death or disability.

The assumed rates of withdrawal applied in prior valuations have been in effect since the 1998 valuation and are as follows:

<b>Sample Ages</b>	<b>Years of Service</b>	<b>Percent Separating Within Next Year</b>
All	0	35.00%
	1	18.00
	2	11.00
	3	8.00
	4	6.50
20	5 & Over	4.00
25		4.00
30		3.20
35		2.40
40		1.90
45		1.40
50		1.40
55		1.40
60		1.40

### **Disability Rates**

The assumed rates of disablement (in effect since the 1998 valuation), are shown below at various ages:

<b>Sample Age</b>	<b>Percent Becoming Disabled Within Next Year</b>
20	0.00%
25	0.01
30	0.01
35	0.02
40	0.06
45	0.13
50	0.23
55	0.33
60	0.45

The mortality table currently used for disabled lives is called the Michigan 1992-1997 Disability Experience Mortality Table and is based primarily on 1992-97 MPSERS experience.

**Retirement Age**

A schedule of retirement rates is used to measure the probability of eligible members retiring during the next year. The following retirement rates apply to members eligible for normal retirement (*i.e.*, with an unreduced benefit):

<b>Retirement Ages</b>	<b>Percentage of Eligible Members Retiring Within the Coming Year</b>	
	<b><u>Basic Members</u></b>	<b><u>MIP Members</u></b>
46 - 49	-	50% each year
50	-	50
51	-	40
52	-	25
53	-	20
54	-	20
55	28%	20
56	18	20
57	18	20
58	22	25
59	22	28
60	21	26
61	20	23
62	35	36
63	25	26
64	25	28
65	40	40
66	30	30
67	25	25
68	25	25
69	25	25
70	30	30
71	40	40
72	50	50
73	60	60
74	70	70
75 and over	100	100

A member is eligible for retirement after attaining age 55 with 30 or more years of credited

service (no age requirement for MIP members), or after attaining age 60 with 10 or more years of credited service (5 years for MIP members).

For members eligible for early retirement (*i.e.*, age 55 with 15 but less than 30 years of credited service), but not yet eligible for an unreduced retirement benefit, the following rates apply:

<u>Age</u>	<u>Basic Members</u>	<u>MIP Members</u>
55	6.5%	9.0%
56	4.5	6.5
57	5.0	7.0
58	5.0	8.0
59	6.0	9.0

The current retirement age assumption was first used for the 1998 valuation.

### **Mortality**

In estimating the amount of the reserves required at the time of retirement to pay an employee's benefit for the remainder of his or her lifetime, it is necessary to make an assumption with respect to expected mortality after retirement. In addition, the same assumption is used to measure the probability of members dying before retirement.

The mortality table used to project the mortality experience of System members is the 1994 Group Annuity Mortality Table (also in effect since 1998).

The life expectancies projected by the assumed mortality table for male and female System retirees are shown below for selected ages, along with the present value of \$1 payable monthly for life (at an 8% interest rate):

<u>Age</u>	<u>Expected Years of Life Remaining</u>		<u>Present Value of \$1 Monthly for Life</u>	
	<u>Men</u>	<u>Women</u>	<u>Men</u>	<u>Women</u>
50	30.73	34.92	\$135.13	\$140.82
55	26.19	30.21	127.66	134.90
60	21.86	25.62	118.28	127.10
65	17.88	21.31	107.30	117.63
70	14.33	17.34	95.23	106.61
75	11.16	13.64	81.86	93.29
80	8.41	10.35	67.67	78.48

### **Funding Method**

Funding the System on an actuarial reserve basis seeks to achieve the following major objectives:

- o Level required contribution rates as a percentage of payroll;
- o Finance benefits earned by present employees on a current basis;
- o Accumulate assets to enhance members' benefit security;
- o Produce investment earnings on accumulated assets to help meet future benefit costs;
- o Make it possible to estimate the long-term actuarial cost of proposed amendments to System provisions; and
- o Assist in maintaining the System's long-term financial viability.

The basic funding objective is a level pattern of cost as a percentage of salary throughout an employee's working lifetime. The funding method used in this actuarial valuation - the entry age normal cost method - is intended to meet this objective and result in a relatively level long-term contribution requirement as a percentage of salary.

Under the entry age normal cost method, the total actuarially-determined contribution requirement is the sum of the normal cost and the payment required to amortize the unfunded accrued liability as a level percentage of payroll over the adopted amortization period of 40 years from October 1, 1996 (34 years remaining as of the valuation date).

