

**City of Madison Heights
Police & Fire Retirement System
Special Meeting Agenda
Executive Conference Room
300 West 13 Mile Road
Friday, May 17, 2019**

1. Call to Order at 8:30 a.m.
2. Roll Call
3. Approval of Minutes of the Regular Meeting of April 16, 2019
4. Meeting Open to the Public
5. Adopt Investment Policy Update
6. Adopt Assumption Rate of Return of 6.75%
7. Adjournment

The next meetings of the Police and Fire Pension Board are scheduled for:

Tuesday, June 18, 2019 at 8:30 a.m.
Tuesday, July 16, 2019 at 8:30 a.m.
Tuesday, August 20, 2019 at 8:30 a.m.

POSTED:

TIME:

*City of Madison Heights
300 West Thirteen Mile
Madison Heights,
Oakland County, Michigan 48071
(248) 583-0826*

**CITY OF MADISON HEIGHTS
POLICE & FIRE RETIREMENT SYSTEM
REGULAR SCHEDULED TRUSTEE MEETING
APRIL 16, 2019**

The Regular Meeting of the City of Madison Heights Policemen & Firemen Retirement System Board of Trustees was held on Tuesday, April 16, 2019, at 8:32 a.m. in the Executive Conference Room at City Hall 300 West Thirteen Mile Road, Madison Heights, Michigan.

PRESENT: Corey Haines, Kevin Powers and Linda Kunath
ALSO PRESENT: Melissa Marsh, Kirk VanDagens, PNC Institutional Advisory Services; Brad Armstrong and Jamal Adora, GRS Retirement Consulting
EXCUSED: Jeff Gerald, Anthony Roberts

07-19 Excuse Trustees Jeff Gerald and Anthony Roberts

Motion by Trustee Powers and supported by Trustee Kunath to excuse Jeff Gerald and Anthony Roberts from the meeting of April 16, 2019.

YEAS: Haines, Powers, Kunath.
NAYS: None

08-19 Approval of Minutes of Special Meeting of February 5, 2019

Motion by Trustee Powers and supported by Trustee Kunath to approve the minutes of the special meeting of February 5, 2019.

YEAS: Haines, Powers, Kunath.
NAYS: None

09-19 PNC – Review Investment Reports through March 31, 2019

Kirk VanDagens of PNC handed out report booklets and reviewed PNC investment process, strategy team in Philadelphia, which he relies upon to make investment decisions. He discussed the significant swing in stock values, going down then up, since September, 2018 and stated that better than feared fourth-quarter earnings aided early 2019's stock market rally. Major central banks have shifted away from actively tightening monetary policy as a global growth continues to moderate, an imminent recession is unlikely. The U.S. has had gradual steady expansion since 2009, not anticipating a recession until 2020, forecast for 2019 is 2.7% growth. The Federal Reserve Board is not anticipated to make any change in rates and the market is currently reacting positively to this move. Long term earning drive stock prices, still, optimistic growth is possible. International growth is tightening, China is critical and needs to improve growth outlook. Kirk VanDagens stated for a 12 to 18 month outlook, preference remains to US equity, Hedge funds have had disappointing returns, as it is difficult to pick the hedge fund manager, and you cannot index hedge funds, you have to pick a manager.

At the end of the fourth quarter total assets are \$41,511,545. Total Portfolio Gross returns are 9.53% year-to-date, 4.82% One year, 7.97% Three year, and 5.25% since inception November 1, 2006.

Motion by Trustee Powers and supported by Trustee Kunath to receive and file the investment report as presented by Kirk VanDagens of PNC.

