



Appendix to the Annual Actuarial Valuation Report December 31, 2020

Summary of Plan Provisions, Actuarial Assumptions and Actuarial Funding
Method as of December 31, 2020



Introduction

The MERS Defined Benefit Plan is an agent multiple-employer plan, meaning that assets are pooled for investment purposes but separate accounts are maintained for each individual employer. Each municipality is responsible for their own plan liabilities. MERS does not borrow from one municipality's account to pay for another.

An actuarial valuation is the mathematical model that estimates plan liabilities and employer contribution requirements for purposes of funding the individual employer plans within the Michigan Municipal Employees' Retirement System (MERS), for determining plan costs for Governmental Accounting Standards Board (GASB) accounting purposes, and for State Reporting. This model is updated annually to adjust the liabilities and contribution requirements for changes in member census and plan features, and to reflect actual plan experience in the process. The valuation reflects the present provisions of the MERS Plan Document (as revised February 25, 2021). The specific benefit provisions reflected in the valuation for each municipality are summarized in Table 2 in the municipality's actuarial report.

Each annual actuarial valuation uses current membership and financial data. In addition, an actuarial valuation requires the use of a series of assumptions regarding uncertain future events. The assumptions and methods used in the December 31, 2020 Actuarial Valuation are those adopted by the Retirement Board February 27, 2020 and June 25, 2020. The economic assumptions used in this valuation are a 7.35% investment rate of return and a 3.00% wage inflation assumption, as adopted February 28, 2019. The demographic assumptions used in this valuation are based on the results of a study of plan experience that covered the period from December 31, 2014 through December 31, 2018. An alternative contribution phasing in the 2019 and 2020 assumption changes (4 years remaining) is included in each report. All actuarial assumptions are estimates of future experience. The rationale for the assumptions is described in this Appendix as well as the most recent experience study report.

The current economic and demographic assumptions are reasonable for the purposes of the December 31, 2020 annual actuarial valuation.

There have been no changes in the actuarial cost method, adopted by the Retirement Board beginning with the December 31, 1993 valuations. The basic funding method is entry age normal and normal cost amounts are developed as a level percentage of projected payroll. The Retirement Board updated the Actuarial Policy most recently on June 25, 2020. The policy updates are described later in this appendix.

The actuarial valuation computations were made by or under the supervision of a Member of the American Academy of Actuaries (MAAA) who meets the U.S. Qualification Standards to render the actuarial opinions in the valuation.

Details on MERS plan provisions, actuarial assumptions, and actuarial methodology follow this section.

Summary of Plan Provisions — Defined Benefit Plan¹

The benefits summarized in this section are intended only as general information regarding the Municipal Employees' Retirement System of Michigan. They are not a substitute for Public Act (PA) 220 of 1996, the MERS Plan Document (as revised), or MERS administrative procedures. If any conflict occurs between the information in this summary and PA 220 of 1996, the MERS Plan Document (as revised) or MERS administrative procedures, the provisions of PA 220, the MERS Plan Document and MERS administrative procedures govern.

Participating Municipality or Court and Membership

A municipality, court or a specific unit (i.e., division) may elect to participate in MERS based on the terms of the plan document. For purposes of the valuation, all divisions of participating municipalities and courts with MERS defined benefit or hybrid programs are identified by MERS.

Municipal employees and judicial employees of a participating municipality or court who are included in an employee division established by such participating municipality or court are eligible to become members* of MERS. Eligibility is defined by the employer via Adoption Agreement(s).

* *Throughout this appendix, the terms member or members may be used interchangeably with participant or participants as defined in the plan document.*

Credited Service

Prior service and membership service to which a member is entitled, shall be credited to the member's individual service account. Service shall be credited in years and twelfths (1/12) of a year. Not more than one year of credited service shall be credited to a member on account of all service rendered to all participating municipality(ies) and/or court(s) in any period of 12 consecutive months. Additional criteria for breaks in service, forfeitures, and reinstatements are described in the MERS Plan Document.

A member may combine service credit accrued under the Defined Benefit Plan and/or Defined Contribution Plan in the employ of more than one participating municipality or court for the sole purpose of satisfying vesting and eligibility requirements under the Defined Benefit Plan, and not for benefit accrual purposes. Some exclusions apply.

At the election of the municipality or court, members may purchase governmental service credit for vesting and eligibility purposes.

At the election of the municipality or court, Defined Benefit members may purchase up to five years of generic service credit.

¹ *Please see the description of the Hybrid Plan beginning on page 12.*

Compensation

Compensation for purposes of the Defined Benefit Plan and Defined Benefit Component of the Hybrid Plan means that remuneration paid to members for services to a participating municipality or court that such participating municipality or court has selected in its Adoption Agreement(s) as the basis for the determination of final average compensation.

A participating municipality or court may select in its Adoption Agreement(s) one of the following four options to define compensation:

- **Base Wages:** This measure of compensation is the sum of:
 - salary, or the product of base hourly wage rate and hours worked, as applicable;
 - employer-provided paid time off actually used; and
 - on-call pay.
- **IRS Form W-2 Box 1 Wages:** This measure of compensation is the amount shown in a member's IRS Form W-2, Box 1.
- **Gross Wages:** This measure of compensation includes all items of compensation included in Box 1 wages, all items of compensation included in base wages but excluded from Box 1 wages, and all taxable fringe benefits and lump sum payments.
- **Custom Wage:** This measure of compensation is the sum of those items of employee remuneration as selected by the participating municipality or court in its Adoption Agreement(s).

Eligibility for Normal Retirement (Unreduced Benefits)

MERS members are eligible to retire with unreduced benefits at the later of:

- Normal Retirement Age T, where T is between ages 60 and 70, as selected by the municipality or court, and
- Y years of credited service, where Y is a whole number between 5 and 10 years, as selected by the municipality or court.

Optional Retirement Programs (Unreduced Benefits)

At the adoption of the participating municipality or court, MERS members are eligible to retire with unreduced benefits at one or more of the following:

- FA(R), where A is an age from 50 to 54, and R is between 25 and 30 years of credited service.
- FA(R), where A is an age from 55 to 65, and R is between 15 and 30 years of credited service.
- FA(R), where A is any age, and R is 20, 21, 22, 23, 24, 25, 26, 27, 28, 29 or 30 years of credited service.
- S Points, where S is between 70 and 90, and S is the sum of the member or former member's attained age and years of credited service.

Eligibility for Retirement (Reduced Benefits)

MERS members are eligible to retire with reduced benefits upon attainment of:

- 25 or more years of credited service and
- Attainment of Age E, equal to Normal Retirement Age T, minus a number of years, where the number of years is 10 or less.

Or

- 15 or more years of credited service and
- Attainment of Age F, equal to Normal Retirement Age T, minus a number of years, where the number of years is 5 or less.

The retirement allowance is reduced for each complete month that the retirement date precedes Normal Retirement Age T, up to a maximum reduction of 60%. The monthly reduction factors, as provided by MERS, for various ages T are shown in the following table:

Monthly Early Retirement Reduction Factor by Normal Retirement Age T										
60	61	62	63	64	65	66	67	68	69	70
0.50%	0.65%	0.66%	0.67%	0.68%	0.69%	0.70%	0.71%	0.72%	0.73%	0.74%

The reduction may be partially or fully waived by adopting the early retirement provisions outlined above.

Mandatory Retirement

None.

Deferred Retirement (Vesting)

Retirement can be deferred if membership is terminated before Normal Retirement Age T other than by retirement or death, after becoming vested with Y years of credited service. Y is a whole number between 5 and 10 years of credited service as adopted for Normal Retirement eligibility. The retirement allowance begins when the application is filed with MERS and eligibility requirements for retirement are met. The deferred retirement allowance is computed in the same manner as a service retirement allowance, based on the benefit program in effect as of the date of termination of membership.

Rights to an allowance are forfeited if the member's accumulated contributions are refunded after termination of employment.

