NORTH Dakota | State Investment Board
Be Legendary. RETIREMENT & INVESTMENT

Investment Committee
Friday, March 14, 2025, 12:00 p.m.
Virtual Only
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AGENDA

I. CALL TO ORDER AND ACCEPTANCE OF AGENDA – ***(Committee Action)***

II. ACCEPTANCE OF MINUTES (February 14, 2025) – ***(Committee Action)***

III. ORGANIZATIONAL ANNOUNCEMENTS

IV. BENCHMARK MEMO (30 minutes) – ***(Committee Action)*** – *Mr. Gesell, Verus*

V. STRATEGY REVIEW (60 minutes) – ***(Information Only)***
   A. Pension Plan Allocation Observations – *Mr. Goldthorpe and Mr. Nankof, NEPC*
   B. Internal Investment Roll Out
      i. Infrastructure/Technology – *Mr. Vaidya*
      ii. Internal Investment Pilot – *Mr. Gandhi*
   C. Investment Organization Structure – *Mr. Anderson*

(Break)

VI. MANAGER RECOMMENDATION[1] (45 minutes) – ***(Committee Action)***
   A. Private Markets – *Mr. Collins and Mr. Ziettlow*
   B. Public Markets – *Mr. Chin, Mr. Cox, and Mr. Posch*

VII. MANAGER UPDATE (10 minutes) – ***(Information Only)***
   A. Private Markets – *Mr. Collins and Mr. Ziettlow*

VIII. DISCUSSION

IX. ADJOURNMENT

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[1] Executive Session pursuant to N.D.C.C. 44-04-19.2, 44-04-18.4 (2)(a) and N.D.C.C. 44-04-18.4(2)(d) to review and discuss confidential commercial information and trade secrets.

Any individual requiring an auxiliary aid or service, please contact the Retirement and Investment Office (701) 328-9885 at least three (3) days prior to the scheduled meeting.

STATE INVESTMENT BOARD
INVESTMENT COMMITTEE
MEETING MINUTES OF THE
FEBRUARY 14, 2025, MEETING

MEMBERS PRESENT:	Thomas Beadle, State Treasurer, Chair Joseph Heringer, Trust Lands Commissioner, Vice Chair Scott Anderson, Chief Investment Officer Eric Chin, Deputy Chief Investment Officer Pete Jahner, External Representative Dr. Prodosh Simlai, External Representative
STAFF PRESENT:	Cory Cox, Investment Analyst Derek Dukart, Senior Investment Analyst Jennifer Ferderer, Fiscal Investment Admin Chirag Gandhi, Portfolio Manager Rachel Kmetz, Interim CFO/COO Robbie Morey, Investment Accountant George Moss, Portfolio Manager Sarah Mudder, Communication & Outreach Director Matt Posch, Portfolio Manager Emmalee Riegler, Procurement/Records Mgmt. Coordinator Chad Roberts, Deputy Executive Director/Chief Retirement Officer Jodi Smith, Interim Executive Director Nitin Vaidya, Chief Risk Officer Jason Yu, Risk Officer Lance Ziettlow, Portfolio Manager
GUESTS:	Members of the Public

CALL TO ORDER

Treasurer Beadle called the State Investment Board (SIB) Investment Committee (IC) meeting to order at 9:02 a.m. on Friday, February 14, 2025. The meeting was held virtually.

The following members were present representing a quorum: Mr. Anderson, Treasurer Beadle, Mr. Chin, Commissioner Heringer, Mr. Jahner, and Dr. Simlai.

AGENDA

The agenda was considered for the February 14, 2025, meeting.

IT WAS MOVED BY MR. ANDERSON AND SECONDED BY MR. CHIN AND CARRIED BY A VOICE VOTE TO APPROVE THE AGENDA FOR THE FEBRUARY 14, 2025, MEETING AS DISTRIBUTED.

AYES: MR. ANDERSON, MR. CHIN, COMMISSIONER HERINGER, MR. JAHNER, DR. SIMLAI, AND TREASURER BEADLE
NAYS: NONE
MOTION CARRIED

MINUTES

The minutes were considered for the January 10, 2025, meeting.

IT WAS MOVED BY COMISSIONER HERINGER AND SECONDED BY DR. SIMLAI AND CARRIED BY A VOICE VOTE TO APPROVE THE MINUTES FOR THE JANUARY 10, 2025, MEETING AS DISTRIBUTED.

AYES: MR. ANDERSON, MR. CHIN, COMMISSIONER HERINGER, MR. JAHNER, DR. SIMLAI, AND TREASURER BEADLE
NAYS: NONE
MOTION CARRIED

INTRODUCTION

Mr. Posch introduced Mr. Cory Cox to the Committee. The team welcomed Mr. Cox as an Investment Analyst for Public Markets.

STRATEGY REVIEW

Mr. Chin provided the committee an update on domestic and international equity markets and their exposure and tariffs, drivers of equities, and rising concentration and valuations. Mr. Chin provided an update on investment managers and equity performance.

Mr. Posch's presentation focused on public fixed income and included information on fixed income markets, the U.S. treasury yield curve, and performance.

Treasurer Beadle left the meeting at 9:25 a.m.

INTERNAL MANAGEMENT

IT WAS MOVED BY MR. JAHNER AND SECONDED BY DR. SIMLAI AND CARRIED BY A ROLL CALL VOTE TO ENTER INTO EXECUTIVE SESSION PURSUANT TO N.D.C.C. 44-04-19.2, 44-04-18.4 (2)(A) AND N.D.C.C. 44-04-18.4(2)(D) TO REVIEW AND DISCUSS CONFIDENTIAL COMMERCIAL INFORMATION AND TRADE SECRETS.

AYES: DR. SIMLAI, MR. CHIN, MR. JAHNER, MR. ANDERSON, AND COMMISSIONER HERINGER
NAYS: NONE
ABSENT: TREASURER BEADLE
MOTION CARRIED

The executive session began at 9:39 a.m. and ended at 10:00 a.m. The session was attended by Committee members, Mr. Cox, Mr. Dukart, Ms. Ferderer, Mr. Gandhi, Mr. Moss, Ms. Mudder, Mr. Posch, Ms. Smith, Mr. Vaidya, Mr. Yu, and Mr. Ziettlow.

Treasurer Beadle rejoined the meeting at 9:46 a.m.

IT WAS MOVED BY COMMISSIONER HERINGER AND SECONDED BY MR. JAHNER AND CARRIED BY A ROLL CALL VOTE TO APPROVE TO DIRECT STAFF TO MOVE FORWARD WITH CONTRACT NEGOTIATIONS WITH THE FIRM DEEMED MOST SUSCEPTIBLE TO AWARD FOR PROXY VOTING SERVICES.

AYES: COMMISSIONER HERINGER, MR. ANDERSON, DR. SIMLAI, MR. CHIN, MR. JAHNER, AND TREASURER BEADLE
NAYS: NONE
MOTION CARRIED

INTERNAL GUIDELINES

Mr. Gandhi and Mr. Moss presented internal fixed income and equity guidelines. Included in the guidelines were income enhanced indexing strategies and objectives. Committee discussion followed.

IT WAS MOVED BY MR. ANDERSON AND SECONDED BY DR. SIMLAI AND CARRIED BY A ROLL CALL VOTE TO APPROVE THE INTERNAL GUIDELINES FOR BOTH FIXED INCOME AND EQUITIES.

AYES: MR. ANDERSON, MR. JAHNER, MR. CHIN, COMMISSIONER HERINGER, DR. SIMLAI, AND TREASURER BEADLE
NAYS: NONE
MOTION CARRIED

DISCUSSION

The Committee offered their gratitude to staff for their continued efforts this Legislative Session.

ADJOURNMENT

With no further business to come before the Investment Committee, Treasurer Beadle adjourned the meeting at 10:28 a.m.

Prepared by:

Jennifer Ferderer, Assistant to the Board

Memorandum

To: Members of the Board
North Dakota State Investment Board

From: Verus

Date: March 14, 2025

RE: Updated Strategic Benchmark Recommendations

The purpose of this memorandum is to update the benchmark recommendations for the strategic asset classes which comprise the asset allocation policies for the respective Plans under the SIB's purview. These updates consist of a few clarifications for the current fiscal year (highlighted in yellow), and a suggested improvement for subsequent years (highlighted in blue).

Summary of Recommendations

Asset Class	Existing Recommendation	Updated Recommendation
Total Fund	Custom asset class weighted policy index	**Custom asset class weighted policy index**
Total Equity	Roll-up of asset class strategy benchmarks	**Roll-up of asset class strategy benchmarks**
Total Public Equity	MSCI ACWI IMI	**Blend of Russell 3000 & MSCI ACWI ex-US IMI (net) (MSCI ACWI IMI market weighted)**
Total Public Equity (custom US/Non-US policy weights)		**Blend of Russell 3000 & MSCI ACWI ex-US IMI (net) (policy weighted)**
U.S. Equity	Russell 3000	**Russell 3000**
U.S. Equity (custom Large/Small policy weights)		**Blend of Russell 1000 & Russell 2000 (policy weighted)**
Non-U.S. Equity	MSCI ACWI ex-US IMI	**MSCI ACWI ex-US IMI (net)**
Private Equity	Hamilton Lane Private Equity Index[1]	**Hamilton Lane Private Equity Index[1]**
Total Fixed Income	Roll-up of asset class strategy benchmarks	**Roll-up of asset class strategy benchmarks**
Inv. Grade Fixed Income	Bloomberg Aggregate Bond Index	**Bloomberg Aggregate Bond Index**
U.S. Government Securities (State Historical Society)	Bloomberg U.S. Government Bond Index	**Bloomberg U.S. Government Bond Index**
Non-Inv. Grade Bonds	Bloomberg HY 2% Issuer Constrained	**Bloomberg HY 2% Issuer Constrained**
Private Credit	Bloomberg HY 2% Issuer Constrained	**Bloomberg HY 2% Issuer Constrained**
Private Credit (Legacy Fund)	Morningstar LSTA Leveraged Loan Index + 100 bps	**Morningstar LSTA Leveraged Loan Index + 100 bps**
Total Real Assets	Roll-up of asset class strategy benchmarks	**Roll-up of asset class strategy benchmarks**
Core Real Estate	NCREIF ODCE	**NCREIF ODCE (net)**
Timber	NCREIF Timberland Index	**NCREIF Timberland Index**
Infrastructure	NCREIF ODCE + 100 bps	**NCREIF ODCE (net) + 100 bps**
TIPS (WSI)	Bloomberg US Government Inflation Linked Bond Index	**Bloomberg US Government Inflation Linked Bond Index**
Short Term Fixed Income	Bloomberg 1-3 Year US G/C Index	**Bloomberg 1-3 Year US G/C Index**
In-State Equity	Benchmark against itself	**Benchmark against itself**
In-State Infrastructure Loan	Benchmark against itself	**Benchmark against itself**
BND CD Match Program	Benchmark against itself	**Benchmark against itself**
Cash	90-day T-Bills	**90-day T-Bills**

[1] SIB adopted three-tiered approach to benchmarking private equity. For new or start up PE funds (Tier 1), accounts will be benchmarked against themselves; between years 4 and 9 (Tier 2), PE fund accounts will be benchmarked against

Overview

Selecting benchmarks is among the most important decisions the SIB makes behind setting asset allocation policy for the Plans under its purview. Benchmarks provide the mechanism through which to evaluate the success of the respective investment program in meeting its stated policy objectives. They provide the link between expectations and success.

Benchmarks serve essential functions in the realm of investment program oversight for fiduciaries. From a policy viewpoint, they reflect the desired asset class risk, or 'beta' exposures. The overarching goal of SIB's benchmarks should be to provide the SIB a measurement tool in order to evaluate and understand the degree to which the Plans, asset classes and strategies are successful in meeting policy objectives over both the short term (i.e., 3 or less years) and long term (i.e., 5 or more years).

Benchmarks provide insight into how capital markets are performing, in general, and help the Board understand how individual asset classes, sub-asset classes and strategies are contributing to overall results. The qualities that are desirable in benchmarks used to evaluate investment performance are typically[2]:

— Representative of the opportunity set
— Investable and known and set *ex ante* (before the fact)
— Transparent
— Measurable
— Unambiguous

Other desirable qualities are:

— Consistent with the proxies used in asset allocation policy development
— Reflective of risk as well as the return of the asset class
— Available in a timely, cost-efficient manner
— Commonly used by Public Fund and other institutional investor peers

Asset classes are defined by the asset allocation policy; thus, the benchmarks for asset classes need to be reflective of the benchmarks used in the policy setting process. The goal of the SIB should be to ensure SIB's benchmarks meet industry standards for benchmark quality and that these benchmarks fairly and accurately represent the asset classes and strategies employed in the various Plans. Benchmarks for the most liquid asset classes (Global Public Equities, Public Fixed Income and Cash) tend to meet all the benchmark quality criteria. For Private Equity, Private Credit, Real Estate and Real Assets, some of the above criteria cannot be fully met and choosing which items to emphasize entails subjective judgement, including the tradeoff between short-term tracking error and long-term compatibility with the desired outcomes.

The recommended strategic asset class benchmarks are summarized in Exhibit 1 below. The main rationale in support of these recommended benchmarks is that the respective benchmarks provide the best representation of capital market "beta" for that market segment as well as

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the Hamilton Lane Private Equity Index, weighted by vintage year; year 10 and afterwards (Tier 3), PE fund accounts will be benchmarked against the Hamilton Lane Private Equity Index, aggregate version. For periods when the Hamilton Lane indices are not available before the reporting date, account returns will be used until the index returns become available.

[2] While these characteristics align with benchmark standards published by the CFA Institute, as a public pension plan, SIB is not, and is not required to be, GIPS compliant.

reflect the proxies that were employed in the asset allocation policy development process. Additionally, most of the recommended benchmarks are widely utilized by SIB's peers for those same market segments. The recommended public markets benchmarks are all published benchmarks which meet the preferred benchmark quality standards articulated earlier in this memorandum. Lastly, the benchmarks are simple and easy to understand.

Rationale Supporting Recommended Benchmarks

Total Equity – The current benchmark is a roll-up of the two Equity sub-asset class (i.e., Public Equities and Private Equities) benchmarks. This represents an industry standard approach to benchmarking an aggregate asset class.

- *Total Public Equity* – The current Total Public Equity benchmark is the MSCI ACWI IMI, which is the broadest published global equity benchmark and is widely used by SIB's peers to benchmark their respective global (or total) public equity asset classes. However, the implicit use of the US component of this index is inconsistent with the use of the superior Russell 3000 Index to benchmark the US exposure in plans with custom policy weights for US and Non-US Equity (see below). Therefore, for plans without such custom weights we recommend replacing the US component of the MSCI ACWI IMI with the Russell 3000 Index. In other words, a plan with a simple policy allocation to the Global Public Equity asset class will have that portfolio benchmarked against a market weighted blend of the Russell 3000 & MSCI ACWI ex-US IMI (net). The market weighting of the blended index will mirror that of the MSCI ACWI IMI Index. In addition to maintaining benchmark consistency across plans, this change would complete SIB's standardization around the best-in-class Russell US Equity Indexes.
- *Total Public Equity (custom US/Non-US policy weights)* – The existing MSCI ACWI IMI recommendation doesn't cover plans with policy level sub-allocations within Total Public Equity, i.e., specific weights to US and Non-US Equity. In those cases, we recommend that the plan's Total Public Equity portfolio be benchmarked against a policy-weighted blend of the Russell 3000 and the MSCI ACWI ex-US IMI (net). The decision to deviate from market weights is made at the level of strategic policy, not at the asset class level. Therefore, any related out-performance (or under-performance) should not be attributed to asset class management, which should instead be benchmarked against the policy-weighted index. For a similar reason, the custom policy weights should be used in the corridor benchmark calculation, which represents an adjustment of the policy benchmark for Private Markets exposures. Such exposures are not fully within the control of fund management because of the inherent unpredictability of Private Markets cash flow.
- *U.S. Equity* – For plans which do not specify sub-allocations within US Equity, Verus recommends continued use of the Russell 3000 Index, the broadest published U.S. equity benchmark and which is also widely used by SIB's peers to benchmark their respective U.S. equity sub-asset class portfolios.
- *US Equity (custom Large/Small policy weights)* – The existing Russell 3000 recommendation doesn't cover plans with policy level sub-allocations within US Equity, i.e., specific weights to US Large Cap and US Small Cap stocks. In those cases, we recommend that the plan's US Equity portfolio be benchmarked against a policy-weighted blend of the Russell US Large Cap (Russell 1000) and US Small Cap indices (Russell 2000). As in the case of Total Public Equity (above), the decision to deviate from market weights is made at the level of strategic policy, not at the asset class level. Therefore, any related out-performance (or under-performance) should not be attributed to the asset class management, which should instead

be benchmarked against the policy-weighted index. Again, the custom policy weights should be used in the corridor benchmark calculation, which represents an adjustment of the policy benchmark for Private Markets cash flows.

- *Non-US Equity* – The current benchmark is the MSCI ACWI ex-US IMI, which is the broadest published non-US equity benchmark and is widely used by SIB's peers. Verus recommends continued use of this benchmark, with the following clarification. More than one return series is published by the provider (MSCI) for each index, depending on calculation methodology. US based investors commonly rely on the "net" methodology, which reflects the payment of dividend taxes withheld by foreign governments. Accordingly, Verus recommends the use of these net returns for performance comparisons, as they more accurately reflect the returns that can be achieved by investment in the benchmark indices by US based funds.

These recommended sub-asset class benchmarks represent a best practices consideration under prevailing investment theory that the broad capital market benchmarks represent the best 'portfolio' in terms of return to risk relationship. Additionally, these benchmarks are typical proxies employed for these sub-asset classes within the asset allocation policy setting process, so they provide for good alignment with the Plans' various asset allocation policy targets.

Private Equity – Verus' recommended benchmark, based on the Hamilton Lane Private Equity Index, represents an appropriate strategic and implementation benchmark for Private Equities. However, because of the need to improve the timeliness of performance reporting, it may not always be possible to strictly adhere to the recommended method (described in the footnote 1 above). Therefore, for periods when the Hamilton Lane data is not available prior to the reporting deadline, we recommend that the actual fund returns be used as a substitute until the Hamilton Lane data becomes available (presumably in the subsequent period). In other words, it may occasionally be necessary to benchmark the funds against themselves over the most recent quarter, and the record would be corrected in the next report.

Total Fixed Income – like the Total Equity benchmark, the current Total Fixed Income benchmark is a roll-up of the sub asset class benchmarks. This is an industry standard approach to benchmarking an aggregate asset class.

- *Investment Grade Fixed Income* – The current benchmark is the Bloomberg Aggregate Bond Index, which is by far the broadest published core fixed income benchmark and is widely used by SIB's peers.
- *US Government Securities* – Verus continues to recommend the Bloomberg US Government Index as the appropriate benchmark for the State Historical Society's allocation to high quality fixed income investments, as this index is commensurate with the fund's risk profile and board-approved policy objective.
- *Private Credit (ex-Legacy Fund)* – the current benchmark is the Bloomberg HY 2% issuer Constrained Index. This recommended benchmark reflects the fact that Private Credit is viewed as an alternative exposure to public market non-investment grade bonds and we anticipate that the Board will regularly monitor and evaluate the decision to strategically employ Private Credit versus public market non-investment grade bonds.
- *Private Credit (Legacy Fund)* – The benchmark for this discreet strategic exposure within the Legacy Fund is an industry standard benchmark for the asset class, the Morningstar LSTA Leveraged Loan Index + 100 basis points. Similar to the above recommended benchmark for Private Credit (ex-Legacy Fund), this benchmark enables the Board to evaluate the decision to employ a private markets asset class versus a public markets alternative.