YEAS: Haines, Powers, Kunath.
NAYS: None

10-19 PNC – Asset Allocation Study

Melissa Marsh stated that the purpose of the asset allocation study was to look at moving towards a fixed rate of return to provide the City's actuary. The Board has been discussing since last year, and needs to make a decision about what rate to set the assumption. Kirk VanDagens, PNC, distributed an Asset Allocation Study and a handout comparisons sheet of Mix 1 and Mix 2 allocation options. The goal of the illustration was to consider options for higher returns, and less volatility than the current asset allocation, currently showing 6.17% as the average expected return. Mix 1 includes the addition of real estate, and Mix 2 has no real estate, but adds hedge funds. The probability considers a 5 year look back, for 10 years of future returns, with the best estimate for the current portfolio of 5.58%, if no changes are made. To implement real estate into the portfolio will take one to two quarters to move the portfolio to that allocation. Adding hedge funds, Mix 2, has some challenges, as it is difficult to retain a good hedge fund manager, and Kirk VanDagens is not necessarily recommended. U.S. stocks are still doing well, if reallocation is decided, the current allocation of U.S. stocks are earmarked to be reduced for inclusion of proposed Mix 1 or Mix 2. Kirk VanDagens recommends the Board look to reallocate about \$1.5 million.

Motion by Trustee Power supported by Trustee Kunath to receive and file the asset allocation study as presented by Kirk VanDagens of PNC and to open the meeting for discussion.

YEAS: Haines, Powers, Kunath.

NAYS: None

The need to revise the 2016 adopted Investment Policy was discussed. A policy revision will permit further diversification of the pension fund investments to include real estate investments and reallocation of emerging market equity. Kirk VanDagens, PNC, will update the investment policy, based upon Asset Allocation Study Mix 1, and provide for the Board's review at a future meeting.

The assumption rate of return of 6.75% was discussed, including adopting a 6.75% rate for future actuarial studies, starting with June 30, 2019. Based upon expected returns for public pensions, under various asset allocations scenarios, Brad Armstrong, GRS, will provide a review of reasonableness for a 6.75% rate of return being adopted, for the Board to consider at a future meeting.

10-19 Approval of contract extension of GRS actuarial services for June 30, 2019

GRS proposed fees for actuarial and consulting services beginning July 1, 2019 to be \$13,150 for determining funding requirements, calculation for GASB Statements No. 67 and No. 68 fee to be \$6,575, benefits computations to be \$204 per initial scenario and \$102 per additional scenario completed at the same time and \$102 per scenario for exclusion ratio calculations. Special project work to be billed separately as has been the practice in the past.

Motion by Trustee Power supported by Trustee Kunath to approval contract extension of GRS actuarial services for June 30, 2019.

YEAS: Haines, Powers, Kunath.

NAYS: None

11-19 Adjournment

Meeting was adjourned at 9:52 a.m.

Respectfully submitted,

Linda A. Kunath, Secretary

City of Madison Heights Police and Fire Retirement System

Statement of Investment Policy and Objectives Approved: _____, 2019

I. General

The Madison Heights Police and Fire Retirement System (the "Retirement System") was established to provide for the retirement benefits for covered employees, retirees and their beneficiaries. It shall be invested solely in the interest of the participants and beneficiaries of the Retirement System for the exclusive purpose of providing benefits accrued thereunder and defraying the reasonable expenses of administration.

II. Purpose

This statement reflects the investment policy, objectives and guidelines, which the Board of Trustees currently considers appropriate for the Retirement System.

This "**Investment Policy Statement**" is set forth by the Board of Trustees of the Retirement System in order to:

1. Define and assign the responsibilities of all involved parties.
2. Establish the investment goals and objectives of the Retirement System's assets.
3. Establish formal yet flexible investment guidelines incorporating prudent asset allocations and realistic performance goals.
4. Provide the Investment Manager with an understanding of the guidelines, limitations and direction that the Board feels is most appropriate for the System.
5. Manage the Retirement System's assets according to the standards described herein.
6. Provide a framework for regular constructive communication between the Board and the Investment Manager.
7. Create standards of investment performance which are historically achievable and by which the Investment Manager agrees are to be measured over a reasonable time period.
8. Provide for the monitoring of performance results of the Investment Manager to determine whether the Investment Manager continues to satisfactorily comply with the policy guidelines and the System's stated objectives.