Final Average Compensation (FAC)

MERS Plan benefits are based on a member's FAC, subject to the dollar compensation limits under Section 401(a)(17) of the Internal Revenue Code, as applicable. For this purpose, FAC means one-fifth of the aggregate amount of compensation paid to a member and earned during the period of 5 consecutive years of the member's credited service in which the aggregate compensation paid is highest. The employer may optionally adopt a FAC averaged over N years, where N is a whole number of years not less than 3. Alternate rules apply for members with less than N years of credited service and for members with credited service in force with more than one participating municipality or court.

Service Retirement Allowance

Credited service at time of termination of membership is multiplied by one of the following options:

- 1.00% of FAC to 2.50% of FAC, in increments of 0.05% of FAC, the "lifetime multiplier" as adopted by the employer. If the multiplier is 2.25% or greater, the maximum benefit is 80% of FAC.

Supplemental Multiplier (in addition to the above lifetime multiplier): 0.05% of FAC to 1.50% of FAC, in increments of 0.05% of FAC, as adopted by the employer and payable only until attainment of the age at which unreduced Social Security benefits are available (or other age as specified by the participating

municipality or court). When this age is reached, the benefit reverts to the above lifetime multiplier. The combined lifetime and supplemental multipliers may not exceed 2.5%, and the combined benefit may not exceed 80% of FAC.

- **Bridged Benefit:** When adopted, Bridged Benefit Programs shall be applicable to all active employees in the affected employee division at the time the Bridged Benefit Program is adopted. Benefits of employees who left the affected employee division before the adoption of the Bridged Benefit Program or who entered the affected employee division after the adoption of the Bridged Benefit Program shall be determined by the benefits in effect during the period of their coverage.

For service prior to the Bridged Benefit date, one of the Benefit Program multiplier percentages of FAC (FAC may be frozen at the Bridged Benefit Date, or may be calculated at termination of membership). For service after the Bridged Benefit date, one of the Benefit Program multiplier percentages of FAC (at termination of membership).

The combined benefit may not exceed the larger of:

- (i) the above benefit based on service prior to the Bridged Benefit date; and
- (ii) 80% of FAC at termination of employment.

- **Frozen Benefit:** A municipality or court offering a Defined Benefit Plan or Hybrid Plan may adopt a MERS Defined Contribution Plan and terminate current members' future participation in the Defined Benefit Plan or Hybrid Plan. At the election of the participating municipality or court, the Defined Benefit Plan or Hybrid Plan retirement allowance shall be calculated using the final average compensation as of the Defined Contribution Plan effective date. The provisions of the frozen defined benefit plan formula apply for ancillary (non-retirement) benefits; alternatively, should the members be enrolled in the Hybrid Plan, the terms of the defined benefit component of the Hybrid Plan shall apply.

Maximum Benefit Payable by MERS

The maximum benefit that may be paid by MERS is governed by Section 415 of the Internal Revenue Code. Benefits in excess of the maximum benefit will be paid by the MERS Qualified Excess Benefit Arrangement.

Act 88 (Reciprocal Retirement Act, 1961 P.A. 88)

If the municipality has elected to come under the provision of Act 88 (see Table 2 in your municipality's actuarial report), service with former and future public employers in Michigan may be used to satisfy the service eligibility conditions of MERS. MERS maintains a statewide Act 88 adoption list:

https://resources.mersofmich.com/SharepointFormsService/Default.aspx?FormName=form_77.pdf

Disability Retirement Allowance

Total and permanent disability while employed by a participating municipality and after meeting the vesting requirement of the benefit program. The service requirement is waived if the disability is duty-related, as set forth in Section 31(4) of the MERS Plan Document.

The allowance is computed in the same manner as a service retirement allowance, except that the reduction for retirement before Normal Retirement Age T is not applied.

If disability is duty-related, the amount of the retirement allowance shall not be less than 25% of the member's FAC.

Adoption of optional Benefit Program D-2 provides a retirement allowance for a duty-related disability that is the greater of:

- (i) 25% of the member's FAC; or
- (ii) A benefit based on 10 years of credited service in addition to the member's actual period of service, provided the total years of service do not exceed the greater of 30 years or the member's actual period of service.

Non-Duty Death Allowance

If a member or vested former member with the minimum years of service required to be vested dies before retirement, a monthly allowance may be payable to a beneficiary.

If the member is married at the time of death, the spouse is the automatic monthly pension beneficiary unless the spouse, in writing, waives the benefit in favor of another named beneficiary.

A monthly pension beneficiary (named in an Option II Contingent Beneficiary Designation form filed with MERS) will receive a retirement allowance computed in the same manner as a service retirement allowance, based on service and FAC at death, but reduced to reflect an Option II (100% joint and survivor) election. The reduction for retirement before Normal Retirement Age T is not applied. Payment of a retirement allowance to the monthly pension survivor beneficiary of a deceased member commences immediately. Payment of a retirement allowance to the monthly pension beneficiary of a deceased vested former member commences on the date the member would have first satisfied eligibility for retirement with an unreduced service retirement allowance.

If there is no named beneficiary and the member leaves a spouse, the spouse will receive an Option II survivor allowance. Payment of a retirement allowance to the surviving spouse of a deceased member commences immediately. Payment of a retirement allowance to the surviving spouse of a deceased vested former member commences on the date the member would have first satisfied eligibility for retirement for an unreduced service retirement allowance. The amount of a surviving spouse's retirement allowance shall be 85% of the deceased member's or deceased vested former member's accrued retirement allowance computed in the same manner as a service retirement allowance, based on service and FAC at time of death.

The amount of a surviving spouse's benefit is always the larger of:

- (i) the benefit computed as a monthly pension beneficiary; and
- (ii) the 85% of accrued retirement allowance benefit described above.

If there is no named beneficiary and no retirement allowance being paid to a surviving spouse, unmarried children under age 21 will be paid an equal share of 50% of the deceased member's or deceased vested former member's accrued retirement allowance. The reduction for retirement before Normal Retirement Age T is not applied.

If no retirement allowance becomes payable at death, the member's accumulated contributions, if any, are paid to the beneficiary or to the decedent's estate.

Duty-Connected Death Allowance

A duty death allowance, computed in the same manner as a non-duty death allowance, may be payable to a spouse or child(ren) if death occurs as the natural and proximate result of performance of duty with a participating municipality, as described in Section 34 of the MERS Plan Document. In such a case, the vesting requirement is waived, and the minimum benefit is 25% of the deceased member's FAC.

Adoption of optional Benefit Program D-2 provides a retirement allowance for a duty-connected death that is the greater of:

- (i) 25% of the member's FAC; or
- (ii) A benefit based on 10 years of credited service in addition to the member's actual period of service, provided the total years of service do not exceed the greater of 30 years or the member's actual period of service.

Member Contributions

Each member contributes a percent of annual compensation, as selected by the municipality, on the member's annual compensation up to the compensation limit under Section 401(a)(17) of the Internal Revenue Code, as applicable. Any percentage from 0% to 10% (in 0.1% increments) may be selected. Interest is credited to accumulated member contributions each December 31 (and reflected in the Annual Member Statement provided to each member) at a rate determined by MERS, currently the one-year U.S. Treasury Bill rate determined as of each December 31.

If a member leaves the employ of the municipality or dies without a retirement allowance or other benefit payable on their account, the member's accumulated contributions plus interest (as described above) are refunded with spousal consent, to the member, if living, or to the member's surviving spouse, if any, or to a named beneficiary (after spousal consent, if applicable). Any accumulated member contributions remaining on account for a non-vested former member based on service that preceded a break in membership of more than 240 consecutive months (20 years) by that former member shall be transferred to a deemed IRA.

Note for MERS' Defined Contribution Plan: The Annual Actuarial Valuation addresses assets and liabilities for participation under the MERS Defined Benefit Plan and Hybrid Plan. The MERS Defined Contribution Plan, which first became available for adoption in late 1997, is not addressed in the valuation results as it is not a defined benefit plan.

Post-Retirement Adjustments

Employers may adopt post-retirement cost-of-living adjustments (COLA):

One-Time COLA for present retirees and beneficiaries. The amount of the increase is equal to the number of years since the later of retirement or the date specified in the adopting resolution times either:

- (i) a fixed percentage of the present benefit; or
- (ii) a fixed dollar amount.

This COLA may be readopted from time to time.

