KENTUCKY PUBLIC PENSIONS AUTHORITY
David L. Eager, Executive Director
1260 Louisville Road · Frankfort, Kentucky 40601
kyret.ky.gov · Phone: 502-696-8800 · Fax: 502-696-8822

Kentucky Public Pensions Authority

MEMORANDUM

TO: State News Media

FROM: County Employee Retirement System

DATE: October 29, 2021

SUBJECT: Notice of Meeting

The County Employee Retirement System Investment Committee will hold their quarterly meeting on Monday, November 8, 2021 at 2:00 p.m. (Eastern) via live video teleconference pursuant to Kentucky Revised Statutes Section 61.826. A portion of this meeting may be held in closed session.

The Investment Committee will meet to discuss items on the agenda. If you would like to submit a public comment to be read during the meeting, please email your comment, full name and affiliation to BoardsPublicComment@kyret.ky.gov no later than 8:00 a.m. Eastern Time on Monday, November 8, 2021. Comments received cannot exceed 3 (three) minutes.

You can view this meeting in the upper lobby of the 1260 Louisville Road building via video feed, or watch the livestream of this meeting by going to the KPPA Facebook page on the date and time of the meeting.

cc: Board of Trustees
Media List

County Employees Retirement System
Investment Committee – Regular Meeting
November 8, 2021 at 2:00 PM EST
Via Video Teleconference and Facebook Live
(Members of the public can view a stream of the meeting at 1260 Louisville Road, Frankfort, KY)

AGENDA

1.	**Call to Order**	**Merl Hackbart**
2.	**Opening Statement**	**Legal Services**
3.	**Roll Call**	**Carol Johnson**
4.	**Public Comment**	**Carol Johnson**
5.	**Approval of Minutes* -- August 25, 2021**	**Merl Hackbart**
6.	**Actuarial Sensitivity Analysis**	**Danny White, GRS** **Janie Shaw, GRS**
7.	**Quarterly Performance Report**	**Steven Herbert**
8.	**Axiom Update**	**Joe Gilbert**
9.	**Investment Policy***	**Merl Hackbart**
10.	**Cybersecurity Awareness Training****	**Chris Johnson**
11.	**ADJOURN**	**Merl Hackbart**

Committee Action May Be Taken

****Trustees Will Receive Education Credit Upon Completion***

MINUTES OF MEETING
COUNTY EMPLOYEES RETIREMENT SYSTEM
SPECIAL CALLED INVESTMENT COMMITTEE MEETING
AUGUST 25, 2021 AT 10:00A.M.
VIA LIVE VIDEO TELECONFERENCE

At the August 25, 2021 Investment Committee Meeting, the following members were present: Dr. Merl Hackbart (Chair), William O'Mara, George Cheatham, Jerry Powell, and Dr. Milkman. Staff members present were David Eager, Steven Herbert, Rebecca Adkins, Erin Surratt, Michael Board, Victoria Hale, Jared Crawford, Steve Willer, Anthony Chiu, Joseph Gilbert, Carol Johnson, Sherry Rankin, Crystal Smith, Shaun Case, Phillip Cook, and Glenna Frasher. Also in attendance were Chris Tessman and Craig Morton from Wilshire, along with Danny White and Janie Shaw from GRS.

Dr. Hackbart called the meeting to order.

Ms. Hale read the Legal Public Statement.

Ms. Johnson called roll.

Dr. Hackbart introduced agenda item *Public Comment.* Ms. Johnson stated that no public comments were submitted.

Dr. Hackbart introduced agenda item *Approval of Minutes – July 14, 2021.* Mr. Powell made a motion and Mr. O'Mara seconded to approve the minutes as presented. The motion carried.

Dr. Hackbart introduced agenda item *Actuarial Stress Test.* Mr. White and Ms. Shaw from GRS provided the 2020 Stress Test for the County Employees Retirement System. Mr. White began by stating that this was something that had been in the works for a while. It had been brought up by legislators at the Public Pensions Oversight Board meeting about this time last year. He stated that at that time Mr. Eager indicated that the agency was taking the stress test seriously and GRS was here to present the findings of that review. Mr. White stated that a stress test is an analysis designed to determine the ability of a given financial institution to deal with an economic crisis or certain stressors. The purpose of a stress test is to identify the stressors in the system, to monitor and possibly adjust policies and procedures in order to improve sustainability, and to educate stakeholders of those potential risks. Mr. White reviewed the process of the test to identify the outcomes to be tested and modelled, and the use of appropriate projection analyses to identify potential outcomes. These analyses include contribution risk, investment return volatility, stochastic simulations, deterministic projections and outcome based events. Mr. White indicated that two risks that affect all of the systems are the legislative risk and the practice of resetting the amortization periods about every five or so years. Ms. Shaw reviewed key takeaways from their review to point out areas they feel CERS should focus on. She began with the CERS Non-Hazardous Pension Fund, reiterating that the stress test only includes the pension fund and does not include the insurance trust fund. Ms. Shaw reported that compared to the KERS Non-Hazardous and SPRS Pension Funds, the CERS Non-Hazardous Pension Fund has materially more investment risk, as measured by the change in contribution rate, because it is significantly better funded. The unfunded liability is currently expected to increase for another four years before beginning to decrease. It could increase beyond its current level with investment volatility under "more likely than not" scenarios. Mr. Eager asked if it was fair to say that if the Trustees were not comfortable with the range that they would be able to revisit their asset allocation and portfolio to make changes that would produce an outcome that is more satisfying. Ms. Shaw answered yes, the Trustees do have options, with asset allocation and assumptions. However, the Board cannot make changes to the Funding Policy, as that is set by statute. Mr. White indicated that if you wanted to tighten the bands shown in the chart, it would just cost more to do so. Mr. Eager stated he just wanted the Trustees to know that the information in this stress test can be used to make decisions. Ms. Shaw continued to state that absent investment volatility and future gains or losses, the fund is expected to the 100% funded in 2049. A continuing considerable risk to the fund is the pattern of resetting the amortization period. This occurred back in 2019 by legislation. A one-time reset will not affect the Plan. It is the resetting of the amortization period several times, such as every five or six years, that will negatively affect the Plan. Mr. White indicated that the legislators have done this twice, in 2014 and 2019. Mr. O'Mara had a question about the Distribution of Unfunded Accrued Liability Chart where the Baseline Valuation and the Payroll

Growth for 10 Years line seemed to mirror each other, and he was thinking there was a 2% growth assumption. He wanted some clarification on what those two lines represent. Ms. Shaw indicated that is the lines were a product of the Funding Policy and if those same lines were examined on the Contribution Rates, they would look differently. Essentially, the assumption is that if a percentage of the payroll received is still increasing the unfunded liability is paid down, because of the Funding Policy. Mr. George Cheatham wanted some clarification and explanation regarding the comment about "tightening the band would increase costs." Mr. White answered that about the comment involved investment volatility at the high level. If a Plan wantedto lower the volatility in investment returns, to the Plan should expect lower returns, which translates to a higher cost. Mr. Herbert indicated that Mr. White's statement was correct. If a Plan wants zero volatility, that is basically cash. Therefore, volatility equals risk; the higher the volatility, the more it costs. Mr. Cheatham indicated that he thought that "costs" here meant "management costs". Mr. Herbert responded that because the expected return number was going down, that the Plan would have to make that up in some other area, i.e., out of pocket. Mr. Eager stated that the costs would be contributions. Dr. Hackbart indicated that supplemental funding would be another way of saying it. Mr. Cheatham indicated that everyone appeared to be in agreement, that the more volatility the less likelihood that the Plan was going to achieve the goal of erasing the deficit in the remaining 29 years. The Plan needs to shoot for a more consistent return around the 6 ¼ mark. Mr. Herbert responded that the 6 ¼ mark brings volatility into the investment portfolio. Mr. Herbert indicated that over time, the investments are shooting to get a return of 6 ¼ plus, but it is not likely to get that 6 ¼ every time period. Mr. White referred to the information provided in the material regarding volatility, and in this last year, volatility paid off tremendously for the CERS funds. Mr. White reminded the Committee that the information provided does not reflect the investment returns made in FY 20-21. Mr. Herbert stated as a reminder that the projected discount rate, which is also tied to the projected investment rate of return, is done through the asset allocation. It is much like a weather report, in that the Plan does not know if we are going to hit that projected return. There are several allocations that will get the Plan there, this is just a general idea along the risk return spectrum of what the Plan is going to need. There are 3 pieces: the contributions coming in as part of the funding, the returns as part of the funding, and taking a nominal approach instead of percentage. In theory, the more contributions that come in and the higher the returns, then the better off the Plan is. Mr. White followed up by stating that regarding the return assumption, CERS is in the conservative spot, well below median compared to other, large state-wide retirement systems. But CERS' starting point is better than other systems, and the funded status needs to improve, but the assumptions themselves that will get funding policies where they need to be, has CERS in a much better spot. Mr. Cheatham asked to what extent GRS was taking into account CERS' assumptions that they are still cash flow negative, and are using some of the returns to pay benefits. Mr. White indicated that does come into play. With CERS' current contribution rates, they are much less cash flow negative than other plans. He said that most state-wide retirement systems are not in a situation of being cash flow negative. In Kentucky the extreme is KERS non-hazardous which is not cash flow negative, and that is because they are only 14% funded. Based on the projections over the next 5 to 10 years, it does not appear that negative cash flow will be much of a concern for CERS. Mr. Eager mentioned that projections show that CERS should be at positive cash flow in about 2 years. Mr. O'Mara asked whether that was a function of the limit on how much of employer contributions can go up per year until it reaches the actuarial amount. It is legislated to be increased in segments over the next few years. Mr. White acknowledged that as being true. He indicated that in the legislative session in 2018, the General Assembly put a phase-in provision that limits the increase in the contribution rate for both CERS funds to 12%. He indicated that they are projecting for FY 2023, that the limit will be fully recognized for the CERS Non-Hazardous fund and unless something extraordinary occurs, it will be fully recognized in FY 2024 for the CERS Hazardous fund. Mr. O'Mara stated that, as a Board, it should not be a surprise that the unfunded liability does migrate to a higher amount over those 2 to 3 years while the phase-in is going in. Mr. White indicated yes, that it is a big ship to have to turn.

Ms. Shaw then discussed the CERS Hazardous Pension fund. She indicated that the potential volatility in future contribution rates for the CERS Hazardous Pension fund is higher than the Non-Hazardous fund because it has a higher leverage of liability to payroll. The CERS Hazardous fund has $9.6 versus the CERS Non-Hazardous fund having $5.7 in liability for every $1.00 in covered payroll. Ms. Shaw stated that similar to the CERS Non-Hazardous fund, the unfunded liability for the CERS Hazardous fund is currently expected to increase for another four years before beginning to decrease. Ms. Shaw indicated that absent investment volatility and future gains or losses, the fund is expected to be 100% funded in 2049. Ms. Shaw then stated that similar to the CERS Non-

Hazardous fund, unfunded liability for the CERS Hazardous fund is no longer effectively being financed if the amortization period continues to be reset back to 30 years. Mr. White spoke and indicated that the biggest risk GRS sees is the contribution risk. It is the not getting the contributions, whether due to the resetting of the amortization period by the legislators, or whether the employers will make efforts to reduce their covered payroll in order to reduce their pension costs, which in a cost-sharing plan, just means that someone else has to pay. After the presentation, Ms. Pendergrass stated that she would like for Mr. Foster, Mr. Owens, and herself to meet and to add this particular report to an Actuarial Committee Meeting for additional discussion.

Dr. Hackbart introduced agenda item *Review of FY 2021 Investment Results.* Mr. Steven Herbert began by indicating that this a view of the quarterly and monthly review prior to the split and these reports are specifically for the County Employees Retirement System. The reports are still a work in progress and he is hopeful that he will be able to bring better robust reporting going forward. Mr. Herbert reviewed the following: Total CERS Non-Hazardous and CERS Hazardous: Asset Allocation vs Targets as of June 30, 2021, and then, Total CERS Non-Hazardous and CERS Hazardous: Risk Categorization Summary as of June 30, 2021. Ms. Pendergrass asked a question about where the information about CERS long-term yields, 5, 10, 20 years was. Mr. Herbert indicated that this was the first reporting completed since the split and that reporting will be included in the future reports going forward. Dr. Hackbart asked if it would be ready by the next meeting or before. Mr. Herbert responded that it should be complete prior to the next meeting. Mr. Herbert then reviewed the Total CERS Non-Hazardous and CERS Hazardous: Risk Categorization Performance as of June 30, 2021; the Total CERS Non-Hazardous and CERS Hazardous: Detailed Performance as of June 30, 2021; the Total CERS Non-Hazardous and CERS Hazardous: Asset Allocation Over Time as of June 30, 2021; and the Total CERS Non-Hazardous and CERS Hazardous: Summary as of June 30, 2021. Mr. Herbert then reviewed the same reports for the Insurance Trust Funds. Mr. Herbert stated that it was a decent quarter and good year.

Dr. Hackbart introduced agenda item *RMS Platform Development.* Mr. Herbert introduced the new Research Management Software. It is a software application that will allow staff to centralize their research, from documents and notes to commentary and reviews. The main features of this platform is to centralize the manager research assets, bring efficiency to the research process, educate the Board, compliance governance, to track activity, capture interactions and it is linked to eVestment data. Mr. Herbert then shared a few slides of what the program wall would look like and how this tool will be beneficial to the Investment team. Dr. Hackbart asked if this will be up and running by January of next year. Mr. Herbert indicated that yes, as of right now staff has all of the current managers in there, in terms of their strategies and returns and staff is working hard on inserting the guidelines. Mr. Herbert is hoping to have that complete by the end of this year. Dr. Milkman asked as a Board member, would they have access to this program. Mr. Herbert indicated that he would be able to share read-only documents if needed. Dr. Hackbart asked if Mr. Herbert was to get a question, if he could provide a document to the Trustees as a response to the question. Mr. Herbert indicated that yes, it could be done.

Dr. Hackbart introduced agenda item *Public Equity Manager Search.* Mr. Herbert began by indicating that he learned the day before the meeting that the President of Axiom Investors is leaving the company at the end of 2021. The reason given for his departure is for personal reasons and the company has agreed to let him leave at the end of the year and search for other employment opportunities. He was brought in back in 2014 to provide management relief to the CEO and his duties were not tied to the investment management portion of the company, but rather operational and administrative in nature. Staff are continuing to analyze the information to see if it would have any effect on the investment management areas, and staff thinks it will not, but are following this closely. Will it affect the overall firm? Staff are looking at that, as well. Staff feels they should proceed with the presentation and proceed to seek the approval for hire. Instead of the usual Board presentation and selection process, it was suggested that CERS could do one of three things. Staff could bring this item back to the CERS Board at their November meeting for reaffirmation of the decision to engage Axiom, or continue the review process as listed on the agenda, or dropAxiom from consideration altogether. Mr. Herbert turned the presentation over to Mr. Gilbert to continue the review process. Mr. Gilbert gave a presentation of the External Manager Search and recommendation on the retention of an investment manager of the Non-US Small Cap Equity mandate. This search was completed in conjunction with Wilshire Associates. The recommendation of staff is to fund an actively managed Non-US Small Cap Equity mandate to be managed by Axiom Investors pending successful investment management agreement negotiations. This investment will be funded through liquidation of current Non-US Small Cap

Equity mandates. Mr. Gilbert indicated that the report contains a review of the competitive search process utilized by staff in accordance with the Investment Policy Statement and the Investment Procurement Policy in the pursuit to improve market access with the Non-US equity allocation. Mr. Gilbert indicated that there was a vast number of managers, and in order to reduce the numbers that would be reviewed, screening criteria was set up between staff and Wilshire Associates. The preliminary screening provided a broad candidate list of 83 potential strategies. Additional screening reduced the list down to 11 firms, who then received a Request for Information. From these, a short list of 5 firms were chosen for further review. These final candidates were allowed to host presentations, and from there, additional discussions with the front-runner was held prior to the final decision.