Real Assets – the current benchmark is a roll-up of the sub asset class benchmarks. This is an industry standard approach to benchmarking an aggregate asset class.

- *Core Real Estate* – The current benchmark is a pooled benchmark comprised of institutional, managed Real Estate commingled funds, similar to the SIB's real estate portfolio. The NCREIF ODCE (i.e., Open-end Diversified Core Equity) Index, is a capitalization-weighted, time-weighted return series of open-end, diversified core real estate funds. Thus, it nicely represents the core real estate universe and performance of the asset class. It is the most widely employed Core Real Estate benchmark by SIB's peers and is the asset class proxy employed in the typical asset allocation policy setting process. Verus recommends continued use of this benchmark, with the following clarification. Like the Non-US Equity benchmark, more than one method is used to calculate returns on the NCREIF ODCE Index. In this case, returns are calculated either net of the management fees paid by the underlying funds or calculated prior to deducting those fees. Again, Verus recommends the use of net returns on this index, as they best reflect the experience of a passive investor in the asset class. Additionally, Verus emphasizes that we continue to recommend the standard cap-weighted version of the ODCE Index, not the equal weighted variant that was erroneously used in recent performance reports.
- *Infrastructure* – The current benchmark is the same benchmark assigned to SIB's Core Real Estate program (NCREIF ODCE) plus a 100 basis points premium to capture both the value-added component and the idiosyncrasies of an infrastructure portfolio. While imperfect, the benchmark does capture the strategic objective of this sub-asset class (real income generation), which is the goal for the strategic benchmarks being recommended to the Board. The challenge with Infrastructure is that it is a relatively nascent sub-asset class and there currently does not exist a widely accepted industry standard benchmark. However, SIB is unique in that it has a well-developed Infrastructure investment program, which is ahead of most peers. Given the existence of multiple strategies and the fact that the program was developed to be income oriented with a return/risk profile similar to a 75%/25% Core/Value-add Real Estate program, Verus continues to recommend the current benchmark.

In-State Investments – The In-State investment program is relatively new and in the process of being built. Additionally, in-state investments are idiosyncratic in nature and do not lend themselves to traditional benchmarks, particularly at the very immature stage. Thus, Verus continues to recommend benchmarking these investments against themselves in the initial years. Benchmarking idiosyncratic assets against themselves is not uncommon in institutional investments. Benchmarks should be revisited every 3 years or so as a matter of industry best practice. At the next strategic benchmark review, these three program components will be evaluated to determine what alternative benchmarks may be appropriate to consider based upon the composition of the respective investment portfolios at that time.

Regarding the practical use of the above recommendations in periodic investment reporting, it should be noted that whenever timing issues (e.g., monthly reporting) require the use of lagged data for a particular asset class, the benchmark data for that asset class should be lagged to the same degree. Matching the period of benchmark performance to the period of portfolio performance is absolutely necessary for accurate measurement of the value added by portfolio management.

The above clarification of Public Equity benchmarks for plans with custom sub-asset class allocations (such as the Legacy Fund) will result in the recalculation of fiscal year-to-date corridor benchmark returns. However, Verus Performance Group estimates the impact to be de minimus at the total fund level. For example, there will be a 0.04% downward adjustment to the Legacy Fund's corridor benchmark return through November, although the correction of the aforementioned ODCE benchmark error is expected to offset this by half, for a net adjustment of -0.02%.

In conclusion, Verus is confident that the recommendations provided in this memo will serve to ensure an even closer alignment of SIB's investment benchmarks with industry standards and best practices, while better facilitating timely performance reporting.

NORTH DAKOTA ASSET ALLOCATION REVIEW

MARCH 2025

NEPC, LLC

OVERVIEW

- **Today's discussion represents an introduction for the Investment Committee to the review of the asset allocation policies for the six state pension system**
- **The plans' liability structure, funded status and discount rate (i.e., long-term return assumption) vary and are outlined on the next slide; these factors will all be analyzed throughout and considered in the final recommendation**
- **Return expectations across the plans range from 6.50% to 7.25%; based on the NEPC December 31, 2024 capital market assumptions, it seems reasonable to expect that the long-term (30-year) return expectations could meet or exceed the current assumptions**
- **In addition to the Current policies for the plans, we have presented in this deck two illustrative allocations as a frame of reference and comparison to the PERS policy allocation**

WORK PLAN / ROADMAP

North Dakota State Investment Board
2025 Pension Asset/Liability Project Plan

Step/Milestone	Estimated Timing
Collect all data relative to plan liabilities and structure	December 2024
Review of NEPC capital market assumptions, current policy expectations and plan objectives (with NDRIO Staff)	January 2025
Review, discuss, and consider revisions to portfolio/plan objectives (with NDRIO Staff)	February 2025
Discuss and identify potential alternatives to the current policy including new asset classes and/or allocation changes: constraints, asset classes, models, building blocks and universes (with NDRIO Staff)	March 2025 (April Board Meeting Agenda)
Scenario modeling for Current and Alternative Policies	April 2025
Review modeling results (with NDRIO Staff)	May 2025
Prepare draft of Board materials	June 2025
Board Materials and Recommendations Finalized	July 2025
Study Presented to Board and Decision Finalized	August 2025 (September Board Meeting Agenda)

PENSION PLANS: CURRENT STATE

Plan	PERS	TFFR	Bismarck Police	Bismarck Employees	Grand Forks Employees	Grand Forks Parks
Plan Year	7/1 - 6/30	7/1 - 6/30	1/1 - 12/31	1/1 - 12/31	1/1 - 12/31	1/1 - 12/31
Actuary	GRS	GRS	VIA	VIA	Deloitte	Gallagher
Participants (Total)	60,098	25,663	253	887	377	51
Actives	25,799	11,945	135	497	28	15
Terminated Vesteds	18,667	4,025	24	90	21	7
Retirees & Beneficiaries	15,632	9,693	94	300	328	29
Payroll	1,544,827,229	879,276,401	9,780,723	32,259,505	1,856,650	618,445
Actuarial Accrued Liability	6,218,968,568	4,758,417,607	62,582,471	144,050,754	103,046,911	11,000,405
Market Value of Assets	4,265,287,349	3,351,007,841	52,210,532	124,700,636	80,547,761	8,670,232
Actuarial Value of Assets	4,247,191,213	3,408,483,045	52,210,532	124,700,636	82,913,131	8,670,232
Unfunded Actuarial Liability	1,971,777,355	1,349,934,562	10,371,939	19,350,118	20,133,780	2,330,173
Funded Status (AVA)	68.3%	71.6%	83.4%	86.6%	80.5%	78.8%
Discount Rate	6.50%	7.25%	7.25%	7.25%	7.00%	7.00%
Payroll Growth Rate	3.50%	3.25%	3.25%	3.25%	2.50%	2.00%
Normal Cost Rate	12.2%	12.3%	12.4%	11.4%	17.9%	6.3%
Remaining Amortization Period	30	19	15	15	11	7
Asset Valuation Method	5-Year Smoothing	5-Year Smoothing	None	None	5-Year Smoothing	None
COLA	None	Ad-hoc, but none assumed	Ad-hoc, but none assumed	Ad-hoc, but none assumed	None	None
Open/Closed	Partially Open	Open	Open	Open	Closed in 1996	Closed in 2010
Funding Policy	ER: Fixed Rate EE: Fixed Rate In 2026, Non-Public Safety funding policy changes to dynamic model of normal cost plus closed 30-yr amortization of unfunded liabilities ending 2056	ER: Fixed Rate EE: Fixed Rate Contribution sufficiency measured against normal cost plus closed 30-yr amortization of unfunded liabilities ending 2043 (19 yrs left as of ‘24)	ER: Fixed Rate EE: Fixed Rate Contribution sufficiency measured against normal cost plus closed 30-yr amortization of unfunded liabilities ending 2038 (15 yrs left as of ‘24)	ER: Fixed Rate EE: Fixed Rate Contribution sufficiency measured against normal cost plus closed 30-yr amortization of unfunded liabilities ending 2038 (15 yrs left as of ‘24)	ER: Normal cost plus amortization of unfunded liabilities based on closed 30-yr amortization of unfunded liabilities ending 2034 (11 yrs left as of ‘24) EE: Fixed Rate	ER: Normal cost plus amortization of unfunded liabilities based on closed 14-yr amortization of unfunded liabilities ending 2030 (7 yrs left as of ‘24) EE: Fixed Rate

CORE ASSET CLASS RETURN ASSUMPTIONS

	Asset Class	12/31/2024 10-Year Return	12/31/2023 10-Year Return	Delta
	Cash	4.1%	3.9%	+0.2%
	U.S. Inflation	2.6%	2.6%	-
Equity	U.S. Large-Cap Equity	5.6%	4.4%	+1.2%
Equity	Non-U.S. Developed Equity	5.3%	4.6%	+0.7%
Equity	Emerging Market Equity	8.0%	8.6%	-0.6%
Equity	Global Equity*	6.1%	5.4%	+0.7%
Equity	Private Equity*	8.5%	9.0%	-0.5%
Fixed Income	U.S. Treasury Bond	4.7%	4.2%	+0.5%
Fixed Income	U.S. Municipal Bond	3.8%	3.5%	+0.3%
Fixed Income	U.S. Aggregate Bond*	5.0%	4.6%	+0.4%
Fixed Income	U.S. TIPS	4.9%	4.6%	+0.3%
Fixed Income	U.S. High Yield Corporate Bond	6.3%	6.1%	+0.2%
Fixed Income	Private Debt*	8.3%	8.3%	-
Real Assets	Commodity Futures	4.4%	4.6%	-0.2%
Real Assets	REIT	5.3%	6.0%	-0.7%
Real Assets	Gold	4.7%	4.9%	-0.2%
Real Assets	Real Estate - Core	5.9%	5.4%	+0.5%
Real Assets	Private Real Assets - Infrastructure	6.0%	6.8%	-0.8%
Multi-Asset	60% S&P 500 & 40% U.S. Aggregate	5.7%	4.8%	+0.9%
Multi-Asset	60% MSCI ACWI & 40% U.S. Agg.	6.0%	5.4%	+0.6%
Multi-Asset	Hedge Fund*	6.4%	6.1%	+0.3%

*Calculated as a blend of other asset classes

NDRIO ASSET ALLOCATION
LONG-TERM (30-YEAR) RETURN EXPECTATIONS ABOVE 7.25%

	PERS	TFFR	Bismarck Police	Bismarck Employees	Grand Forks Employees	Grand Forks Parks
Cash	0.0%	1.0%	0.0%	0.0%	1.0%	0.0%
Total Cash	**0.0%**	**1.0%**	**0.0%**	**0.0%**	**1.0%**	**0.0%**
Global Equity	51.0%	45.0%	46.0%	42.0%	55.0%	47.0%
Private Equity	7.0%	10.0%	5.0%	4.0%	5.0%	7.5%
Total Equity	**58.0%**	**55.0%**	**51.0%**	**46.0%**	**60.0%**	**54.5%**
US Aggregate Bond	16.0%	18.0%	22.0%	27.0%	17.0%	18.0%
US High Yield Corporate Bond	3.5%	4.0%	3.5%	3.5%	3.5%	3.8%
Private Debt - Direct Lending	3.5%	4.0%	3.5%	3.5%	3.5%	3.8%
Total Fixed Income	**23.0%**	**26.0%**	**29.0%**	**34.0%**	**24.0%**	**25.5%**
Real Estate - Core	8.3%	6.8%	9.0%	8.6%	5.3%	7.5%
Real Estate - Non-Core	2.7%	2.3%	3.0%	3.4%	1.8%	2.5%
Private Real Assets - Natural Resources	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
Private Real Assets - Infrastructure	7.0%	8.0%	7.0%	7.0%	7.0%	9.0%
Total Real Assets	**19.0%**	**18.0%**	**20.0%**	**20.0%**	**15.0%**	**20.0%**

Expected Return 10 yrs (Geometric)	**6.6%**	**6.6%**	**6.5%**	**6.4%**	**6.5%**	**6.6%**
Expected Return 30 yrs (Geometric)	**7.7%**	**7.8%**	**7.5%**	**7.4%**	**7.6%**	**7.7%**
Standard Deviation	**13.6%**	**13.2%**	**12.4%**	**11.6%**	**13.3%**	**13.1%**
Sharpe Ratio (10 years)	**0.18**	**0.19**	**0.19**	**0.20**	**0.17**	**0.19**
Sharpe Ratio (30 years)	**0.30**	**0.32**	**0.32**	**0.33**	**0.30**	**0.32**

ASSET ALLOCATION MODELS

PRIVATES, DIVERSIFICATION AND LEVERAGE OFFER OPPORTUNITIES

	Current Policy	Optimal NEPC	Balanced Risk	Income Yield
US Leverage Cost	0%	0%	-30%	4.4%
Total Cash	**0%**	**0%**	**-30%**	
Global Equity	51%	35%	30%	2.8%
Private Equity	7%	15%	15%	0.0%
Total Equity	**58%**	**50%**	**50%**	
US TIPS	0%	5%	12%	4.5%
US Treasury Bond	0%	10%	24%	4.4%
US Corporate Bond	0%	6%	15%	5.8%
US Aggregate Bond	16%	0%	0%	4.9%
US High Yield Corporate Bond	3.5%	2.5%	3%	8.1%
Private Debt - Direct Lending	3.5%	8%	8%	9.5%
Total Fixed Income	**23%**	**31%**	**61%**	
Real Estate - Core	8.3%	8.3%	8.3%	5.4%
Real Estate - Non-Core	2.7%	2.7%	2.7%	7.2%
Private Real Assets - Natural Resources	1.0%	1.0%	1.0%	3.9%
Private Real Assets - Infrastructure	7.0%	7.0%	7.0%	3.2%
Total Real Assets	**19%**	**19%**	**19%**	

10-Year Expected Return (Geometric)	**6.6%**	**6.9%**	**7.1%**
30-Year Expected Return (Geometric)	**7.7%**	**8.0%**	**8.5%**
Asset Volatility	**13.6%**	**12.9%**	**13.3%**
Sharpe Ratio (10 years)	**0.18**	**0.21**	**0.22**
Sharpe Ratio (30 years)	**0.30**	**0.34**	**0.37**

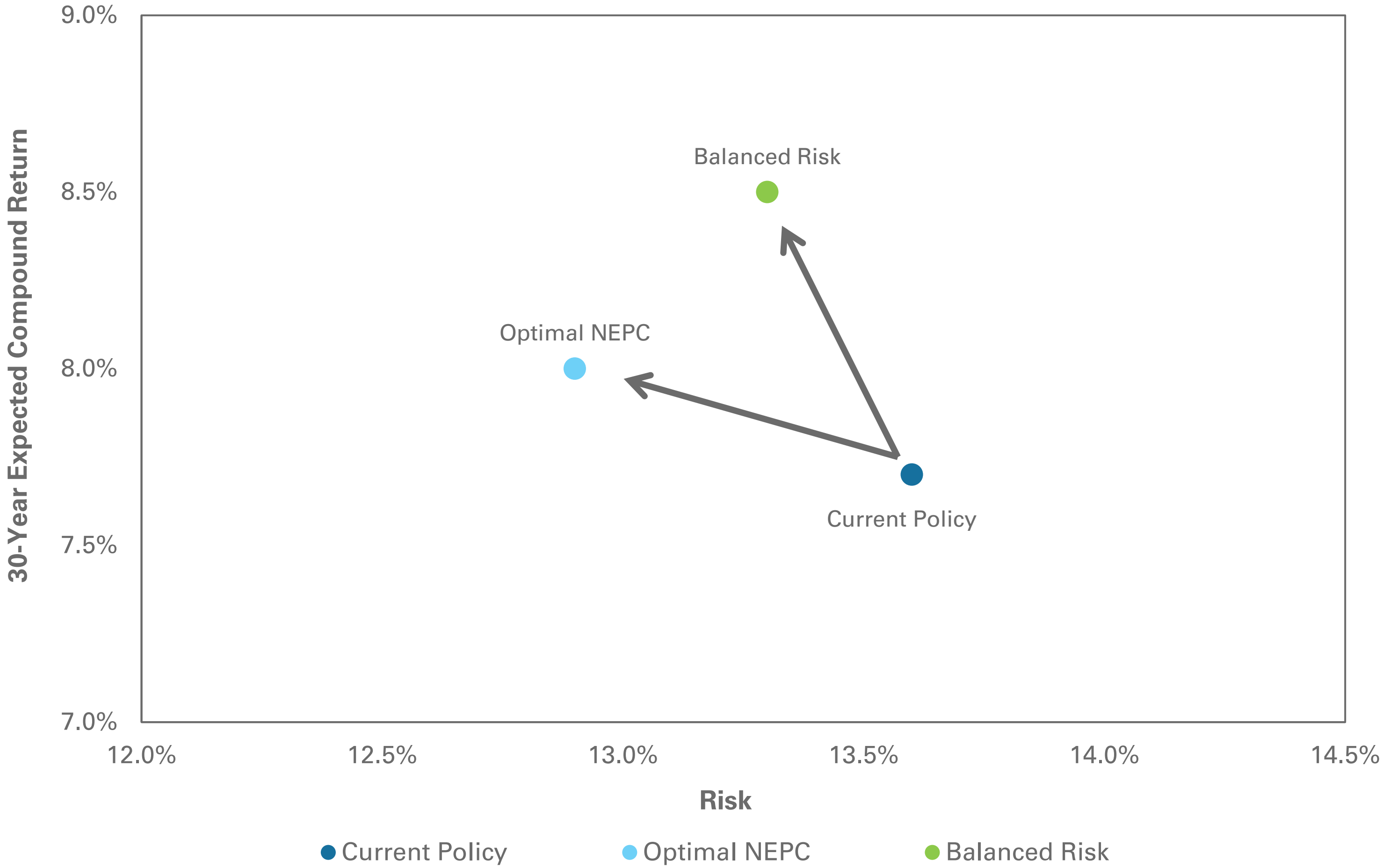
Probability of 1-Year Return Under 0%	**28.5%**	**26.8%**	**26.2%**
Probability of 30-Year Return Over 6.5%	**68.7%**	**73.7%**	**79.0%**
95% 1-Year Max Drawdown	**-14.7%**	**-13.2%**	**-13.4%**

Liquidity Profile

Tier 1 (Daily Liquidity)	**51%**	**45%**	**29%**
Tier 2 (Semi-liquid)	**19.5%**	**13.5%**	**29%**
Tier 3 (Illiquid)	**29.5%**	**41.5%**	**42%**

- The Balanced Risk portfolio employs leverage to reduce the equity risk of the portfolio