Annual COLA – provides automatic annual benefit increases. The COLA may apply to either:

- (i) retirees (and their beneficiaries) retired before the effective date of the COLA; or
- (ii) retirees (and their beneficiaries) retired on or after the effective date of the COLA.

The amount of the annual increase may be:

- (i) a percentage of the original (base) retirement benefit (non-compounded COLA); or
- (ii) a percentage of the present retirement benefit (compounded COLA); or
- (iii) a fixed dollar amount.

Bridged COLA - A bridged COLA program prospectively terminates the COLA on service accrued on and after the COLA Bridge date.

Upon adoption of a COLA Bridge, the amount of annual increase may be:

- (i) a percentage of the original (base) retirement benefit accrued through the COLA bridge date (non-compounded COLA); or
- (ii) a percentage of the original (base) retirement benefit plus prior adjustments accrued through the COLA bridge date, (compounded COLA); or
- (iii) a fixed dollar amount.

Death-After-Retirement Surviving Spouse Benefit

A retiring member electing the Straight Life (highest) form of retirement payment is normally paid a lifetime retirement allowance, with payments terminating at death. The retiring member could provide benefits to a surviving spouse or another named beneficiary by electing Option II (100% continuation to beneficiary), Option II-A (75% continuation to beneficiary), Option III (50% continuation to beneficiary) or Option IV (5, 10, 15, or 20 years certain and life). A surviving spouse is automatically the beneficiary to an Option II allowance unless the spouse, in writing, relinquishes the benefit to the member electing a Straight Life allowance or to another named beneficiary. Electing these alternate forms of payment would lower the retiring member's retirement allowance.

If Benefit Program RS50% is adopted, a member retiring on or after the effective date of Benefit RS50% may elect the Straight Life form of retirement payment and still provide a 50% survivor benefit to their spouse. To be eligible for a surviving spouse benefit, the retiring member and spouse must have been married to each other both at the time of death and during the full one-year period just before retirement.

Delayed Retirement Option Partial Lump Sum (DROP+)

Any member who is eligible to retire with full, immediate retirement benefits has the option to:

- (i) Retire immediately and receive a monthly benefit payable immediately; or
- (ii) Delay their retirement date and continue to work.

If the member is covered by DROP+ and they retire at least 12 months after first becoming eligible for unreduced benefits, at actual retirement the member has the option to receive a partial lump sum and a reduced monthly benefit:

- (i) The member can elect a lump sum equal to 12, 24, 36, 48, or 60 times their monthly accrued benefit (if they have delayed retirement at least that many months).
- (ii) For each 12 months included in the lump sum, the member's lifetime benefit is reduced by the DROP+ percentage adopted by the employer. The employer can adopt any of the following DROP+ reduction percentages: 6%, 7%, 8%, 9% or 10%.

DROP+ may not be adopted after June 30, 2013.

Annuity Withdrawal

An employer may adopt the Annuity Withdrawal Program (AWP). Under the AWP, a retiring member may elect to receive a refund of their accumulated member contributions with interest in a lump sum at retirement. The member's monthly pension would then be reduced by the actuarial equivalent of the lump sum payment. The employer has two options for the interest discount rate used to compute the actuarial equivalent reduction:

- (i) The current investment return assumption used in the annual actuarial valuations (currently 7.35%); or
- (ii) The most recent December 31 interest rate used for crediting interest on member contributions.

Deferred Retirement Option Program (DROP)

If a participant is covered by the Benefit Program DROP and is eligible for retirement, they have the option to elect a specified DROP period in which they will cease to accrue any additional retirement benefits, but remain employed by the participating municipality or court. The participant must elect a DROP end date at least six months after the beginning date, but no more than sixty months after the beginning date, in one-month increments.

Upon the participant's election of DROP and the receipt of an application to enroll in DROP, MERS will calculate the participant's service retirement and benefit payment as of the beginning date. The Retirement System also shall calculate any age differential between the participant and the participant's beneficiary as of the calendar year of the DROP exit date in accordance with Treas. Reg. § 1.401(a)(9)-6. Upon the beginning date of the DROP period, the participant shall be responsible to continue employee contributions, if any.

On the next available benefit payment date after processing is complete, and monthly thereafter, an amount equal to 100% of the monthly service retirement benefit payment the participant would have received if he or she had retired as of the DROP beginning date will be credited to a notional account for the benefit of the participant. Funds in the DROP account are credited with interest in the amount of 3% annually, or prorated in the event of a DROP period that is less than twelve months.

Upon the end date, the participant shall receive a lump-sum distribution of the participant's DROP account and on the first day of the calendar month following end date, the participant will begin receiving monthly service retirement benefit payments.

Non-Standard Benefit Provisions

Some municipalities have collectively bargained benefit provisions that differ from the benefit provisions described in this section, and MERS has agreed to administer such provisions. Such benefit provisions, if any, are listed in Table 2 of a municipality's annual actuarial valuation report, or are reflected in the actuarial assumptions that are specific to a municipality and are listed individually in a municipality's annual actuarial valuation report.

Legacy Provisions

A number of plan provisions, primarily service retirement allowance programs and member contribution programs, have been sunset (are no longer available for adoption). A participating municipality or court may continue such benefit program. Such benefit provisions, if any, are listed in Table 2 of a municipality's annual actuarial valuation report.

Summary of Plan Provisions – Hybrid Plan¹

The benefits summarized in this section are intended only as general information regarding the Municipal Employees' Retirement System of Michigan. They are not a substitute for PA 220 of 1996, the MERS Plan Document, or MERS administrative procedures. If any conflict occurs between the information in this summary and PA 220, the MERS Plan Document, or MERS administrative procedures the provisions of PA 220, the MERS Plan Document, and MERS administrative procedures govern.

Hybrid Plan Part I — Defined Benefit Portion

Eligibility for Retirement

Members are eligible to retire at a Normal Retirement Age, between 60 and 70, as selected by the participating municipality, with 6 or more years of service.

Optional Retirement Programs (Unreduced Benefits)

An age between 55 and 65 as selected by the participating municipality, with 25 years of service.

Mandatory Retirement

None.

Deferred Retirement (Vesting)

Retirement can be deferred if membership is terminated before the applicable retirement age other than by retirement or death, after becoming vested (6 years of credited service is required for vesting). The retirement allowance begins when the application is filed with MERS and eligibility requirements for retirement are met. The deferred retirement allowance is computed in the same manner as a service retirement allowance, based on the final average compensation and years of service at termination of membership.

Final Average Compensation (FAC)

Benefits are based on a member's FAC, subject to the dollar compensation limits under Section 401(a)(17) of the Internal Revenue Code, as applicable. For this purpose, FAC means one-third of the aggregate amount of compensation paid to a member and earned during the period of 3 consecutive years of the member's credited service in which the aggregate compensation paid is highest.

Act 88 (Reciprocal Retirement Act, 1961 P.A. 88)

If the municipality has elected to come under the provision of Act 88 (see Table 2 in your municipality's actuarial report), service with former and future public employers in Michigan may be used to satisfy the service eligibility conditions of MERS. MERS maintains a statewide Act 88 adoption list:

https://resources.mersofmich.com/SharepointFormsService/Default.aspx?FormName=form_77.pdf

¹ Please see the description of the Defined Benefit Plan beginning on page 3.

Service Retirement Allowance

Credited service at time of termination of membership is multiplied by one of the following options:

Hybrid 1.00%	1.00% of a member's FAC
Hybrid 1.25%	1.25% of a member's FAC
Hybrid 1.50%	1.50% of a member's FAC
Hybrid 1.75% ¹	1.75% of a member's FAC
Hybrid 2.00% ¹	2.00% of a member's FAC

¹ Available to those without Social Security coverage.

Maximum Benefit Payable by MERS

The maximum benefit that may be paid by MERS is governed by Section 415 of the Internal Revenue Code. Benefits in excess of the maximum benefit will be paid by the MERS Qualified Excess Benefit Arrangement.

Disability Retirement Allowance

Benefits are the same as under the Defined Benefit Plan, except that optional Benefit Program D-2 does not apply.

Non-Duty Death Allowance

Benefits are the same as under the Defined Benefit Plan.