Mr. Gilbert provided an overview of Axiom, which was founded in 1998 and is headquartered in Greenwich, Connecticut. It is a 100% employee owned company whose focus is on global, international and emerging market strategies. Ms. Pendergrass asked a question about how much of the company did the president own. Mr. Gilbert did not know that answer to that question, and was not sure that the company would release that information. He indicated that he would inquire about, and if he gets a response, he will certainly report to the Board his findings. Mr. Gilbert reviewed Axiom's Investment Philosophy and Investment process. Dr. Milkman asked how long does Axiom typically keep a company before they would sell it off. Mr. Gilbert indicated that it seems they would review a company after a 2 year period of time. Dr. Hackbart asked about their client base, in other words, do they manage any other pension funds. Mr. Gilbert responded that pension funds make up about 28% of their client base. He reported that 55% of their clients have been with them for 5 years or more. Mr. Gilbert reviewed Axiom's performance charts over a 5 year period of time. Mr. Gilbert then reported on the Implementation and Sizing, Management Fees, and Third Party Provider and Placement Agent Disclosure. The recommendation is to engage Axiom Investors in the International Small Cap Equity Strategy with the initial funding of approximately $159.2 million (3.2%) with the option to grow or add to total 5% of the Non-US Equity allocation. The primary funding is to come from the existing Northern Trust (Pension) and BlackRock (Insurance) Non-US small equity mandates. Dr. Hackbart asked if someone with Wilshire Associates was present at the meeting. Ms. Johnson indicated that Chris Tessman and Craig Morton were present. Mr. Gilbert announced that Mr. Tessman was his main point of contact with Wilshire during this search process. Mr. Tessman stated that from a qualitative perspective, Axiom, is on Wilshire's focus list for the International Small Cap Equity Managers. Mr. Tessman wanted to answer a few questions that had been asked during Mr. Gilbert's presentation. One of those being about the ownership aspect of Axiom. Mr. Tessman reported that there are 20 owners across Axiom, with the largest owner being the CIO. It is typical business practice for an individual such as the President to not hold a very large percentage of ownership. He expressed his willingness to try and get that information for the Board if that information should be made available. Mr. O'Mara wanted to express his thanks to Mr. Gilbert for going through such a detailed explanation of the due diligence and research on this matter. He also stated that as a new Board member he has found this very educational and informative for the type and depth of the research completed in order to bring this presentation before the Board. Mr. O'Mara then stated that from the presentation, there were 2 strategies that scored very high and he wanted to know what set Axiom apart from the other strategy that also scored high. Mr. Gilbert then stated that all 5 of the finalists are quality managers and firms and he feels that there would not be any issues working with any of those firms. Mr. Gilbert explained that Axiom's strategy was more in line with what the KPPA investment team felt would be a better fit. Mr. Eager asked to provide a few comments. He began by indicating, for the newer Trustees, that he has spent his whole career in institutional investments, so he does have some background in these types of matters. Mr. Eager stated that it is not uncommon for the President of an investment management firm, particularly mid-size or larger firms, to be a non-investment person. This is essentially a non-event, and even though it does not have an effect the investments, the outcome cannot be predicted. Mr. Eager gave his perspective that if the Committee liked the presentation, and wanted to proceed with a vote on the recommendation, the Board should do that. However, since there are unknowns, the Board could bring it back for a vote at the November meeting. The risk of waiting would be if Axiom outperforms the current small cap equity mandates in place. The risk of going ahead is unknown. Mr. Eager indicated that from his perspective, the proper decision is to wait, but affirm the vote today. Mr. Gilbert wanted to address statement of the president of the company leaving as being a non-event. He indicated that he does not deem it material. Mr. Gilbert indicated that most of these firms require their portfolio managers to invest in the portfolio they manage, so the likelihood of the portfolio managers leaving the firm for another, is highly unlikely. Mr. Gilbert wanted to reiterate that even with a vote today, it will take months to get the funds moved and staff can certainly monitor the outcome, if any, from the news received regarding the resignation of the president of Axiom. Mr. Eager responded that should the committee so yes, the contract negotiations could then begin, not execute it, but there are some things we can do in the meantime. Mr. Gilbert indicated that there are several things we can do, we can begin to work on the IMA and get funds moved to be in a position once the agreement is finalized, all based on the Board's direction. Mr. Gilbert expressed his concerns about how long the process would stretch out. Mr. Herbert stated that Axiom is the recommendation. If the Committee votes on it, Mr. Herbert recommends voting to approve the recommendation, pending an update at the November meeting, on this issue if the Committee were to vote yes. Ms. Hale indicated that the Board would then ratify the action of the Investment Committee at the next meeting. Mr. Cheatham had a concern or question regarding the size of Axiom, and not knowing the size of their other clients, what kind of risk there is should they be forced to sell out of a particular asset in order to meet redemptions should a client be looking to get out for this reason, or another one. Mr. Gilbert answered that the size of the company does not matter as all of the firms are investing the same, otherwise, they would not be in the small cap equity market, they would have to move to the large cap or other market. Mr. Herbert indicated the risk is actually the opposite, and that small cap managers with too many assets under management can detract from performance (causing them to creep up the cap scale). Mr. Gilbert indicated that we do monitor for the rise in the amount of funds the firm is handling. If it gets to be too high, then the question becomes if they can effectively manage our investment. Dr. Milkman made a motion and Mr. O'Mara seconded to retain Axiom Investors as the manager for the Non-US Small Cap Equity mandate, subject to final approval at the November meeting and successful contract negotiations. The motion carried.

Dr. Hackbart introduced agenda item *Investment Policy.* Mr Owens indicated that the CERS Investment Policy is still being edited and revisions are still ongoing. This policy will be brought forth at a later meeting for consideration.

Mr. Powell made a motion and Dr. Milkman seconded to adjourn the meeting. The motion carried.

Copies of all documents presented are incorporated as part of the Minutes of the Special Called County Employees Retirement System Investment Committee meeting held August 25, 2021.

CERTIFICATION

I do certify that I was present at this meeting, and I have recorded the above actions of the Committee on the various items considered by it at this meeting. Further, I certify that all requirements of KRS 61.805-61.850 were met in conjunction with this meeting.

Recording Secretary

I, as Chair of the Investment Committee of the Board of Trustees of the County Employees Retirement System, do certify that the Minutes of Meeting held on August 25, 2021 were approved by the Committee on November 8, 2021.

Committee Chair

I have reviewed the Minutes of the August 25, 2021 Investment Committee Meeting of the Board of Trustees of the County Employees Retirement System for content, form, and legality.

Office of Legal Services

P: 469.524.0000 | www.grsconsulting.com

October 29, 2021

Board of Trustees
County Employees Retirement System
Perimeter Park West
1260 Louisville Road
Frankfort, KY 40601

Re: Additional Sensitivity Scenarios Based on Results of the June 30, 2021 Actuarial Valuation

Dear Members of the Board:

As requested, we are providing this additional information regarding the sensitivity of the valuation results for the **County Employees Retirement System (CERS)** to changes in the investment return assumption.

Background

The investment return assumption is used to discount future expected benefit payments to the valuation date in order to determine the liabilities of the plans. The lower the investment return assumption, the less the benefit payments are discounted and the higher the valuation liability. The current investment return assumption is 6.25% for the CERS non-hazardous and hazardous retirement and insurance funds. The sensitivity analysis shows the financial impact of a 0.25% increase, a 0.25% decrease, a 0.50% increase, and a 0.50% decrease in the investment return assumption. For purposes of this sensitivity analysis, the inflation assumption and payroll growth assumption remain unchanged from the valuation assumption.

Basis of Calculations

The information provided in this letter compliments the information provided in the June 30, 2021 actuarial valuation report. Please refer to the June 30, 2021 actuarial valuation report for additional discussion of the actuarial valuation, including the nature of actuarial calculations and more information related to participant data, economic and demographic assumptions, and benefit provisions. Additionally, please refer to the sensitivity analysis letter provided with the June 30, 2021 actuarial valuation report that provides additional sensitivity scenarios under additional economic assumptions. The scenarios provided in that letter are required per Kentucky State Statute 61.670

Board of Trustees
October 29, 2021
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Actual results can, and almost certainly will, differ as actual experience deviates from the assumptions. Even seemingly minor changes in the assumptions can materially change the liabilities, calculated contribution rate, and funding periods. The actuarial calculations are intended to provide information for rational decision making. The purpose of this information is to provide stakeholders the financial sensitivity of the unfunded liability and contribution rates to changes in the assumed rate of return.

The undersigned are independent actuaries and consultants. Both of the undersigned are Enrolled Actuaries, Members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. Both of the undersigned are experienced in performing valuations for large public retirement systems. This communication shall not be construed to provide tax advice, legal advice or investment advice.

Sincerely,

Gabriel, Roeder, Smith & Company

Daniel J. White, FSA, EA, MAAA
Senior Consultant

Janie Shaw, ASA, EA, MAAA
Consultant

Sensitivity Analysis - Discount Rate ± 0.25%
Non-Hazardous Members
(Dollar amounts expressed in thousands)

(1)	Decrease Discount Rate (2)	Valuation Results (3)	Increase Discount Rate (4)
Payroll Growth Rate	2.00%	2.00%	2.00%
Inflation Rate	2.30%	2.30%	2.30%
Discount Rate - Retirement	6.00%	6.25%	6.50%
Discount Rate - Insurance	6.00%	6.25%	6.50%
Retirement			
Actuarial Accrued Liability	$ 15,312,127	$ 14,894,906	$ 14,497,248
Actuarial Value of Assets	7,715,881	7,715,881	7,715,881
Unfunded Actuarial Accrued Liability	7,596,246	7,179,025	6,781,367
Funded Ratio	50.4%	51.8%	53.2%
Actuarially Determined Contribution Rate	24.77%	23.40%	22.07%
Insurance			
Actuarial Accrued Liability	$ 3,562,118	$ 3,450,484	$ 3,344,299
Actuarial Value of Assets	2,947,312	2,947,312	2,947,312
Unfunded Actuarial Accrued Liability	614,806	503,172	396,987
Funded Ratio	82.7%	85.4%	88.1%
Actuarially Determined Contribution Rate	3.92%	3.39%	2.87%
Combined			
Actuarial Accrued Liability	$ 18,874,245	$ 18,345,390	$ 17,841,547
Actuarial Value of Assets	10,663,193	10,663,193	10,663,193
Unfunded Actuarial Accrued Liability	8,211,052	7,682,197	7,178,354
Funded Ratio	56.5%	58.1%	59.8%
Actuarially Determined Contribution Rate	28.69%	26.79%	24.94%

Sensitivity Analysis - Discount Rate ± 0.50%
Non-Hazardous Members
(Dollar amounts expressed in thousands)

	Decrease Discount Rate	Valuation Results	Increase Discount Rate
(1)	(2)	(3)	(4)
Payroll Growth Rate	2.00%	2.00%	2.00%
Inflation Rate	2.30%	2.30%	2.30%
Discount Rate - Retirement	5.75%	6.25%	6.75%
Discount Rate - Insurance	5.75%	6.25%	6.75%
Retirement			
Actuarial Accrued Liability	$ 15,749,553	$ 14,894,906	$ 14,117,539
Actuarial Value of Assets	7,715,881	7,715,881	7,715,881
Unfunded Actuarial Accrued Liability	8,033,672	7,179,025	6,401,658
Funded Ratio	49.0%	51.8%	54.7%
Actuarially Determined Contribution Rate	26.23%	23.40%	20.80%
Insurance			
Actuarial Accrued Liability	$ 3,679,570	$ 3,450,484	$ 3,243,220
Actuarial Value of Assets	2,947,312	2,947,312	2,947,312
Unfunded Actuarial Accrued Liability	732,258	503,172	295,908
Funded Ratio	80.1%	85.4%	90.9%
Actuarially Determined Contribution Rate	4.47%	3.39%	2.38%
Combined			
Actuarial Accrued Liability	$ 19,429,123	$ 18,345,390	$ 17,360,759
Actuarial Value of Assets	10,663,193	10,663,193	10,663,193
Unfunded Actuarial Accrued Liability	8,765,930	7,682,197	6,697,566
Funded Ratio	54.9%	58.1%	61.4%
Actuarially Determined Contribution Rate	30.70%	26.79%	23.18%

Sensitivity Analysis - Discount Rate ± 0.25%
Hazardous Members
(Dollar amounts expressed in thousands)

(1)	Decrease Discount Rate (2)	Valuation Results (3)	Increase Discount Rate (4)
Payroll Growth Rate	2.00%	2.00%	2.00%
Inflation Rate	2.30%	2.30%	2.30%
Discount Rate - Retirement	6.00%	6.25%	6.50%
Discount Rate - Insurance	6.00%	6.25%	6.50%
Retirement			
Actuarial Accrued Liability	$ 5,799,604	$ 5,629,458	$ 5,467,573
Actuarial Value of Assets	2,628,621	2,628,621	2,628,621
Unfunded Actuarial Accrued Liability	3,170,983	3,000,837	2,838,952
Funded Ratio	45.3%	46.7%	48.1%
Actuarially Determined Contribution Rate	45.25%	42.81%	40.46%
Insurance			
Actuarial Accrued Liability	$ 1,805,341	$ 1,751,203	$ 1,699,848
Actuarial Value of Assets	1,475,635	1,475,635	1,475,635
Unfunded Actuarial Accrued Liability	329,706	275,568	224,213
Funded Ratio	81.7%	84.3%	86.8%
Actuarially Determined Contribution Rate	7.77%	6.78%	5.81%
Combined			
Actuarial Accrued Liability	$ 7,604,945	$ 7,380,661	$ 7,167,421
Actuarial Value of Assets	4,104,256	4,104,256	4,104,256
Unfunded Actuarial Accrued Liability	3,500,689	3,276,405	3,063,165
Funded Ratio	54.0%	55.6%	57.3%
Actuarially Determined Contribution Rate	53.02%	49.59%	46.27%

Sensitivity Analysis - Discount Rate ± 0.50%
Hazardous Members
(Dollar amounts expressed in thousands)

	Decrease Discount Rate	Valuation Results	Increase Discount Rate
(1)	(2)	(3)	(4)
Payroll Growth Rate	2.00%	2.00%	2.00%
Inflation Rate	2.30%	2.30%	2.30%
Discount Rate - Retirement	5.75%	6.25%	6.75%
Discount Rate - Insurance	5.75%	6.25%	6.75%
Retirement			
Actuarial Accrued Liability	$ 5,978,810	$ 5,629,458	$ 5,313,349
Actuarial Value of Assets	2,628,621	2,628,621	2,628,621
Unfunded Actuarial Accrued Liability	3,350,189	3,000,837	2,684,728
Funded Ratio	44.0%	46.7%	49.5%
Actuarially Determined Contribution Rate	47.81%	42.81%	38.21%
Insurance			
Actuarial Accrued Liability	$ 1,862,454	$ 1,751,203	$ 1,651,082
Actuarial Value of Assets	1,475,635	1,475,635	1,475,635
Unfunded Actuarial Accrued Liability	386,819	275,568	175,447
Funded Ratio	79.2%	84.3%	89.4%
Actuarially Determined Contribution Rate	8.80%	6.78%	4.88%
Combined			
Actuarial Accrued Liability	$ 7,841,264	$ 7,380,661	$ 6,964,431
Actuarial Value of Assets	4,104,256	4,104,256	4,104,256
Unfunded Actuarial Accrued Liability	3,737,008	3,276,405	2,860,175
Funded Ratio	52.3%	55.6%	58.9%
Actuarially Determined Contribution Rate	56.61%	49.59%	43.09%