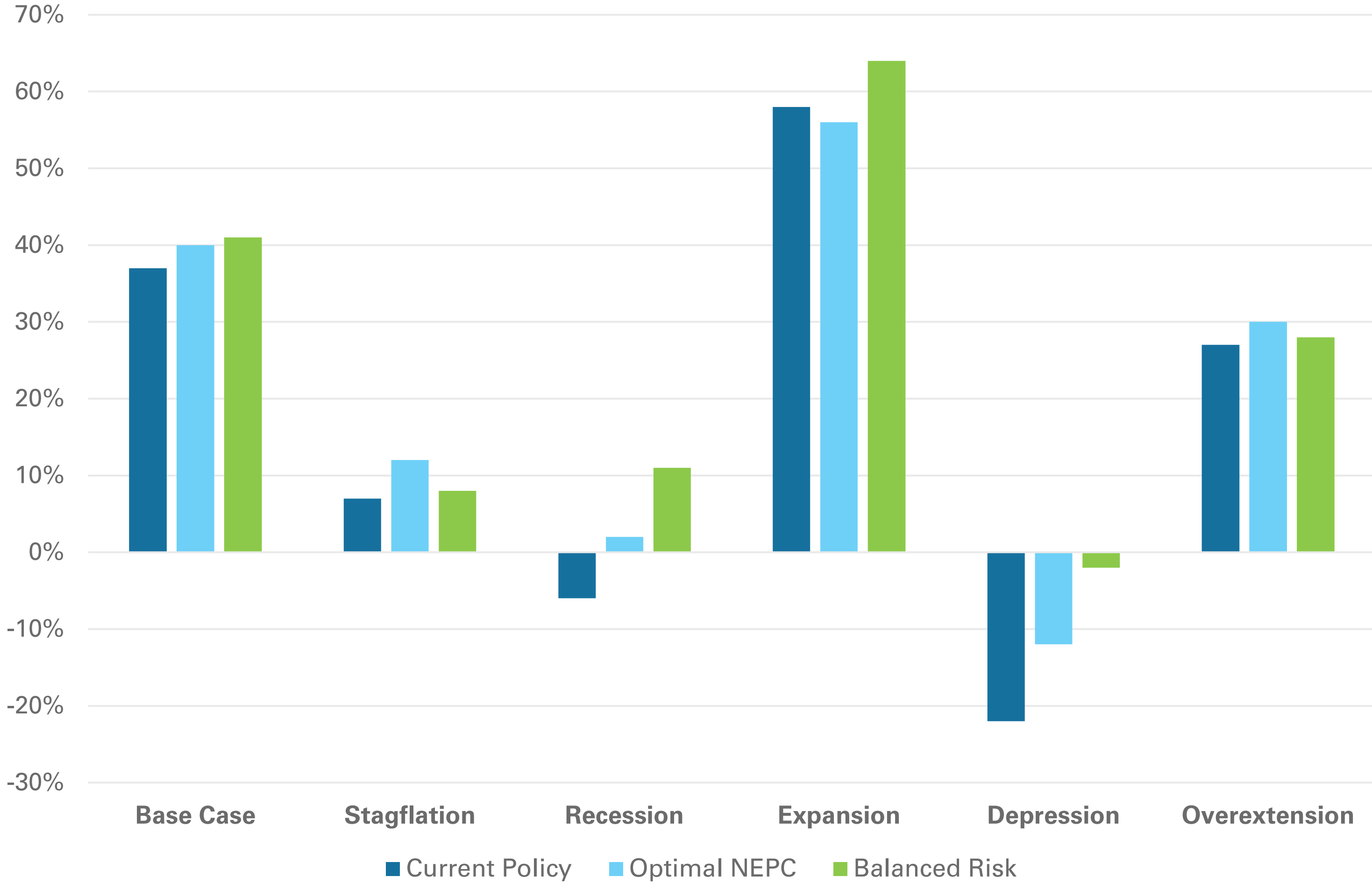
RISK RETURN CHART



- Returns represent the 30-year geometric return assumption for each model
- Risk represents the standard deviation

MACRO SCENARIOS

ALTERNATIVE ALLOCATIONS PERFORM WELL IN STRESS SCENARIOS



- Represents a 5-year cumulative return

NEPC CAPITAL MARKET ASSUMPTIONS

12/31/2024

INTRODUCTION

ASSET CLASS ASSUMPTIONS

OVERVIEW

- **NEPC's capital market assumptions are available each quarter with this release reflecting December 31, 2024 market data**
- **We adjusted our equity assumption methodology to better reflect the pathway for valuation multiples, profit margins, and share buybacks**
- **Fixed income returns moved higher, reflecting market expectations of fewer rate cuts priced-in to forward base rates**
- **We encourage a dedicated safe-haven fixed income allocation to serve as a critical liquidity source for the portfolio**
- **We recommend adding strategic policy targets to U.S. TIPS given elevated levels of real yields and attractive breakeven inflation levels**
- **We see a favorable environment for diversified real assets exposure given the inflation backdrop and ongoing geopolitical risks**

CAPITAL MARKET ASSUMPTION PRINCIPLES

HOW SHOULD RETURN ASSUMPTIONS BE INTERPRETED

- **NEPC return assumptions are meant to reflect a nominal return expectation for a buy-and-hold investor, net of fees, over a 10-year and 30-year investment horizon**
- **With this in mind, NEPC asset class return assumptions look to include all sources of return that flow to an asset class over time**
  - Each major contributing source of return is a building block in our models
- **NEPC's asset class models are designed to be forward-looking and not to replicate the past, which requires both model scrutiny and iteration**
- **Forecasting asset class returns, requires forward-looking assumptions about building block contributors and how they evolve over time**
- **Developing market trends require scrutiny and time to analyze data and research market shifts to understand whether they are cyclical or structural inputs contributing to an asset class's building blocks**

RECOGNIZING ASSET CLASS EVOLUTIONS

CHANGES TO PUBLIC EQUITY BUILDING BLOCKS

- **Public market equity asset classes were adjusted to better align the underlying assumption building blocks with long-term return drivers**
  - NEPC public equity models assume that core building blocks will revert to long-term terminal levels over the 10-year and 30-year investment horizon
- **The building blocks for U.S. Large Cap Equity were revised to reflect an updated pathway for valuations, profit margins and share buybacks**
  - As a result, terminal value assumptions for valuations (P/E ratio) and profit margins were adjusted higher over the long-term investment horizon
  - With higher profit margins, we increased the input related to a sustainable long-term share buyback and revised the Shareholder Yield building block
- **The building blocks for Non-U.S. Developed Equity were adjusted to reflect a marginally higher terminal value for profit margins**
  - As a result, long-term earnings growth expectations have increased but remain well below historical averages
  - Ultimately no adjustments were made to emerging market equity and each of the small-cap equity assumptions

RECOGNIZING ASSET CLASS EVOLUTIONS

ADJUSTMENTS TO PRIVATE DEBT BUILDING BLOCKS

- **Private Debt – Credit Opportunities was adjusted to better align the underlying public market buildup with the investment opportunity**
  - U.S. high yield securitized was added to public market beta and the contribution from U.S. small-cap equity was reduced
- **NEPC private market assumptions rely on a buildup of public market asset classes that represent the underlying beta exposure of a private asset class plus an illiquidity premium**
- **The investment opportunity has evolved over time for Private Credit – Credit Opportunities and the inclusion of some equity beta was not representative of the long-term return expectations**

ASSET CLASS ASSUMPTIONS

DEVELOPMENT

- **Capital market assumptions are published for over 70 core asset classes and over 30 composites**
- **Market data as of 12/31/2024**
- **NEPC proprietary models used to develop return forecasts based on a building block approach**
- **The 10-year return outlook is intended to support strategic asset allocation analysis**
- **30-year return assumptions are used for actuarial inputs and long-term planning**

Asset Allocation Process

1. Finalize list of new asset classes
2. Calculate asset class volatility and correlation assumptions
3. Set model terminal values, growth, and inflation inputs
4. Model data updated at quarter-end
5. Review model outputs and produce asset class return assumptions
6. Assumptions released on the 15th calendar day after quarter-end

ASSET CLASS BUILDING BLOCKS

METHODOLOGY

- **Asset models reflect current and forecasted market data to inform expected returns**
- **Systematic inputs are paired with a long-term trend to terminal values**
- **Model inputs are aggregated to capture key return drivers for each asset class**
- **Building block inputs will differ across asset class categories**

CORE ASSET CLASS RETURN ASSUMPTIONS

	Asset Class	12/31/2024 10-Year Return	12/31/2023 10-Year Return	Delta
	Cash	4.1%	3.9%	+0.2%
	U.S. Inflation	2.6%	2.6%	-
Equity	U.S. Large-Cap Equity	5.6%	4.4%	+1.2%
Equity	Non-U.S. Developed Equity	5.3%	4.6%	+0.7%
Equity	Emerging Market Equity	8.0%	8.6%	-0.6%
Equity	Global Equity*	6.1%	5.4%	+0.7%
Equity	Private Equity*	8.5%	9.0%	-0.5%
Fixed Income	U.S. Treasury Bond	4.7%	4.2%	+0.5%
Fixed Income	U.S. Municipal Bond	3.8%	3.5%	+0.3%
Fixed Income	U.S. Aggregate Bond*	5.0%	4.6%	+0.4%
Fixed Income	U.S. TIPS	4.9%	4.6%	+0.3%
Fixed Income	U.S. High Yield Corporate Bond	6.3%	6.1%	+0.2%
Fixed Income	Private Debt*	8.3%	8.3%	-
Real Assets	Commodity Futures	4.4%	4.6%	-0.2%
Real Assets	REIT	5.3%	6.0%	-0.7%
Real Assets	Gold	4.7%	4.9%	-0.2%
Real Assets	Real Estate - Core	5.9%	5.4%	+0.5%
Real Assets	Private Real Assets - Infrastructure	6.0%	6.8%	-0.8%
Multi-Asset	60% S&P 500 & 40% U.S. Aggregate	5.7%	4.8%	+0.9%
Multi-Asset	60% MSCI ACWI & 40% U.S. Agg.	6.0%	5.4%	+0.6%
Multi-Asset	Hedge Fund*	6.4%	6.1%	+0.3%

*Calculated as a blend of other asset classes

MACROECONOMIC

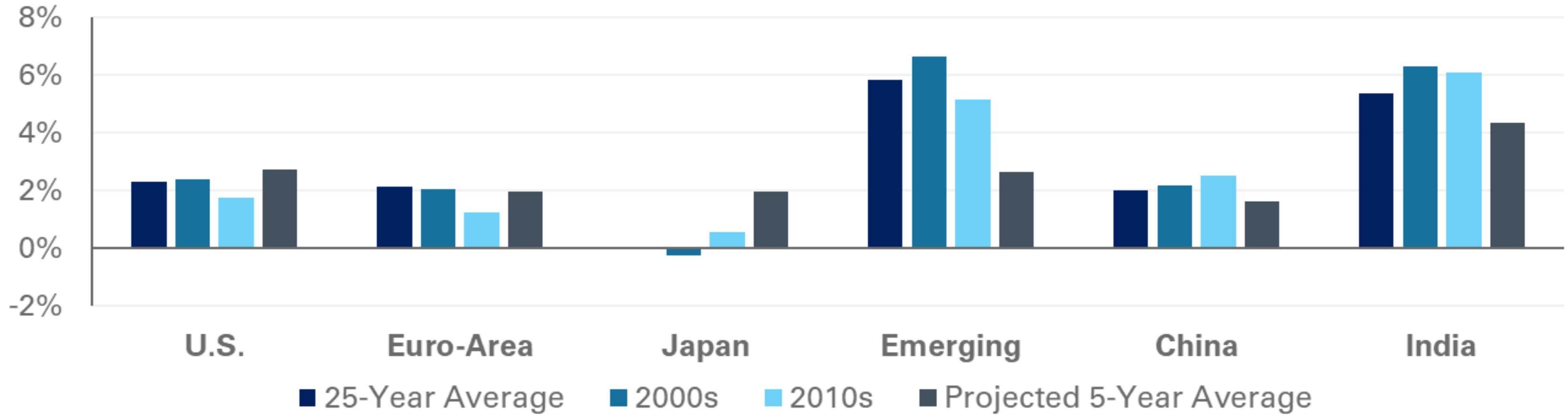
U.S. INFLATION ASSUMPTIONS

OVERVIEW

- **Inflation is a key building block to develop asset class assumptions**
- **Inflation assumptions are model-driven and informed by multiple inputs for both the U.S. and global assets**
- **NEPC's inflation assumption forecasts near-term paths for major Consumer Price Index (CPI) components including food, energy, core services, and shelter costs**
  - CPI is expected to converge with breakeven inflation forecast over the long-term
- **The composite inflation assumption reflects a blend of NEPC's inflation forecast and market-implied breakeven inflation rates**

U.S. Inflation Assumption		
Time Horizon	**Current**	**12-Month Change**
10-Year	2.6%	—
30-Year	2.7%	+0.1%

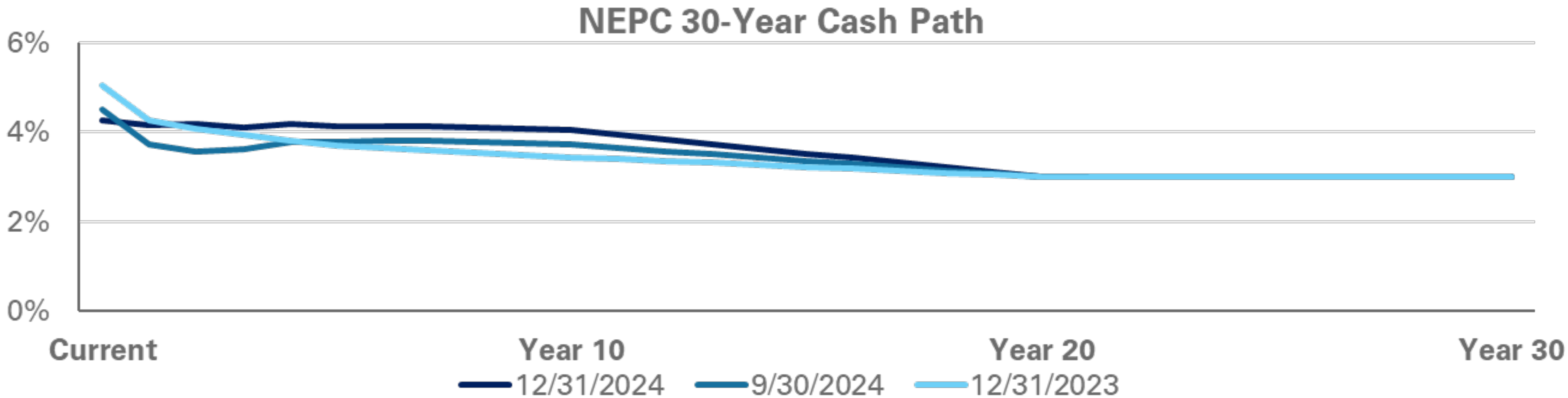
GLOBAL INFLATION
HISTORICAL INFLATION



- **Non-U.S. forecasts are guided by IMF forecasts, local consumer and producer price indices, and global interest rate curves**
- **Near-term inflation levels for developed markets are projected to be higher relative to history**
  - Long-term inflation assumptions reflect NEPC's path and central bank targets
  - The expected inflation differential between emerging and developed markets has narrowed significantly

Sources: IMF, FactSet, NEPC

U.S. CASH
EXPECTATIONS



- **Cash is a foundational input for all asset class return expectations that reflects forward expectations of inflation and real interest rates**
  - Cash + risk premia is an input for long-term asset class return projections

- **The composite cash assumption is built from a blend of NEPC's cash forecast and market forward pricing of short-term interest rates**

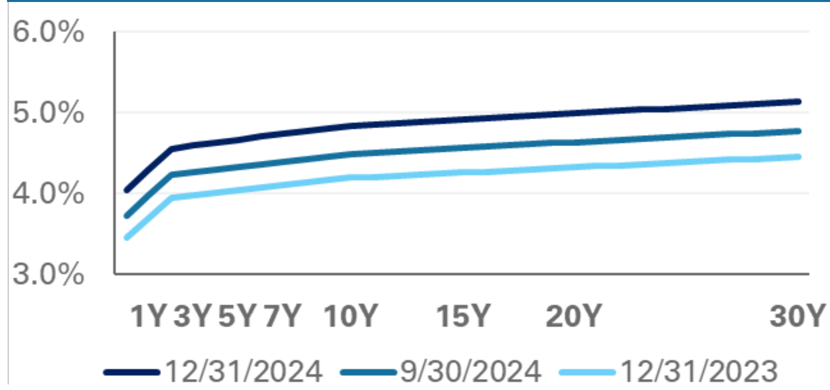
Time Horizon	Current	12-Month Change
10-Year	4.1%	+0.2%
30-Year	3.6%	+0.2%

Sources: Bloomberg, FactSet, NEPC

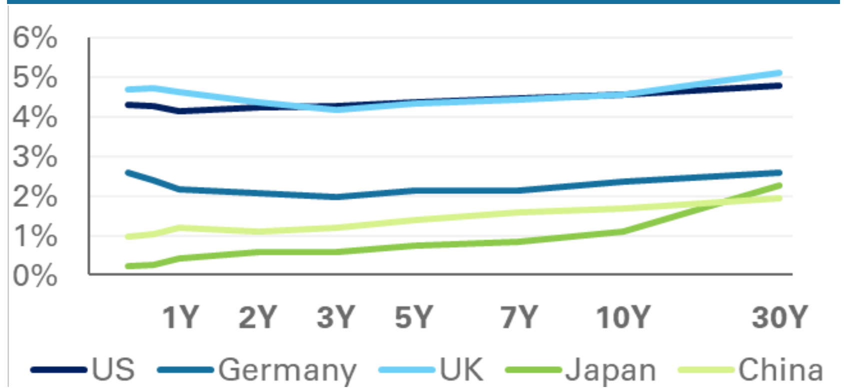
GLOBAL INTEREST RATES
EXPECTATIONS

- **NEPC's outlook on forward U.S. interest rates has remained consistent over the past few years, generally higher than market expectations**
- **Market expectations shifted substantially higher in Q4 2024, contributing to a higher return outlook for fixed income**
- **The outlook is less attractive for non-U.S. developed markets due to the nominal yield differential relative to the U.S.**
  - Differing regional growth and inflation conditions have led to diverging central bank actions

NEPC 10-Year Forward U.S. Treasury Curve



Global Yield Curves



Sources: FactSet, NEPC

PUBLIC EQUITY

PUBLIC EQUITY ASSUMPTIONS

OVERVIEW

- **As part of our ongoing process enhancements, we adjusted the public equity methodology in recognition of structural market changes**
  - Mean reversion remains a driver of our modeling, but we adjusted the pathway of share buybacks, profit margins, and valuations into long-term targets
- **These enhancements increased developed market equity forecasts, with the largest impact flowing through U.S. large-cap return expectations**
  - U.S. large-caps continue to reflect a valuation headwind, but benefit from a higher shareholder yield and profit margins, which we expect to persist
  - Non-U.S. developed market forecasts also benefitted with an adjustment to long-term margins, but were tempered by muted expected earnings growth
- **Emerging market forecasts moved lower, reflecting the impact of depressed valuations and muted growth expectations from China**
- **NEPC's strategic recommendation for public equity reflects benchmark-neutral regional weights relative to the MSCI ACWI IMI**