III. Objectives

To maximize the long-term total return of System assets, which will depend upon the Retirement System's ability to accept moderate risk, recognizing that a reasonable degree of volatility in market value is necessary to achieve long-term capital appreciation. The Retirement System assets shall be invested commensurate with the Investment Fiduciary (as defined below) standard as set forth in Michigan Public Act 314 (the "Act"), Section 38.1133(3) and the Retirement System's risk taking ability as defined herein.

IV. Definitions

For the purpose of this document, the following terms shall have the following meanings:

1. “**Board of Trustees**” or “**the Board**” means the person or group of persons established to administer and manage the assets of the Retirement System as set forth in Michigan Public Act 314.
2. “**Investment Fiduciary**” means any person who exercises any discretionary authority or control in the investment of the Retirement System’s assets (this being a function of the Investment Manager) and any “Investment Fiduciary” as defined in Section 38.1132c(1) of the Act, which shall include members of the Board.
3. “**Investment Manager**” means any Investment Fiduciary who:
 - a) Has the power to manage, acquire, or dispose of any assets of the Retirement System;
 - b) Has acknowledged in writing that it is an Investment Fiduciary with respect to the assets of the Retirement System;
 - c) Provides generalized investment advice to the Board; and
 - d) Manages the assets of the Retirement System in accordance with the Investment Policy Statement; including (without limitation) compliance with applicable provisions of Act 314.
4. “**Securities**” shall refer to the marketable investment securities which are defined as in the Asset Class Guidelines below.

V. Delegation of Authority

The Board of Trustees of the Retirement System is an Investment Fiduciary, and is responsible for directing and monitoring the investment management of the Retirement System’s assets. As such, the Board of Trustees is authorized to delegate certain responsibilities to professional experts in various fields. These professional experts may include, but are not limited to:

1. **Investment Manager.** The Investment Manager has discretion to purchase, sell, or hold the specific securities that will be used to meet the Retirement System’s investment objectives. The Investment Manager also may assist the Board of Trustees in establishing investment policy, objectives, and guidelines and evaluating investment performance against appropriate benchmarks.
2. **Custodian.** The Custodian will physically maintain possession of the Retirement System assets, collect dividend and interest payments, redeem maturing securities, and effect receipt and delivery following purchases and sales of Retirement System assets. The custodian may also perform regular accounting of all assets owned, purchased, or sold as well as movement of assets into and out of the Retirement System’s accounts.
3. **Actuary.** The Actuary provides an accounting of the assets and liabilities of the Retirement System. The Actuary will perform periodic actuarial valuations to determine liability and funding requirements for the Retirement System, calculate the benefits for the participants and monitor the funding progress of the Retirement System.
4. **Others.** Additional specialists such as attorneys, consultants, auditors, and others may be employed by the Board of Trustees to assist in meeting its responsibilities and obligations to administer the Retirement System’s assets prudently.

VI. Responsibilities

Board of Trustees Responsibilities

The Board of Trustees is charged by law with the responsibility for the management of the Retirement System's assets. The Board shall discharge its duties solely in the interest of the participants and beneficiaries, and commensurate with the Investment Fiduciary standard as set forth in the Section 38.1133(3) of the Act. The specific responsibilities of the Board of Trustees relating to the investment management of the Retirement System's assets include:

1. To establish and develop an Investment Policy Statement and the strategic policy for the Retirement System (asset allocation) and periodically review policy in light of any changes in actuarial variables and/or market conditions.
2. To select qualified Investment Managers and Custodians to manage, advise and custody the Retirement System's assets.
3. To communicate the investment goals, objectives and standards to the Investment Manager, including any material changes that may be subsequently occur.
4. To monitor and review the investment performance of the Retirement System's assets to determine achievement of goals and compliance with policy guidelines.
5. To determine, with assistance from professional experts, how the Retirement System's assets should be allocated among various asset classes.
6. To monitor and evaluate manager performance versus objectives and performance standards.
7. To monitor all costs associated with the administration of the Retirement System's investments to assure that they are reasonable with market averages.