Kentucky Public Pensions Authority, Office of Investments
Pension Trust Fiscal Year 2022
Investment Review for the Quarter Ended September 30, 2021 Presented to the County Employees Retirement System Investment Committee

KPPA
Kentucky Public Pensions Authority

Total CERS & CERS-H

Risk Categorization Summary As of September 30, 2021

	Market Value ($USD)	% of Portfolio	MTD	QTD	YTD	1 Year	3 Year	5 Year	10 Year	20 Year	30 Year	Inception	IRR 1 YR
Total Portfolio	**$ 11,599,448,895**	**100.0%**	**-0.9%**	**1.2%**	**11.1%**	**21.3%**							
CERS Pension IPS Policy Index			-0.4%	1.0%	1.1%	21.0%	9.6%	9.6%	8.9%	7.2%	8.2%	9.2%	21.0%
CERS-H Pension IPS Policy Index			-0.4%	1.0%	1.1%	21.0%	9.6%	9.6%	8.9%	7.2%	8.2%	9.2%	21.0%
Growth	**$ 8,357,116,273**	**72.0%**	**-1.5%**	**1.1%**	**13.3%**	**26.7%**							
Growth Custom Benchmark			-1.9%	0.8%	12.8%	27.3%	13.0%						13.1%
Liquidity	**$ 1,659,958,717**	**14.3%**	**-0.1%**	**0.1%**	**0.7%**	**2.0%**							
Liquidity Custom Benchmark			-0.8%	0.0%	-1.5%	-0.8%	5.1%						4.7%
Diversifying Strategies	**$ 1,253,326,753**	**10.8%**	**1.1%**	**2.8%**	**12.4%**	**19.4%**							
Diversifying Strategies Custom			1.1%	2.5%	7.0%	8.7%	5.6%						5.5%
Opportunistic	**$ 329,630,549**	**2.8%**	**1.1%**	**2.9%**	**8.7%**								

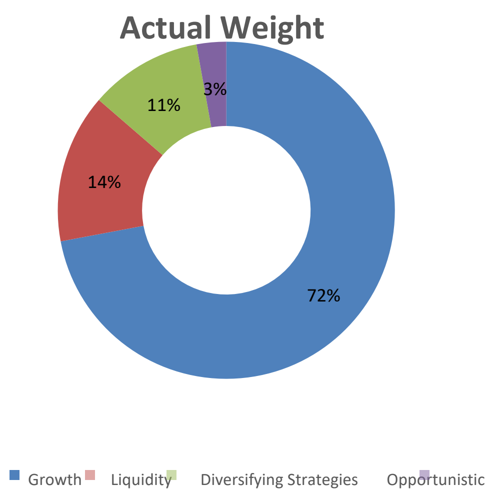
Kentucky Public Pensions Authority

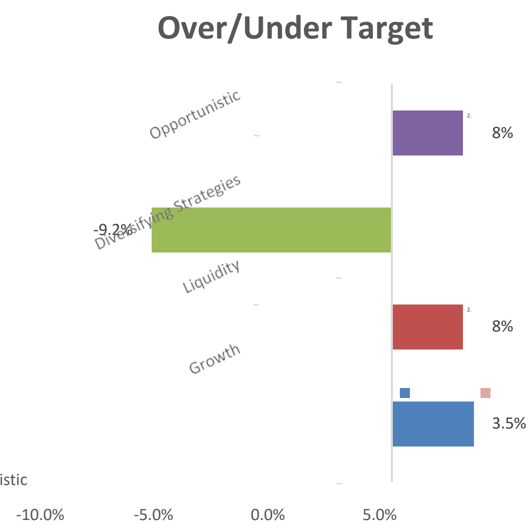
Total CERS & CERS-H

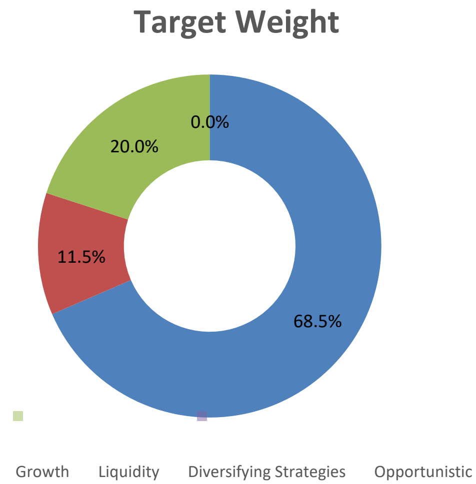
Asset Allocation vs Targets

As of September 30, 2021

Actual vs Target Weights







Risk Categorization	Ending Market Value ($USD)	Actual Weight	Target Weight	Relative
Growth	$8,357,116,273	72.0%	68.5%	3.5%
Liquidity	$1,659,958,717	14.3%	11.5%	2.8%
Diversifying Strategies	$1,253,326,753	10.8%	20.0%	-9.2%
Opportunistic	$329,630,549	2.8%	0.0%	2.8%

Asset Allocation	Actual	Target	Target Difference	IPS Min	IPS Max
US Equity	22.54%	21.75%	0.79%	15.23%	28.28%
Non-US Equity	22.05%	21.75%	0.30%	15.23%	28.28%
Private Equity	9.38%	10.00%	-0.63%	7.00%	13.00%
High Yield/Specialty Credit	15.65%	15.00%	0.65%	10.50%	19.50%
Core Fixed Income	8.53%	10.00%	-1.47%	8.00%	12.00%
Cash	3.73%	1.50%	2.23%	0.00%	3.00%
Real Return	5.89%	10.00%	-4.11%	7.00%	13.00%
Real Estate	5.38%	10.00%	-4.63%	7.00%	13.00%
Opportunistic	3.06%	0.00%	3.06%	0.00%	5.00%

KPPA
Kentucky Public Pensions Authority

Total CERS & CERS-H

Risk Categorization Performance As of September 30, 2021

	Market Value ($USD)	% of Portfolio	MTD	QTD	YTD	1 Year	3 Year	5 Year	10 Year	20 Year	30 Year	Inception	IRR 1 YR
Total Portfolio	**$ 11,599,448,895**	**100.0%**	**-0.9%**	**1.2%**	**11.1%**								**21.3%**
CERS Pension IPS Policy Index			-0.4%	1.1%	1.1%	21.0%	9.6%	9.6%	8.9%	7.2%	8.2%	9.2%	21.0%
CERS-H Pension IPS Policy Index			-0.4%	1.1%	1.1%	21.0%	9.6%	9.6%	8.9%	7.2%	8.2%	9.2%	21.0%
Growth	**$ 8,357,116,273**	**72.0%**	**-1.5%**	**1.1%**	**13.3%**	**26.7%**							
Growth Custom Benchmark			-1.9%	0.8%	12.8%	27.3%	13.0%						13.1%
Public Equity	**$ 5,368,937,282**	**46.3%**	**-4.1%**	**-1.0%**	**11.6%**	**29.7%**							
Global Equity Blended Index			-3.8%	-1.3%	10.9%	28.6%	12.2%	13.1%	11.9%	7.9%	9.2%		10.6%
U.S. Equity	**$ 2,741,469,880**	**23.6%**	**-4.4%**	**-0.2%**	**15.5%**	**33.1%**							
KY Domestic Equity Blend			-4.5%	-0.1%	15.0%	31.9%	16.0%	16.8%	16.6%	10.0%	10.8%		11.9%
Non U.S. Equity	**$ 2,627,467,402**	**22.7%**	**-3.9%**	**-1.8%**	**7.6%**	**26.2%**							
KY Ret. Int'l Eq. Blended Index			-3.2%	-2.6%	6.8%	25.2%	8.3%	9.2%	7.9%	6.9%	6.9%		8.2%
Private Equity	**$ 1,007,699,917**	**8.7%**	**9.6%**	**11.2%**	**37.6%**	**47.1%**							
Pension Private Equity Custom Benchmark			2.7%	4.2%	28.9%	37.8%	16.2%	15.9%	15.4%				11.6%
High Yield/Specialty Credit	**$ 1,980,479,074**	**17.1%**	**0.8%**	**2.0%**	**8.0%**	**12.7%**							
High Yield Custom Benchmark			0.3%	1.0%	4.5%	9.8%	5.5%						5.2%
Liquidity	**$ 1,659,958,717**	**14.3%**	**-0.1%**	**0.1%**	**0.7%**	**2.0%**							
Liquidity Custom Benchmark			-0.8%	0.0%	-1.5%	-0.8%	5.1%						4.7%
Core Fixed Income	**$ 1,478,055,226**	**12.7%**	**-0.1%**	**0.1%**	**0.8%**	**2.2%**							
Bloomberg Barclays U.S. Aggregate Bond Index			-0.9%	0.0%	-1.6%	-0.9%	5.4%	2.9%	3.0%				4.0%
Cash	**$ 181,903,491**	**1.6%**	**0.0%**	**0.0%**	**0.1%**	**0.1%**							
FTSE Treasury Bill-3 Month			0.0%	0.0%	0.0%	0.1%	1.1%	1.1%	0.6%	1.3%	2.4%		2.9%
Diversifying Strategies	**$ 1,253,326,753**	**10.8%**	**1.1%**	**2.8%**	**12.4%**	**19.4%**							
Diversifying Strategies Custom			1.1%	2.5%	7.0%	8.7%	5.6%						5.5%
Real Return	**$ 748,844,478**	**6.5%**	**-0.3%**	**0.4%**	**11.4%**	**21.7%**							
Pension Real Return Custom Bmk			0.3%	0.9%	12.0%	22.3%	5.8%	4.1%	3.5%				3.5%
Real Estate	**$ 504,482,275**	**4.3%**	**3.2%**	**6.7%**	**13.7%**	**17.8%**							
NCREIF NFI ODCE Net 1Qtr in Arrears Index			3.7%	3.7%	6.8%	7.1%	4.6%	5.6%	8.6%	6.6%	6.6%		6.3%
Opportunistic	**$ 329,630,549**	**2.8%**	**1.1%**	**2.9%**	**8.7%**								

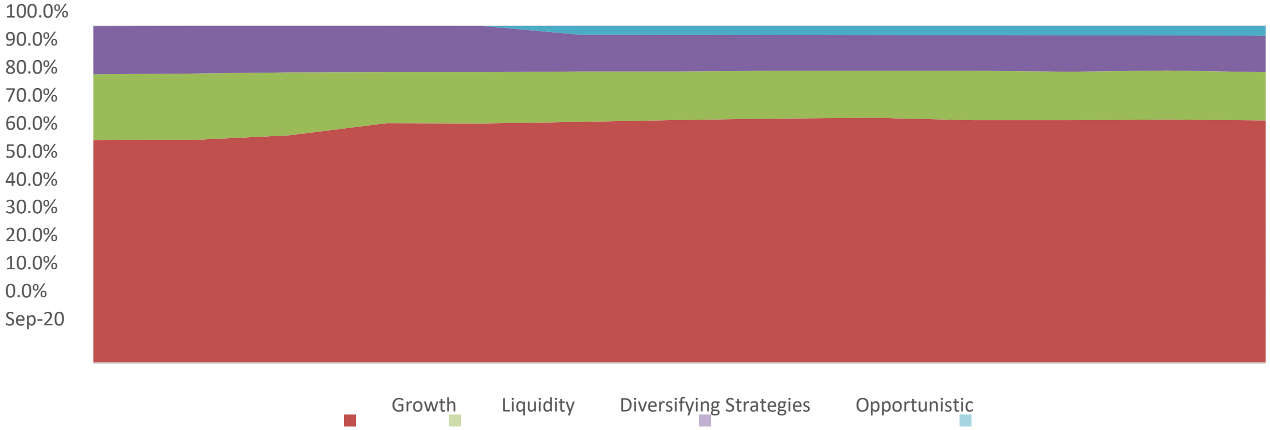
Kentucky Public Pensions Authority

Total CERS & CERS-H

Asset Allocation Over Time

As of September 30, 2021

Asset Allocation Over time



Risk Categorization	April 2021	May 2021	June 2021	July 2021	August 2021	September 2021
Growth	72.59%	72.80%	72.10%	72.11%	72.29%	72.05%
Liquidity	14.14%	13.93%	14.64%	14.37%	14.53%	14.31%
Diversifying Strategies	10.70%	10.64%	10.60%	10.84%	10.59%	10.81%
Opportunistic	2.57%	2.63%	2.67%	2.69%	2.60%	2.84%

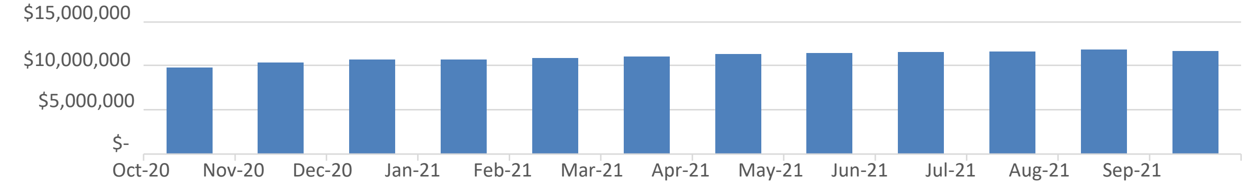
Kentucky Public Pensions Authority

Total CERS & CERS-H

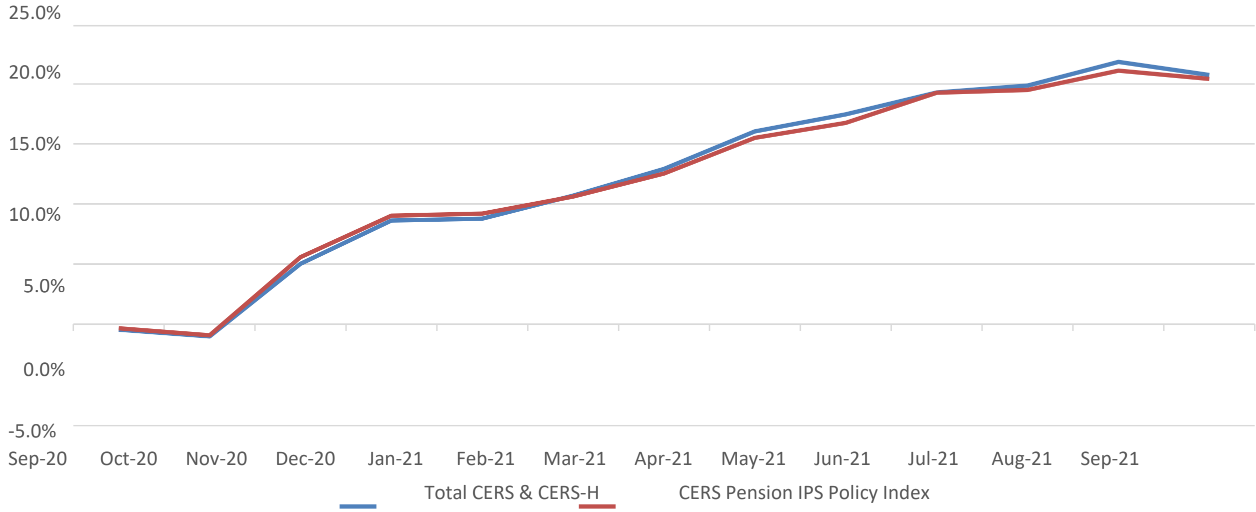
Summary

As of September 30, 2021

Market Value Over Time ($USD 000)