### **Normal Cost**

In general terms, the normal cost is the cost of benefit rights accruing on the basis of current service. Technically, the normal cost rate is the level percentage-of-salary contribution required each year, with respect to each employee, to accumulate over his or her projected working lifetime the reserves needed to meet the cost of earned benefits. The normal cost represents the ultimate cost of the System if the unfunded liability is paid up and the actual experience of the System conforms to the assumptions.

Normal cost contributions for death and disability benefits were determined using a one-year term cost method. This method produces contributions sufficient to fund the value of (i) disability benefits likely to be incurred during the year, and (ii) survivor benefits likely to be incurred during the year because of a member's death while employed.

### **Actuarial Accrued Liabilities**

The total actuarial present value of future benefits is computed as the current discounted value of all benefits expected to be paid in the future to all active, retired, and inactive vested members. Subtracting the present value of future normal costs results in the actuarial accrued liability.

The total actuarial accrued liability essentially represents the amount that would have been accumulated as of September 30, 2002 if contributions sufficient to meet the normal costs of the System had been made each year in the past. If assets equalled the total accrued liability, there would be no unfunded liability and future contribution requirements would consist solely of the calculated normal cost rates.

### **Amortization of Unfunded Actuarial Accrued Liabilities**

Unfunded actuarial accrued liabilities are amortized by level percent of payroll contributions over a 40-year period from October 1, 1996 (34 years remaining as of October 1, 2002). Active member payroll is assumed to increase 4% a year for the purpose of determining the level percent contributions. In accordance with Public Act 300 of 1980 (as amended by Public Act 143 of 1997), section 36(3), overfunding is credited to a stabilization subaccount.

## **VI. SUMMARY OF SYSTEM PROVISIONS**

Our actuarial valuation of the System as of September 30, 2002 is based on the present provisions of the Public School Employees' Retirement Act (Act 300 of 1980, as amended).

### **Regular Retirement** (no reduction factor for age):

Eligibility - Age 55 with 30 years credited service; or age 60 with 10 years credited service. For Member Investment Plan (MIP) members, any age with 30 years credited service; or age 60 with 10 years credited service; or age 60 with 5 years of credited service provided member worked through 60th birthday and has credited service in each of the last 5 years.

Mandatory Retirement Age - None.

Annual Amount - Total credited service times 1.5% of final average compensation.

Final Average Compensation - Average of highest 5 consecutive years. (3 years for MIP members).

### **Early Retirement** (age reduction factor used):

Eligibility - Age 55 with 15 or more years credited service and earned credited service in each of the last 5 years.

Annual Amount - Regular retirement benefit, reduced by 1/2% for each month by which the commencement age is less than 60.

### **Deferred Retirement** (vested benefit):

Eligibility - 10 years of credited service. Benefit commences at the time age qualification is met.

Annual Amount - Regular retirement benefit based on service and final average compensation at time of termination.

### **Duty Disability Retirement:**

Eligibility - No age or service requirement; in receipt of workers' disability compensation.

Annual Amount - Computed as regular retirement benefit with minimum benefit based on 10 years credited service. Additional limitation such that disability benefits plus authorized outside earnings limited to 100% of final average compensation (increased by 2% each year retired).

### **Non-Duty Disability Retirement:**

Eligibility - 10 years of credited service.

Annual Amount - Computed as regular retirement benefit based on credited service and final average compensation at time of disability. Additional limitation such that disability benefits plus authorized outside earnings limited to 100% of final average compensation (increased by 2% each year retired).

### **Duty Death Before Retirement:**

Eligibility - No age or service requirement. Beneficiary is in receipt of workers' compensation. Also applies to "duty disability" retirees during first three years of disability.

Annual Amount - Spouse benefit computed as regular retirement benefit with minimum benefit based on ten years of credited service, reduced for 100% joint and survivor election. If no surviving spouse, children under 18 share in benefit; if no spouse or children, a disabled and dependent parent is eligible.

### **Non-Duty Death Before Retirement:**

Eligibility - 15 years of credited service, or age 60 and 10 years of credited service. 10 years of credited service, or age 60 and 5 years of credited service for MIP members.

Annual Amount - Computed as regular retirement benefit, reduced in accordance with a 100% joint and survivor election, with payments commencing first of month following death. For the beneficiary of a deferred member, benefit commences at time member would have attained the minimum age qualification.

**Post-Retirement Cost-of-Living Adjustments:** One-time upward adjustments have been made in 1972, 1974, 1976, and 1977 for members retired on or after July 1, 1956 and prior to July 1, 1976 who were eligible for Social Security benefits. For members who retired prior to July 1, 1956 and not eligible for Social Security benefits based upon membership service, the minimum base pension was increased in 1965, 1971, 1972, 1974 and 1981, and in 1976 and 1977 one-time upward adjustments were made.