PUBLIC EQUITY ASSUMPTIONS

BUILDING BLOCKS

Building Block	Description
Illiquidity Premium	The return expected for assets with illiquidity risk
Valuation	Represents P/E multiple contraction or expansion relative to long-term trend
Inflation	Market-specific inflation based on country-level revenue exposure
Real Earnings Growth	Market-specific real growth based on a weighted-average of country revenue exposure and GDP growth
Shareholder Yield	Income distributed to shareholders via dividend distributions and net share repurchases

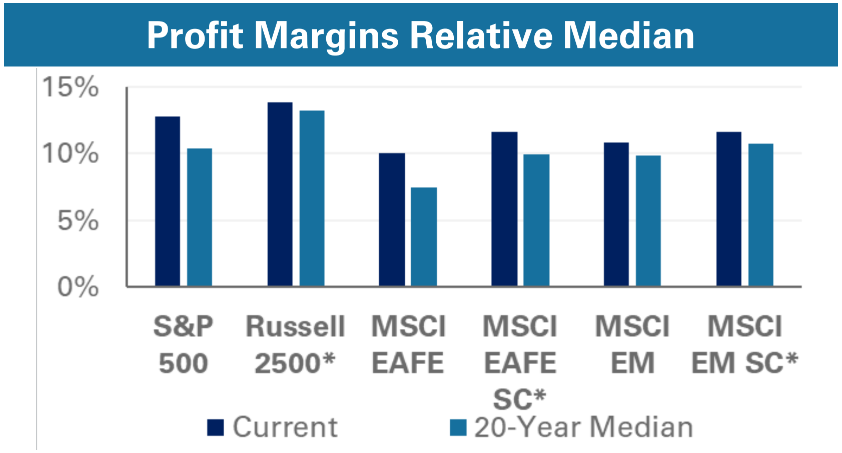
Asset Class	12/31/24 10-Yr Return	12-Month Change
U.S. Large-Cap Equity	5.6%	+1.2%
U.S. Small/Mid-Cap Equity	5.8%	-0.2%
Non-U.S. Developed Equity	5.3%	+0.7%
Non-U.S. Developed Small-Cap Equity	6.7%	+0.3%
Emerging Market Equity	8.0%	-0.6%
Emerging Market Small-Cap Equity	7.1%	-0.8%
Hedge Fund - Equity	5.8%	+0.3%
Global Equity*	6.1%	+0.7%
Private Equity*	8.5%	-0.5%

Source: NEPC

*Calculated as a blend of other asset classes

PUBLIC EQUITY
REAL EARNINGS GROWTH

- **U.S. equities benefit from higher sales growth forecasts, reflecting the resiliency and consistency of the U.S. consumer**
  - Relative to other markets, U.S. large cap companies have global revenue exposure that benefits from global growth rates
- **Cyclically-high profit margin levels temper real earnings growth forecasts given expectations for normalization**
  - Profit margin assumptions reflect a path towards long-term targets that consider the shift in index composition through time

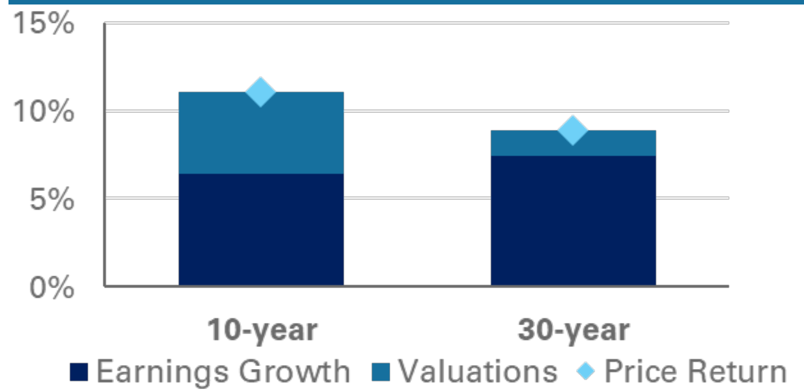


Sources: S&P, Russell, MSCI, FactSet, NEPC
Note: *Small cap indices margins based on EBITDA margins

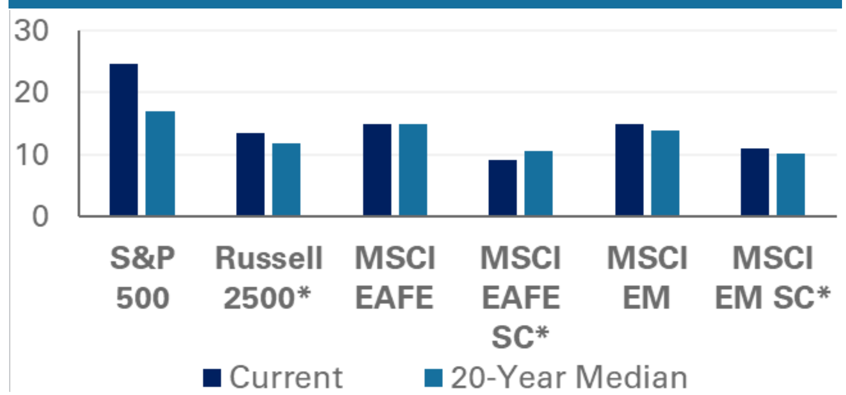
PUBLIC EQUITY
VALUATION

- **Valuations have a large influence on short- to medium-term returns, but earnings growth is the driver of long-term returns**
- **U.S. large-cap valuations are elevated relative to long-term target levels**
  - U.S. large-cap valuations represent the largest drag on returns across the equity complex
- **Non-U.S. Developed valuations remain close to fair value**
  - Lower long-term valuation targets reflect expectations of a more challenged economic profile

Historical S&P 500 Price Return



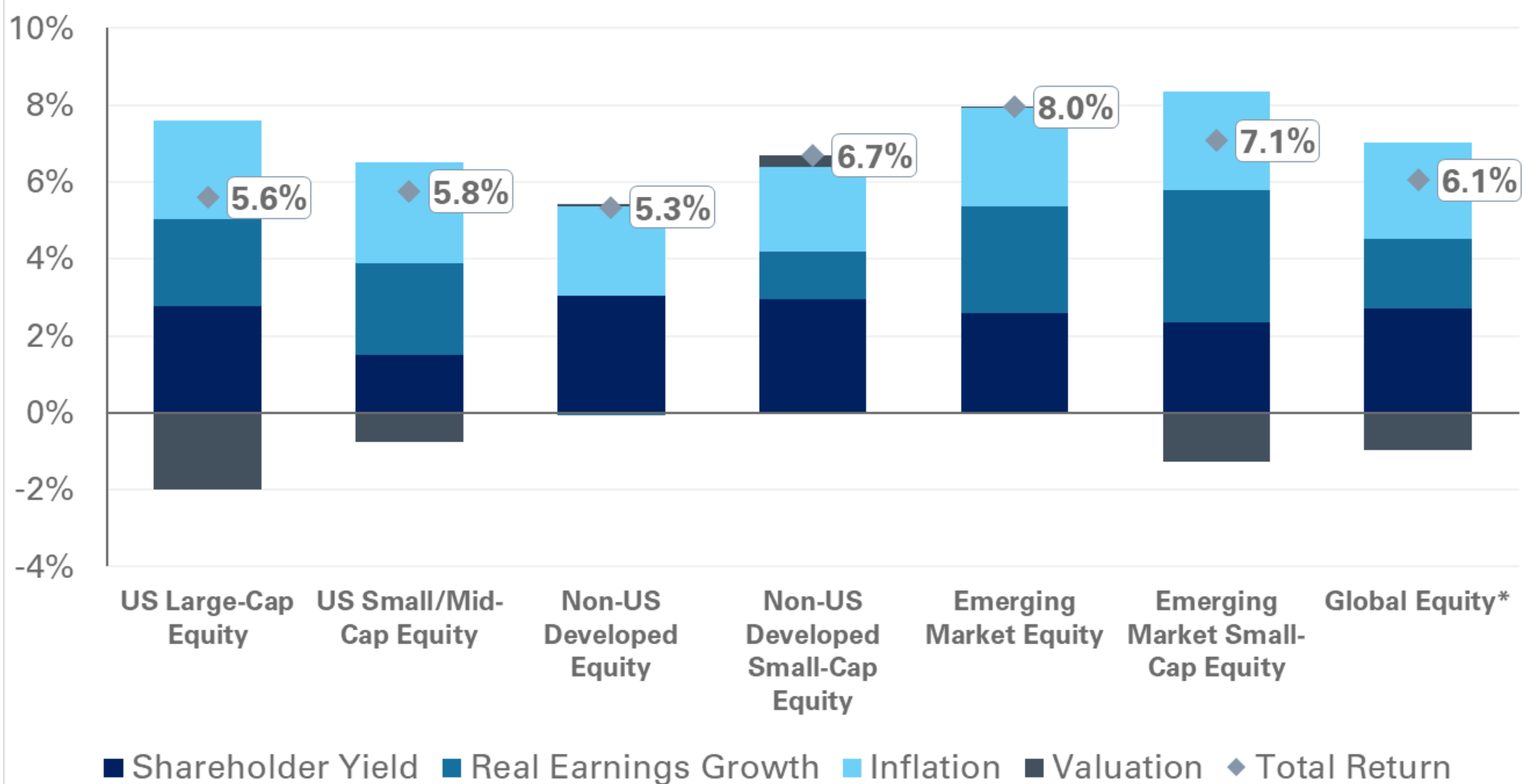
Trailing P/E Relative Median



Sources: S&P, Shiller, Russell, MSCI, FactSet, NEPC; Shiller PE long-term average beginning in 1924
Note: *Small cap indices valuations based on EV/EBITDA multiples

PUBLIC EQUITY

BUILDING BLOCKS: 10-YEAR EXPECTED RETURN



Source: NEPC
*Calculated as a blend of other classes

FIXED INCOME

FIXED INCOME ASSUMPTIONS

OVERVIEW

- **Expected returns have improved as market rate expectations rose, reflecting a resilient economic backdrop and lingering inflation**
- **Credit spreads remain tight at below-median levels across the credit complex, limiting return expectations**
- **We encourage a dedicated safe-haven fixed income allocation to serve as a critical liquidity source for the portfolio**
  - We believe safe-haven assets are reasonably attractive today and encourage duration-neutral positioning relative to strategic targets
- **High-quality fixed income is an asset class group designed to support lower volatility portfolios and larger strategic targets to fixed income**
- **We recommend utilizing U.S. TIPS within high-quality fixed income policy targets given forecasts for real yields and breakeven inflation**

FIXED INCOME ASSUMPTIONS

BUILDING BLOCKS

Illiquidity Premium	The return expected for assets with illiquidity risk
Government Rates Price Change	Change due to shifts in current yields relative to forecasted rates
Credit Deterioration	The average loss for credit assets due to defaults and recovery rates
Spread Price Change	Valuation change due to changes in credit spreads relative to long-term targets
Credit Spread	Yield premium provided by securities with credit risk
Government Rates	The yield attributed to sovereign bonds that do not have credit risk

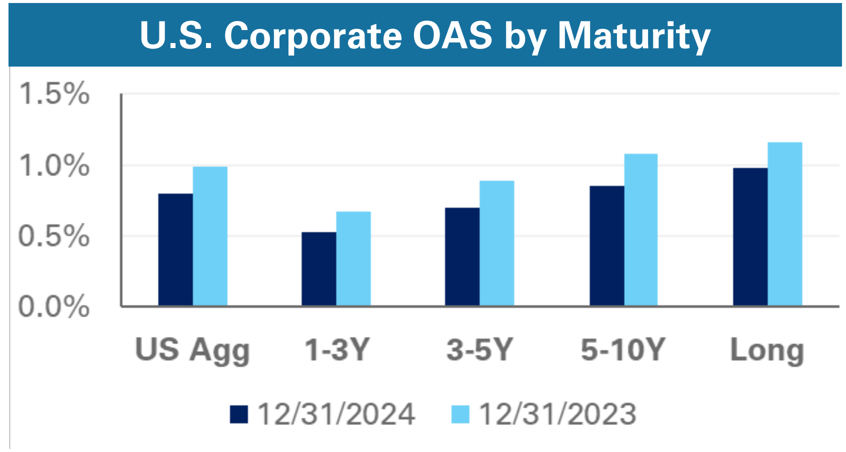
Asset Class	09/30/24 10-Yr Return	12-Month Change
U.S. TIPS	4.9%	+0.3%
U.S. Treasury Bond	4.7%	+0.5%
U.S. Corporate Bond	5.7%	+0.4%
U.S. MBS	4.9%	+0.5%
U.S. High Yield Corporate	6.3%	+0.2%
U.S. Leveraged Loan	7.3%	+0.1%
EMD External Debt*	6.9%	-0.2%
EMD Local Currency Debt	6.7%	+0.6%
Non-U.S. Govt. Bond	2.5%	+0.1%
U.S. Muni Bond (1-10 Year)	3.4%	+0.5%
U.S. High Yield Muni Bond	4.3%	-0.2%
Hedge Fund – Credit	6.9%	+0.3%
U.S. Aggregate Bond*	5.0%	+0.4%
Private Debt*	8.3%	-

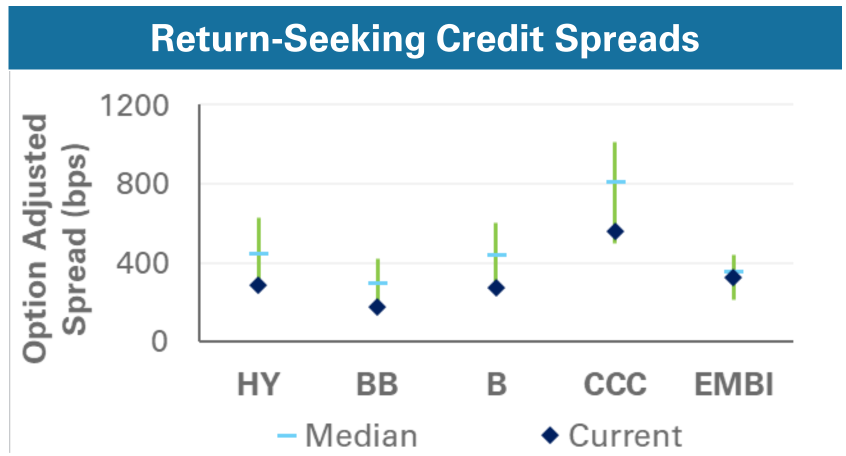
Source: NEPC
*Calculated as a blend of other asset classes

FIXED INCOME

CREDIT SPREADS

- **Credit spreads have tightened and are broadly below median levels**
  - BB and B spreads have fallen near historical lows
- **Lower spread levels weigh on future return expectations given less overall carry return**
- **Credit spread assumptions reflect a path towards long term medians**
- **Default and recovery rate assumptions are informed by long-term history**





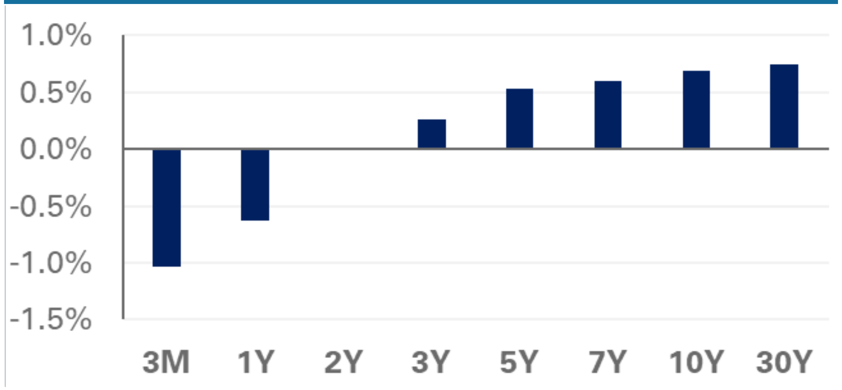
Sources: Bloomberg, JPM, FactSet, NEPC; Spread medians as of 12/31/2000 and range represents 5th to 75th percentile

FIXED INCOME
GOVERNMENT RATES

- **Government rates price change reflects shifts in interest rates, the yield curve, and roll down**
  - Roll down refers to the price change due to the aging of a bond along the yield curve
- **U.S. Treasury yield curve has steepened substantially over the past 12 months - closer to what we would consider a normal, upward-sloping yield curve**
- **A normal, upward-sloping yield curve provides optimal return potential for fixed income**