Cumulative Performance Over 1 Year



KPPA
Kentucky Public Pensions Authority

Total CERS

Risk Categorization Summary As of September 30, 2021

	Market Value ($USD)	% of Portfolio	MTD	QTD	YTD	1 Year	3 Year	5 Year	10 Year	20 Year	30 Year	Inception	IRR 1 YR
Total Portfolio	**$ 8,658,814,690**	**100.0%**	**-0.9%**	**1.2%**	**1.2%**	**21.3%**	**9.9%**	**10.0%**	**9.0%**	**7.2%**	**8.3%**	**9.2%**	**21.4%**
CERS Pension IPS Policy Index			-0.4%	1.1%	1.1%	21.0%	9.6%	9.6%	8.9%	7.2%	8.2%	9.2%	21.0%
Growth	**$ 6,245,935,412**	**72.1%**	**-1.5%**	**1.1%**	**13.3%**	**26.7%**							
Growth Custom Benchmark			-1.9%	0.8%	12.8%	27.3%	13.0%						13.1%
Liquidity	**$ 1,223,412,494**	**14.1%**	**-0.1%**	**0.1%**	**0.7%**	**2.0%**							
Liquidity Custom Benchmark			-0.8%	0.0%	-1.5%	-0.8%	5.1%						4.7%
Diversifying Strategies	**$ 942,168,840**	**10.9%**	**1.1%**	**2.8%**	**12.4%**	**19.4%**							
Diversifying Strategies Custom			1.1%	2.5%	7.0%	8.7%	5.6%						5.5%
Opportunistic	**$ 247,733,644**	**2.9%**	**1.1%**	**2.9%**	**8.7%**								

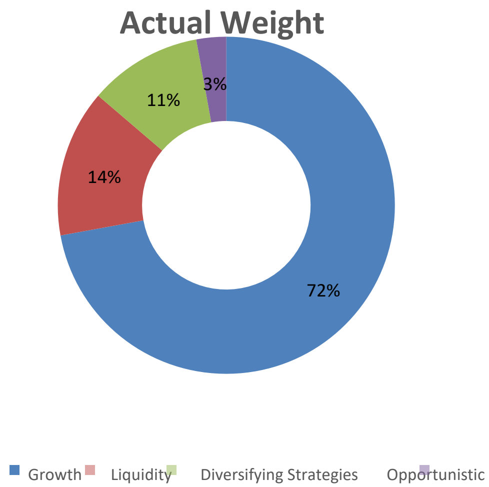
Kentucky Public Pensions Authority

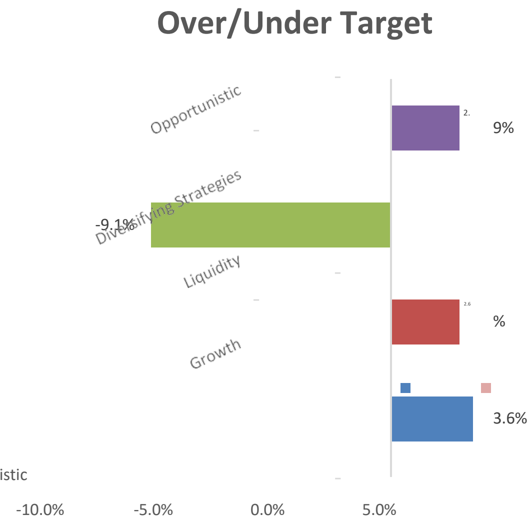
Total CERS

Asset Allocation vs Targets

As of September 30, 2021

Actual vs Target Weights





Risk Categorization	Ending Market Value ($USD)	Actual Weight	Target Weight	Relative
Growth	$6,245,935,412	72.1%	68.5%	3.6%
Liquidity	$1,223,412,494	14.1%	11.5%	2.6%
Diversifying Strategies	$942,168,840	10.9%	20.0%	-9.1%
Opportunistic	$247,733,644	2.9%	0.0%	2.9%

Asset Allocation	Actual	Target	Target Difference	IPS Min	IPS Max
US Equity	24.18%	21.75%	2.43%	15.23%	28.28%
Non-US Equity	23.21%	21.75%	1.46%	15.23%	28.28%
Private Equity	8.36%	10.00%	-1.64%	7.00%	13.00%
High Yield/Specialty Credit	15.73%	15.00%	0.73%	10.50%	19.50%
Core Fixed Income	12.73%	10.00%	2.73%	8.00%	12.00%
Cash	1.63%	1.50%	0.13%	0.00%	3.00%
Real Return	6.18%	10.00%	-3.82%	7.00%	13.00%
Real Estate	5.24%	10.00%	-4.76%	7.00%	13.00%
Opportunistic	2.67%	0.00%	2.67%	0.00%	5.00%

KPPA
Kentucky Public Pensions Authority

Total CERS

Risk Categorization Performance As of September 30, 2021

	Market Value ($USD)	% of Portfolio	MTD	QTD	YTD	1 Year	3 Year	5 Year	10 Year	20 Year	30 Year	Inception	IRR 1 YR
Total Portfolio	**$ 8,658,814,690**	**100.0%**	**-0.9%**	**1.2%**	**1.2%**	**21.3%**	**9.9%**	**10.0%**	**9.0%**	**7.2%**	**8.3%**	**9.2%**	**21.4%**
CERS Pension IPS Policy Index			-0.4%	1.1%	1.1%	21.0%	9.6%	9.6%	8.9%	7.2%	8.2%	9.2%	21.0%
Growth	**$ 6,245,935,412**	**72.1%**	**-1.5%**	**1.1%**	**13.3%**	**26.7%**							
Growth Custom Benchmark			-1.9%	0.8%	12.8%	27.3%	13.0%						13.1%
Public Equity	**$ 4,015,970,369**	**46.4%**	**-4.1%**	**-1.0%**	**11.6%**	**29.7%**							
Global Equity Blended Index			-3.8%	-1.3%	10.9%	28.6%	12.2%	13.1%	11.9%	7.9%	9.2%		10.6%
U.S. Equity	**$ 2,051,160,482**	**23.7%**	**-4.4%**	**-0.2%**	**15.5%**	**33.1%**							
KY Domestic Equity Blend			-4.5%	-0.1%	15.0%	31.9%	16.0%	16.8%	16.6%	10.0%	10.8%		11.9%
Non U.S. Equity	**$ 1,964,809,887**	**22.7%**	**-3.9%**	**-1.8%**	**7.6%**	**26.2%**							
KY Ret. Int'l Eq. Blended Index			-3.2%	-2.6%	6.8%	25.2%	8.3%	9.2%	7.9%	6.9%	6.9%		8.2%
Private Equity	**$ 753,854,896**	**8.7%**	**9.6%**	**11.2%**	**37.6%**	**47.1%**							
Pension Private Equity Custom Benchmark			2.7%	4.2%	28.9%	37.8%	16.2%	15.9%	15.4%				11.6%
High Yield/Specialty Credit	**$ 1,476,110,147**	**17.0%**	**0.8%**	**2.0%**	**8.0%**	**12.7%**							
High Yield Custom Benchmark			0.3%	1.0%	4.5%	9.8%	5.5%						5.2%
Liquidity	**$ 1,223,412,494**	**14.1%**	**-0.1%**	**0.1%**	**0.7%**	**2.0%**							
Liquidity Custom Benchmark			-0.8%	0.0%	-1.5%	-0.8%	5.1%						4.7%
Core Fixed Income	**$ 1,099,533,657**	**12.7%**	**-0.1%**	**0.1%**	**0.8%**	**2.2%**							
Bloomberg Barclays U.S. Aggregate Bond Index			-0.9%	0.0%	-1.6%	-0.9%	5.4%	2.9%	3.0%				4.0%
Cash	**$ 123,878,837**	**1.4%**	**0.0%**	**0.0%**	**0.1%**	**0.1%**							
FTSE Treasury Bill-3 Month			0.0%	0.0%	0.0%	0.1%	1.1%	1.1%	0.6%	1.3%	2.4%		2.9%
Diversifying Strategies	**$ 942,168,840**	**10.9%**	**1.1%**	**2.8%**	**12.4%**	**19.4%**							
Diversifying Strategies Custom			1.1%	2.5%	7.0%	8.7%	5.6%						5.5%
Real Return	**$ 559,788,525**	**6.5%**	**-0.3%**	**0.4%**	**11.4%**	**21.7%**							
Pension Real Return Custom Bmk			0.3%	0.9%	12.0%	22.3%	5.8%	4.1%	3.5%				3.5%
Real Estate	**$ 382,380,314**	**4.4%**	**3.2%**	**6.7%**	**13.7%**	**17.8%**							
NCREIF NFI ODCE Net 1Qtr in Arrears Index			3.7%	3.7%	6.8%	7.1%	4.6%	5.6%	8.6%	6.6%	6.6%		6.3%
Opportunistic	**$ 247,733,644**	**2.9%**	**1.1%**	**2.9%**	**8.7%**								

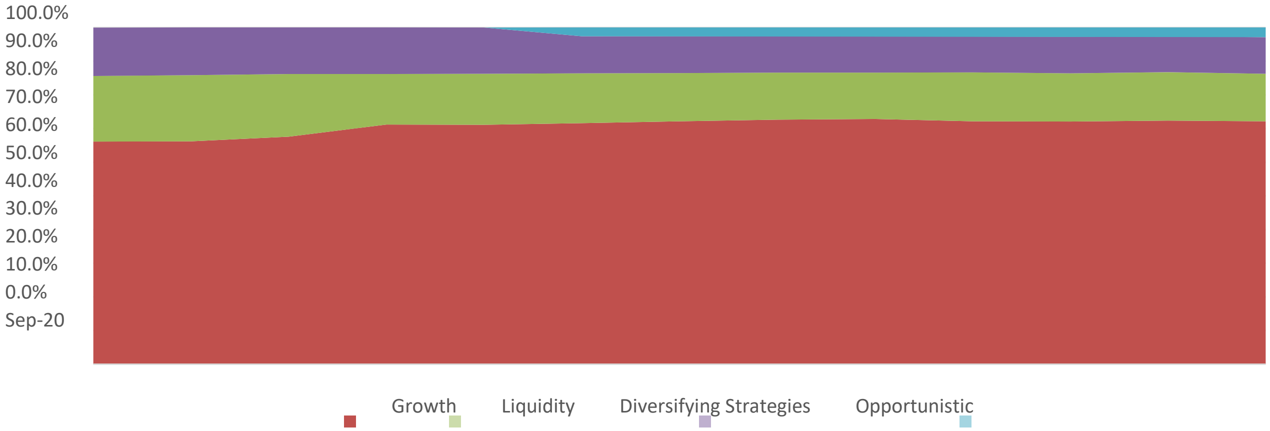
Kentucky Public Pensions Authority

Total CERS

Asset Allocation Over Time

As of September 30, 2021

Asset Allocation Over time



Risk Categorization	April 2021	May 2021	June 2021	July 2021	August 2021	September 2021
Growth	72.63%	72.84%	72.16%	72.12%	72.35%	72.13%
Liquidity	14.01%	13.80%	14.50%	14.28%	14.38%	14.13%
Diversifying Strategies	10.77%	10.71%	10.67%	10.91%	10.66%	10.88%
Opportunistic	2.59%	2.65%	2.68%	2.70%	2.61%	2.86%

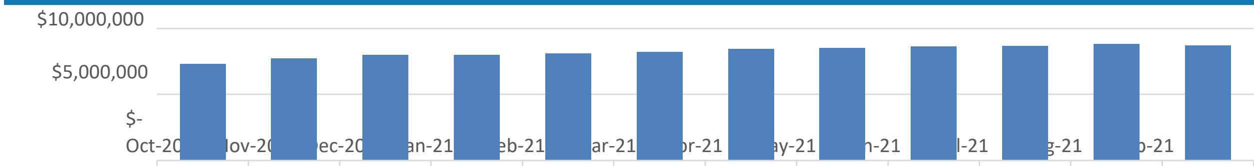
Kentucky Public Pensions Authority

Total CERS

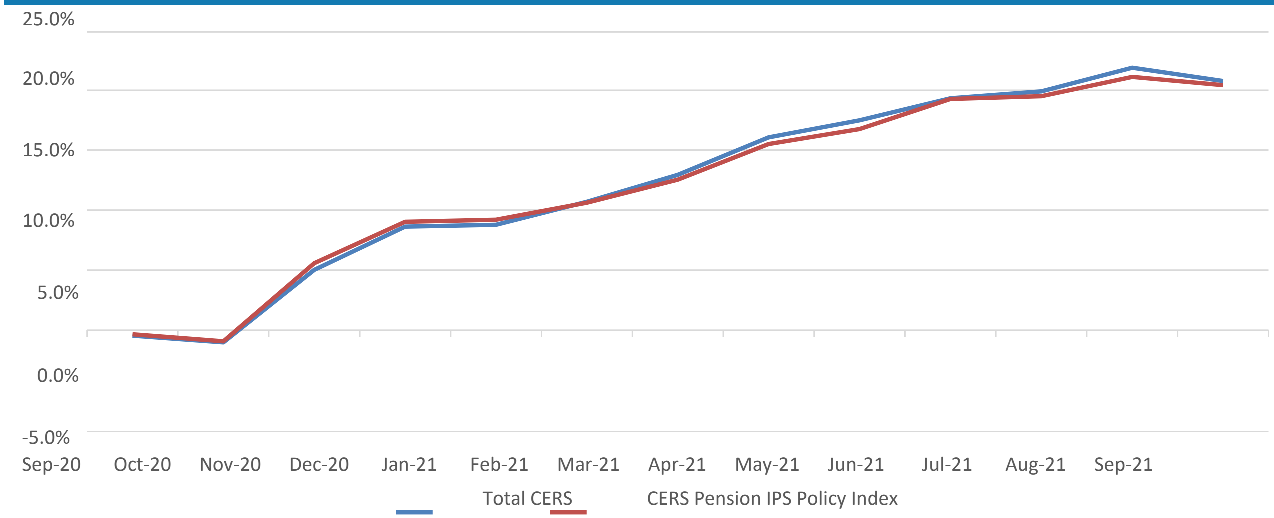
Summary

As of September 30, 2021

Market Value Over Time ($USD 000)



Cumulative Performance Over 1 Year



Total CERS - H

Risk Categorization Summary As of September 30, 2021

KPPA
Kentucky Public Pensions Authority

	Market Value ($USD)	% of Portfolio	MTD	QTD	YTD	1 Year	3 Year	5 Year	10 Year	20 Year	30 Year	Inception	IRR 1 YR
Total Portfolio	**$ 2,940,634,205**	**100.0%**	**-0.9%**	**1.2%**	**1.2%**	**21.2%**	**9.8%**	**10.0%**	**9.0%**	**7.2%**	**8.3%**	**9.2%**	**21.3%**
CERS-H Pension IPS Policy Index			-0.4%	1.1%	1.1%	21.0%	9.6%	9.6%	8.9%	7.2%	8.2%	9.2%	21.0%
Growth	**$ 2,111,180,861**	**71.8%**	**-1.5%**	**1.1%**	**13.3%**	**26.7%**							
Growth Custom Benchmark			-1.9%	0.8%	12.8%	27.3%	13.0%						13.1%
Liquidity	**$ 436,546,223**	**14.8%**	**-0.1%**	**0.1%**	**0.7%**	**2.0%**							
Liquidity Custom Benchmark			-0.8%	0.0%	-1.5%	-0.8%	5.1%						4.7%
Diversifying Strategies	**$ 311,157,914**	**10.6%**	**1.1%**	**2.8%**	**12.4%**	**19.4%**							
Diversifying Strategies Custom			1.1%	2.5%	7.0%	8.7%	5.6%						5.5%
Opportunistic	**$ 81,896,904**	**2.8%**	**1.1%**	**2.9%**	**8.7%**								