Duty-Related Death Allowance

Benefits are the same as under the Defined Benefit Plan, except that optional Benefit Program D-2 does not apply.

Member Contributions

The Defined Benefit portion of the Hybrid plan only allows member contributions in the situation where the employer has a cap on their contributions. Each municipality's actuarial valuation reflects the member contribution provisions reported by MERS.

Post-Retirement Adjustments

Not available.

Death-After-Retirement Surviving Spouse Benefit

The same optional forms of payment are available as under the Defined Benefit Plan, except that the optional Benefit Program RS50% does not apply.

Annuity Withdrawal

Not available.



Deferred Retirement Option Program (DROP)

Not available.

Hybrid Plan Part II - Defined Contribution Portion

Employer Contributions and Vesting

The employer contribution amount is any amount allowed by federal law.

The vesting schedule for employer contributions is one of the following schedules, as adopted by the employer:

- (i) Immediate vesting upon participation; or
- (ii) 100% vesting after stated years (participant is 100% vested after not to exceed maximum 5 years of service ("cliff" vesting)); or
- (iii) Graded vesting percentages per year of service, not to exceed maximum 6 years of service for 100% vesting, nor be less than certain stated minimums.

If an employer has a cap of the Defined Benefit Component and the total contribution requirement to fund the Defined Benefit Component of the Plan equals the employer cap percentage or more, the employer shall pay the employer cap to the Defined Benefit Component, and make no contributions to the Defined Contribution Component.

Member Contributions and Vesting

The member contribution amount is any amount allowed by federal law and subject to procedures established by the Retirement Board.

The vesting schedule for member contributions is 100% immediate vesting.

Note: The Annual Actuarial Valuation addresses assets and liabilities for participation under the MERS Defined Benefit Plan and the Defined Benefit portion of the Hybrid Plan. The Defined Contribution portion of the Hybrid Plan is not addressed in the valuation results.

Municipal Employees' Retirement System of Michigan IRC Section 415(b)(1)(A) Benefit Dollar Limits — 2021

The limits are based on the retiree's age at normal retirement with at least 10 years of participation. The limit at ages 62-65 is indexed with inflation, in \$5,000 increments. The limits at earlier ages are then increased proportionately. The limit applies to the retiree's or beneficiary's employer-financed straight life benefit, except in the case of an Option II, IIA, or III election with the retiree's spouse as named beneficiary, in which case the limit applies to the employer-financed portion of the reduced joint and survivor benefit.

Age at Retirement	General Employees	Police and Fire Members ¹
35	\$43,256	\$230,000
36	45,687	230,000
37	48,269	230,000
38	51,014	230,000
39	53,934	230,000
40	57,042	230,000
41	60,353	230,000
42	63,882	230,000
43	67,648	230,000
44	71,669	230,000
45	75,968	230,000
46	80,567	230,000
47	85,492	230,000
48	90,774	230,000
49	96,443	230,000
50	102,536	230,000
51	109,093	230,000
52	116,159	230,000
53	123,786	230,000
54	132,029	230,000
55	140,954	230,000
56	150,632	230,000
57	161,146	230,000
58	172,588	230,000
59	185,064	230,000
60	198,696	230,000
61	213,621	230,000
62	230,000	230,000
63	230,000	230,000
64	230,000	230,000

¹ Requires that the member have at least 15 years of police, fire, and/or armed forces service as defined in IRC regulations. Otherwise use the limits for general members.

IRC Section 401(a)(17) Compensation Limit — 2021

For 2021, the IRC Section 401(a)(17) limit is \$290,000. This limit is indexed with price inflation in \$5,000 increments.

Actuarial Assumptions

To calculate MERS contribution requirements, plan accounting costs, and reporting requirements, assumptions are made about future events that could affect the amount and timing of expected benefits to be paid and the assets to be accumulated. The economic and demographic assumptions include:

- An investment return assumption that is used to discount liabilities and project what plan assets will earn.
- A mortality assumption projecting the number of members who will die before retirement and the duration of benefit payments after retirement.
- Assumed retirement rates projecting when members will retire and commence receiving retirement benefits.
- A set of withdrawal and disability rates to estimate the number of members who will leave the work force before retirement.
- Assumed rates of pay increase to project member compensation in future years.

At the February 27, 2020 Board meeting, the MERS Retirement Board adjusted demographic assumptions. These assumptions, in particular the rates of mortality and assumed rate of mortality improvement, have a significant effect on a plan's required contribution and funding level. The actuarial assumptions currently used are summarized below and on the following pages.

The actuarial assumptions used for this valuation, including the assumed rate of investment return, are reasonable for purposes of the measurement

Interest Rate

Funding plan benefits involves the accumulation of assets to pay benefits in the future. These assets are invested and the net rate of investment earnings is a significant factor in determining the contributions required to support the ultimate cost of benefits. For the 2020 actuarial valuation, the long-term investment return is assumed to be 7.35% annually, net of administrative and investment expenses. This assumption was first used for the December 31, 2019 actuarial valuations.

Pay Increases

Because benefits are based on a member's final average compensation (FAC), it is necessary to make an assumption with respect to each member's estimated pay progression. The pay increase assumption used in the actuarial valuation projects annual pay increases of 3.00% in the long-term plus a percentage based on a service-related scale to reflect merit, longevity and promotional pay increases.

The pay increase assumption for selected ages is shown below. The 3.00% long-term wage inflation assumption was first used for the December 31, 2019 actuarial valuations. The merit and longevity pay increase assumption was first used for the December 31, 2020 actuarial valuations.

Sample Years of Service	Base (Wage Inflation)	Merit and Longevity	Total Percentage Increase in Pay
0	3.00%	6.70%	9.70%
5	3.00	1.90	4.90
10	3.00	1.10	4.10
15	3.00	0.70	3.70
20	3.00	0.60	3.60
25	3.00	0.40	3.40
30	3.00	0.20	3.20
35	3.00	0.10	3.10
40 and Over	3.00	0.00	3.00

Inflation

The long-term annual rate of price inflation is 2.5% annually.

Payroll Growth

For divisions that are open to new hires, the number of active members is projected to remain constant, and the total payroll is projected to increase 3.00% annually. This assumption was first used for the December 31, 2019 actuarial valuations.

Increase in Final Average Compensation (FAC Loads)

The Retirement Board adopted new FAC load assumptions that were first used for the December 31, 2020 annual actuarial valuations. These assumptions reflect an FAC load of 1% to 15% for each municipality, based on the municipality's experience in the 2014-2018 experience study. A load of 0% is used for divisions with a definition of compensation equal to base wages. It is anticipated that these assumptions will be updated after every 5-year experience study. The FAC increase assumption(s) for your municipality are shown in your annual actuarial valuation report. Note that for divisions that adopted Sick Leave in FAC (SLIF), the assumption is developed individually for each division, based on the specific SLIF provision. FAC loads are applied to decrements from active employment under Normal (unreduced) and Early (reduced) retirement decrements. If the division has a bridged benefit with frozen FAC in effect, FAC loads are applicable to the post-bridge benefit only.

Withdrawal Rates

The withdrawal rates are used to estimate the number of employees at each age that are expected 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 the current valuation are based on years of service, and employment classification. Divisions 02, 20 – 29, 05, and 50 -59 are considered to be a Public Safety employment classification. All other divisions are considered to be a General employment classification.

Sample rates of withdrawal from active employment, are shown below. These rates were first used for the December 31, 2020 actuarial valuations.

Sample Years of Service	% of Active Members Withdrawing Within the Next Year	
	Public Safety	General
0	13.90%	23.40%
1	11.60	19.50
2	9.40	15.80
3	7.40	12.50
4	6.10	10.30
5	4.90	8.30
10	3.20	5.40
15	2.40	4.00
20	1.80	3.10
25 and Over	1.50	2.60

Retirement Rates

A schedule of retirement rates is used to measure the probability of eligible members retiring during the next year. The retirement rates for Normal Retirement are determined by each member's replacement index and employment classification, as defined previously, at the time of retirement. The replacement index is defined as the approximate percentage of the member's pay (after reducing for their member contributions) that will be replaced by the member's benefit at retirement. The index is calculated as:

$$\text{Replacement Index} = 100 \times \text{Accrued Benefit} \text{ divided by } [\text{Beginning of Year Pay less Member Contributions}]$$

The assumed retirement percentage is 100% at the later of age 85 or a member's age on the valuation date.