Barclays U.S. Aggregate Bond

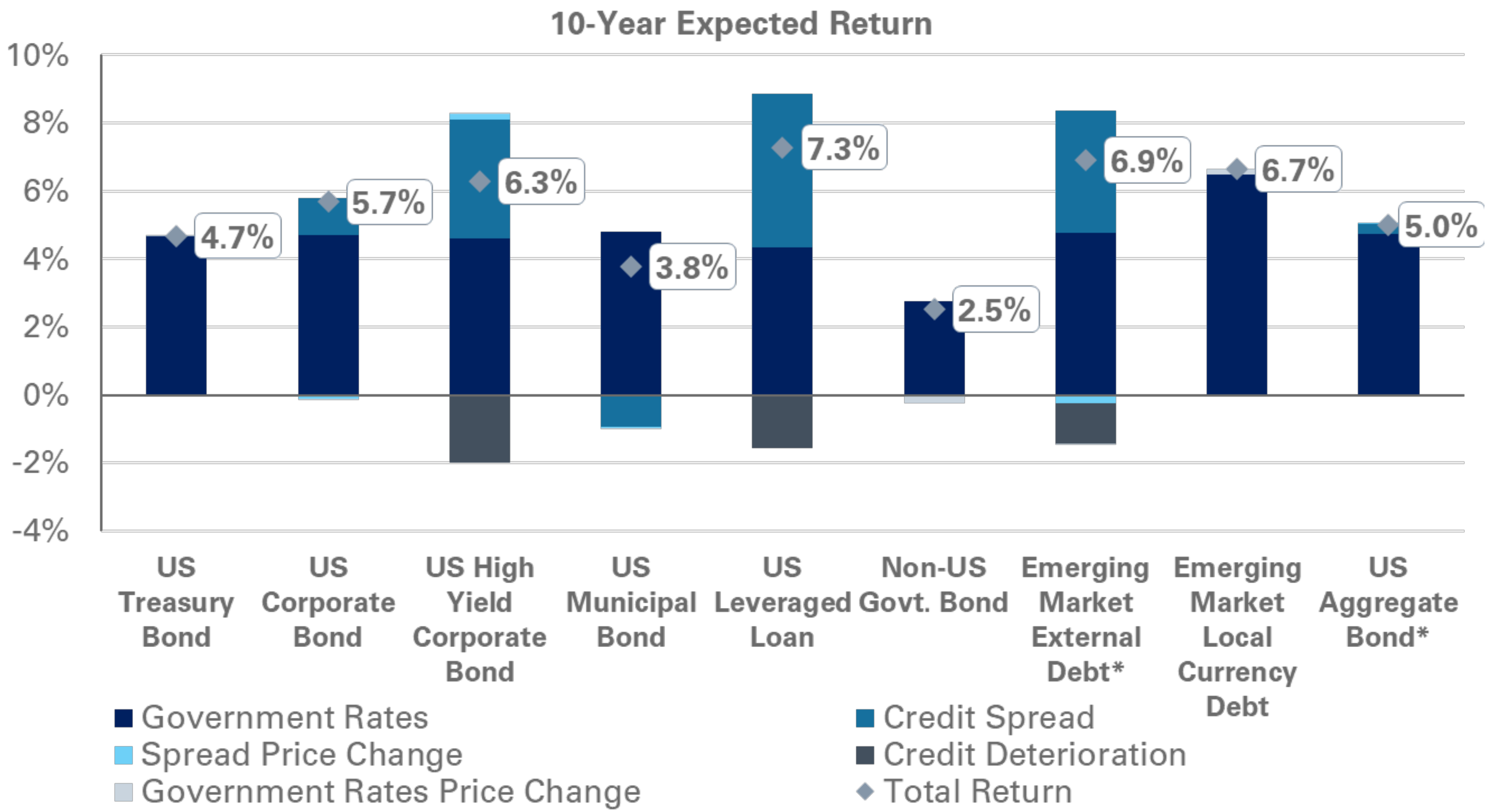
Annual Change in Treasury Yields



Sources: Bloomberg, FactSet, NEPC

FIXED INCOME

BUILDING BLOCKS: 10-YEAR EXPECTED RETURN

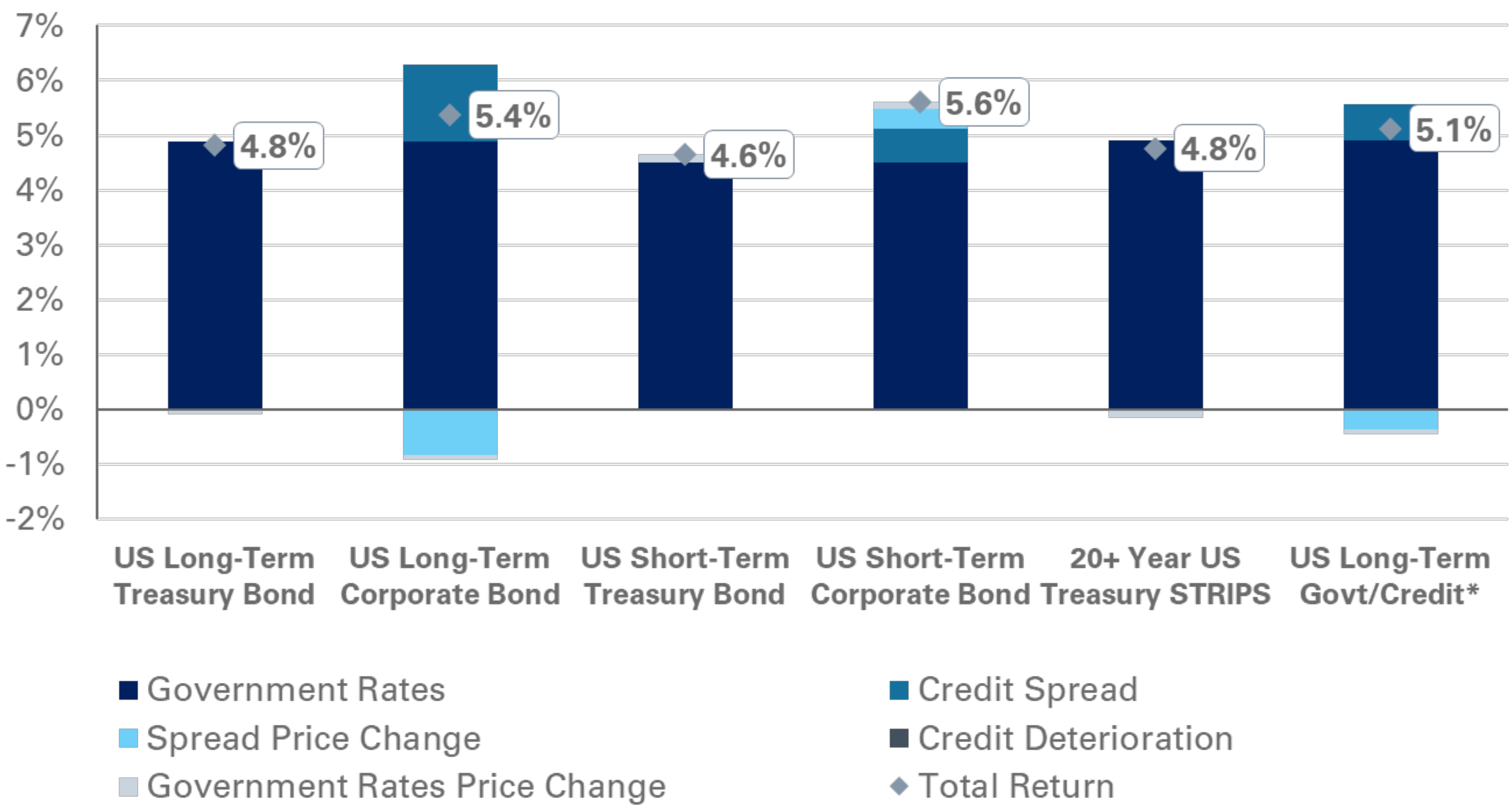


Source: NEPC

*Calculated as a blend of other classes

FIXED INCOME

BUILDING BLOCKS: 10-YEAR EXPECTED RETURN



Source: NEPC
*Calculated as a blend of other classes

REAL ASSET

REAL ASSET ASSUMPTIONS

OVERVIEW

- **We see a favorable environment for diversified real assets exposure given ongoing geopolitical risks and the potential for inflation surprises**
  - A diversifying blend of real assets provides an elevated beta to inflation relative to public equity and nominal bond exposure
- **Real estate forecasts have increased as higher cap rates reflect an improving valuation profile**
- **We encourage investors to evaluate strategic real asset exposure relative to their long-term investment objectives and spending needs**
  - We believe building portfolio inflation sensitivity is a strategic exercise and public real assets serve as a complement to private market investments
- **NEPC recommends a strategic real assets target comprising an equal-weight blend to commodity futures, natural resource equity, public infrastructure equity, REITs, and gold**

REAL ASSET ASSUMPTIONS

BUILDING BLOCKS

Illiquidity Premium	The return expected for assets with illiquidity risk
Valuation	The change in price of the asset moving to a terminal value or real average level
Inflation	Based on the inflation path as defined by breakeven-inflation rates and NEPC assumptions
Growth	Market-specific real growth based on a weighted-average of country-level revenue exposure and GDP growth
Real Income	The inflation-adjusted income produced by the asset

Asset Class	12/31/24 10-Yr Return	12-Month Change
Commodity Futures	4.4%	-0.2%
Midstream Energy	4.6%	-0.9%
REIT	5.3%	-0.7%
Global Infrastructure Equity	5.4%	-1.2%
Global Nat Resource Equity	7.0%	+0.8%
Gold	4.7%	-0.2%
Real Estate - Core	5.9%	+0.5%
Real Estate – Non-Core	7.6%	+0.5%
Private Debt - Real Estate	6.5%	+0.2%
Private Real Assets - Natural Resources	8.2%	-
Private Real Assets - Infrastructure	6.0%	-0.8%

Source: NEPC

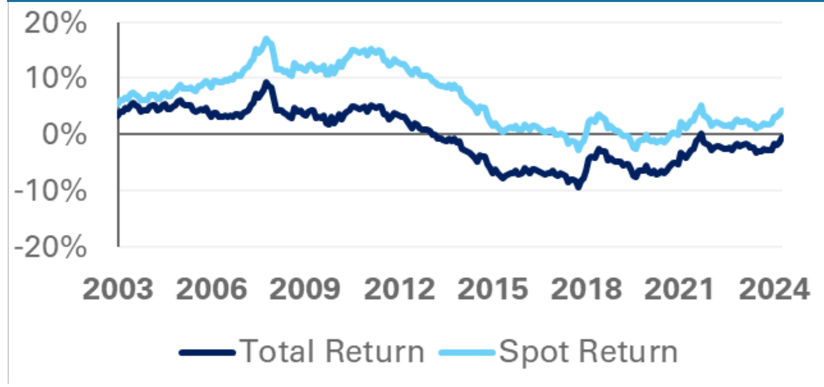
*Calculated as a blend of other asset classes

REAL ASSET

REAL INCOME

- **Equity: Real income is inflation-adjusted dividend yield**
  - Includes public infrastructure, REITS, midstream energy, and natural resource equity
- **Real Estate: Real income is net operating income (NOI)**
  - NOI growth tracks the business cycle and economic regimes
- **Commodity Futures: Real income reflects collateral return and the futures roll yield**
  - Collateral is based on a cash proxy over the time horizon and has increased in-line with cash rates

Commodities Rolling 10-Year Returns



Real Asset Yields

	12/31/24	12/31/23
Midstream Energy	3.1%	5.9%
Real Estate - Core	3.1%	2.6%
U.S. REITs	4.3%	4.2%
Global Infrastructure Equities	3.6%	3.7%
Natural Resource Equities	3.7%	3.7%
U.S. 10-Year Breakeven Inflation	2.3%	2.2%
Commodity Index Roll Yield	-0.9%	-0.9%

Sources: Bloomberg, NCREIF, Alerian, NAREIT, S&P, FactSet, NEPC

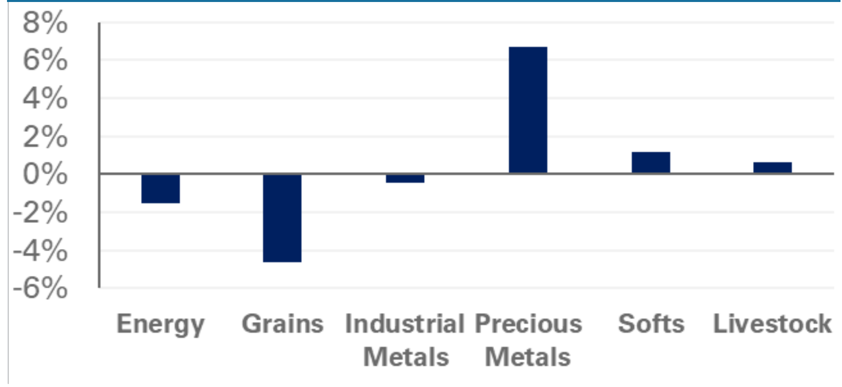
*Commodity Index Roll Yield represents a proprietary calculation methodology

REAL ASSET

VALUATION

- **Commodity valuation inputs reflect the long-term average of spot prices**
  - Energy and grains prices are trading at a large discount to long-term real averages
- **Valuation assumptions for other real assets are based on asset-specific valuation inputs**
  - Capitalization rates are used for core real estate, price-to-earnings for global infrastructure and global natural resources equity
  - Gold's valuation incorporates the asset's historical risk premia and the impact of the macroeconomic market regime

Discount/Premium to 10-Year Real Average

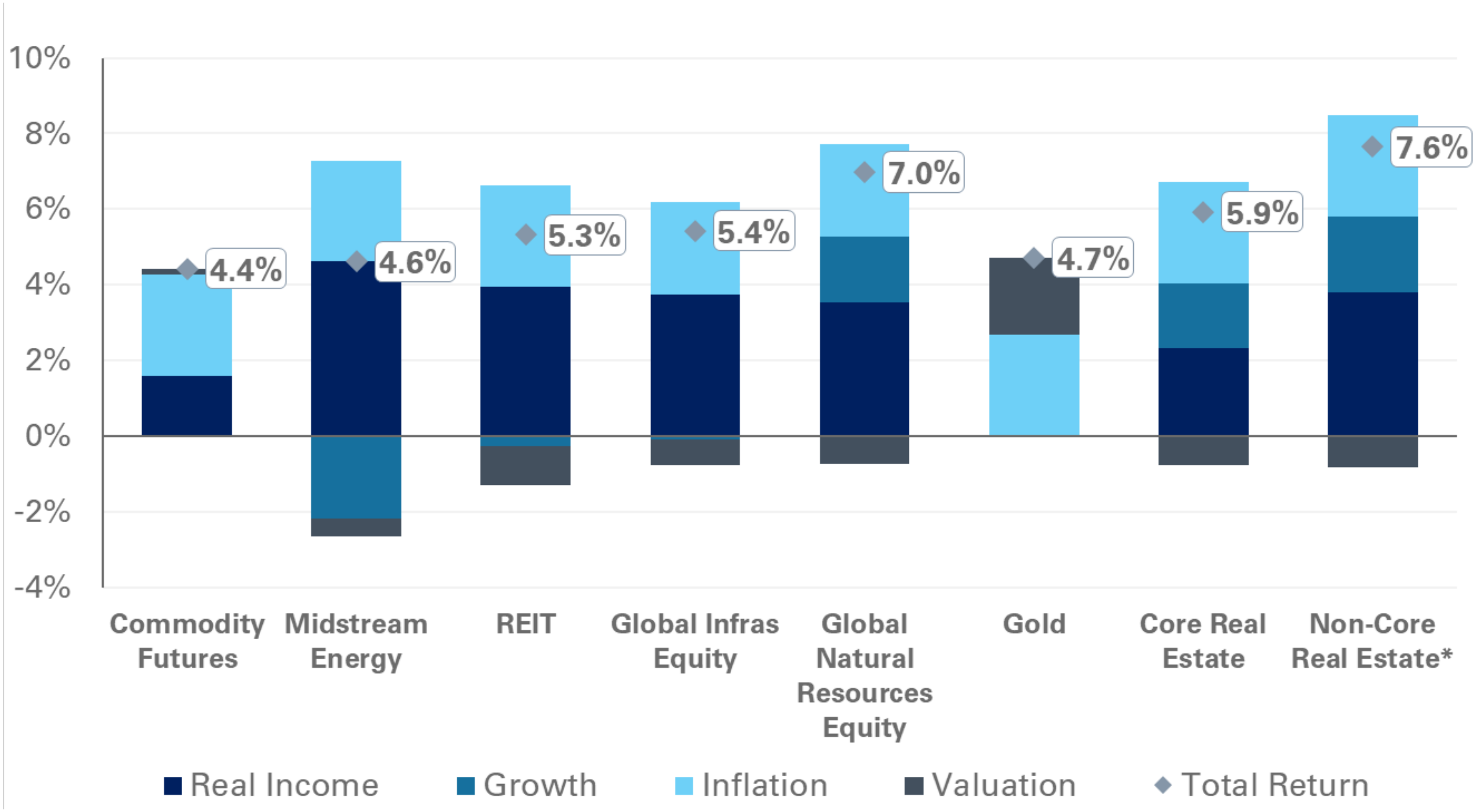


Real Price of Gold

Sources: FactSet, NEPC

REAL ASSET

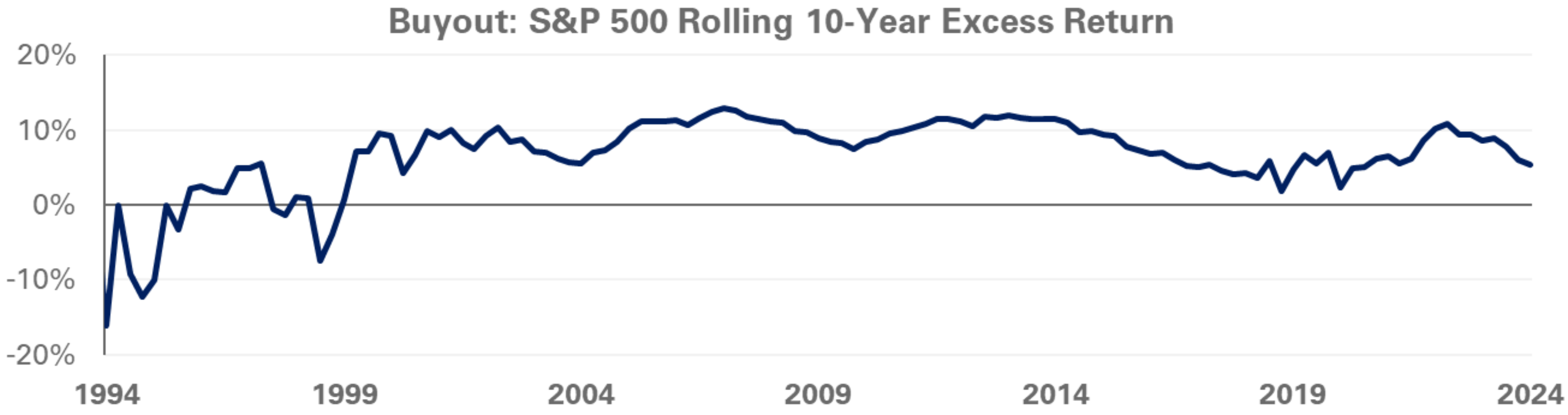
BUILDING BLOCKS: 10-YEAR EXPECTED RETURN



Source: NEPC

ALTERNATIVE ASSETS

ALTERNATIVE ASSETS
METHODOLOGY



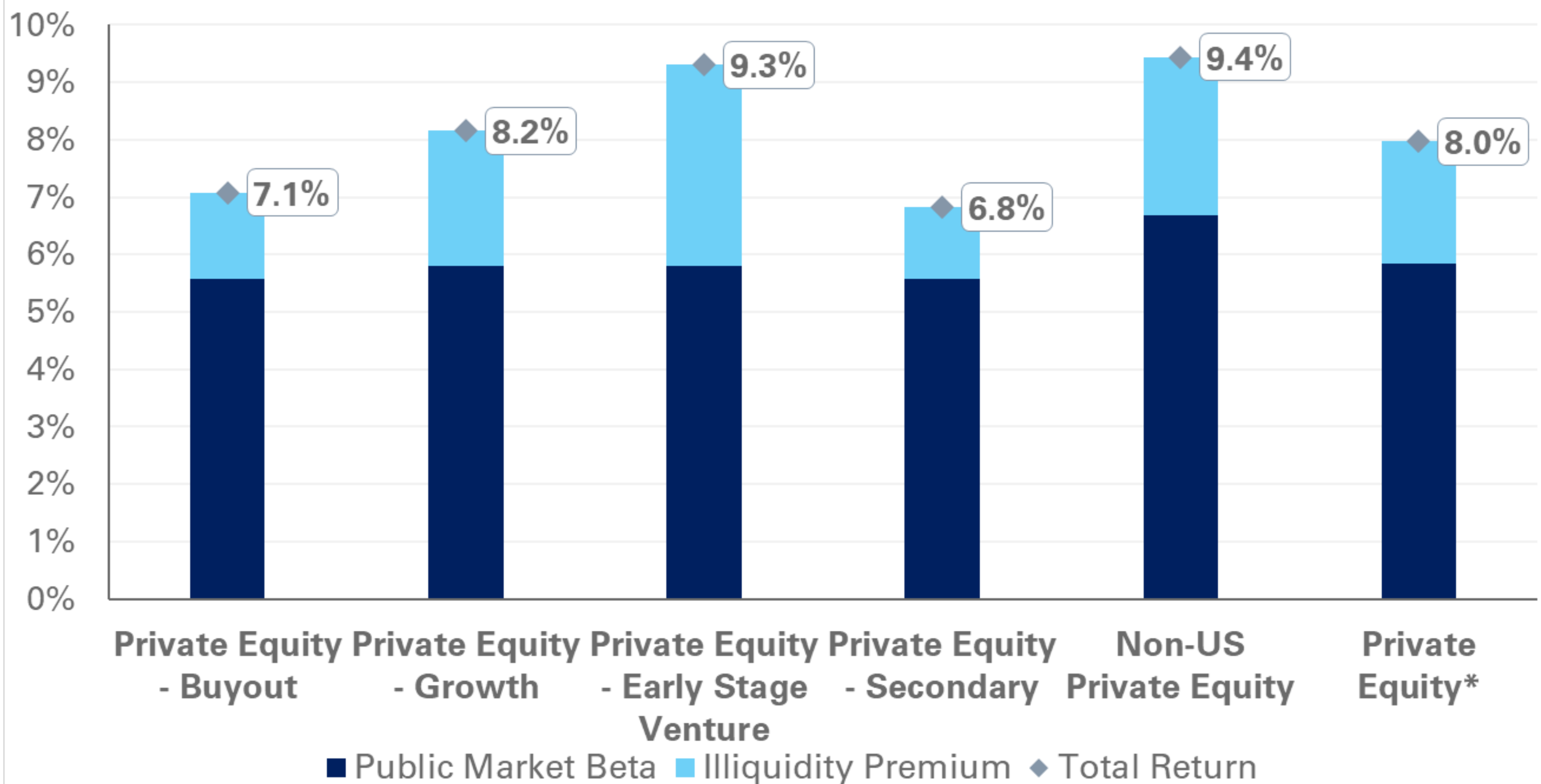
- **Private market assumptions are constructed from public market betas with an added illiquidity premia**
  - Historically, the observed illiquidity premium has been a significant component driving private market returns