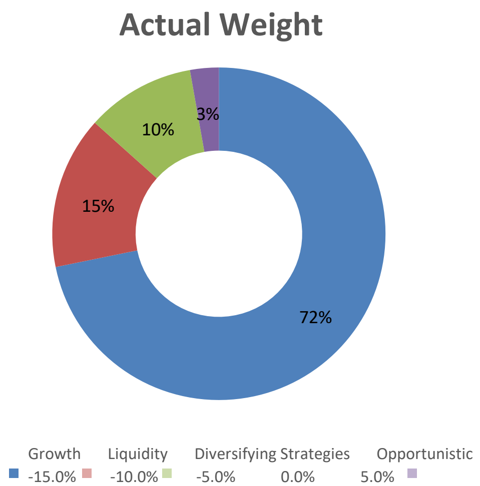
KPPA
Kentucky Public Pensions Authority

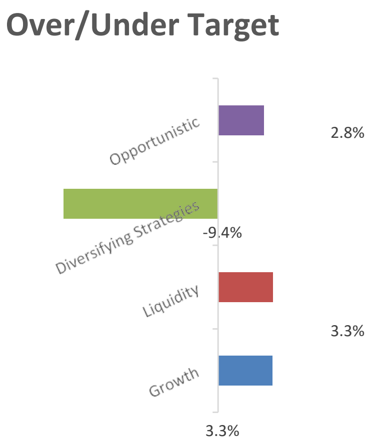
Total CERS - H

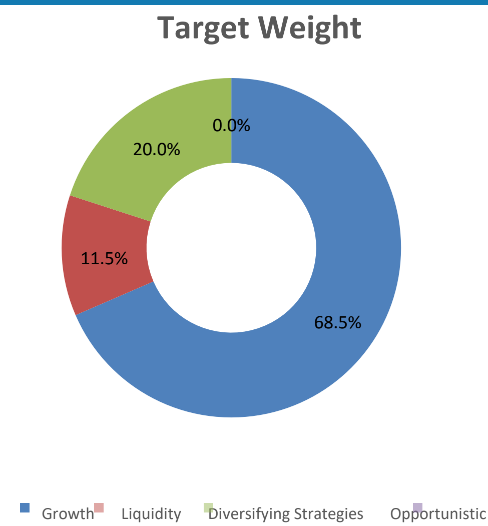
Asset Allocation vs Targets

As of September 30, 2021

Actual vs Target Weights







Risk Categorization	Ending Market Value ($USD)	Actual Weight	Target Weight	Relative
Growth	$2,111,180,861	71.8%	68.5%	3.3%
Liquidity	$436,546,223	14.8%	11.5%	3.3%
Diversifying Strategies	$311,157,914	10.6%	20.0%	-9.4%
Opportunistic	$81,896,904	2.8%	0.0%	2.8%

Asset Allocation	Actual	Target	Target Difference	IPS Min	IPS Max
US Equity	24.01%	21.75%	2.26%	15.23%	28.28%
Non-US Equity	23.11%	21.75%	1.36%	15.23%	28.28%
Private Equity	8.29%	10.00%	-1.71%	7.00%	13.00%
High Yield/Specialty Credit	15.95%	15.00%	0.95%	10.50%	19.50%
Core Fixed Income	12.94%	10.00%	2.94%	8.00%	12.00%
Cash	1.94%	1.50%	0.44%	0.00%	3.00%
Real Return	6.16%	10.00%	-3.84%	7.00%	13.00%
Real Estate	4.88%	10.00%	-5.12%	7.00%	13.00%
Opportunistic	2.61%	0.00%	2.61%	0.00%	5.00%

KPPA
Kentucky Public Pensions Authority

Total CERS - H

Risk Categorization Performance As of September 30, 2021

	Market Value ($USD)	% of Portfolio	MTD	QTD	YTD	1 Year	3 Year	5 Year	10 Year	20 Year	30 Year	Inception	IRR 1 YR
Total Portfolio	**$ 2,940,634,205**	**100.0%**	**-0.9%**	**1.2%**	**1.2%**	**21.2%**	**9.8%**	**10.0%**	**9.0%**	**7.2%**	**8.3%**	**9.2%**	**21.3%**
CERS-H Pension IPS Policy Index			-0.4%	1.1%	1.1%	21.0%	9.6%	9.6%	8.9%	7.2%	8.2%	9.2%	21.0%
Growth	**$ 2,111,180,861**	**71.8%**	**-1.5%**	**1.1%**	**13.3%**	**26.7%**							
Growth Custom Benchmark			-1.9%	0.8%	12.8%	27.3%	13.0%						13.1%
Public Equity	**$ 1,352,966,913**	**46.0%**	**-4.1%**	**-1.0%**	**11.6%**	**29.7%**							
Global Equity Blended Index			-3.8%	-1.3%	10.9%	28.6%	12.2%	13.1%	11.9%	7.9%	9.2%		10.6%
U.S. Equity	**$ 690,309,398**	**23.5%**	**-4.4%**	**-0.2%**	**15.5%**	**33.1%**							
KY Domestic Equity Blend			-4.5%	-0.1%	15.0%	31.9%	16.0%	16.8%	16.6%	10.0%	10.8%		11.9%
Non U.S. Equity	**$ 662,657,515**	**22.5%**	**-3.9%**	**-1.8%**	**7.6%**	**26.2%**							
KY Ret. Int'l Eq. Blended Index			-3.2%	-2.6%	6.8%	25.2%	8.3%	9.2%	7.9%	6.9%	6.9%		8.2%
Private Equity	**$ 253,845,021**	**8.6%**	**9.6%**	**11.2%**	**37.6%**	**47.1%**							
Pension Private Equity Custom Benchmark			2.7%	4.2%	28.9%	37.8%	16.2%	15.9%	15.4%				11.6%
High Yield/Specialty Credit	**$ 504,368,927**	**17.2%**	**0.8%**	**2.0%**	**8.0%**	**12.7%**							
High Yield Custom Benchmark			0.3%	1.0%	4.5%	9.8%	5.5%						5.2%
Liquidity	**$ 436,546,223**	**14.8%**	**-0.1%**	**0.1%**	**0.7%**	**2.0%**							
Liquidity Custom Benchmark			-0.8%	0.0%	-1.5%	-0.8%	5.1%						4.7%
Core Fixed Income	**$ 378,521,569**	**12.9%**	**-0.1%**	**0.1%**	**0.8%**	**2.2%**							
Bloomberg Barclays U.S. Aggregate Bond Index			-0.9%	0.0%	-1.6%	-0.9%	5.4%	2.9%	3.0%				4.0%
Cash	**$ 58,024,653**	**2.0%**	**0.0%**	**0.0%**	**0.1%**	**0.1%**							
FTSE Treasury Bill-3 Month			0.0%	0.0%	0.0%	0.1%	1.1%	1.1%	0.6%	1.3%	2.4%		2.9%
Diversifying Strategies	**$ 311,157,914**	**10.6%**	**1.1%**	**2.8%**	**12.4%**	**19.4%**							
Diversifying Strategies Custom			1.1%	2.5%	7.0%	8.7%	5.6%						5.5%
Real Return	**$ 189,055,953**	**6.4%**	**-0.3%**	**0.4%**	**11.4%**	**21.7%**							
Pension Real Return Custom Bmk			0.3%	0.9%	12.0%	22.3%	5.8%	4.1%	3.5%				3.5%
Real Estate	**$ 122,101,961**	**4.2%**	**3.2%**	**6.7%**	**13.7%**	**17.8%**							
NCREIF NFI ODCE Net 1Qtr in Arrears Index			3.7%	3.7%	6.8%	7.1%	4.6%	5.6%	8.6%	6.6%	6.6%		6.3%
Opportunistic	**$ 81,896,904**	**2.8%**	**1.1%**	**2.9%**	**8.7%**								

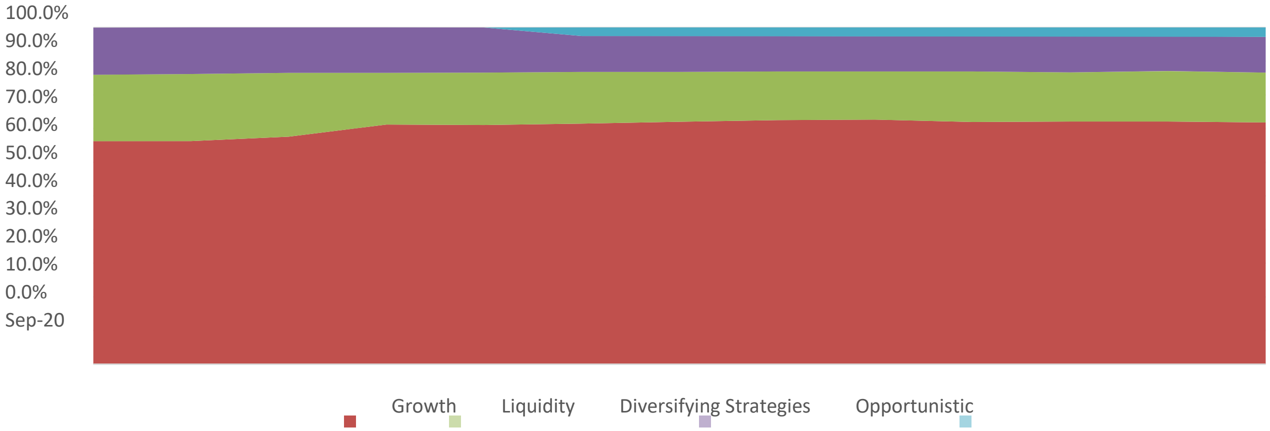
KPPA
Kentucky Public Pensions Authority

Total CERS - H

Asset Allocation Over Time

As of September 30, 2021

Asset Allocation Over time



Risk Categorization	April 2021	May 2021	June 2021	July 2021	August 2021	September 2021
Growth	72.48%	72.66%	71.92%	72.08%	72.11%	71.79%
Liquidity	14.50%	14.31%	15.06%	14.62%	14.96%	14.85%
Diversifying Strategies	10.50%	10.45%	10.41%	10.66%	10.39%	10.58%
Opportunistic	2.53%	2.58%	2.62%	2.64%	2.55%	2.79%

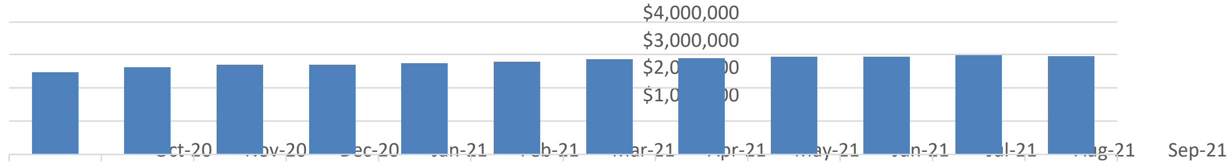
Kentucky Public Pensions Authority

Total CERS - H

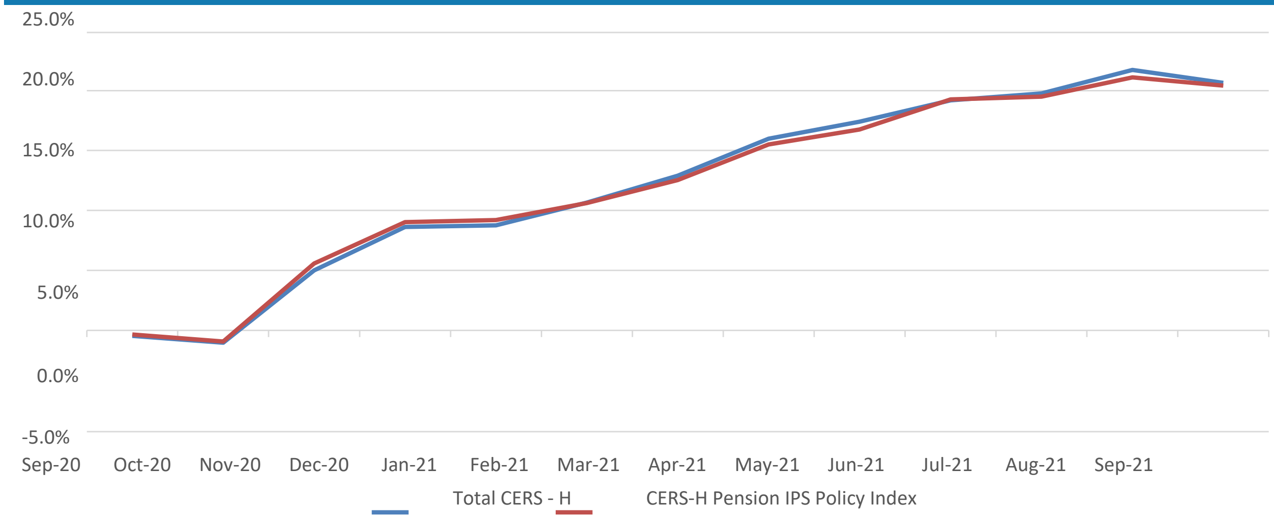
Summary

As of September 30, 2021

Market Value Over Time ($USD 000)



Cumulative Performance Over 1 Year



Kentucky Public Pensions Authority, Office of Investments
Insurance Fiscal Year 2022
Investment Review for the Quarter Ended September 30, 2021 Presented to the County Employees Retirement System Investment Committee

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Kentucky Public Pensions Authority

Total CERS INS & CERS-H INS

Risk Categorization Summary As of September 30, 2021

	Market Value ($USD)	% of Portfolio	MTD	QTD	YTD	1 Year	3 Year	5 Year	10 Year	20 Year	30 Year	Inception	IRR 1 YR
Total Portfolio	**$ 4,799,344,458**	**100.0%**	**-0.6%**	**1.4%**	**10.9%**	**20.9%**							
CERS Insurance IPS Policy Index			-0.3%	1.3%	1.3%	20.7%	9.2%	9.4%	8.8%	6.9%	7.6%	7.9%	20.7%
CERS-H Insurance IPS Policy Index			-0.3%	1.3%	1.3%	20.7%	8.2%	9.4%	8.8%	6.9%	7.6%	7.9%	20.7%
Growth	**$ 3,361,361,824**	**70.0%**	**-1.2%**	**1.3%**	**13.1%**	**26.5%**							
Growth Custom Benchmark			-1.9%	0.8%	12.8%	27.3%	13.0%						13.1%
Liquidity	**$ 788,330,563**	**16.4%**	**-0.1%**	**0.2%**	**0.6%**	**1.9%**							
Liquidity Custom Benchmark			-0.8%	0.0%	-1.5%	-0.8%	5.1%						4.7%
Diversifying Strategies	**$ 495,461,207**	**10.3%**	**1.0%**	**2.7%**	**11.5%**	**18.2%**							
Diversifying Strategies Custom			1.1%	2.5%	7.0%	8.7%	5.6%						5.5%
Opportunistic	**$ 154,524,502**	**3.2%**	**1.1%**	**2.9%**	**8.7%**								