Retirement rates for Early (reduced) Retirement are determined by the member's age at early retirement.

The Normal Retirement and Early Retirement rates below were first used for the December 31, 2020 actuarial valuations.

Normal Retirement – Unreduced Benefit (Exception Below)

Sample Replacement Index	Percent of Eligible Active Members Retiring Within the Next Year	
	Public Safety	General
5	11.0%	9.0%
10	14.0	11.0
15	19.0	15.0
20	24.0	19.0
25	24.0	19.0
30	24.0	19.0
35	24.0	19.0
40	24.0	19.0
45	25.0	20.0
50	26.0	21.0
55	26.0	21.0
60	30.0	24.0
65	30.0	24.0
70	31.0	25.0
75	33.0	27.0
80	38.0	30.0
85	42.0	33.0
90	48.0	38.0
95	52.0	42.0
100+	60.0	48.0

Early Retirement – Reduced Benefit

Age	Percent of Eligible Active Members
All Applicable ages	4.0%

Normal Retirement – Unreduced Benefit – Frozen Benefit – The retirement rates are equal to 20.0% at all ages, except age 85. At age 85 the retirement rate is equal to 100.0%.

Disability Rates

Disability rates are used in the valuation to estimate the incidence of member disability in future years.

The assumed rates of disablement at various ages are shown below. These rates were first used for the December 31, 2015 actuarial valuations.

Sample Ages	Percent Becoming Disabled Within the Next Year
	Public Safety
20	0.02%
25	0.02
30	0.02
35	0.05
40	0.08
45	0.20
50	0.29
55	0.38
60 and Above	0.39

The assumption of duty vs. non-duty disability is shown in the table below.

Benefit Program D-2 Adopted	Percent of Disabilities Assumed to be	
	Duty	Non-Duty
No	20%	80%
Yes	60%	40%

Mortality Tables and Mortality Improvement

In estimating the amount of the reserves required at the time of retirement to pay a member's benefit for the remainder of their lifetime, it is necessary to make an assumption with respect to the probability of surviving to retirement and the life expectancy after retirement.

This valuation incorporates fully generational mortality. The base mortality tables used are constructed as described below and are based on amount weighted sex distinct rates:

Pre-Retirement Mortality:

1. 100% of Pub-2010 Juvenile Mortality Tables for Ages 0-17
2. 100% of PubG-2010 Employee Mortality Tables for Ages 18-80
3. 100% of PubG-2010 Healthy Retiree Tables for Ages 81-120

Non-Disabled retired plan members and beneficiaries:

1. 106% of Pub-2010 Juvenile Mortality Tables for Ages 0-17
2. 106% of PubG-2010 Employee Mortality Tables for Ages 18-49
3. 106% of PubG-2010 Healthy Retiree Tables for Ages 50-120

Disabled retired plan members:

1. 100% of Pub-2010 Juvenile Mortality Tables for Ages 0-17
2. 100% of PubNS-2010 Disabled Retiree Tables for Ages 18-120

Future mortality improvements are assumed each year using scale MP-2019 applied fully generationally from the Pub-2010 base year of 2010.

These mortality tables were first used for the December 31, 2020 actuarial valuations.

Sample life expectancies and mortality rates are shown below.

Pre-Retirement Mortality:

Age on December 31, 2020	Expected Years of Life		Mortality Rates	
	Male	Female	Male	Female
20	70.01	72.73	0.039%	0.014%
25	64.72	67.41	0.033%	0.011%
30	59.44	62.08	0.050%	0.020%
35	54.21	56.79	0.067%	0.031%
40	49.03	51.53	0.082%	0.042%
45	43.86	46.29	0.100%	0.055%
50	38.73	41.07	0.139%	0.080%
55	33.65	35.90	0.214%	0.129%
60	28.69	30.81	0.333%	0.198%
65	23.87	25.82	0.473%	0.286%

Ninety percent (90%) of active member deaths are assumed to be non-duty deaths and 10% of the deaths are assumed to be duty related.

Disabled retired plan members:

Age on December 31, 2020	Expected Years of Life		Mortality Rates	
	Male	Female	Male	Female
45	40.18	43.24	0.106%	0.058%
50	34.97	37.95	0.295%	0.226%
55	30.09	32.99	0.447%	0.318%
60	25.41	28.15	0.680%	0.434%
65	20.95	23.44	0.978%	0.629%
70	16.73	18.92	1.514%	1.020%
75	12.82	14.68	2.580%	1.824%
80	9.39	10.90	4.653%	3.356%
85	6.61	7.73	8.503%	6.304%
90	4.57	5.33	14.679%	11.691%

Non-Disabled retired plan members:

Age on December 31, 2020	Expected Years of Life		Mortality Rates	
	Male	Female	Male	Female
45	29.81	32.48	1.024%	0.970%
50	25.97	28.64	1.500%	1.425%
55	22.51	25.22	2.068%	1.828%
60	19.44	22.07	2.609%	2.085%
65	16.59	18.89	3.076%	2.182%
70	13.80	15.55	3.650%	2.591%
75	11.04	12.28	4.732%	3.658%
80	8.48	9.37	6.757%	5.660%
85	6.31	7.02	10.098%	8.943%
90	4.57	5.26	15.341%	13.120%

State Reporting Assumptions

The Protecting Local Government Retirement and Benefits Act, Public Act 202 of 2017, was put into law effective December 20, 2017. One outcome of the law is the requirement for the local unit of government to provide select reporting disclosures to the State. Sec. 5(1) of the Act provides the State treasurer with the authority to annually establish uniform actuarial assumptions for purposes of developing the requisite disclosures. Below you will find information which may be used to assist the local unit of government with required reporting.

Uniform Assumptions, as applicable to the measurement and the required disclosures under uniform assumptions are denoted below. Additional discussion of the PA No. 202 and uniform assumptions may be found on the State [website](#) in the [memo](#) dated October 22, 2020.

Uniform Assumption	Value
Investment Rate of Return	7.00%
Discount Rate	7.00%
Salary Increase	3.00%* + Merit and longevity
Mortality	A version of Pub-2010*
	Fully generational MP-2019*
Mortality Improvement	* (Based upon the experience study dated February 14, 2020)
Amortization of the Unfunded Accrued Actuarial Liability:	
	<u>Closed Non-Linked Divisions</u>
Period	18 years
Method	Level Dollar
Type	Closed
	<u>Open Divisions[^]</u>
Period	18 years
Method	Level Percent
Type	Closed
	[^] Includes Closed Linked Divisions

Note that for PA No. 202 purposes, all other demographic assumptions are as disclosed earlier in this Appendix. For purposes of state reporting under PA No. 202 only, the 7.00% investment rate of return and discount rate are set by Treasury, not the Board of Trustees. These assumptions are reasonable for the purpose of state reporting.

Miscellaneous and Technical Assumptions

Annuity Withdrawal	The assumption used to model election of an Annuity Withdrawal provision is disclosed in the annual actuarial valuation report of the participating municipality or court. If applicable, the load is applied to decrements from active employment under normal and early retirement.
Loads - Vested Liabilities	Vesting liabilities are increased by 2% to reflect the value of the potential survivor benefit payable in case of death during the benefit deferral period.
Marriage Assumptions	Eighty percent (80%) of males and 80% of females are assumed to be married for purposes of death-in-service benefits. Eighty percent (80%) of males and 80% of females are assumed to be married at the time of death and the one-year period immediately prior to retirement. Male spouses are assumed to be three years older than female spouses. Adjustments for optional form of payment are based on the valuation assumptions.
Compensation	Compensation is reported in the valuation data. The maximum of current year wages and annualized wages is used to model valuation benefits. Historical compensation is used in the development of final average compensation by the System. Valuation data includes actual FAC as of the valuation date. Non-indexed, reported FAC is used as the minimum FAC in the development of the present value future value of benefits.
Pay Increase Timing	Beginning of valuation year. This is equivalent to assuming that reported pays represent amounts paid to members during the year ended on the valuation date.
Decrement Timing	Decrements of all types are assumed to occur mid-year.
Future Service	Members are assumed to earn 1.0 years of service in each future year.
Eligibility Testing	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
Benefit Service	Exact fractional service is used to determine the amount of benefit payable. Benefit service is the service used in the benefit formula.
Eligibility Service	The larger of reported Eligibility Service and reported Vesting Service was used as eligibility service in the valuation. Eligibility Service is the service used to meet the conditions for retirement, and is generally equal to or larger than benefit service.
Decrement Relativity	Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.