- **Hedge fund assumptions are constructed from betas to public markets with an added alpha assumption**

Sources: Thomson One, S&P, FactSet

PRIVATE EQUITY

BUILDING BLOCKS: 10-YEAR EXPECTED RETURN

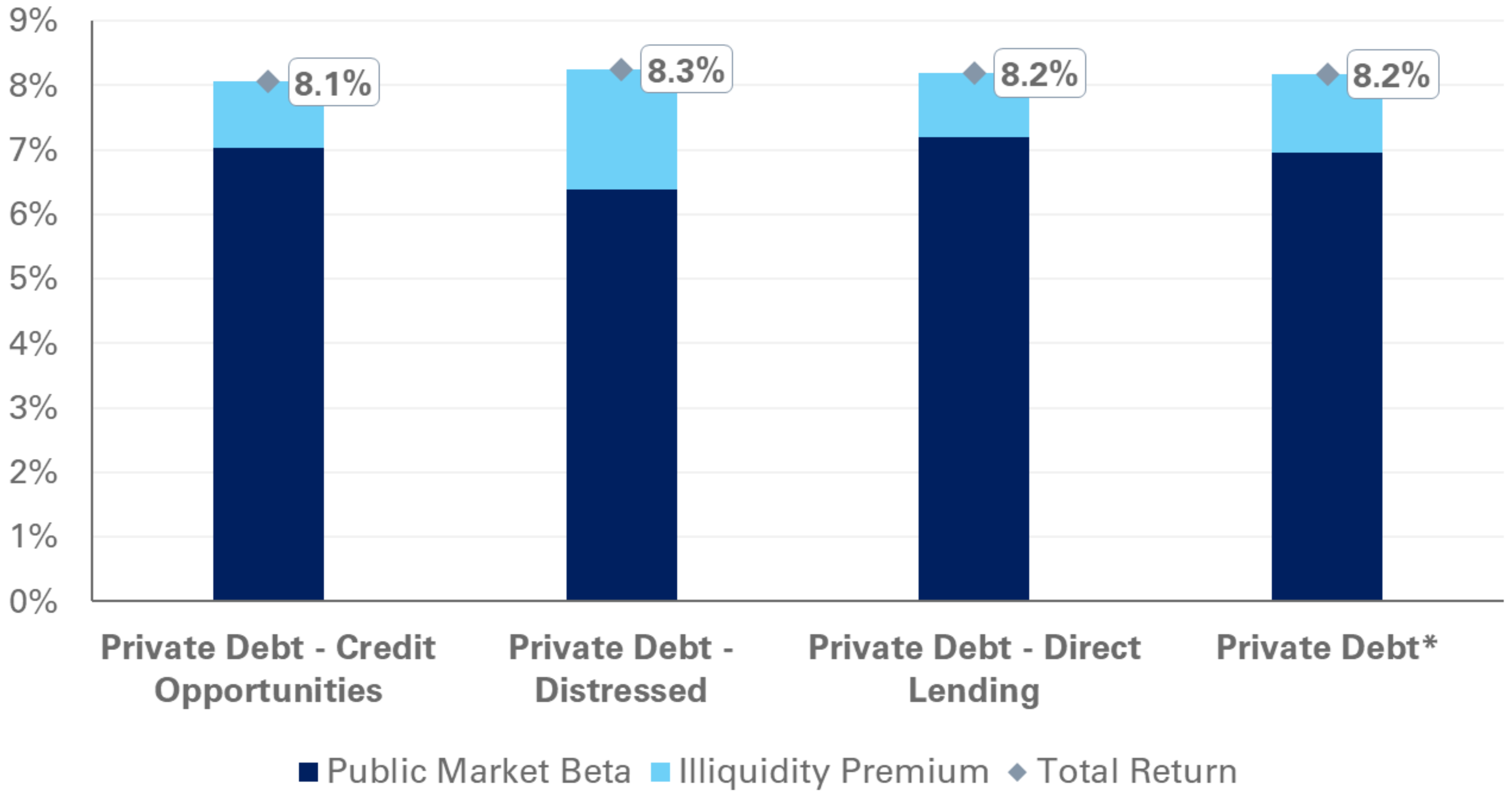


Source: NEPC

*Private Equity is a derived composite of 34% U.S. Buyout, 34% U.S. Growth, 8.5% U.S. Secondary, 8.5% U.S. Venture, 15% Non-U.S. PE

PRIVATE DEBT

BUILDING BLOCKS: 10-YEAR EXPECTED RETURN

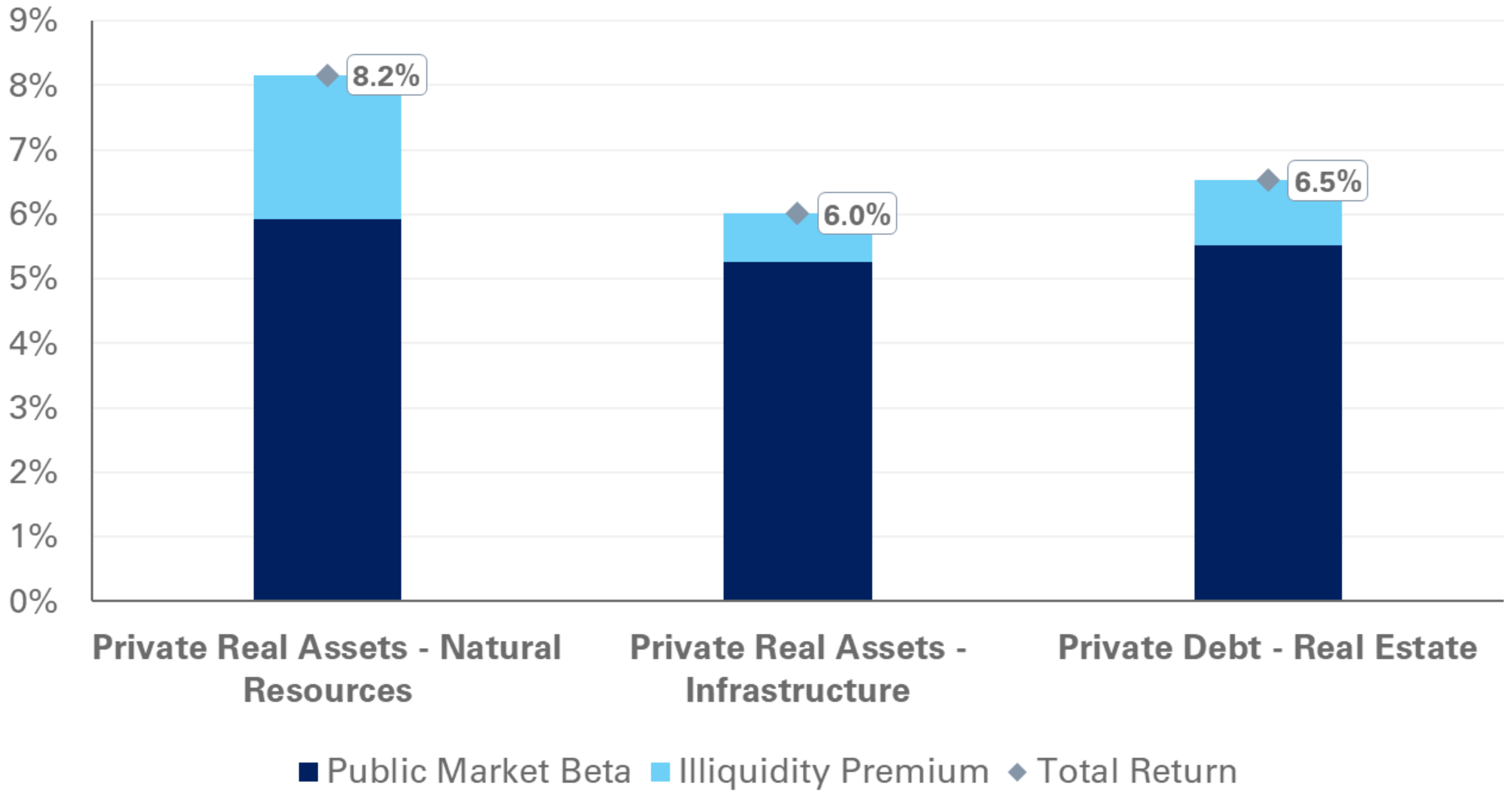


Source: NEPC

*Private Debt is a derived composite of 25% Credit Opportunities, 25% Distressed, 50% Direct Lending

PRIVATE REAL ASSET

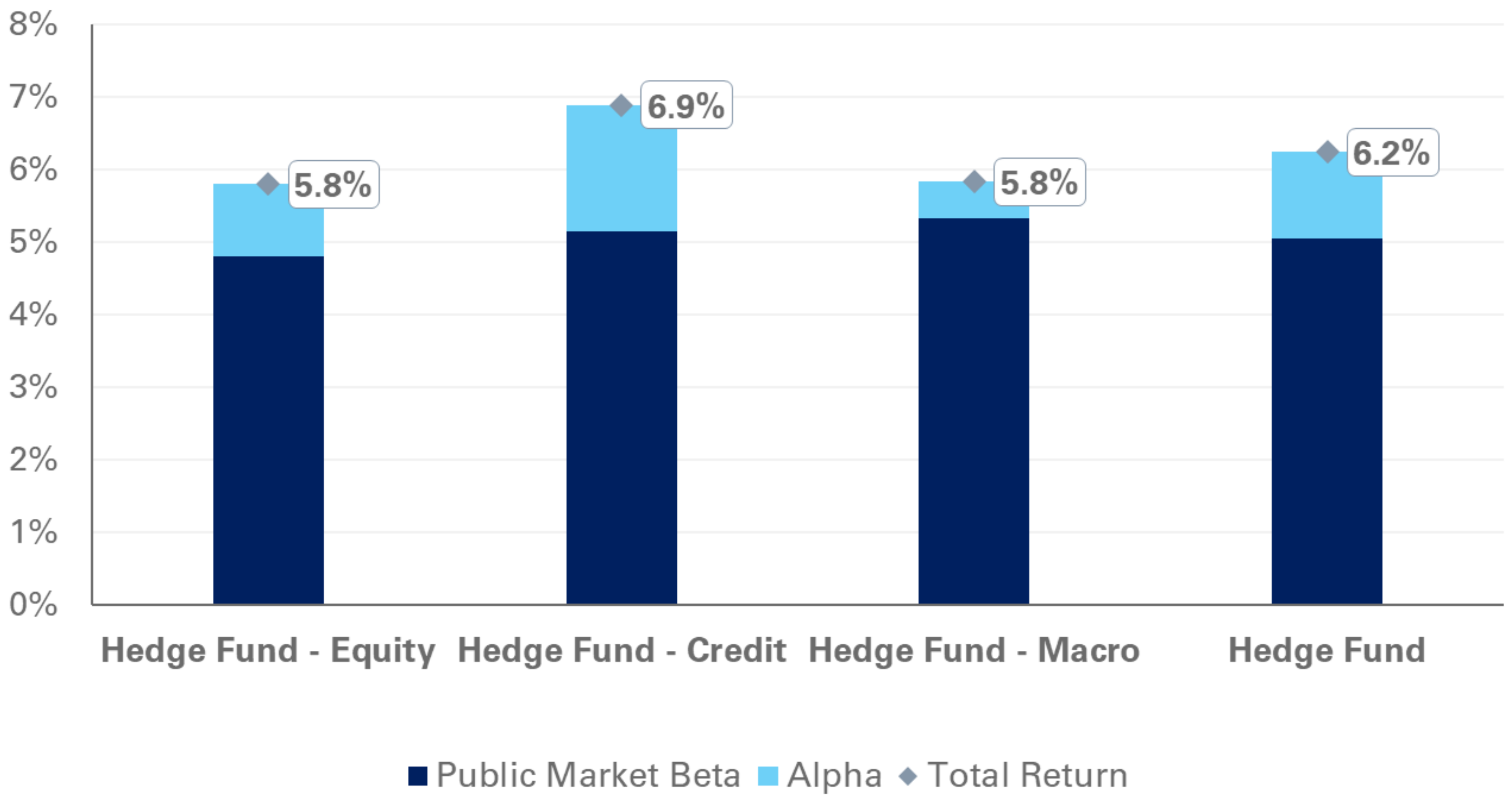
BUILDING BLOCKS: 10-YEAR EXPECTED RETURN



Source: NEPC

HEDGE FUND

BUILDING BLOCKS: 10-YEAR EXPECTED RETURN



Source: NEPC

*Hedge Funds is a derived composite of 40% Long/Short, 40% Credit, 20% Macro

APPENDIX

PRIVATE MARKETS COMPOSITES

PUBLIC MARKET BETA INPUTS FOR PRIVATE MARKETS

PRIVATE EQUITY

Buyout: 25% U.S. Large Cap, 75% U.S. Small/Mid Cap

Secondary: 25% U.S. Large Cap, 75% U.S. Small/Mid Cap

Growth: 100% U.S. Small/Mid Cap

Early-Stage Venture: 100% U.S. Small/Mid Cap

Non-U.S.: 70% International Small Cap, 30% Emerging Small Cap

Composite: 34% Buyout, 34% Growth, 15 % Non-U.S., 8.5% Secondary, 8.5% Early Venture

PRIVATE DEBT

Direct Lending: 100% Bank Loans

Distressed: 20% U.S. Small/Mid Cap, 60% U.S. High Yield, 20% Bank Loans

Credit Opportunities: 34% High Yield Securitized, 33% U.S. High Yield, 33% Bank Loans

Composite: 50% Direct Lending, 25% Credit Opportunities, 25% Distressed

PRIVATE REAL ASSETS

Energy: 30% Comm., 35% Midstream, 35% Public Resource Equity

Infra/Land: 30% Commodities, 70% Public Infrastructure

Private Real Estate Debt: 50% CMBS, 50% Real Estate - Core

10-YEAR RETURN FORECASTS

EQUITY

Geometric Expected Return			
Asset Class	**12/31/2024**	**12/31/2023**	**Delta**
U.S. Large-Cap Equity	5.6%	4.4%	+1.2%
U.S. Small/Mid-Cap Equity	5.8%	6.0%	-0.2%
Non-U.S. Developed Equity	5.3%	4.6%	+0.7%
Non-U.S. Developed Equity (USD Hedge)	5.6%	4.8%	+0.8%
Non-U.S. Developed Small-Cap Equity	6.7%	6.4%	+0.3%
Emerging Market Equity	8.0%	8.6%	-0.6%
Emerging Market Small-Cap Equity	7.1%	7.9%	-0.8%
Hedge Fund - Equity	5.8%	5.5%	+0.3%
Private Equity - Buyout	7.1%	7.4%	-0.3%
Private Equity - Growth	8.2%	8.7%	-0.5%
Private Equity - Early Stage Venture	9.3%	9.8%	-0.5%
Private Equity - Secondary	6.8%	6.9%	-0.1%
Non-U.S. Private Equity	9.4%	10.3%	-0.9%
China Equity	8.3%	9.9%	-1.6%
Global Equity*	6.1%	5.4%	+0.7%
Private Equity*	8.5%	9.0%	-0.5%

*Calculated as a blend of other asset classes

10-YEAR RETURN FORECASTS

FIXED INCOME

Geometric Expected Return			
Asset Class	**12/31/2024**	**12/31/2023**	**Delta**
Cash	4.1%	3.9%	+0.2%
US TIPS	4.9%	4.6%	+0.3%
US Treasury Bond	4.7%	4.2%	+0.5%
US Corporate Bond	5.7%	5.3%	+0.4%
US Corporate Bond - AAA	5.0%	4.4%	+0.6%
US Corporate Bond - AA	5.2%	4.6%	+0.6%
US Corporate Bond - A	5.5%	5.1%	+0.4%
US Corporate Bond - BBB	5.9%	5.6%	+0.3%
US Mortgage-Backed Securities	4.9%	4.4%	+0.5%
US Securitized Bond	5.4%	5.2%	+0.2%
US Collateralized Loan Obligation	5.7%	5.5%	+0.2%
US Municipal Bond	3.8%	3.5%	+0.3%
US Municipal Bond (1-10 Year)	3.4%	2.9%	+0.5%
US Taxable Municipal Bond	5.6%	5.3%	+0.3%

10-YEAR RETURN FORECASTS

FIXED INCOME

Geometric Expected Return			
Asset Class	**12/31/2024**	**12/31/2023**	**Delta**
Non-US Government Bond	2.5%	2.4%	+0.1%
Non-US Government Bond (USD Hedge)	2.8%	2.6%	+0.2%
Non-US Inflation-Linked Bond (USD Hedge)	3.6%	3.2%	+0.4%
US Short-Term TIPS (1-3 Year)	4.8%	4.7%	+0.1%
US Short-Term Treasury Bond (1-3 Year)	4.6%	4.4%	+0.2%
US Short-Term Corporate Bond (1-3 Year)	5.6%	5.4%	+0.2%
US Intermediate-Term TIPS (3-10 Year)	4.9%	4.6%	+0.3%
US Intermediate-Term Treasury Bond (3-10 Year)	4.6%	4.2%	+0.4%
US Intermediate-Term Corporate Bond (3-10 Year)	5.9%	5.6%	+0.3%
US Long-Term TIPS (10-30 Year)	5.3%	4.5%	+0.8%
US Long-Term Treasury Bond (10-30 Year)	4.8%	3.7%	+1.1%
US Long-Term Corporate Bond (10-30 Year)	5.4%	4.7%	+0.7%
20+ Year US Treasury STRIPS	4.8%	3.3%	+1.5%
10 Year US Treasury Bond	4.8%	4.2%	+0.6%
10 Year Non-US Government Bond (USD Hedge)	2.4%	2.1%	+0.3%
US Aggregate Bond*	5.0%	4.6%	+0.4%