Investment Manager Responsibilities

The Investment Manager is expected to diversify the portfolio to minimize the risk of large losses unless, under the circumstances, it is clearly prudent not to so diversify. The Investment Manager shall invest the assets of the Retirement System in accordance with the standard of care set forth in Section 38.1133(3)(a) of the Act. The Investment Manager will provide the Board with suggested investment strategies, which might be changed or adopted by the Board to better suit the investment guidelines. The Investment Manager will have full discretion to make all investment decisions for the assets of the Retirement System placed under its control, while observing and operating within this Investment Policy Statement. Specific responsibilities of the Investment Manager include:

1. To manage the Retirement System's assets under its supervision in accordance with the guidelines and objectives contained in this Investment Policy Statement.
2. To exercise investment authority including the power to buy, sell, or hold individual securities, and to alter asset allocation within the guidelines established in this Investment Policy Statement.
3. To communicate any major changes to economic outlook, investment strategy or any other factors that the Investment Manager in its discretion may determine could affect implementation of this Investment Policy Statement as outlined in the Portfolio Review section of this Investment Policy Statement.

4. Vote all proxies and take all related actions in accordance with the terms of the investment management agreement between the Retirement System and the Investment Manager.
5. To inform the Board of any qualitative change or quantitative changes to the Investment Manager's organization at the same time and in the same manner as Investment Manager communicates the same to the public generally.
6. Report to the Board quarterly regarding the status of the portfolio and its performance for various time periods.
7. Conduct due diligence regarding managers utilized/recommended to the Retirement System.
8. Assist in the development and periodic review of an Investment Policy Statement and strategic asset allocation targets in accordance to the Retirement System's objectives and risk tolerance as set forth by the Investment Policy Statement.
9. Develop performance measurement standards and monitor Retirement System performance.

Custodian Responsibilities

The primary responsibilities of the Retirement System's Custodian are to:

1. Provide adequate safekeeping services.
2. Upon receipt of proper, executable trade instructions, seek to settle trades in a timely manner.
3. Collect interest and dividend income when due.
4. Notify the Investment Manager of corporate actions, including mergers, tender offers, stock splits and capital changes that require a decision.
5. Sweep daily cash balances into appropriate investment funds.
6. Accept instructions from the designated individuals.
7. Disburse funds as directed.
8. Provide monthly statements.

VII. Asset Allocation

This strategic asset allocation policy is consistent with the achievement of the Retirement System's financial needs and overall investment objectives. Asset classes are selected based on their expected long-term returns, individual reward/risk characteristics, correlation with other asset classes, and fulfillment of the Retirement System's long-term financial needs. The Board recognizes that from time to time the asset mix will deviate from the targeted percentages due to market conditions.

In recognition of the expected returns and volatility from financial assets, the portfolio will be invested in the following primary asset classes. Specified targets and acceptable ranges are shown below:

	Target	Range
Global Equity	65%	25 - 75%
Real Estate	8%	0 - 10%
Fixed Income	26%	20 - 75%
Cash	1%	0 - 10%

Within the primary asset classes noted above, the following sub-asset classes and ranges are shown in the table below.

Sub Asset Class	Target	Range
Domestic Equity Large Cap Growth	11%	5-20%
Domestic Equity Large Cap Value	12%	5-20%
Domestic Equity Mid Cap	11%	5-20%
Domestic Equity Small Cap	7%	0-12%
International Equity Large Cap Growth	7%	0-12%
International Equity Large Cap Value	7%	0-12%
International Equity- Small Cap	3%	0-5%
International Equity- Emerging Markets	4%	0-6%
Other Equity (Infrastructure)	3%	0-5%
Real Estate Investment Trusts	4%	0-8%
Private Real Estate	4%	0-8%
Domestic Core Fixed Income	23%	20-60%
Domestic High Yield Fixed Income	3%	0-5%
Global Fixed Income	0%	0-5%
Unconstrained Fixed Income	0%	0-5%
Cash	1%	0-20%

Any deviations beyond this mix of securities must have prior approval of the Board. The Investment Manager, within the above ranges, will from time to time, recommend tactical asset allocation decisions (over and under-weights).