Beginning in 1983, eligible recipients received an annual distribution of investment earnings in excess of 8% (supplemental payment). On January 1, 1986, all members who retired prior to January 1, 1986 were given a permanent 8% increase. On January 1, 1990 a one-time upward adjustment for members who retired prior to October 1, 1981 was made.



Currently members receive annual increases based on the following schedule:

Retired before January 1, 1987 - greater of supplemental payment or automatic 3% increase.

Retired on or after January 1, 1987 under MIP - automatic 3% increases only.

Retired on or after January 1, 1987 not under MIP - supplemental payment only.

**Post-Retirement Health Benefits:** Members in receipt of pension benefits are eligible for fully System-paid Master Health Care Plan coverage (90% System-paid Dental Plan, Vision Plan and Hearing Plan coverage) with the following exceptions:

- 1) Members not yet eligible for Medicare coverage pay an amount equal to the Medicare Part B premiums.
- 2) Members with less than 30 years of service, who terminate employment after October 31, 1980 with vested deferred benefits, are eligible for partially System-paid health benefit coverage (no System payment if less than 21 years service).

Dependents are eligible for 90% System-paid health benefit coverage (partial System payment for dependents of deferred vested members who had 21 or more years of service).

**Member Contributions:**

MIP Participants hired before January 1, 1990 - 3.9% of pay

MIP Participants hired on or after January 1, 1990 - 3.0% of first \$5,000 of pay, plus 3.6% of next \$10,000 of pay, plus 4.3% pay in excess of \$15,000.

Non-MIP Participants - None

## **VII. ACCOUNTING INFORMATION**

The Governmental Accounting Standards Board (GASB) has changed the way governmental entities account for their pension plans. The new standards, GASB Statements Nos. 25 and 27, replaced the prior reporting requirements under GASB Statement No. 5 beginning in 1998.

### **GASB Statement No. 25**

For plan years commencing after June 15, 1996, the plan became subject to the disclosure requirements of Statement No. 25 of the Governmental Accounting Standards Board (GASB).

Statement No. 25 establishes financial reporting standards for defined benefit pension plans as they relate to the Plan's financial accounting. As used in Statement No. 25, pension benefits include retirement income as well as other types of postemployment benefits (disability, death benefits, life insurance) but exclude postemployment healthcare.

Statement No. 25 for defined benefit plans requires two plan financial statements on an accrual basis (statement of plan net assets and a statement of changes in plan net assets). The statement now requires the fair value of assets for those financial statements where previously cost or amortized cost could be used.

Statement No. 25 also requires notes to the Financial Statements including plan description, classes of employees covered, brief description of benefit provisions and a summary of significant accounting policies (including funding policy).

Also required (after the notes) is supplementary information ("Required Supplementary Information") including a schedule of funding progress and a schedule of employer contributions. The actuarial information to be shown must be determined under certain parameters. These parameters are the same as those required under GASB Statement No. 27, and are summarized below:

**Actuarial Valuations:** Must occur at least every two years and the results must be applied within 12 months (24 months for biennial valuations) for plans and 24 months for employers.

**Actuarial Assumptions:** Best estimate of individual assumptions and consistency of all assumptions. Investment return assumption (discount rate) based on estimated long-term investment yield for plan.

**Actuarial Cost Method:** Entry age, frozen entry age, attained age, frozen attained age, aggregate or projected unit credit are acceptable.

**Actuarial Value of Assets:** Market-related.

**Annual Required Contributions of Employers:** Must include normal (current service) cost and amortization of the plan's total unfunded actuarial liability (UAL).

**Amortization Period:** Periods of up to 40 years will be acceptable for the first 10 years after the effective date of Statement No. 25. After that, periods cannot exceed 30 years. Significant decreases in UAL caused by changing actuarial methods must be amortized over at least 10 years.

**Amortization Method:** Level dollar or level percentage of projected payroll, open or closed basis.

It is important to note that GASB Statement No. 25 eliminates the need to report actuarial accrued liabilities on a standardized basis (*i.e.*, pension benefit obligation) and instead substitutes all actuarially determined information based on the plan's funding method (*e.g.*, Entry Age Normal Actuarial Cost for the Michigan Public School Employees' Retirement System).

Paragraph 39 states that the required "Schedules of Funding Progress" and "Employer Contributions" should include information for the current year and as many of the prior years as information, according to the parameters, is available.

The "Schedule of Funding Progress" is presented in Table 5, which appears in Section II.