*Calculated as a blend of other asset classes

10-YEAR RETURN FORECASTS

FIXED INCOME

Geometric Expected Return			
Asset Class	**12/31/2024**	**12/31/2023**	**Delta**
US High Yield Corporate Bond	6.3%	6.1%	+0.2%
US Corporate Bond - BB	6.9%	6.8%	+0.1%
US Corporate Bond - B	6.6%	6.3%	+0.3%
US Corporate Bond - CCC/Below	-0.2%	1.4%	-1.6%
US Short-Term High Yield Corporate Bond (1-3 Year)	5.7%	5.5%	+0.2%
US Leveraged Loan	7.3%	7.2%	+0.1%
Emerging Market Investment Grade External Debt	5.7%	5.0%	+0.7%
Emerging Market High Yield External Debt	7.8%	9.0%	-1.2%
Emerging Market Local Currency Debt	6.7%	6.1%	+0.6%
US High Yield Securitized Bond	9.3%	8.7%	+0.6%
US High Yield Collateralized Loan Obligation	7.8%	7.8%	-
US High Yield Municipal Bond	4.3%	4.5%	-0.2%
Hedge Fund - Credit	6.9%	6.6%	+0.3%
Private Debt - Credit Opportunities	8.1%	7.8%	+0.3%
Private Debt - Distressed	8.3%	8.6%	-0.3%
Private Debt - Direct Lending	8.2%	8.1%	+0.1%
Private Debt*	8.3%	8.3%	-

*Calculated as a blend of other asset classes

10-YEAR RETURN FORECASTS

REAL ASSETS

Geometric Expected Return			
Asset Class	**12/31/2024**	**12/31/2023**	**Delta**
Commodity Futures	4.4%	4.6%	-0.2%
Midstream Energy	4.6%	5.5%	-0.9%
REIT	5.3%	6.0%	-0.7%
Global Infrastructure Equity	5.4%	6.6%	-1.2%
Global Natural Resources Equity	7.0%	6.2%	+0.8%
Gold	4.7%	4.9%	-0.2%
Real Estate - Core	5.9%	5.4%	+0.5%
Real Estate – Value-Add	7.1%	6.6%	+0.5%
Real Estate - Opportunistic	8.1%	7.6%	+0.5%
Private Debt - Real Estate	6.5%	6.3%	+0.2%
Private Real Assets - Natural Resources	8.2%	8.2%	-
Private Real Assets - Infrastructure	6.0%	6.8%	-0.8%

30-YEAR RETURN FORECASTS

EQUITY

Geometric Expected Return			
Asset Class	**12/31/2024**	**12/31/2023**	**Delta**
U.S. Large-Cap Equity	7.1%	6.7%	+0.4%
U.S. Small/Mid-Cap Equity	7.2%	7.4%	-0.2%
Non-U.S. Developed Equity	6.7%	6.4%	+0.3%
Non-U.S. Developed Equity (USD Hedge)	6.9%	6.6%	+0.3%
Non-U.S. Developed Small-Cap Equity	7.8%	7.5%	+0.3%
Emerging Market Equity	9.1%	9.2%	-0.1%
Emerging Market Small-Cap Equity	8.5%	9.1%	-0.6%
Hedge Fund - Equity	6.3%	6.0%	+0.3%
Private Equity - Buyout	9.3%	8.8%	+0.5%
Private Equity - Growth	10.3%	9.7%	+0.6%
Private Equity - Early Stage Venture	11.2%	10.6%	+0.6%
Private Equity - Secondary	8.7%	8.2%	+0.5%
Non-U.S. Private Equity	10.5%	10.8%	-0.3%
China Equity	9.0%	9.5%	-0.5%
Global Equity*	7.5%	7.3%	+0.2%
Private Equity*	10.5%	10.1%	+0.4%

*Calculated as a blend of other asset classes

30-YEAR RETURN FORECASTS

FIXED INCOME

Geometric Expected Return			
Asset Class	**12/31/2024**	**12/31/2023**	**Delta**
Cash	3.6%	3.4%	+0.2%
US TIPS	5.0%	4.7%	+0.3%
US Treasury Bond	4.8%	4.3%	+0.5%
US Corporate Bond	6.3%	5.9%	+0.4%
US Corporate Bond - AAA	5.7%	5.1%	+0.6%
US Corporate Bond - AA	5.5%	5.1%	+0.4%
US Corporate Bond - A	6.0%	5.5%	+0.5%
US Corporate Bond - BBB	6.5%	6.1%	+0.4%
US Mortgage-Backed Securities	5.0%	4.6%	+0.4%
US Securitized Bond	5.6%	5.4%	+0.2%
US Collateralized Loan Obligation	5.1%	4.9%	+0.2%
US Municipal Bond	4.1%	3.8%	+0.3%
US Municipal Bond (1-10 Year)	3.8%	3.5%	+0.3%
US Taxable Municipal Bond	6.4%	6.0%	+0.4%

30-YEAR RETURN FORECASTS

FIXED INCOME

Geometric Expected Return			
Asset Class	**12/31/2024**	**12/31/2023**	**Delta**
Non-US Government Bond	3.1%	2.9%	+0.2%
Non-US Government Bond (USD Hedge)	3.3%	3.2%	+0.1%
Non-US Inflation-Linked Bond (USD Hedge)	3.6%	3.3%	+0.3%
US Short-Term TIPS (1-3 Year)	4.6%	4.4%	+0.2%
US Short-Term Treasury Bond (1-3 Year)	4.4%	4.2%	+0.2%
US Short-Term Corporate Bond (1-3 Year)	5.5%	5.2%	+0.3%
US Intermediate-Term TIPS (3-10 Year)	5.0%	4.7%	+0.3%
US Intermediate-Term Treasury Bond (3-10 Year)	4.8%	4.4%	+0.4%
US Intermediate-Term Corporate Bond (3-10 Year)	6.4%	6.0%	+0.4%
US Long-Term TIPS (10-30 Year)	5.4%	4.8%	+0.6%
US Long-Term Treasury Bond (10-30 Year)	5.1%	4.3%	+0.8%
US Long-Term Corporate Bond (10-30 Year)	6.6%	6.0%	+0.6%
20+ Year US Treasury STRIPS	5.3%	4.2%	+1.1%
10 Year US Treasury Bond	5.3%	4.8%	+0.5%
10 Year Non-US Government Bond (USD Hedge)	3.2%	2.8%	+0.4%
US Aggregate Bond*	5.3%	4.9%	+0.4%

*Calculated as a blend of other asset classes

30-YEAR RETURN FORECASTS

FIXED INCOME

Geometric Expected Return			
Asset Class	**12/31/2024**	**12/31/2023**	**Delta**
US High Yield Corporate Bond	7.4%	7.1%	+0.3%
US Corporate Bond - BB	7.8%	7.7%	+0.1%
US Corporate Bond - B	7.3%	7.1%	+0.2%
US Corporate Bond - CCC/Below	1.3%	1.9%	-0.6%
US Short-Term High Yield Corporate Bond (1-3 Year)	5.9%	5.6%	+0.3%
US Leveraged Loan	6.7%	6.6%	+0.1%
Emerging Market Investment Grade External Debt	6.4%	5.0%	+1.4%
Emerging Market High Yield External Debt	8.3%	9.0%	-0.7%
Emerging Market Local Currency Debt	5.8%	5.5%	+0.3%
US High Yield Securitized Bond	8.8%	8.3%	+0.5%
US High Yield Collateralized Loan Obligation	7.5%	7.3%	+0.2%
US High Yield Municipal Bond	5.1%	4.9%	+0.2%
Hedge Fund - Credit	7.2%	7.0%	+0.2%
Private Debt - Credit Opportunities	8.9%	8.4%	+0.5%
Private Debt - Distressed	9.7%	9.3%	+0.4%
Private Debt - Direct Lending	8.9%	8.9%	-
Private Debt*	9.2%	9.0%	+0.2%

*Calculated as a blend of other asset classes

30-YEAR RETURN FORECASTS

REAL ASSETS

Geometric Expected Return			
Asset Class	**12/31/2024**	**12/31/2023**	**Delta**
Commodity Futures	3.9%	3.9%	-
Midstream Energy	6.3%	6.6%	-0.3%
REIT	7.1%	7.3%	-0.2%
Global Infrastructure Equity	6.5%	7.0%	-0.5%
Global Natural Resources Equity	7.5%	7.1%	+0.4%
Gold	4.8%	4.8%	-
Real Estate - Core	6.5%	6.1%	+0.4%
Real Estate – Value-Add	7.8%	7.3%	+0.5%
Real Estate - Opportunistic	8.7%	8.2%	+0.5%
Private Debt - Real Estate	6.9%	6.6%	+0.3%
Private Real Assets - Natural Resources	8.9%	8.7%	+0.2%
Private Real Assets - Infrastructure	6.8%	7.1%	-0.3%

VOLATILITY FORECASTS

EQUITY

Volatility			
Asset Class	**12/31/2024**	**12/31/2023**	**Delta**
U.S. Large-Cap Equity	17.4%	17.2%	+0.2%
U.S. Small/Mid-Cap Equity	21.4%	21.0%	+0.4%
Non-U.S. Developed Equity	19.6%	19.7%	-0.1%
Non-U.S. Developed Equity (USD Hedge)	17.4%	17.7%	-0.3%
Non-U.S. Developed Small-Cap Equity	23.3%	24.2%	-0.9%
Emerging Market Equity	27.4%	28.1%	-0.7%
Emerging Market Small-Cap Equity	30.6%	31.4%	-0.8%
Hedge Fund - Equity	10.9%	11.0%	-0.1%
Private Equity - Buyout	20.7%	20.0%	+0.7%
Private Equity - Growth	30.8%	31.5%	-0.7%
Private Equity - Early Stage Venture	48.0%	46.5%	+1.5%
Private Equity - Secondary	20.4%	20.4%	-
Non-U.S. Private Equity	29.0%	32.0%	-3.0%
China Equity	30.4%	30.6%	-0.2%
Global Equity*	18.2%	18.2%	-
Private Equity*	25.8%	25.9%	-0.1%

*Calculated as a blend of other asset classes

VOLATILITY FORECASTS

FIXED INCOME

Volatility			
Asset Class	**12/31/2024**	**12/31/2023**	**Delta**
Cash	0.6%	0.6%	-
US TIPS	6.0%	6.0%	-
US Treasury Bond	5.5%	5.4%	+0.1%
US Corporate Bond	7.9%	7.7%	+0.2%
US Corporate Bond - AAA	7.0%	6.8%	+0.2%
US Corporate Bond - AA	6.7%	6.6%	+0.1%
US Corporate Bond - A	7.7%	7.6%	+0.1%
US Corporate Bond - BBB	8.6%	8.4%	+0.2%
US Mortgage-Backed Securities	6.5%	6.5%	-
US Securitized Bond	7.9%	8.0%	-0.1%
US Collateralized Loan Obligation	6.5%	7.7%	-1.2%
US Municipal Bond	6.0%	6.0%	-
US Municipal Bond (1-10 Year)	4.5%	4.5%	-
US Taxable Municipal Bond	7.5%	7.5%	-

VOLATILITY FORECASTS
FIXED INCOME

Volatility			
Asset Class	**12/31/2024**	**12/31/2023**	**Delta**
Non-US Government Bond	9.8%	9.5%	+0.3%
Non-US Government Bond (USD Hedge)	4.1%	4.1%	-
Non-US Inflation-Linked Bond (USD Hedge)	6.7%	6.7%	-
US Short-Term TIPS (1-3 Year)	3.3%	3.3%	-
US Short-Term Treasury Bond (1-3 Year)	2.3%	2.3%	-
US Short-Term Corporate Bond (1-3 Year)	2.8%	2.8%	-
US Intermediate-Term TIPS (3-10 Year)	5.8%	6.0%	-0.2%
US Intermediate-Term Treasury Bond (3-10 Year)	5.4%	5.9%	-0.5%
US Intermediate-Term Corporate Bond (3-10 Year)	7.4%	7.1%	+0.3%
US Long-Term TIPS (10-30 Year)	12.6%	12.4%	+0.2%
US Long-Term Treasury Bond (10-30 Year)	12.3%	11.8%	+0.5%
US Long-Term Corporate Bond (10-30 Year)	12.4%	11.9%	+0.5%
20+ Year US Treasury STRIPS	21.0%	20.7%	+0.3%
10 Year US Treasury Bond	7.6%	7.5%	+0.1%
10 Year Non-US Government Bond (USD Hedge)	4.9%	5.0%	-0.1%
US Aggregate Bond*	5.8%	5.8%	-

*Calculated as a blend of other asset classes

VOLATILITY FORECASTS
FIXED INCOME

Volatility			
Asset Class	**12/31/2024**	**12/31/2023**	**Delta**
US High Yield Corporate Bond	11.3%	11.2%	+0.1%
US Corporate Bond - BB	9.7%	9.7%	-
US Corporate Bond - B	11.7%	11.6%	+0.1%
US Corporate Bond - CCC/Below	20.4%	20.3%	+0.1%
US Short-Term High Yield Corporate Bond (1-3 Year)	8.2%	8.2%	-
US Leveraged Loan	6.1%	9.1%	-3.0%
Emerging Market Investment Grade External Debt	8.7%	8.7%	-
Emerging Market High Yield External Debt	17.5%	17.5%	-
Emerging Market Local Currency Debt	12.6%	12.7%	-0.1%
US High Yield Securitized Bond	13.0%	11.2%	+1.8%
US High Yield Collateralized Loan Obligation	15.9%	10.4%	+5.5%
US High Yield Municipal Bond	12.0%	12.0%	-
Hedge Fund - Credit	9.7%	9.9%	-0.2%
Private Debt - Credit Opportunities	14.3%	14.5%	-0.2%
Private Debt - Distressed	13.9%	14.4%	-0.5%
Private Debt - Direct Lending	11.0%	11.0%	-
Private Debt*	11.8%	11.8%	-

*Calculated as a blend of other asset classes

VOLATILITY FORECASTS

REAL ASSETS

Volatility			
Asset Class	**12/31/2024**	**12/31/2023**	**Delta**
Commodity Futures	18.5%	18.5%	-
Midstream Energy	27.7%	28.2%	-0.5%
REIT	22.4%	21.8%	+0.6%
Global Infrastructure Equity	19.3%	19.4%	-0.1%
Global Natural Resources Equity	22.9%	23.3%	-0.4%
Gold	16.6%	16.4%	+0.2%
Real Estate - Core	14.7%	15.0%	-0.3%
Real Estate – Value-Add	23.0%	23.4%	-0.4%
Real Estate - Opportunistic	27.3%	25.8%	+1.5%
Private Debt - Real Estate	11.9%	11.9%	-
Private Real Assets - Natural Resources	32.5%	32.3%	+0.2%
Private Real Assets - Infrastructure	10.6%	12.4%	-1.8%

INFORMATION DISCLAIMER

Past performance is no guarantee of future results.

The goal of this report is to provide a basis for substantiating asset allocation recommendations. The opinions presented herein represent the good faith views of NEPC as of the date of this report and are subject to change at any time.

Information on market indices was provided by sources external to NEPC. While NEPC has exercised reasonable professional care in preparing this report, we cannot guarantee the accuracy of all source information contained within.

All investments carry some level of risk. Diversification and other asset allocation techniques do not ensure profit or protect against losses.

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INTERNAL INVESTMENT ROLLOUT

UPDATE

INVESTMENT TEAM

March 14, 2025

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PLATFORMS TO ENHANCE INVESTMENT EXECUTION

Program Initiated to Acquire These Platforms

Order Execution Management System

- Transaction Execution
- Market Data
- Post Trade Actions
- Compliance Monitoring
- Realtime IBOR
- Transaction Reporting
- Commission Reporting
- Real time portfolio monitoring

Portfolio& Treasury Management System

- Portfolio modeling and construction
- Risk management, stress testing and scenario analysis
- Performance attribution
- Cash management
- Collateral management
- Securities lending

Data Warehouse + Data Exchange

- Central repository
- Integrated portfolio data and analytics
- AI, Machine Learning & Advanced Analytics
- Analysis and reporting overlays
- Dashboard

OEMS/PMS ACQUISITION

OEMS/PMS Acquisition Progress Summary

- Strategy approval obtained in September 2023 followed by initiation of acquisition of OEMS and PMS platforms.
- Engaged with IT and Procurement. Categorized as a 'Large IT Project'.
- Limited procurement using third party research (Gartner) and peer references.
- Blackrock chosen as our vendor and agreement negotiated. Implementation of Aladdin OEMS/PMS kicked-off August 2024.
- Implementation process included review of business processes, system configuration, interface development, training and user acceptance.
- Production platform launched March 10, 2025
- A few remaining issues expected to be completed by March 31, 2025. Portfolio launch and live trading expected to commence April 1, 2025

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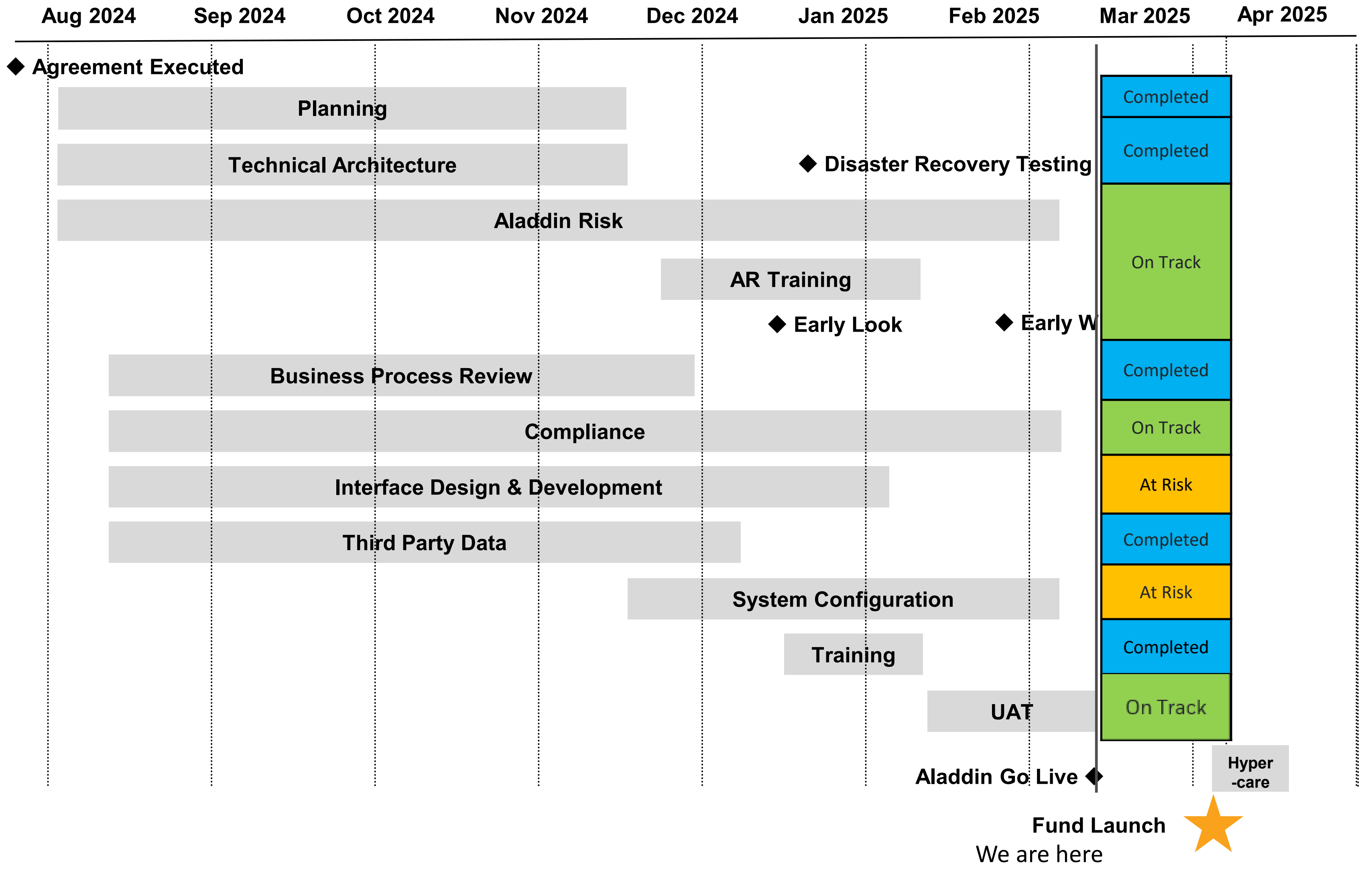
TIMELINE AND MILESTONES



Remaining Activities

On Track –

- SWIFT and CTM Connectivity Testing
- Compliance Testing
- Ongoing issues with Optimizer and Explore

At Risk

- Custodian source data integration – interim workaround in place.
- Traiana delayed – agreement with Morgan Stanley for Bloomberg as interim workaround

Post Fund Launch

- Initiate acquisition of Data Warehouse and Exchange

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INTERNAL INVESTMENT PILOT

Internal Investment Pilot targeted for execution in first week of April.