VIII. Asset Class Guidelines

Domestic Equity

The Investment Manager will invest in a broadly diversified portfolio of publicly held stocks, issued by companies domiciled in the United States. Up to 15% of the Domestic Equity portfolio's current market value may be invested in publicly held companies domiciled in foreign countries as long as they trade on any of the major U.S. exchanges. Investment Manager may not invest more than 5% of the Domestic Equity portfolio assets in the securities of one issuer at time of purchase. Investment Manager may not invest in more than 5% of the outstanding securities of one issuer.

Style appropriate mutual funds, ETFs and other pooled investments are acceptable investment alternatives any may be utilized. Portfolios should exhibit market-like return and risk characteristics (market-like is defined as the manager's performance index). Portfolios should consist of stocks with growth or value characteristics and corresponding capitalization ranges which are consistent with the Investment Manager's style.

Foreign Securities

No more than 20% of the Retirement System's assets may be invested in the foreign securities as defined by MCLA Section 38.1132b.(4). The Retirement System shall hold no more than 5% of the outstanding foreign securities of any one issue, nor may more than 5% of the Retirement System's assets be invested in the foreign securities of any one issuer.

Style appropriate mutual funds, ETFs and other pooled investments are acceptable investment alternatives any may be utilized. Portfolios should exhibit market-like return and risk characteristics (market-like is defined as the manager's performance index). Portfolios should consist of stocks with growth or value characteristics and corresponding capitalization ranges which are consistent with the Investment Manager's style.

Real Estate

The Manager will invest in a diversified portfolio of institutional quality real estate properties located primarily within the United States. The portfolio should be diversified across property types, geographical regions, and economic exposures. The manager may not invest more than 5% of the System's assets in a single property.

Style appropriate mutual funds, ETFs and other pooled investments are acceptable investment alternatives any may be utilized. Portfolios should exhibit market-like return and risk characteristics (market-like is defined as the manager's performance index).

Fixed Income

Core Portfolio: The Investment Manager will invest in a diversified portfolio of U.S. dollar-denominated investment-grade debt securities issued by the U.S. Government, agencies, U.S.-domiciled companies, and foreign issuers (Core Portfolio). Investment Manager may also invest in issues of mortgage backed securities (MBS), asset-backed securities (ABS), and commercial mortgage-backed securities (CMBS). Investment Manager may not invest more than 5% of the Fixed Income portfolio assets in the securities of one issuer, except for Treasury and Agency securities. Investment Manager may not invest in more than 5% of the outstanding securities of one issuer.

High Yield Fixed Income: Manager may invest in below investment-grade debt securities of U.S. and foreign issuers. Manager may not invest more than 1% of the combined portfolio's assets in the securities of one issuer. Manager may not invest in more than 5% of the outstanding securities of one issuer

Style appropriate mutual funds, ETFs and other pooled investments are acceptable investment alternatives any may be utilized. The portfolio should exhibit market-like characteristics, including return and risk properties ("market-like is defined as the manager's performance index). The duration of the Fixed Income portfolio should be within a 20% range of the Investment Manager's performance index.

Cash: Investment Manager who use cash equivalents in their portfolio are expected to follow the American Banking Association investment standards on security-type, quality, and maturity for short-term investment funds (a.k.a. STIF), money market funds exempted.

Derivative Investments: Unless a specific type of derivative security is allowed in this document and to the extent permitted under MCLA 38.1140j, the Investment Manager must inform the Board of Trustees of any type of derivatives they may buy or hold in their portfolio.