Decrement Operation	Disability and withdrawal do not operate during retirement eligibility.
Normal Form of Payment	Future retiring members are assumed to elect the Straight Life form of payment. (Benefit Program RS50% includes a subsidized death benefit.)
Incidence of Contributions	Contributions are assumed to be received continuously throughout the year based upon the computed percent of payroll shown in this report, and the actual payroll payable at the time contributions are made. New entrant normal cost contributions are applied to the funding of new entrant benefits.
Benefits by Effective Date	Divisions may adopt benefit by effective date, which is an alternate treatment, from MERS standard rules, of benefits for transfer/rehires. For valuation purposes, data of each impacted member is reported and/or adjusted to reflect the alternate treatment.
Transfers	For valuation purposes, members who have transferred between divisions within an employer are valued as reported by the System. This means each impacted member may have multiple records with different employment statuses, i.e., inactive and active. Valuation assumptions are applied based upon the reported employment status.
Pension Obligation Bond Proceeds	Proceeds from pension obligation bonds contributed to the fund are first applied to the outstanding Initial UAL amortization layer. Any remainder is applied to the most recent gain/loss amortization layer.
Maximum Compensation	The dollar compensation limits under Section 401(a)(17) of the Internal Revenue Code are projected to increase with price inflation, 2.5% annually. No member or employer contributions are projected to be made on the portion of any member's annual compensation in excess of the IRC Section 401(a)(17) limit for the year.
Maximum Benefit	The dollar benefit limitations under Section 415 of the Internal Revenue Code are projected to increase with price inflation, 2.5% annually. Employee divisions 02, 20-29 (Police), 05 and 50-59 (Fire) are presumed eligible for the public safety benefit limits. No benefits in excess of the IRC 415 limits are projected to be paid out of the Qualified Benefit Plan. For existing retirees presently over the 415 limits, a QEBA liability is developed using the municipal bond rate and offset against other valuation scenarios.
Member Contribution Interest	The interest rate credited on member contributions is the one-year Treasury Bill rate as of December 31, determined annually. The long-term rate assumed in the valuation is 2.75% annually, which is consistent with the 2.5% price inflation assumption.

DROP+ Assumptions

Each eligible member is assumed to make the DROP+ election with the most valuable combination of lump sum and reduced monthly benefit.

The retirement probabilities shown earlier are used for members who are not covered by Benefit Program DROP+. For those covered by Benefit Program DROP+, it is assumed that retirement will be delayed long enough to become eligible for at least 4 years' worth of DROP+ lump sum.

The assumption used to model election of a DROP+ provision is disclosed in the annual actuarial valuation report of the participating municipality or court.

Traditional DROP

Total normal cost, accrued liability, and the present value of future benefits, for active members, are loaded for potential future DROP election. The DROP load is estimated for an affected division by assuming each eligible member was assumed to enter the DROP when first eligible and stay in the DROP program for 3 years.

At the end of the 3-year period, the member was assumed to receive their DROP account balance with interest and the monthly benefit. No load is applied to the normal cost to reflect the fact that employer contributions stop but member contributions continue at DROP entry.

Members in the DROP are treated as having retired immediately. No adjustment has been made for interest accruing during the DROP period or continued member contributions.

Reported DROP balances that are included in the assets are added to the liability. No adjustment has been made for future DROP interest credits.

The assumption used to model election of a Traditional DROP provision is disclosed in the annual actuarial valuation report of the participating municipality or court.

Data Adjustments

In the event gender is not reported, the member is assumed to be female.

Active members with frozen benefits use pay as provided on the record without adjustment. Pay is increased from the valuation date with valuation assumptions for purposes of ancillary (non-retirement) benefits.

Active members with frozen benefits use a frozen benefit as provided. In cases where a frozen benefit is not provided, one is estimated using service, multiplier, and FAC information on the record.

Certain retirees were reported without a beneficiary date of birth. In the event this data was necessary to value a retired liability, a 3-year age difference was assumed.

Retired records reported with a recipient type of MEMB, optional form involving a joint and survivor, and beneficiary count of 0, were assumed to have the surviving beneficiary predecease the retiree. These records were valued as straight life.

Analysis was prepared on potential redundant retirement conditions. The results of this analysis were inconclusive, resulting in no special adjustment to the valuation process. We will coordinate with MERS to determine if additional analysis is recommended.

Non-vested Former Members Active in a DC Plan

Liabilities in excess of accumulated member contributions are not included in the valuation until the former member earns total vesting service to become vested in the defined benefit plan. We did not receive sufficient data on these individuals to calculate the liability in excess of accumulated contributions; however, we believe this amount, if any, is likely to be immaterial to the calculation.

Non-vested Former Members Active in Another DB or Hybrid Plan

Members of this type were assumed to become vested through continued employment with another MERS employer. Liabilities for these former members were included in the valuation. Benefits were assumed to commence based upon service in effect at the valuation date.

Non-vested Former Members Terminated from All Plans

Liability is equal to the accumulated member contribution balance.

Eligible Domestic Relations Orders (EDROs)

Participants and alternate payees under EDROs are reported individually. In the event the Participant is active and the Alternate Payee has commenced benefits, the liability associated with the Alternate Payee has been netted from the Participant's gross liability.

Nonstandard Amortization Policies

Certain exceptions to the MERS Actuarial Policy were reported in the valuation data and have been applied in the determination of the minimum required employer contributions valuation.

Projection Assumptions

Open and closed (linked) divisions are assumed to be stable populations. Total payroll of the link set, open division and the associated closed (linked) divisions, is projected to grow with wage inflation in future years of projections. Payroll projections for closed (linked and not linked) divisions are projected based on the closed group demographic and pay increase assumptions. In the event the open (linked) division does not have any active members, the normal cost for emerging new entrants is projected under the benefit structure of the existing closed (linked) division(s).

Emerging new entrant normal cost is projected to be a level percent equal at the rate determined in the current valuation year. No adjustment has been made for future generational mortality improvement.

The accumulated member contribution balance as of the valuation date for non-vested former members terminated from all plans is assumed to be paid out mid-year.

Future projection years are not adjusted from the provisions of employer contribution cap arrangements or other non-standard amortization policies.

Effective with the December 31, 2018 valuations, divisions becoming overfunded were assumed to contribute an employer contribution equal to normal cost. This minimum contribution was assumed to continue regardless of funded status.

Valuation Model Disclosures

Valuation results are developed through the use of multiple models.

Valuation liabilities were prepared using ProVal's valuation model, a software product of Winklevoss Technologies. We are relying on the ProVal model. We performed tests of the ProVal model with this assignment and made a reasonable attempt to understand the developer's intended purpose of, general operation of, major sensitivities and dependencies within, and key strengths and limitations of the ProVal model. In our professional judgment, the ProVal valuation model has the capability to provide results that are consistent with the purposes of the valuation and has no material limitations or known weaknesses.

Financial results were prepared using our financing and projection model which in our professional judgment has the capability to provide results that are consistent with the purposes of the valuation and has no material limitations or known weaknesses. We performed tests to ensure that the model reasonably represents that which is intended to be modeled.

Funded Status Disclosures

Unless otherwise indicated, a funded status measurement is based upon the actuarial accrued liability and the actuarial value of assets. The measurement is:

- a. Inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations.
- b. Inappropriate for assessing benefit security for the membership.
- c. Dependent upon the actuarial cost method which, in combination with the amortization policy and asset valuation method, affects the timing and amounts of future contributions. The amounts of future contributions will differ from those assumed due to future actual experience differing from assumed.