The "Schedule of Employer Contributions" is presented in Table 3, which also appears in Section II. Each applicable computed contribution (or the annual required contribution) is

based on the actuarial valuation for that year. Actual contributions shown are based on data provided by the System

Additional “Required Supplementary Information” is shown in Table 19.

### **GASB Statement No. 27**

GASB Statement No. 27 establishes the standards of accounting and financial reporting for pension expenditures/expense and related pension liabilities, pension assets, note disclosures and required supplementary information in the financial reports of governmental employers. (The financial reporting for the pension trust funds is covered by GASB Statement No. 25 as described above.)

GASB Statement No. 27 does not mandate or require the employer to fund (contribute) any specific amount. Rather it determines the standards (parameters) to be used for the purpose of expensing the cost of pension benefits on the employer’s financial statements. To the extent that an employer wants to fund (contribute) the same amount that it expenses, the amount contributed must be determined under certain parameters. When the funding methods and assumptions meet the parameters, the same methods and assumptions are used for both funding and expensing (accounting). If they do not, the employer/entity must choose between making two calculations at each actuarial valuation - one for funding and one for accounting - or modifying the funding approach to meet the parameters. Using different methods for accounting and funding may result in increasing employer liabilities (Net Pension Obligation).

Statement No. 27 uses some new terms, including:

Net Pension Obligation (NPO) - Represents the employer’s transition obligation/asset for past underfunding/overfunding of contribution amounts compared to those actuarially determined. After the effective date of Statement No. 27, it will include the cumulative difference between annual pension expense and the employer’s contributions.

It is our understanding that the System is considered a cost-sharing multiple-employer plan for purposes of Statement No. 27.

The NPO at transition of a cost-sharing employer is equal to the employer's contractually required contributions that are due and payable at the effective date and pension-related debt, if applicable. Each employer contributing to the System will need to determine their NPO at transition based on the preceding.

Actuarial Required Contribution (ARC) - Represents the contribution amount that can also be used for purposes of reporting annual pension expense/accounting. Employers that participate in a cost-sharing multiple-employer plan (such as the System) report, for annual pension expense/accounting purposes, an amount equal to their contractually required contributions to the Plan.

**Table 19**

**Required Supplementary Information**  
**- GASB Statement Nos. 25 and 27**

Valuation date	9/30/2002
Actuarial cost method	Entry Age Normal
Amortization method	Level Percent, Closed
Remaining amortization period	34 Years
Asset valuation method	5-Year Smoothed Market Value
Actuarial assumptions:	
Investment rate of return	8.00%
Projected salary increases	4%-13.5%
Cost-of-living adjustments	3% Annual Non-Compounded for MIP Members

February, 2003

The Retirement Board  
Michigan Public School Employees' Retirement System  
General Office Building, Third Floor  
P. O. Box 30171  
Lansing, Michigan 48909

Dear Board Members:

We are pleased to present this report on our actuarial valuation of the Michigan Public School Employees' Retirement System (the "System") as of September 30, 2002, the fifty-eighth annual actuarial valuation of the System.

Our 2002 actuarial valuation of the System is based on the present provisions of Public Act No. 300 of 1980 (as amended); membership data as of September 30, 2002; financial data as of September 30, 2002; and the actuarial assumptions and cost methods described in Section V.

This report on our 2002 actuarial valuation of the System is presented in the following sections:

<b><u>Section</u></b>	<b><u>Page</u></b>
I. INTRODUCTION .....	1
II. RESULTS OF ACTUARIAL VALUATION .....	2
III. FINANCIAL EXPERIENCE .....	12
IV. MEMBERSHIP CHARACTERISTICS .....	16
V. ACTUARIAL ASSUMPTIONS AND FUNDING METHOD .....	29
VI. SUMMARY OF SYSTEM PROVISIONS .....	37
VII. ACCOUNTING INFORMATION .....	40
APPENDIX: ACTUARIAL VALUATION STATEMENT	

We look forward to meeting with you to review this report on our 2002 actuarial valuation of the System.

Sincerely,

The Segal Company

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Michael Karlin, F.S.A., M.A.A.A.  
Senior Vice President and Actuary

February, 2003

**MICHIGAN PUBLIC SCHOOL EMPLOYEES' RETIREMENT SYSTEM**

**Actuarial Valuation Statement**

This is to certify that we have prepared an actuarial valuation of the Michigan Public School Employees' Retirement System (the "System") as of September 30, 2002, recognizing the present provisions of Public Act No. 300 of 1980 (as amended).

Actuarial calculations were made with respect to a total of 476,030 System members: 326,350 active members, 14,403 members with vested rights to a deferred pension; and 135,277 retirees and surviving beneficiaries.