IX. Performance Objectives

Relative Performance - Over a given market cycle, (typically defined as three to five years), the time weighted total rate of investment return should exceed, for the total fund, an appropriately designed custom benchmark. The custom benchmark is based on the fund's and investment manager's investment style, actual asset allocations, and constructed with appropriate indices given the asset mix.

Absolute Performance - Retirement System assets are intended to provide for the future retirement benefits for covered employees, retirees and their beneficiaries pursuant to the terms of collective bargaining agreements and policies for non-union former employees. To satisfy this obligation, the Retirement System should earn the actuarially assumed rate of return identified by the actuary annually, net of fees and expenses.

The above stated goals not meant to be imposed on each investment account. The goal of each investment manager, over the investment horizon, shall be to:

- a) Meet or exceed the market index, or blended market index, selected and agreed upon by the Board of Trustees that most closely corresponds to the style of investment management.
- b) Display an overall level of risk in the portfolio, which is consistent with the risk associated with the benchmark specified in a), above. Risk will be measured by the standard deviation of quarterly returns.

X. Definition of Risk

The Board of Trustees realizes that there are many ways to define risk. It believes that any person or organization involved in the process of managing the Retirement System assets understands how the Board defines risk so that the assets produce long-term investment results sufficient to meet the Retirement System objectives and investment strategy outlined in this document. The Board of Trustees defines risk as:

The probability of not meeting the Retirement System's objectives and of losing money over the Retirement System's investment time horizon.

No investment loss of funds over the investment horizon of 10 years is tolerable for the Retirement System's total portfolio.

XI. Performance Standards

On a quarterly basis, the Board of Trustees will monitor the investment performance of each Investment Manager according to specified performance standards. Those performance standards will examine both short (1- 3 year returns) and longer term (beyond three year returns) compared to pre-established benchmarks or indexes.

Style Appropriate Benchmarks are shown in the table below:

Asset Class	Benchmark Index
Domestic Equity Large Cap Growth	Russell 1000 Growth Index
Domestic Equity Large Cap Value	Russell 1000 Value Index
Domestic Equity Mid Cap	Russell Mid-Cap Index
Domestic Equity Small Cap	Russell 2000 Index
Developed International Equity Growth	MSCI ACWI Ex U.S. Growth NR USD
Developed International Equity Value	MSCI ACWI Ex U.S. Value NR USD
International Equity- Small Cap	MSCI EAFE Small Cap (net)
International Equity- Emerging Markets	MSCI Emerging Markets (net)
Other Equity (Infrastructure)	SP Global Infrastructure Index (net)
Real Estate Investment Trusts	FTSE NAREIT All Equity Index
Private Real Estate	NCREIF OE Diversified Core Index
Domestic Core Fixed Income	Barclays Intermediate G/C Index
Domestic High Yield Fixed Income	Barclays U.S. Corporate High Yield
Global Fixed Income	Barclays Global Aggregate Ex USA
Unconstrained Fixed Income	Barclays Capital U.S. Universal
Cash	FTSE 90 day T-Bill

Total Plan investment performance will be judged against a blended benchmark consisting of the market indexes shown above weighted according to the approved target asset allocations.

XII. Portfolio Review

In order to ensure that the guidelines and objectives stated herein are being adequately met and to review the continued appropriateness of said guidelines, a meeting between the Board of Trustees and the Investment Manager shall be held on periodic basis. During such meetings, a general review of the investment performance of the portfolio shall be conducted taking into consideration the long term goals and objectives of the account, as well as the existing environment of the financial markets.