A funded status measurement of 100% is not synonymous with no required future contributions. If the funded status were 100%, the Plan would still require future normal cost contributions (i.e., the cost of the active membership accruing an additional year of service credit).

Temporary Workforce Modification

In light of COVID-19, the Board has amended the Plan document covering the period of March 1, 2020 through December 31, 2021, allowing participating municipalities and courts to temporarily adjust the definition of service credit, the definition of compensation for FAC determination, and select provisions of retiree reemployment. Impact of these provisions will be modeled through reported valuation data, to the extent that data is available.

Actuarial Funding Method

The Retirement Board has adopted funding policies for the Retirement System to achieve the following major objectives:

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

The basic funding objective is a level pattern of cost as a percentage of pay throughout each member's working lifetime.

The funding method used in this actuarial valuation – the entry age normal cost method – was first used for the December 31, 1993 actuarial valuations and is intended to:

- (i) Meet this funding objective; and
- (ii) Result in a relatively level long-term contribution requirement as a percentage of pay.

Under the entry age normal cost method, the total actuarially-determined contribution requirement is equal to the sum of the normal cost plus the payment required to fund the unfunded actuarial accrued liability over a period of years. Funding or amortizing the unfunded actuarial accrued liability includes a payment toward the liability (principal) plus a payment to reflect the time value of money (interest).

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-pay contribution required each year, with respect to each member, to accumulate over their projected working lifetime the reserves needed to meet the cost of earned benefits. The normal cost represents the ultimate cost of the Retirement System, if the unfunded liability is paid up and the actual experience of the System conforms to the assumptions.

For purposes of Plan funding and State reporting, the normal cost for each member is calculated based on the prospective benefit formula for that member (referred to as the replacement life method), with entry based upon benefit service (eligibility service if the participant is reported with a frozen benefit). For accounting purposes, the normal cost for each member is calculated as the level contribution over the member's entire career which is anticipated to accumulate to the value of benefits at the end of the career.

Actuarial Accrued Liability

The total actuarial present value of future benefits is computed using the valuation's actuarial assumptions. 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 a given valuation date, if:

- i. Contributions sufficient to meet the normal costs of the Retirement System had been made each year in the past;
- ii. Benefit provisions had always been the same as current benefit provisions; and
- iii. Actual past experience had always conformed to current actuarial assumptions.

If assets equaled the total accrued liability, there would be no unfunded liability and future contribution requirements would consist solely of the calculated normal cost rates, absent other funding policy parameters.

Open Divisions and Closed Divisions

There are three types of divisions for funding purposes that a participating municipality or court may have in its actuarial valuation:

- Open division (linked or not linked) – Generally a division accepting new hires and having at least one active member. An open linked division having zero active members, but having inactives or assets and having active members in the associated closed linked divisions(s) is considered open for valuation purposes. A shadow division is an open linked division that does not yet have assets or members.
- Closed (linked) divisions - A division not accepting new hires, with new hires enrolled in a separate open division. This division is usually created when a Defined Benefit Plan or Hybrid Plan division is closed and a new Defined Benefit Plan Division or Hybrid Plan division for the same employee classification is adopted. Multiple closed (linked) divisions can be linked to the same open division.
- Closed (not linked) – A division not accepting new hires, but that may include remaining active members. A participating municipality or court may close one or more employee divisions in the Defined Benefit Plan or Hybrid Plan without terminating participation in the Retirement System.

Closed not-linked divisions generally arise from either:

- (i) a decision by the employer to enroll new hires (including rehires and transfers), and possibly current members (by freezing accrued service), in a defined contribution plan instead of the Defined Benefit Plan or Hybrid Plan defined benefit component, or
- (ii) a decision by the employer to transfer active members to a different division, leaving only inactives (retirees, vested former members, and non-vested former members who have not yet applied for a refund of accumulated employee contributions) in the closed division.

A division that is accepting new hires, that has no active members but has retirees, vested former members, or non-vested former members who have not yet applied for a refund of accumulated employee contributions is considered closed (not linked) for valuation purposes.

An open linked division with no active members across all divisions within the linked set is considered closed for valuation purposes.

Linked Divisions

If new hires, transfers and rehires in a division are covered by a new tier of benefits in the MERS Defined Benefit Plan (including the defined benefit portion of the MERS Hybrid Plan), there can be a transfer of employer assets between the defined benefit division with no new hires (with the old benefit structure) and the defined benefit or hybrid division covering the new hires within the same employee classification. (Note that assets cannot be transferred if the new tier of benefits is a defined contribution plan.) This allows multiple divisions to be “linked” and financed as if they were one division.

If a division with no new hires is “linked” to an open MERS Defined Benefit Plan or MERS Hybrid Plan division, this is indicated in Table 2 of your municipality’s annual actuarial valuation report.

Divisions within a link set may be invoiced a total blended employer contribution. The total blended contribution of a closed (linked) division(s) and its applicable open division is expressed as a percentage of combined payroll, and is available by request of the participating municipality or court.

Amortization of Unfunded Actuarial Accrued Liability

The unfunded accrued liability (UAL) as of December 31, 2020 (see Table 6 of your municipality’s annual actuarial valuation report) is projected to the beginning of the fiscal year for which employer contributions are being calculated (see Table 10 of your municipality’s annual actuarial valuation report). This allows the 2020 valuation to account for expected future contributions that are based on past valuations.

Since the December 31, 2016 Annual Valuation, the projected UAL has been amortized in layers with each layer determined by UAL source. Since the implementation of layering, there have been procedural updates to the projection methodology. Amortization payments are developed using a level-percent-of-payroll method. For divisions that are open to new hires, the resulting total amortization payment is divided by the projected fiscal year payroll to determine the amortization payment as a percentage of active member payroll. For divisions that will have no new hires the payment is not converted to a percentage of active member payroll. After applying other funding policy requirements (described below) the resulting amortization requirement is displayed in Table 1.

The MERS funding policy uses a level-percent-of-payroll amortization method. This means that the annual amortization payment dollars will increase each year at the assumed wage inflation of 3.00%. One result of the level percent of pay amortization method is that the outstanding balance of the UAL will increase in nominal dollars each year for amortization periods longer than around 20 years under the current assumptions (although it will decline in real, inflation-adjusted terms). This is called negative amortization. This phenomenon ceases once the amortization periods become shorter than approximately 20 years.

Beginning with the December 31, 2020 valuation, a single amortization layer will be established each valuation year for changes in UAL occurring since the prior valuation year (plan amendments, assumption or method changes, and experience). Each new layer will be recognized over a fixed period, refer to the following table, which will decline by 1-year in each subsequent valuation year. Additional administrative procedures apply for carve-outs and mergers.

Division Status	Link Status	Period¹	Method
Open	Linked	15 years	Level Percent
Open	Not Linked	15 years	Level Percent
Closed	Linked	15 years	Level Percent
Closed	Not Linked	10 years	Level Percent

¹ The greater of this period or the remaining period under the prior policy, discussed further under legacy UAL.

Closed (linked and not linked) division amortization payments are calculated using the same amortization method used for open divisions. Contributions are invoiced as a dollar amount rather than a percentage of pay to avoid applying a percent of pay contribution to a declining (or non-existent) payroll.

The following are special situations affecting amortization bases, the establishment of amortization layers and minimum contribution requirements:

- When the UAL, adjusted to start of the participating municipality or court’s fiscal year, changes from underfunded to overfunded, or from overfunded to underfunded, existing amortization bases are combined to a single layer. As of the date of the combination, the single layer is established in accordance with the schedule above.
- Every division is required to maintain a minimum market value of reserves equal to three times the expected annual benefit payments (the “three times benefit minimum” rule). The required total minimum employer contribution equals the excess (if any) of three times the expected annual benefit payments over the projected market value of assets as of the participating municipality or court’s fiscal year for which the contribution applies. In the event that the three times minimum contribution applies, all existing amortization layers will be combined under a layer established in accordance with the schedule above.
- Effective with the December 31, 2018 valuations, when a division switches from underfunded to overfunded on the valuation date, the division is required to make a minimum contribution equal to employer normal cost until the division’s funded ratio reaches 120%.
- At times, divisions within participating municipalities or courts issue Pension Obligation Bonds (POBs). In the valuation subsequent to receipt of POB proceeds, all existing amortization layers shall be combined to a single layer. As of the date of combination, the single layer is established in accordance with the schedule above.
 - All divisions within a participating municipality or court issuing a POB are subject to a minimum annual employer contribution requirement not less than the division employer normal cost, regardless of the division’s funded ratio.