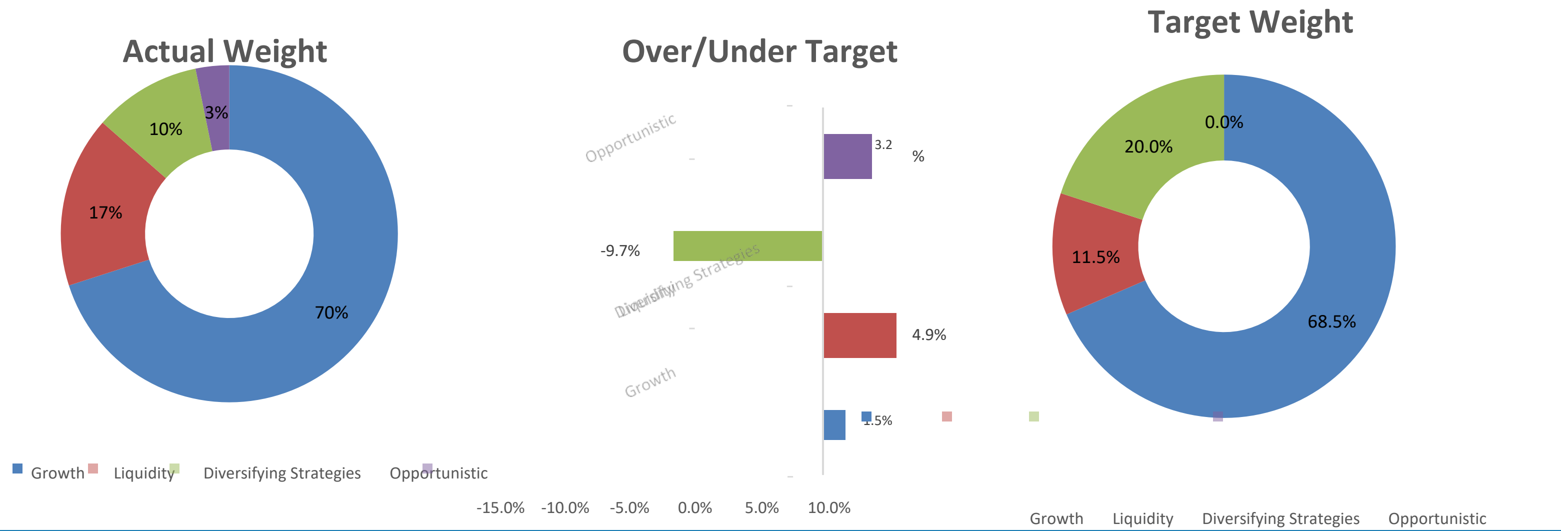
Kentucky Public Pensions Authority

Total CERS INS & CERS-H INS

Asset Allocation vs Targets

As of September 30, 2021

Actual vs Target Weights



Risk Categorization	Ending Market Value ($USD)	Actual Weight	Target Weight	Relative
Growth	$3,361,361,824	70.0%	68.5%	1.5%
Liquidity	$788,330,563	16.4%	11.5%	4.9%
Diversifying Strategies	$495,461,207	10.3%	20.0%	-9.7%
Opportunistic	$154,524,502	3.2%	0.0%	3.2%

KPPA
Kentucky Public Pensions Authority

Total CERS INS & CERS-H INS

Risk Categorization Performance As of September 30, 2021

	Market Value ($USD)	% of Portfolio	MTD	QTD	YTD	1 Year	3 Year	5 Year	10 Year	20 Year	30 Year	Inception	IRR 1 YR
Total Portfolio	**$ 4,799,344,458**	**100.0%**	**-0.6%**	**1.4%**	**10.9%**								**20.9%**
CERS Insurance IPS Policy Index			-0.3%	1.3%	1.3%	20.7%	9.2%	9.4%	8.8%	6.9%	7.6%	7.9%	20.7%
CERS-H Insurance IPS Policy Index			-0.3%	1.3%	1.3%	20.7%	9.2%	9.4%	8.8%	6.9%	7.6%	7.9%	20.7%
Growth	**$ 3,361,361,824**	**70.0%**	**-1.2%**	**1.3%**	**13.1%**	**26.5%**							
Growth Custom Benchmark			-1.9%	0.8%	12.8%	27.3%	13.0%						13.1%
Public Equity	**$ 2,079,487,145**	**43.3%**	**-4.1%**	**-1.0%**	**11.6%**	**29.6%**							
Global Equity Blended Index			-3.8%	-1.3%	10.9%	28.6%	12.2%	13.1%	11.9%	7.9%	9.2%		10.6%
U.S. Equity	**$ 1,052,637,336**	**21.9%**	**-4.4%**	**-0.2%**	**15.5%**	**33.0%**							
KY Domestic Equity Blend			-4.5%	-0.1%	15.0%	31.9%	16.0%	16.8%	16.6%	10.0%	10.8%		11.9%
Non U.S. Equity	**$ 1,026,849,810**	**21.4%**	**-3.8%**	**-1.7%**	**7.7%**	**26.2%**							
KY Ret. Int'l Eq. Blended Index			-3.2%	-2.6%	6.8%	25.2%	8.3%	9.2%	7.9%	6.9%	6.9%		8.2%
Private Equity	**$ 459,699,987**	**9.6%**	**11.4%**	**12.9%**	**33.5%**	**44.9%**							
Insurance Private Equity Custom Benchmark				1.4%	19.9%	30.1%	11.2%	13.6%	14.3%				10.6%
High Yield/Specialty Credit	**$ 822,174,693**	**17.1%**	**0.7%**	**1.8%**	**7.7%**	**12.3%**							
High Yield Custom Benchmark			0.3%	1.0%	4.5%	9.8%	5.5%						5.2%
Liquidity	**$ 788,330,563**	**16.4%**	**-0.1%**	**0.2%**	**0.6%**	**1.9%**							
Liquidity Custom Benchmark			-0.8%	0.0%	-1.5%	-0.8%	5.1%						4.7%
Core Fixed Income	**$ 583,869,850**	**12.2%**	**-0.2%**	**0.2%**	**0.8%**	**2.2%**							
Bloomberg Barclays U.S. Aggregate Bond Index			-0.9%	0.0%	-1.6%	-0.9%	5.4%	2.9%	3.0%				4.0%
Cash	**$ 204,460,713**	**4.3%**	**0.0%**	**0.0%**	**0.1%**	**0.1%**							
FTSE Treasury Bill-3 Month			0.0%	0.0%	0.0%	0.1%	1.1%	1.1%	0.6%	1.3%	2.4%		2.9%
Diversifying Strategies	**$ 495,461,207**	**10.3%**	**1.0%**	**2.7%**	**11.5%**	**18.2%**							
Diversifying Strategies Custom			1.1%	2.5%	7.0%	8.7%	5.6%						5.5%
Real Return	**$ 291,852,889**	**6.1%**	**-0.5%**	**0.4%**	**10.1%**	**19.7%**							
Insurance Real Return Custom Bmk				0.9%	10.7%	20.3%	6.4%	4.3%	3.6%				3.6%
Real Estate	**$ 203,608,317**	**4.2%**	**3.4%**	**6.5%**	**13.5%**	**17.4%**							
NCREIF NFI ODCE Net 1Qtr in Arrears Index			3.7%	3.7%	6.8%	7.1%	4.6%	5.6%	8.6%	6.6%	6.6%		6.3%
Opportunistic	**$ 154,524,502**	**3.2%**	**1.1%**	**2.9%**	**8.7%**								

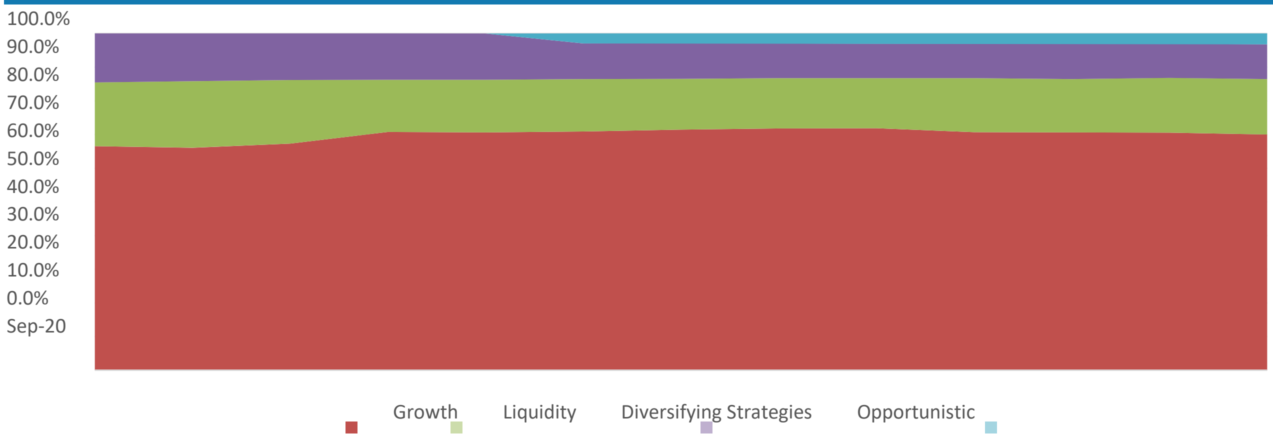
Kentucky Public Pensions Authority

Total CERS INS & CERS-H INS

Asset Allocation Over Time

As of September 30, 2021

Asset Allocation Over time



Risk Categorization	April 2021	May 2021	June 2021	July 2021	August 2021	September 2021
Growth	71.81%	71.88%	70.69%	70.60%	70.57%	70.04%
Liquidity	14.91%	14.86%	16.08%	15.88%	16.29%	16.43%
Diversifying Strategies	10.34%	10.26%	10.19%	10.45%	10.19%	10.32%
Opportunistic	2.95%	3.01%	3.05%	3.07%	2.96%	3.22%

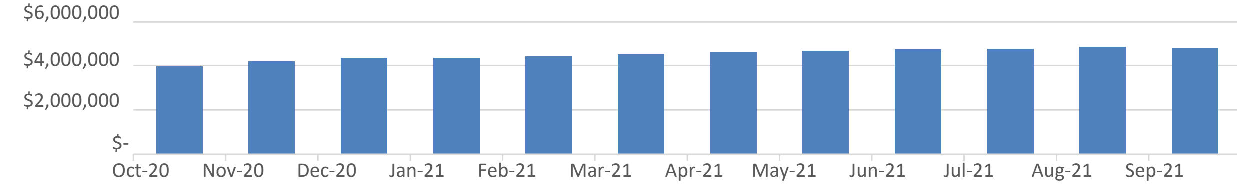
Kentucky Public Pensions Authority

Total CERS INS & CERS-H INS

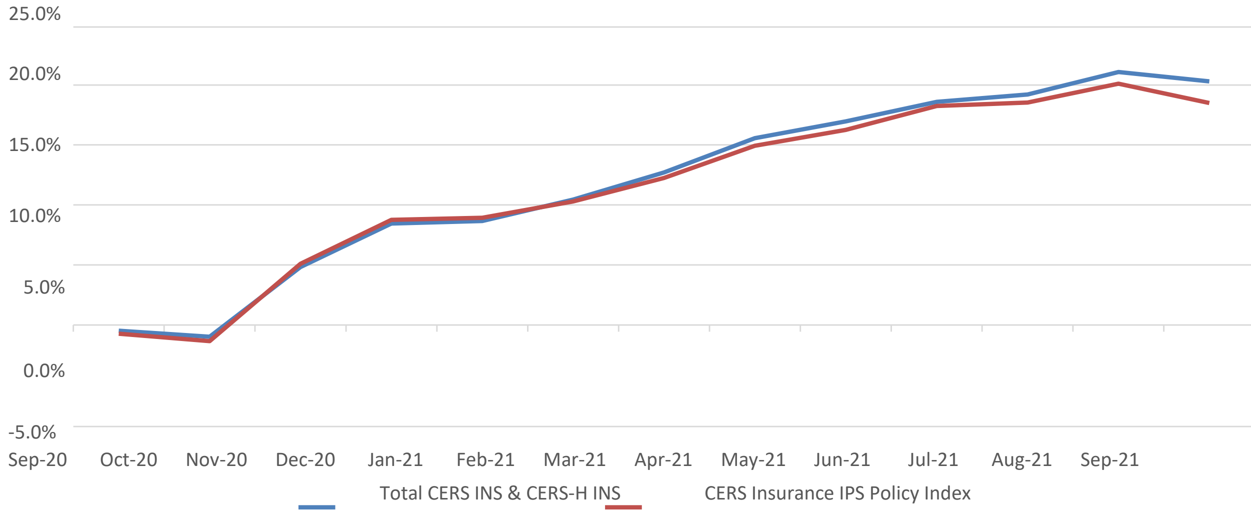
Summary

As of September 30, 2021

Market Value Over Time ($USD 000)



Cumulative Performance Over 1 Year



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Kentucky Public Pensions Authority

Total CERS INS

Risk Categorization Summary As of September 30, 2021

	Market Value ($USD)	% of Portfolio	MTD	QTD	YTD	1 Year	3 Year	5 Year	10 Year	20 Year	30 Year	Inception	IRR 1 YR
Total Portfolio	**$ 3,175,932,503**	**100.0%**	**-0.7%**	**1.4%**	**1.4%**	**20.8%**	**9.5%**	**9.9%**	**8.8%**	**6.8%**	**7.5%**	**7.7%**	**20.8%**
CERS Insurance IPS Policy Index			-0.3%	1.3%	1.3%	20.7%	9.2%	9.4%	8.8%	6.9%	7.6%	7.9%	20.7%
Growth	**$ 2,217,024,084**	**69.8%**	**-1.2%**	**1.3%**	**13.1%**	**26.5%**							
Growth Custom Benchmark			-1.9%	0.8%	12.8%	27.3%	13.0%						13.1%
Liquidity	**$ 536,140,949**	**16.9%**	**-0.1%**	**0.2%**	**0.6%**	**1.9%**							
Liquidity Custom Benchmark			-0.8%	0.0%	-1.5%	-0.8%	5.1%						4.7%
Diversifying Strategies	**$ 322,958,682**	**10.2%**	**1.0%**	**2.7%**	**11.5%**	**18.2%**							
Diversifying Strategies Custom			1.1%	2.5%	7.0%	8.7%	5.6%						5.5%
Opportunistic	**$ 100,029,566**	**3.1%**	**1.1%**	**2.9%**	**8.7%**								

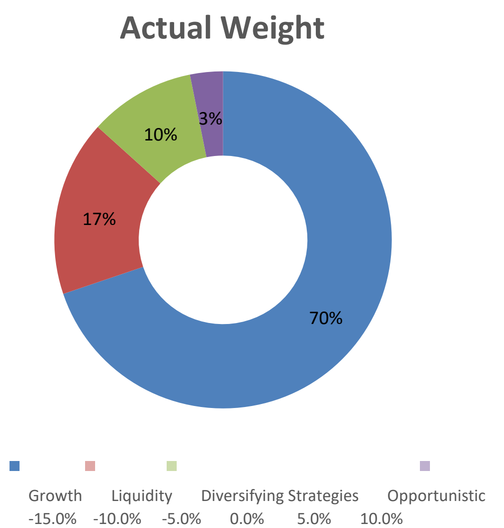
Kentucky Public Pensions Authority

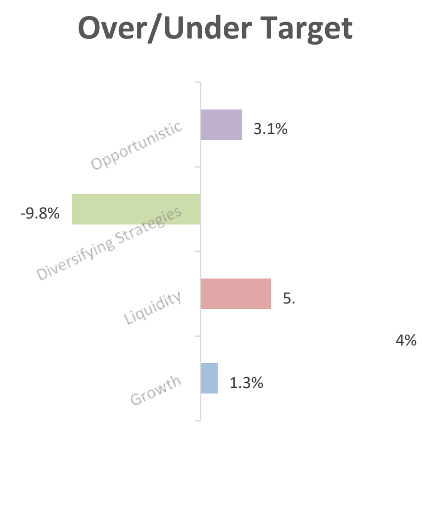
Total CERS INS

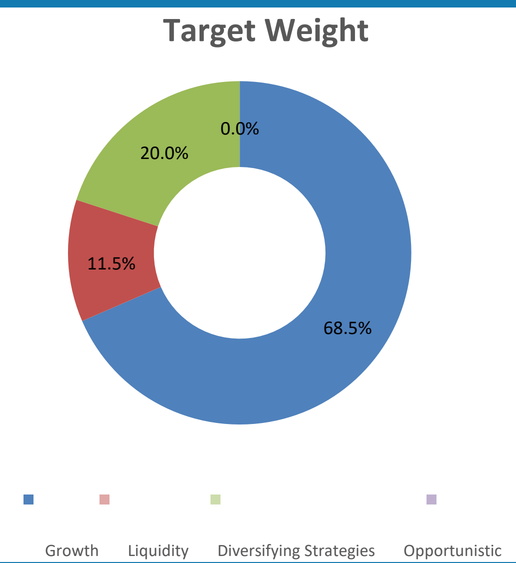
Asset Allocation vs Targets

As of September 30, 2021

Actual vs Target Weights







Risk Categorization	Ending Market Value ($USD)	Actual Weight	Target Weight	Relative
Growth	$2,217,024,084	69.8%	68.5%	1.3%
Liquidity	$536,140,949	16.9%	11.5%	5.4%
Diversifying Strategies	$322,958,682	10.2%	20.0%	-9.8%
Opportunistic	$100,029,566	3.1%	0.0%	3.1%