The actuarial cost factors for pension benefits for System members are as follows:

	<b><u>Current Assumptions</u></b>
1. Actuarial accrued liability	
Active employees	\$18,821,870,264
Inactive vested members	654,938,675
Retirees and surviving beneficiaries	<u>22,480,420,600</u>
Total	41,957,229,539
2. Assets at actuarial value (\$29,655,593,676 at market value)	38,382,189,323
3. Unfunded (overfunded) actuarial accrued liability* [item (1) - item 2]	3,575,040,216
4. Payment required to amortize unfunded actuarial accrued liability over 34 years as a level percentage of payroll = $.05221406 \times (3)$	186,667,364
5. Normal cost — total	1,004,650,869
Employer share	626,224,052
Expected employee contributions (under MIP plan)	378,426,817
6. Total cost = (4) + (5)	1,191,318,233
7. Total payroll	9,707,280,750
8. Normal cost as a percentage of projected payroll - total	10.35%
Employer share	6.45%
Employee share	3.90%
9. Payment required to amortize unfunded actuarial accrued liability as a percentage of payroll	1.92%
10. Total cost = (8) + (9)	12.27%
11. Member portion	3.90%
12. Total employer cost = (10) - (11)	8.37%

\* Under Public Act 300 of 1980 (as amended by Public Act 143 of 1997), Section 36(3), overfunding is credited to a stabilization subaccount.



**MICHIGAN PUBLIC SCHOOL EMPLOYEES' RETIREMENT SYSTEM**

Actuarial Valuation ..... - 2 -

The actuarial assumptions used in the September 30, 2002 actuarial valuation are summarized below:

Interest Rate: 8%

Salary Scale:

4% per year, plus percentage based on age-related scale. Projected increases at selected ages are: 12.50% at 25, 9.00% at 30, 7.55% at 35, 6.40% at 40, 5.65% at 45, 5.10% at 50, 4.60% at 55, and 4.00% at 60 and over.

Retirement Ages

**Percentage of Eligible Members  
Retiring Within the Coming Year**

<u>Retirement Ages</u>	<u>Basic Members</u>	<u>MIP Members</u>
46 - 49	-	50% each year
50	-	50
51	-	40
52	-	25
53	-	20
54	-	20
55	28%	20
56	18	20
57	18	20
58	22	25
59	22	28
60	21	26
61	20	23
62	35	36
63	25	26
64	25	28
65	40	40
66	30	30
67	25	25
68	25	25
69	25	25
70	30	30
71	40	40
72	50	50
73	60	60
74	70	70
75 and over	100	100

**MICHIGAN PUBLIC SCHOOL EMPLOYEES' RETIREMENT SYSTEM**

Actuarial Valuation ..... - 3 -

A member was assumed to be eligible for retirement after attaining age 55 with 30 or more years of credited service (no age requirement for MIP members), or after attaining age 60 with 10 or more years of service (5 years for MIP members).

For members eligible for early retirement (i.e., age 55 with 15 but less than 30 years of credited service), but not yet eligible for an unreduced retirement benefit, the following rates apply:

<u>Age</u>	<u>Basic Members</u>	<u>MIP Members</u>
55	6.5%	9.0%
56	4.5	6.5
57	5.0	7.0
58	5.0	8.0
59	6.0	9.0

Termination Rates Before Retirement

<u>Sample Ages</u>	<u>Years of Service</u>	<u>Percent Separating Within Next Year</u>
All	0	35.0%
	1	18.0
	2	11.0
	3	8.0
	4	6.5
20	5 & over	4.0
25		4.0
30		3.2
35		2.4
40		1.9
45		1.4
50		1.4
55		1.4
60		1.4

**MICHIGAN PUBLIC SCHOOL EMPLOYEES' RETIREMENT SYSTEM**

Actuarial Valuation ..... - 4 -

Disability Rates:

<u>Sample Ages</u>	<u>Annual Rate of Disability</u>
20	0.00%
25	0.01
30	0.01
35	0.02
40	0.06
45	0.13
50	0.23
55	0.33
60	0.45

The mortality table used for disabled lives is the Michigan 1992-1997 Disability Experience Mortality Table.

Mortality Rates:

In accordance with the 1994 Group Annuity Mortality Table.

Credited Service Earned

Members are assumed to earn .92 years of credited service each year.

The actuarial calculations were performed by qualified actuaries in accordance with accepted actuarial procedures, and were based on the actuarial assumptions adopted by the Board of Trustees upon the recommendation of the actuary.

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Michael Karlin, F.S.A., M.A.A.A.  
Senior Vice President and Actuary

**APPENDIX:**

**ACTUARIAL CERTIFICATION STATEMENT**

**MPSERS**