XIII. Approvals

This Investment Policy Statement is subject to the terms and conditions, including the standard of care and any limitations of liability, of the documents which constitute the governing instruments for the applicable account. In the event there is any conflict between the terms of this Investment Policy Statement and the terms of such governing instruments, such governing instruments shall control. This Investment Policy Statement has been accepted and approved by:

City of Madison Heights Police and Fire Retirement System

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____



CITY OF MADISON HEIGHTS
300 WEST 13 MILE ROAD, MADISON HEIGHTS, MI 48071

FINANCE/TREASURER DEPARTMENT

Linda A. Kunath,
Finance Director/Treasurer

(248) 837-2639
LindaKunath@Madison-Heights.org

MEMORANDUM

DATE: May 6, 2019
TO: Police & Fire Retirement Board
FROM: Linda A. Kunath, Finance Director/Treasurer
SUBJECT: GRS review of reasonableness of 6.75% investment return

The Retirement Board adopted a gradual reduction of assumed rate of return for actuarial valuation starting June 30, 2017. The declining amount was 0.25% per year, the current assumption rate of return is 6.75%. Uniform assumptions under Public Act 202 were adopted by the Board at the meeting held on November 20, 2018. City auditors are recommending the Board set the assumed rate of return at an amount reasonably expected to be achieved over the actuarially assumed valuation period. The 6.75% current rate of return was asked to be reviewed for reasonableness by GRS.

Brad Armstrong, GRS, will be at the 05/17/2019 Special Pension Board meeting to discuss the reasonableness of setting the estimated investment rate of return at 6.75% for actuarial valuations starting June 30, 2019 and beyond.

Brad provided the following 2-page analysis document based upon GRS using an asset allocation of Mix 1, as well as information received from 12 different investment consulting firms, along with considering a 2.5% price inflation, and added 30bp. This analysis supports setting the expected average rate of return at 6.75% as being reasonable

City of Madison Heights Police and Fire Retirement System GRS 2018 Capital Market Assumptions Model

Current Target Asset Allocation

Investment Consultant	Investment Consultant Expected Nominal Return	Investment Consultant Inflation Assumption	Expected Real Return (2)-(3)	Actuary Inflation Assumption^	Expected Nominal Return (4)+(5)	Investment Expenses*	Expected Nominal Return Net of Expenses (6)-(7)	Standard Deviation of Expected Return (1-Year)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	4.85%	2.20%	2.65%	2.50%	5.15%	-0.30%	5.45%	11.59%
2	5.26%	2.21%	3.05%	2.50%	5.55%	-0.30%	5.85%	11.88%
3	5.81%	2.50%	3.31%	2.50%	5.81%	-0.30%	6.11%	11.66%
4	5.67%	2.26%	3.41%	2.50%	5.91%	-0.30%	6.21%	9.70%
5	5.92%	2.50%	3.42%	2.50%	5.92%	-0.30%	6.22%	11.63%
6	5.65%	2.00%	3.65%	2.50%	6.15%	-0.30%	6.45%	9.75%
7	5.77%	2.00%	3.77%	2.50%	6.27%	-0.30%	6.57%	10.92%
8	6.11%	2.31%	3.80%	2.50%	6.30%	-0.30%	6.60%	11.20%
9	6.06%	2.25%	3.81%	2.50%	6.31%	-0.30%	6.61%	11.83%
10	6.40%	2.26%	4.14%	2.50%	6.64%	-0.30%	6.94%	11.59%
11	6.21%	1.95%	4.26%	2.50%	6.76%	-0.30%	7.06%	11.20%
12	6.91%	2.00%	4.91%	2.50%	7.41%	-0.30%	7.71%	11.30%
Average	5.88%	2.20%	3.68%	2.50%	6.18%	-0.30%	6.48%	11.19%

^PNC is using 2.0% price inflation.

*Grossing up expectation by 30 basis points to reflect City is contributing additional amounts to cover investment expenses.