New employers joining MERS will be placed on a schedule consistent with the treatment of existing divisions based on division and link status.

Amortization policy has evolved over time. As a result, each division may have multiple legacy UAL layers established prior to December 31, 2020. Legacy layers were established by source of UAL as denoted in the following table:

Source of UAL	Definition
Initial UAL	UAL as of December 31, 2015, or the valuation date the municipality joined MERS
Gain/Loss	UAL attributable to differences between the actuarial assumptions and expected contributions and the experience of the plan from one valuation to the next
Plan Amendment	UAL arising from adoption of a benefit change
Assumption Change	UAL arising from a change in actuarial assumptions
Method Change	UAL arising from a change in methods (i.e., funding method or asset method)
Early Retirement Incentive	UAL arising from adoption of an Early Retirement Incentive program
Merged Division Balance	Aggregate UAL resulting when divisions merge

Beginning in the December 31, 2020 annual actuarial valuation, each legacy layer will have the remaining amortization period written down by one-year each year, unless otherwise noted in the individual valuation report or triggering a special situation as denoted above. In addition, any remaining (overfunded) negative Initial UAL shall be amortized over a closed ten-year period.

Asset Valuation Method

The actuarial value of assets is determined on the basis of a method that calculates expected investment income at the valuation rate of return and adds a portion of the difference between the expected investment income and actual investment income earned on a market value basis. Beginning with the December 31, 2016 valuation the difference in investment income between expected return and market return is recognized over a 5-year period at the rate of 20% per year. This asset valuation method was first adopted for the December 31, 2016 valuation, and is applied as follows:

Actuarial Value equals:

- (i) Actuarial value of assets from the previous actuarial valuation; plus
- (ii) Aggregate employer and member contributions since the last valuation; minus
- (iii) Benefit payments and refunds of member contributions since the last valuation; plus
- (iv) Estimated investment income at the 7.75% valuation interest rate (through December 31, 2019, changing to 7.35% prospectively from that date); plus
- (v) Portion of gain (loss) recognized in the current valuation.

For the above purpose, gain (loss) is defined as the excess during the period of the investment return on the market value of assets over the expected investment income. The portion recognized in the valuation is 20% of the current year's gain (loss) plus 20% of the gain (loss) from each of the 4 preceding years. The transition from the 10 year to the 5-year asset method was fully recognized as of December 31, 2019.

During 2020, the approximate net investment return on average total assets at actuarial value (determined as the actuarial value of investment income divided by the average actuarial value of assets during the year) was 8.17%. The corresponding amounts for 2019, 2018, 2017, and 2016 were 4.77%, 3.80%, 6.08%, and 5.14%, respectively.

For the December 31, 2020 valuation, the actuarial value of assets is equal to 97.24% of market value (compared to 101.32%, 109.53%, 101.13%, and 107.71%, in 2019, 2018, 2017, and 2016 respectively). This percentage is applied to each division's reported market value of assets to estimate the actuarial value of assets for the division. The table on the following page provides the details of the derivation of the actuarial value of assets for the retirement system in the aggregate.

As of December 31, 2020, the actuarial value of assets is 97% of market value due to asset smoothing. This means that rate of return on the actuarial value of assets should exceed the actuarial assumption in the next few years provided that the annual market returns exceed the 7.35% investment return assumption. When all assumptions are met, contribution rates are expected to stay approximately level as a percent of payroll (dollar amounts are expected to increase with wage inflation of 3.0% each year).

Please see the Comments on Asset Smoothing in your municipality's annual actuarial valuation report.

Municipal Employees' Retirement System of Michigan

Derivation of Actuarial Value of Assets

Valuation Date December 31	2016	2017	2018	2019	2020	2021	2022	2023	2024
1. Beginning of Year Assets									
a) Market Value	\$7,886,133,448	\$8,490,200,180	\$9,438,790,673	\$8,956,119,550	\$9,916,708,010				
b) Valuation Assets	8,953,772,507	9,144,749,435	9,545,649,179	9,810,014,644	10,047,396,867				
2. End of Year Market Value of Assets	8,490,200,180	9,438,790,673	8,956,119,550	9,916,708,010	11,001,035,223				
3. Net Additions to Market Value									
a) Net Contributions	654,676,753	698,797,543	796,389,263	709,508,687	811,296,796				
b) Benefit Payments	(917,084,153)	(849,733,843)	(892,535,236)	(935,026,931)	(975,740,569)				
c) Net Cash Flow = (3a) + (3b)	(262,407,400)	(150,936,300)	(96,145,973)	(225,518,244)	(164,443,773)				
d) As a percent of market value of assets = (3c) / (1a)	(3.33%)	(1.78%)	(1.02%)	(2.52%)	(1.66%)				
4. Average Valuation Assets = (1b) + 0.5 x [(3a) + (3b)]	8,822,568,807	9,069,281,285	9,497,576,193	9,697,255,522	9,965,174,981				
5. Determination of Annual Gain/(Loss)									
a) Valuation Rate	7.75%	7.75%	7.75%	7.75%	7.35%				
b) Expected Income at Valuation Rate = (4) x (5a)	683,749,083	702,869,300	736,062,155	751,537,303	732,440,361				
c) Actual Net Investment Income = (2) - (3c) - (1a)	866,474,132	1,099,526,793	(386,525,150)	1,186,106,704	1,248,770,986				
d) Gain (Loss) = (5c) - (5b)	182,725,049	396,657,493	(1,122,587,305)	434,569,401	516,330,625				
6. Phased-In Recognition of Investment Return									
a) Current Year = 0.2 x (5d)	36,545,010	79,331,499	(224,517,461)	86,913,880	103,266,125				
b) First Prior Year	(266,909,765)	36,545,010	79,331,499	(224,517,461)	86,913,880	103,266,125			
c) Second Prior Year	0	(266,909,765)	36,545,010	79,331,499	(224,517,461)	86,913,880	103,266,125		
d) Third Prior Year			(266,909,765)	36,545,010	79,331,499	(224,517,461)	86,913,880	103,266,125	
e) Fourth Prior Year				(266,909,764)	36,545,009	79,331,497	(224,517,461)	86,913,881	103,266,125
f) Total Recognized Investment Gain (Loss)	(230,364,755)	(151,033,256)	(375,550,717)	(288,636,836)	81,539,052	44,994,041	(34,337,456)	190,180,006	103,266,125
7. Change in Valuation Assets = (3a) + (3b) + (5b) + (6f)	190,976,928	400,899,744	264,365,465	237,382,223	649,535,640				
8. End of Year Assets									
a) Market Value = (2)	8,490,200,180	9,438,790,673	8,956,119,550	9,916,708,010	11,001,035,223				
b) Valuation Assets = (1b) + (7)	9,144,749,435	9,545,649,179	9,810,014,644	10,047,396,867	10,696,932,507				
c) Difference Between Market & Valuation Assets	(654,549,255)	(106,858,506)	(853,895,094)	(130,688,857)	304,102,716				
9. Recognized Rate of Return = [(5b) + (6f)] / (4)	5.14%	6.08%	3.80%	4.77%	8.17%				
10. Market Rate of Return = (5c) / [(1a) + 0.5 x (3c)]*	11.17%	13.07%	(4.12%)	13.41%	12.70%				
11. Valuation Asset Adjustment Factor = (8b) / (8a)	1.077095	1.011321	1.095342	1.013179	0.972357				

*Market rate of return as shown is the dollar-weighted rate of investment return, net of expenses, assuming all cash flows occur mid-year as calculated by the Actuary. Market rates of return as computed by MERS Investments are time-weighted rates of return, net of investment expenses and may differ from the Actuary's calculation.