Internal Equity: $50MM

- In-kind transfer from externally managed Index portfolio.
- Approximately $31MM to the non-qualified account (Insurance and Legacy combined) and $19MM to the Pension account.

Internal Fixed Income Government Credit Portfolio: $50MM

- Cash funded from the externally managed Core Fixed Income Portfolio.
- Internal team will trade about 26 securities with approximately 20 Investment Grade Bonds and 6 U.S. Treasury securities.

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INTERNAL INVESTMENT PILOT (CONTINUED)

Internal Treasury Inflation-Protected Securities (TIPS): $175MM (full portfolio)

- In-kind transfer of all Treasury Inflation-Protected Securities and approximately $6MM in cash from external manager.
- TIPS portfolio is in the Insurance Fund only.
- The last motion approved moving to TIPS index with external manager first before moving it internally, we are bypassing that step.

Cash Overlay: $10MM (Pension and Legacy pool)

- This will be split across Equity and Fixed Income in 60/40 proportion, respectively.
- If connectivity for trading Futures is not available or if Futures are expensive, Exchange Traded Funds will be utilized.

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ORGANIZATION STRUCTURE

Scott M Anderson, CFA – Chief Investment Officer

March 14, 2025

North Dakota | Retirement & Investment

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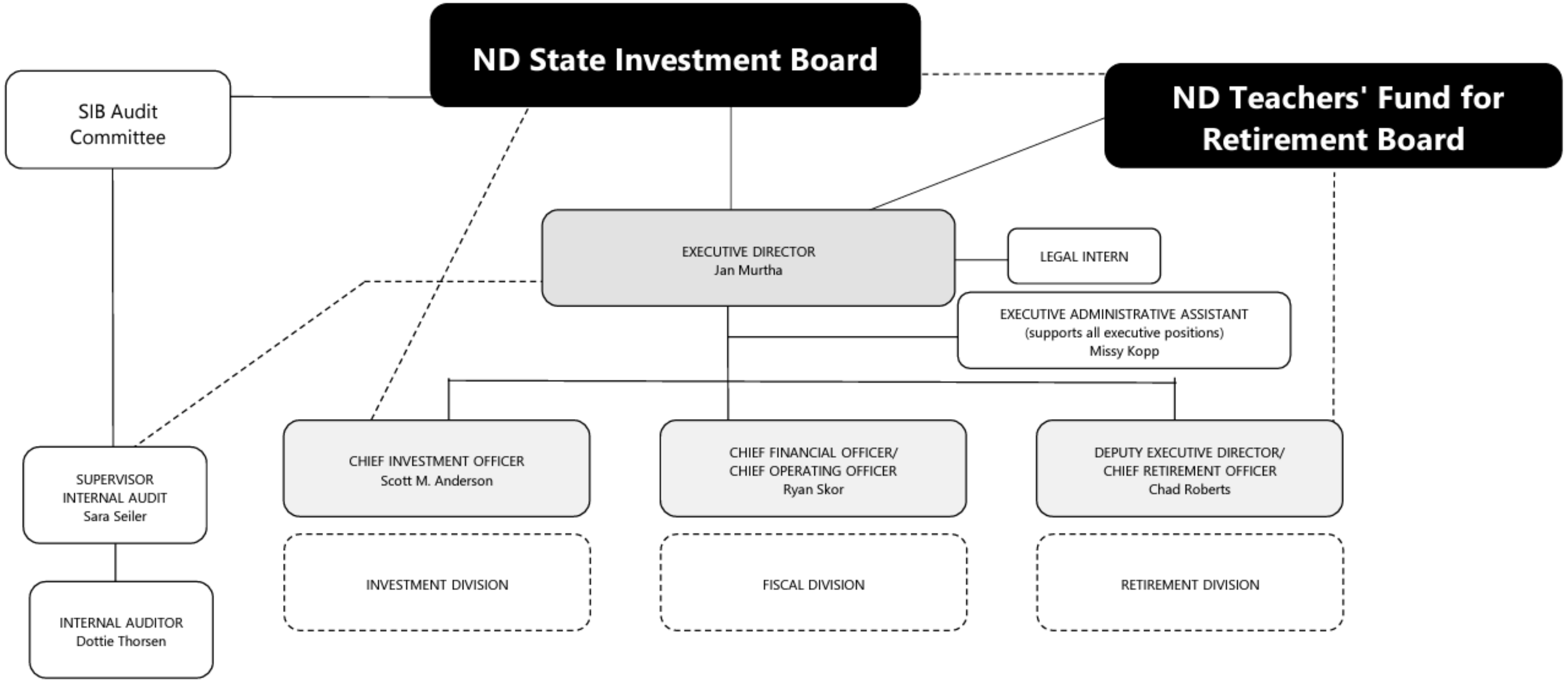
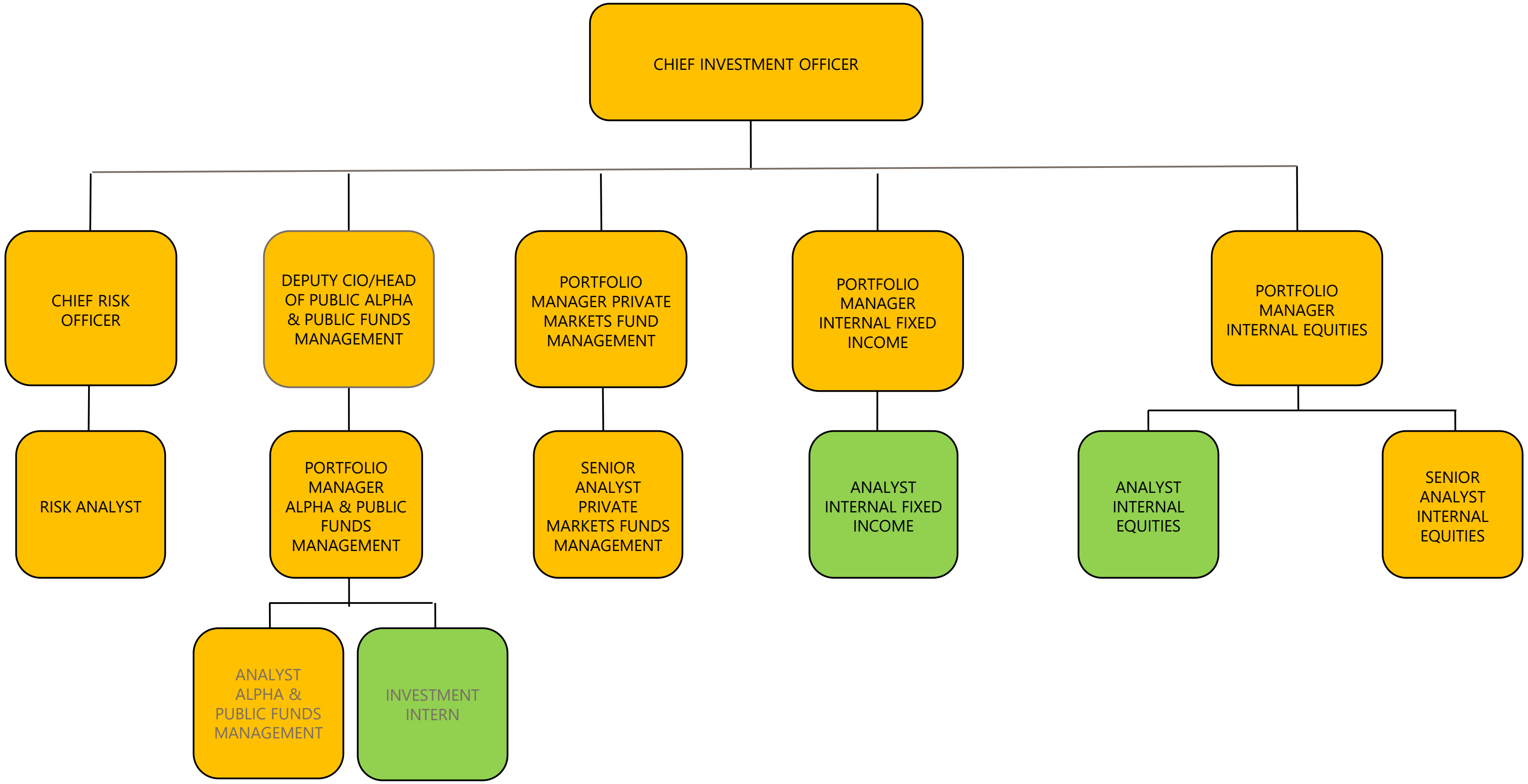
THE RIO ORGANIZATION STRUCTURE

RETIREMENT AND INVESTMENT OFFICE ORGANIZATIONAL CHART



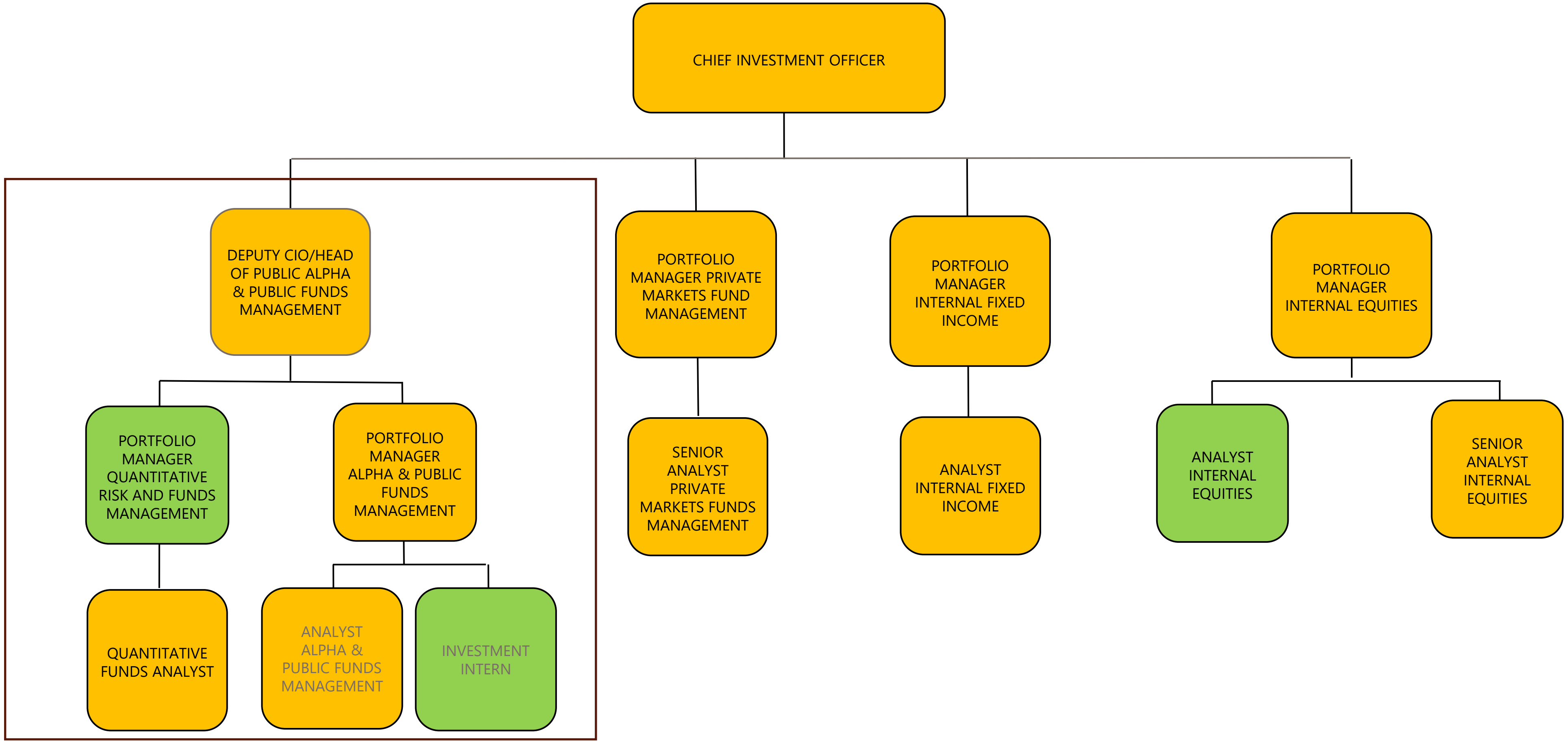
THE CURRENT INVESTMENT ORGANIZATION



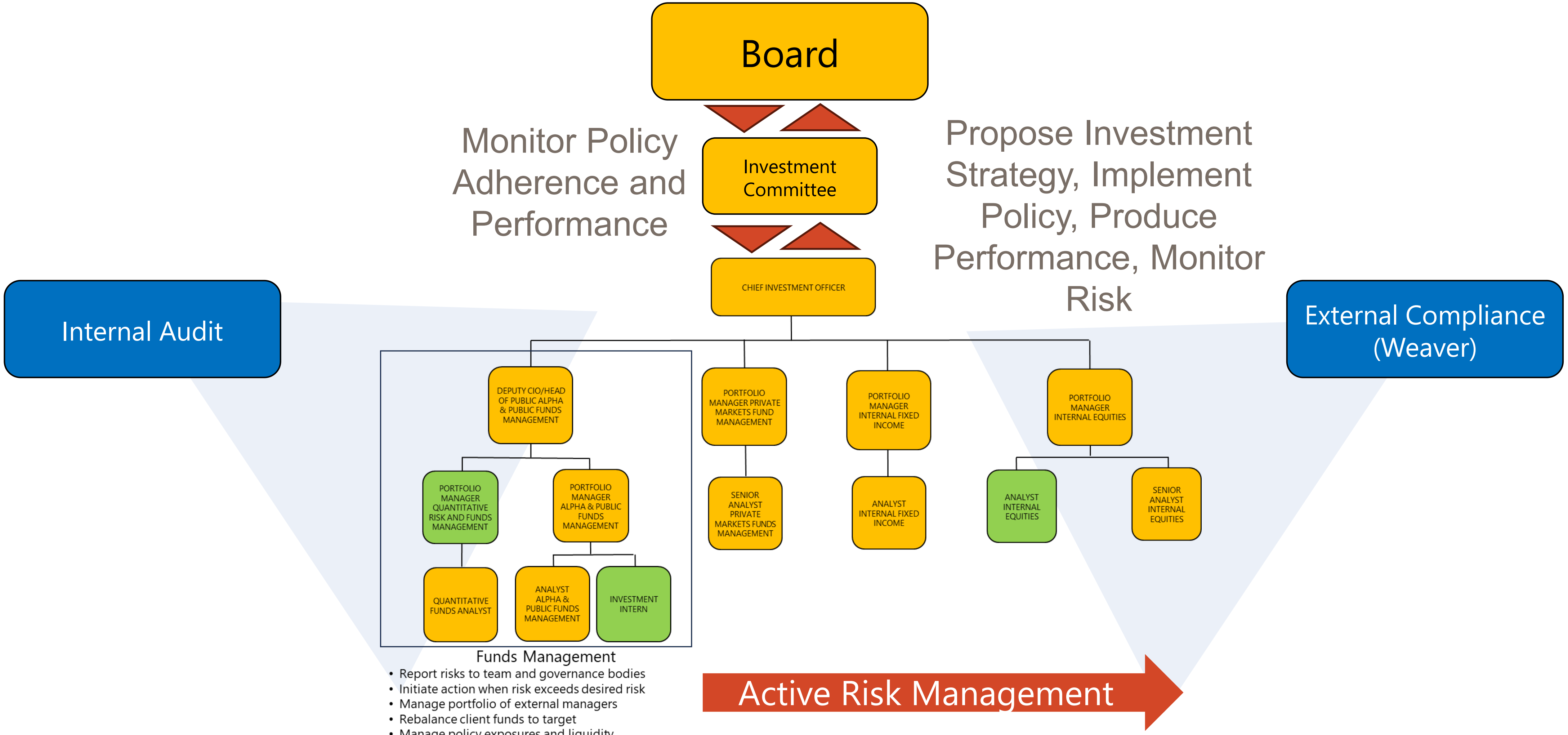
ADVANCED FUNDS MANAGEMENT

Funds Management

- Report risks to team and governance bodies
- Initiate action when risk exceeds desired risk
- Manage portfolio of external managers
- Rebalance client funds to target
- Manage policy exposures and liquidity
- Allocate active risk to managers (external and internal)
- Lead asset allocation activities
- Stress test portfolios and create contingency plans



FINANCIAL CONTROL AND RISK MANAGMENT



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Confidential materials will be sent separately to Committee members via secure link.

IN-STATE MANAGER UPDATE

50 South Capital

- On April 22, 2021, the State Investment Board approved a $250 million commitment.
- The initial commitment was $100 million to minimize the impact of fees on returns.
- The investment recommendation allowed RIO to increase the commitment amount as compelling investment opportunities were identified and subject to appropriate due diligence.
- RIO is releasing the remaining $150 million to 50 South Capital after further due diligence and improvements to the limited partnership terms.