Investment Consultant	Distribution of 10-Year Average Geometric Net Nominal Return			Probability of exceeding 6.75%	Probability of exceeding 6.50%
	40th	50th	60th		
(1)	(2)	(3)	(4)	(5)	(6)
1	3.91%	4.82%	5.75%	29.96%	32.35%
2	4.25%	5.19%	6.13%	33.83%	36.28%
3	4.56%	5.48%	6.41%	36.48%	39.05%
4	5.00%	5.77%	6.54%	37.44%	40.56%
5	4.67%	5.58%	6.51%	37.53%	40.13%
6	5.23%	6.01%	6.79%	40.46%	43.63%
7	5.15%	6.01%	6.88%	41.50%	44.34%
8	5.13%	6.02%	6.91%	41.79%	44.57%
9	5.02%	5.96%	6.90%	41.57%	44.20%
10	5.40%	6.32%	7.24%	45.28%	48.00%
11	5.60%	6.48%	7.38%	46.96%	49.80%
12	6.23%	7.12%	8.02%	54.17%	56.97%
Average	5.01%	5.90%	6.79%	40.58%	43.33%

City of Madison Heights Police and Fire Retirement System GRS 2018 Capital Market Assumptions Model

Mix 1 Target Asset Allocation

Investment Consultant	Investment Consultant Expected Nominal Return	Investment Consultant Inflation Assumption	Expected Real Return (2)-(3)	Actuary Inflation Assumption [^]	Expected Nominal Return (4)+(5)	Investment Expenses*	Expected Nominal Return Net of Expenses (6)-(7)	Standard Deviation of Expected Return (1-Year)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	5.25%	2.20%	3.05%	2.50%	5.55%	-0.30%	5.85%	12.45%
2	5.76%	2.21%	3.55%	2.50%	6.05%	-0.30%	6.35%	12.31%
3	5.95%	2.26%	3.69%	2.50%	6.19%	-0.30%	6.49%	10.03%
4	6.21%	2.50%	3.71%	2.50%	6.21%	-0.30%	6.51%	12.02%
5	6.22%	2.50%	3.72%	2.50%	6.22%	-0.30%	6.52%	12.07%
6	5.91%	2.00%	3.91%	2.50%	6.41%	-0.30%	6.71%	10.09%
7	6.28%	2.25%	4.03%	2.50%	6.53%	-0.30%	6.83%	12.10%
8	6.06%	2.00%	4.06%	2.50%	6.56%	-0.30%	6.86%	11.48%
9	6.41%	2.31%	4.10%	2.50%	6.60%	-0.30%	6.90%	11.64%
10	6.65%	2.26%	4.39%	2.50%	6.89%	-0.30%	7.19%	12.44%
11	6.41%	1.95%	4.46%	2.50%	6.96%	-0.30%	7.26%	11.65%
12	7.27%	2.00%	5.27%	2.50%	7.77%	-0.30%	8.07%	11.29%
Average	6.20%	2.20%	4.00%	2.50%	6.50%	-0.30%	6.80%	11.63%

[^]PNC is using 2.0% price inflation.

*Grossing up expectation by 30 basis points to reflect City is contributing additional amounts to cover investment expenses.

Investment Consultant	Distribution of 10-Year Average Geometric Net Nominal Return			Probability of exceeding 6.75%	Probability of exceeding 6.50%
	40th	50th	60th		
(1)	(2)	(3)	(4)	(5)	(6)
1	4.14%	5.12%	6.11%	33.92%	36.26%
2	4.67%	5.64%	6.62%	38.76%	41.24%
3	5.23%	6.02%	6.82%	40.89%	43.98%
4	4.89%	5.84%	6.80%	40.51%	43.09%
5	4.89%	5.84%	6.81%	40.57%	43.13%
6	5.44%	6.24%	7.04%	43.60%	46.71%
7	5.19%	6.15%	7.11%	43.70%	46.29%
8	5.34%	6.25%	7.17%	44.49%	47.23%
9	5.35%	6.27%	7.20%	44.80%	47.51%
10	5.49%	6.47%	7.46%	47.17%	49.72%
11	5.72%	6.64%	7.57%	48.77%	51.50%
12	6.59%	7.48%	8.38%	58.24%	61.00%
Average	5.24%	6.16%	7.09%	43.78%	46.47%