Asset Allocation	Actual	Target	Target Difference	IPS Min	IPS Max
US Equity	22.48%	21.75%	0.73%	15.23%	28.28%
Non-US Equity	21.96%	21.75%	0.21%	15.23%	28.28%
Private Equity	8.94%	10.00%	-1.06%	7.00%	13.00%
High Yield/Specialty Credit	15.95%	15.00%	0.95%	10.50%	19.50%
Core Fixed Income	12.13%	10.00%	2.13%	8.00%	12.00%
Cash	4.56%	1.50%	3.06%	0.00%	3.00%
Real Return	5.81%	10.00%	-4.19%	7.00%	13.00%
Real Estate	5.18%	10.00%	-4.82%	7.00%	13.00%
Opportunistic	2.96%	0.00%	2.96%	0.00%	5.00%

KPPA
Kentucky Public Pensions Authority

Total CERS INS

Risk Categorization Performance As of September 30, 2021

	Market Value ($USD)	% of Portfolio	MTD	QTD	YTD	1 Year	3 Year	5 Year	10 Year	20 Year	30 Year	Inception	IRR 1 YR
Total Portfolio	**$ 3,175,932,503**	**100.0%**	**-0.7%**	**1.4%**	**1.4%**	**20.8%**	**9.5%**	**9.9%**	**8.8%**	**6.8%**	**7.5%**	**7.7%**	**20.8%**
CERS Insurance IPS Policy Index			-0.3%	1.3%	1.3%	20.7%	9.2%	9.4%	8.8%	6.9%	7.6%	7.9%	20.7%
Growth	**$ 2,217,024,084**	**69.8%**	**-1.2%**	**1.3%**	**13.1%**	**26.5%**							
Growth Custom Benchmark			-1.9%	0.8%	12.8%	27.3%	13.0%						13.1%
Public Equity	**$ 1,373,223,511**	**43.2%**	**-4.1%**	**-1.0%**	**11.6%**	**29.6%**							
Global Equity Blended Index			-3.8%	-1.3%	10.9%	28.6%	12.2%	13.1%	11.9%	7.9%	9.2%		10.6%
U.S. Equity	**$ 695,501,543**	**21.9%**	**-4.4%**	**-0.2%**	**15.5%**	**33.0%**							
KY Domestic Equity Blend			-4.5%	-0.1%	15.0%	31.9%	16.0%	16.8%	16.6%	10.0%	10.8%		11.9%
Non U.S. Equity	**$ 677,721,968**	**21.3%**	**-3.9%**	**-1.7%**	**7.7%**	**26.2%**							
KY Ret. Int'l Eq. Blended Index			-3.2%	-2.6%	6.8%	25.2%	8.3%	9.2%	7.9%	6.9%	6.9%		8.2%
Private Equity	**$ 294,201,681**	**9.3%**	**11.4%**	**12.9%**	**33.5%**	**44.9%**							
Insurance Private Equity Custom Benchmark				1.4%	19.9%	30.1%	11.2%	13.6%	14.3%				10.6%
High Yield/Specialty Credit	**$ 549,598,892**	**17.3%**	**0.7%**	**1.8%**	**7.7%**	**12.3%**							
High Yield Custom Benchmark			0.3%	1.0%	4.5%	9.8%	5.5%						5.2%
Liquidity	**$ 536,140,949**	**16.9%**	**-0.1%**	**0.2%**	**0.6%**	**1.9%**							
Liquidity Custom Benchmark			-0.8%	0.0%	-1.5%	-0.8%	5.1%						4.7%
Core Fixed Income	**$ 382,495,648**	**12.0%**	**-0.2%**	**0.2%**	**0.8%**	**2.2%**							
Bloomberg Barclays U.S. Aggregate Bond Index			-0.9%	0.0%	-1.6%	-0.9%	5.4%	2.9%	3.0%				4.0%
Cash	**$ 153,645,301**	**4.8%**	**0.0%**	**0.0%**	**0.1%**	**0.1%**							
FTSE Treasury Bill-3 Month			0.0%	0.0%	0.0%	0.1%	1.1%	1.1%	0.6%	1.3%	2.4%		2.9%
Diversifying Strategies	**$ 322,958,682**	**10.2%**	**1.0%**	**2.7%**	**11.5%**	**18.2%**							
Diversifying Strategies Custom			1.1%	2.5%	7.0%	8.7%	5.6%						5.5%
Real Return	**$ 191,440,394**	**6.0%**	**-0.5%**	**0.4%**	**10.1%**	**19.7%**							
Insurance Real Return Custom Bmk				0.9%	10.7%	20.3%	6.4%	4.3%	3.6%				3.6%
Real Estate	**$ 131,518,288**	**4.1%**	**3.4%**	**6.5%**	**13.5%**	**17.4%**							
NCREIF NFI ODCE Net 1Qtr in Arrears Index			3.7%	3.7%	6.8%	7.1%	4.6%	5.6%	8.6%	6.6%	6.6%		6.3%
Opportunistic	**$ 100,029,566**	**3.1%**	**1.1%**	**2.9%**	**8.7%**								

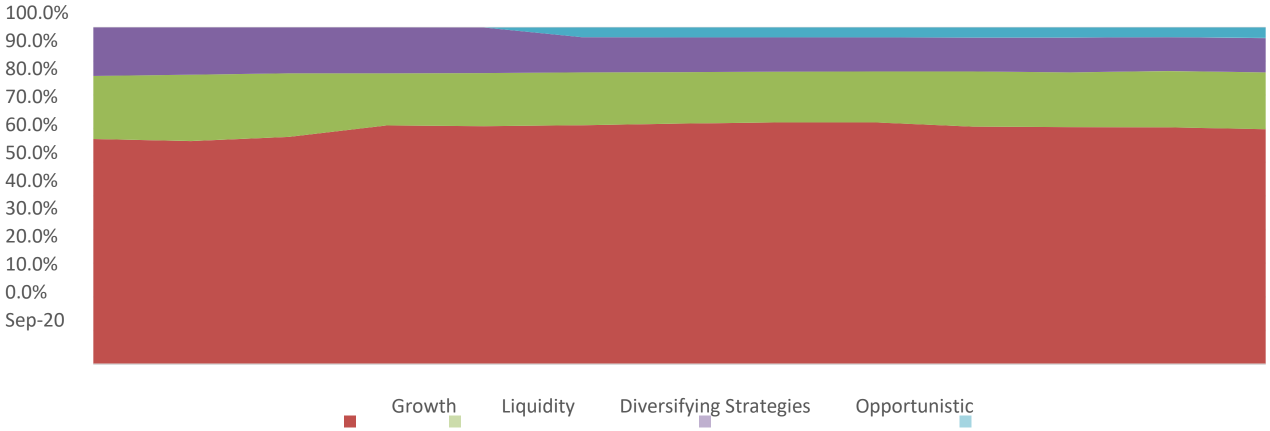
Kentucky Public Pensions Authority

Total CERS INS

Asset Allocation Over Time

As of September 30, 2021

Asset Allocation Over time



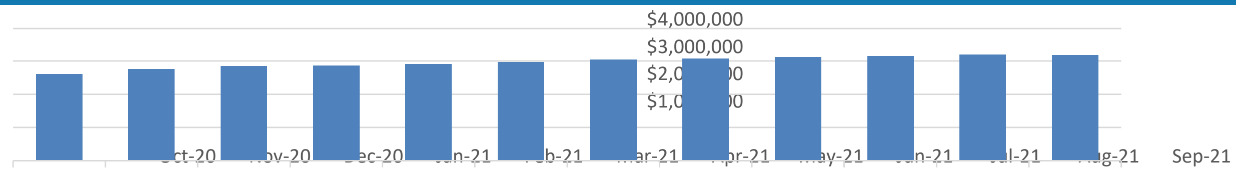
Risk Categorization	April 2021	May 2021	June 2021	July 2021	August 2021	September 2021
Growth	71.81%	71.84%	70.55%	70.39%	70.36%	69.81%
Liquidity	15.10%	15.09%	16.42%	16.31%	16.71%	16.88%
Diversifying Strategies	10.20%	10.13%	10.05%	10.30%	10.04%	10.17%
Opportunistic	2.89%	2.95%	2.98%	3.00%	2.89%	3.15%

Total CERS INS

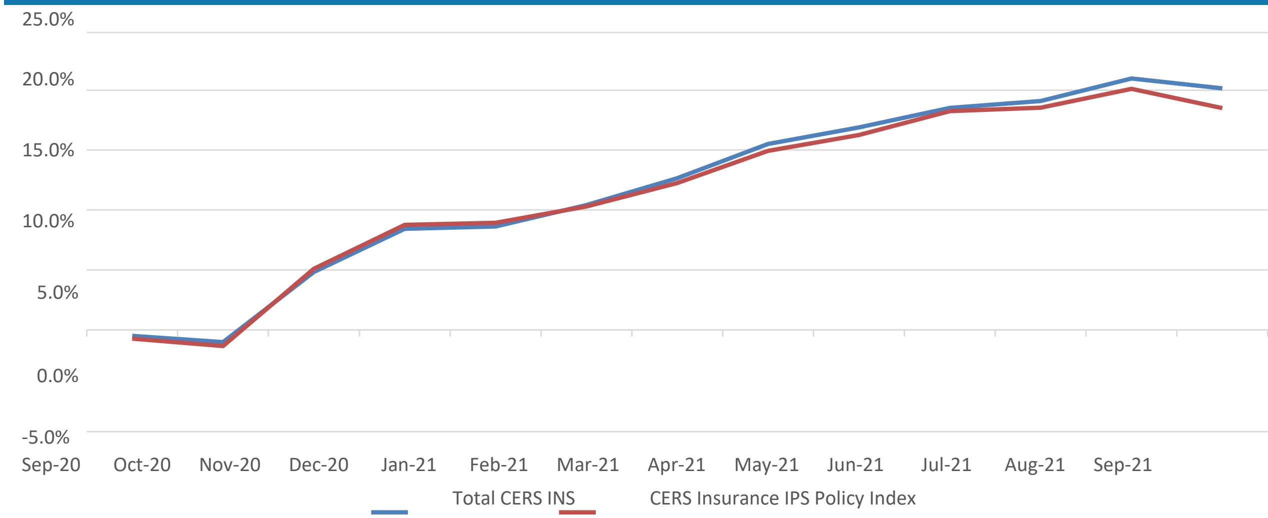
Summary

As of September 30, 2021

Market Value Over Time ($USD 000)



Cumulative Performance Over 1 Year



KPPA
Kentucky Public Pensions Authority

Total CERS - H INS

Risk Categorization Summary As of September 30, 2021

	Market Value ($USD)	% of Portfolio	MTD	QTD	YTD	1 Year	3 Year	5 Year	10 Year	20 Year	30 Year	Inception	IRR 1 YR
Total Portfolio	**$ 1,623,411,954**	**100.0%**	**-0.6%**	**1.5%**	**1.5%**	**21.1%**	**9.6%**	**10.0%**	**8.8%**	**6.8%**	**7.5%**	**7.7%**	**21.2%**
CERS-H Insurance IPS Policy Index			-0.3%	1.3%	1.3%	20.7%	9.2%	9.4%	8.8%	6.9%	7.6%	7.9%	20.7%
Growth	**$ 1,144,337,741**	**70.5%**	**-1.2%**	**1.3%**	**13.1%**	**26.5%**							
Growth Custom Benchmark			-1.9%	0.8%	12.8%	27.3%	13.0%						13.1%
Liquidity	**$ 252,189,614**	**15.5%**	**-0.1%**	**0.2%**	**0.6%**	**1.9%**							
Liquidity Custom Benchmark			-0.8%	0.0%	-1.5%	-0.8%	5.1%						4.7%
Diversifying Strategies	**$ 172,502,525**	**10.6%**	**1.0%**	**2.7%**	**11.5%**	**18.2%**							
Diversifying Strategies Custom			1.1%	2.5%	7.0%	8.7%	5.6%						5.5%
Opportunistic	**$ 54,494,935**	**3.4%**	**1.1%**	**2.9%**	**8.7%**								

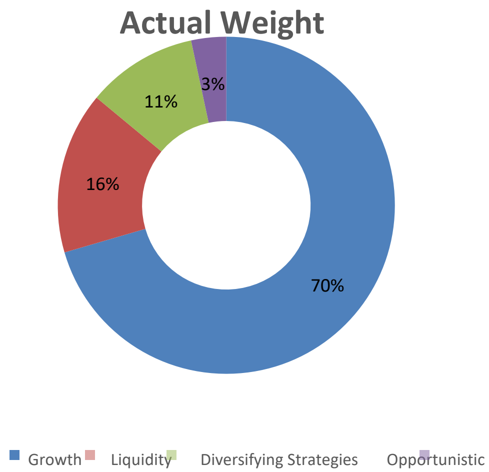
KPPA Kentucky Public Pensions Authority

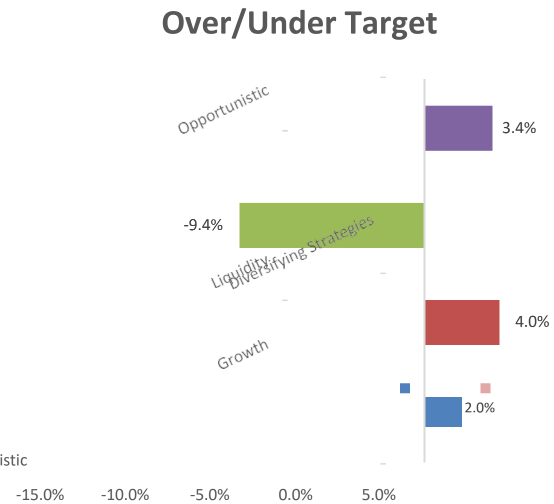
Total CERS - H INS

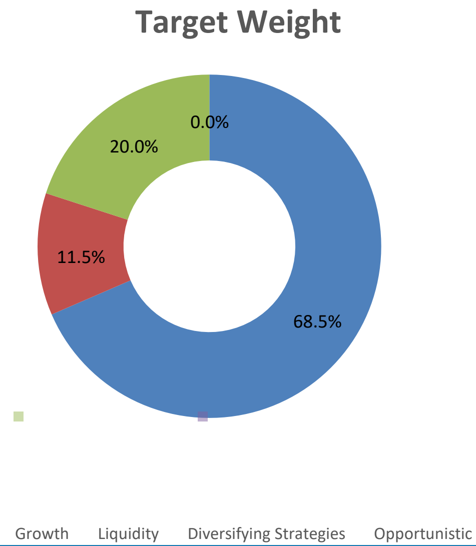
Asset Allocation vs Targets

As of September 30, 2021

Actual vs Target Weights







Risk Categorization	Ending Market Value ($USD)	Actual Weight	Target Weight	Relative
Growth	$1,144,337,741	70.5%	68.5%	2.0%
Liquidity	$252,189,614	15.5%	11.5%	4.0%
Diversifying Strategies	$172,502,525	10.6%	20.0%	-9.4%
Opportunistic	$54,494,935	3.4%	0.0%	3.4%

Asset Allocation	Actual	Target	Target Difference	IPS Min	IPS Max
US Equity	22.59%	21.75%	0.84%	15.23%	28.28%
Non-US Equity	22.14%	21.75%	0.39%	15.23%	28.28%
Private Equity	9.81%	10.00%	-0.19%	7.00%	13.00%
High Yield/Specialty Credit	15.34%	15.00%	0.34%	10.50%	19.50%
Core Fixed Income	12.50%	10.00%	2.50%	8.00%	12.00%
Cash	2.89%	1.50%	1.39%	0.00%	3.00%
Real Return	5.97%	10.00%	-4.03%	7.00%	13.00%
Real Estate	5.57%	10.00%	-4.43%	7.00%	13.00%
Opportunistic	3.16%	0.00%	3.16%	0.00%	5.00%

KPPA
Kentucky Public Pensions Authority

Total CERS - H INS

Risk Categorization Performance As of September 30, 2021

	Market Value ($USD)	% of Portfolio	MTD	QTD	YTD	1 Year	3 Year	5 Year	10 Year	20 Year	30 Year	Inception	IRR 1 YR
Total Portfolio	**$ 1,623,411,954**	**100.0%**	**-0.6%**	**1.5%**	**1.5%**	**21.1%**	**9.6%**	**10.0%**	**8.8%**	**6.8%**	**7.5%**	**7.7%**	**21.2%**
CERS-H Insurance IPS Policy Index			-0.3%	1.3%	1.3%	20.7%	9.2%	9.4%	8.8%	6.9%	7.6%	7.9%	20.7%
Growth	**$ 1,144,337,741**	**70.5%**	**-1.2%**	**1.3%**	**13.1%**	**26.5%**							
Growth Custom Benchmark			-1.9%	0.8%	12.8%	27.3%	13.0%						13.1%
Public Equity	**$ 706,263,635**	**43.5%**	**-4.1%**	**-1.0%**	**11.6%**	**29.6%**							
Global Equity Blended Index			-3.8%	-1.3%	10.9%	28.6%	12.2%	13.1%	11.9%	7.9%	9.2%		10.6%
U.S. Equity	**$ 357,135,793**	**22.0%**	**-4.4%**	**-0.2%**	**15.5%**	**33.0%**							
KY Domestic Equity Blend			-4.5%	-0.1%	15.0%	31.9%	16.0%	16.8%	16.6%	10.0%	10.8%		11.9%
Non U.S. Equity	**$ 349,127,842**	**21.5%**	**-3.8%**	**-1.7%**	**7.7%**	**26.2%**							
KY Ret. Int'l Eq. Blended Index			-3.2%	-2.6%	6.8%	25.2%	8.3%	9.2%	7.9%	6.9%	6.9%		8.2%
Private Equity	**$ 165,498,306**	**10.2%**	**11.4%**	**12.9%**	**33.5%**	**44.9%**							
Insurance Private Equity Custom Benchmark				1.4%	19.9%	30.1%	11.2%	13.6%	14.3%				10.6%
High Yield/Specialty Credit	**$ 272,575,800**	**16.8%**	**0.7%**	**1.8%**	**7.7%**	**12.3%**							
High Yield Custom Benchmark			0.3%	1.0%	4.5%	9.8%	5.5%						5.2%
Liquidity	**$ 252,189,614**	**15.5%**	**-0.1%**	**0.2%**	**0.6%**	**1.9%**							
Liquidity Custom Benchmark			-0.8%	0.0%	-1.5%	-0.8%	5.1%						4.7%
Core Fixed Income	**$ 201,374,202**	**12.4%**	**-0.2%**	**0.2%**	**0.8%**	**2.2%**							
Bloomberg Barclays U.S. Aggregate Bond Index			-0.9%	0.0%	-1.6%	-0.9%	5.4%	2.9%	3.0%				4.0%
Cash	**$ 50,815,412**	**3.1%**	**0.0%**	**0.0%**	**0.1%**	**0.1%**							
FTSE Treasury Bill-3 Month			0.0%	0.0%	0.0%	0.1%	1.1%	1.1%	0.6%	1.3%	2.4%		2.9%
Diversifying Strategies	**$ 172,502,525**	**10.6%**	**1.0%**	**2.7%**	**11.5%**	**18.2%**							
Diversifying Strategies Custom			1.1%	2.5%	7.0%	8.7%	5.6%						5.5%
Real Return	**$ 100,412,495**	**6.2%**	**-0.5%**	**0.4%**	**10.1%**	**19.7%**							
Insurance Real Return Custom Bmk				0.9%	10.7%	20.3%	6.4%	4.3%	3.6%				3.6%
Real Estate	**$ 72,090,030**	**4.4%**	**3.4%**	**6.5%**	**13.5%**	**17.4%**							
NCREIF NFI ODCE Net 1Qtr in Arrears Index			3.7%	3.7%	6.8%	7.1%	4.6%	5.6%	8.6%	6.6%	6.6%		6.3%
Opportunistic	**$ 54,494,935**	**3.4%**	**1.1%**	**2.9%**	**8.7%**								

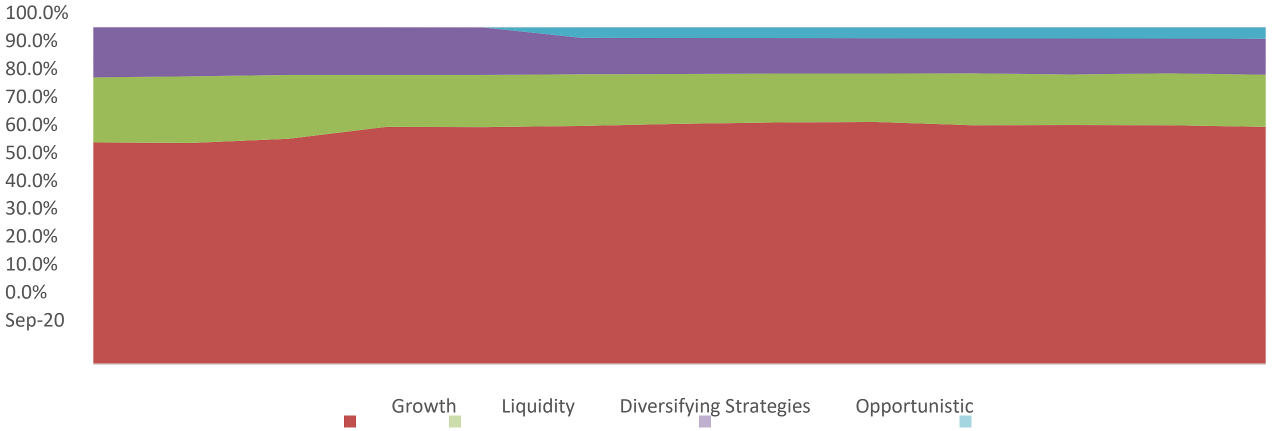
Kentucky Public Pensions Authority

Total CERS - H INS

Asset Allocation Over Time

As of September 30, 2021

Asset Allocation Over time



Risk Categorization	April 2021	May 2021	June 2021	July 2021	August 2021	September 2021
Growth	71.81%	71.96%	70.95%	71.02%	70.97%	70.49%
Liquidity	14.54%	14.40%	15.42%	15.04%	15.47%	15.53%
Diversifying Strategies	10.59%	10.53%	10.46%	10.76%	10.49%	10.63%
Opportunistic	3.06%	3.13%	3.17%	3.20%	3.08%	3.36%

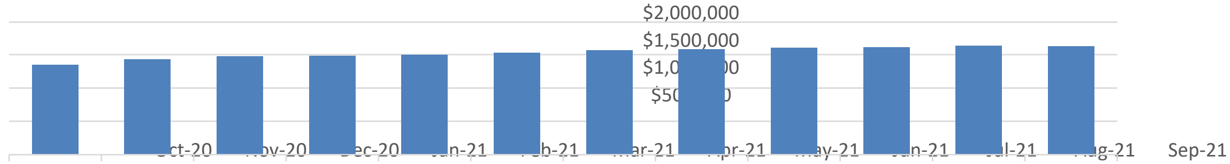
Kentucky Public Pensions Authority

Total CERS - H INS

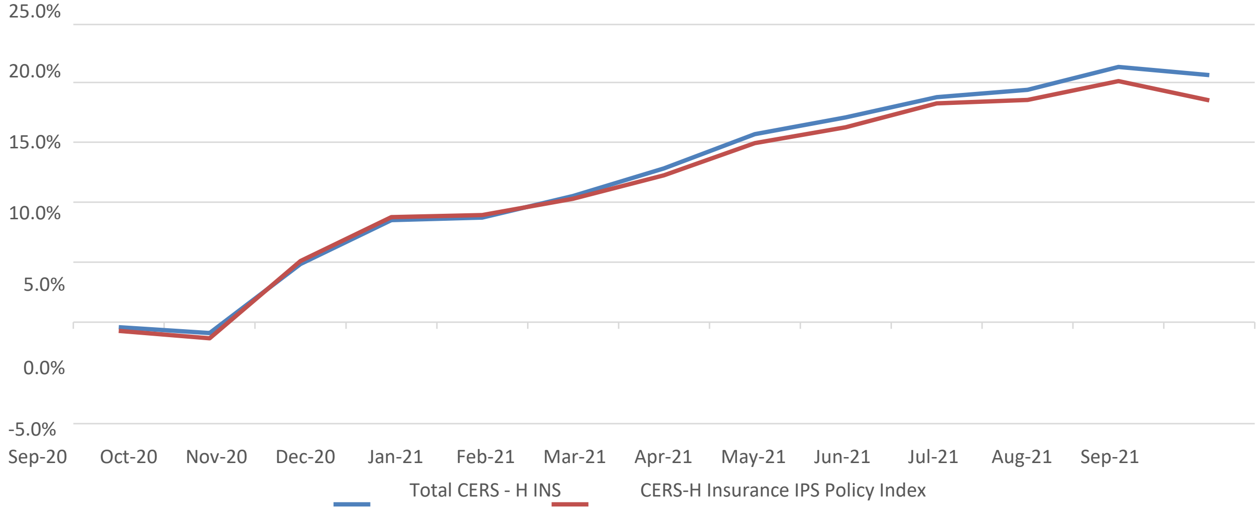
Summary

As of September 30, 2021

Market Value Over Time ($USD 000)



Cumulative Performance Over 1 Year



UPDATE:
AXIOM INVESTORS
INTERNATIONAL SMALL CAP EQUITY

Date: November 3, 2021
To: KRS Investment Committee
From: Joe Gilbert, Director of Equity

Overview
The KPPPA Office of Investments' recommendation for Axiom Investors to manage an active non-U.S. small cap equity mandate was approved by the KRS & CERS Investment Committees on August 24th & 25th, respectively. Both committees approved the recommendation contingent on successful investment management agreement negotiations. The CERS Investment Committee approval was also subject to final approval at its November meeting.

The KRS & CERS Board of Directors subsequently ratified the decision of their corresponding investment committees on September 9th & 15th, respectively.

Staff was notified of the resignation of Kurt Polk, President, who oversaw the operations side of the business on August 24th. Staff's assessment was that there would be no deterioration in Axiom's business due to Mr. Polk's departure. Since the firm's announcement, staff has maintained that Mr. Polk's departure should not affect the decision to move forward with funding the investment mandate. Any risk of business disruptions are mitigated by the continued leadership of tenured department heads of operations, compliance, distribution, and marketing who continue to report to the same managerial committee as before.

The Wilshire manager research team's position on Mr. Polk's departure aligns with the view of KKPA investment staff. The following is an extract from a statement Wilshire released at the time of Axiom's announcement:

"… There will be no impact to Axiom's Investment teams or strategies and the firm does not plan on hiring a replacement. Manager research views the departure as a non-material event and there will be no ratings changes as a result of this announcement. "

Update
Since the investment committee meetings, KPPA investment staff has continued to research and monitor Axiom with particular focus on their non-U.S. small cap equity business. Specifically, whether any issues arose from Mr. Polk's impending departure surrounding client stability. The following is an excerpt received from Axiom management:

"…, there have been no client losses (or notification of upcoming client terminations) or concerns (we have actually had several new accounts fund); … just support … and comfort with the current coverage of non-investment functions…"

The firm has added six new accounts to the strategy post the announcement of Mr. Polk's departure. The total number of clients employing the International Small Cap product now stands at 72, with assets just under $1.2 billion. The strategy has not lost any accounts since the announcement.

Current Standing
The manager and staff have agreed to investment guidelines that strike a balance between the flexibility required to manage the strategy as intended and provide sufficient guardrails to ensure proper diversification. The two parties have exchanged in the first round of comments regarding the investment management agreement, and are negotiating points of disagreement. Investment and operations staffs have engaged the custodial bank to begin the account opening and unitization schematic process. In summary, staff continues to move forward with the operational side of establishing a new mandate so that funding can occur quickly once final approval is given.

Moving Forward
Given our updated research and original conviction in Axiom, we ask that the committee grant final approval to move forward in funding the Axiom International Small Cap mandate. We anticipate the IMA negotiations and final preparations for transition funding to take place over the next few weeks.

County Employees Retirement Systems
Investment Policy Statement
Adopted November 10, 2021

This Investment Policy Statement (IPS) is issued by the CERS Board of Trustees (CERS Board or CERS Trustees) of the County Employees Retirement System (CERS) in connection with investing in the pension and insurance trust funds (Funds) of CERS.

I. Introduction

A. Purpose

The purpose of this IPS is to define the framework for investing the assets of CERS. This IPS is intended to provide general principles for establishing the goals of CERS, the allocation of assets, employment of outside asset management, and monitoring the results of the respective Funds.

The pension plans administered by the County Employees Retirement System (CERS) are Qualified Pension Plans under Section 401(a) of the Internal Revenue Code. Additionally, Kentucky Revised Statutes 61.701 establishes health insurance benefits to recipients of CERS. Kentucky Revised Statutes 61.702 provides that all amounts necessary to provide for insurance benefits shall be paid to the insurance fund. The CERS Board shall administer the insurance fund in the same manner as the pension funds.

B. Philosophy

The CERS Trustees recognize their fiduciary duty not only to invest CERS funds in formal compliance with the Prudent Person Rule, but also to manage those assets in continued recognition of the basic long-term nature of CERS. The CERS Trustees interpret this to mean, in addition to the specific guidelines and restrictions set forth in the law and this document, that the assets of CERS shall be proactively managed—that is, investment decisions regarding the particular asset classes, strategies, and securities to be purchased or sold shall be the result of a long-term investment strategy. Being a long-term investor means that CERS Trustees are willing to accept a certain amount of risk in pursuit of potentially higher reward and that the Trustees can afford to be patient for a longer period of time.

The CERS Trustees recognize that asset allocation is the primary driver of long-term investment performance, and will therefore review asset allocation and asset-liability studies on a regular basis as outlined in Section III of this document. The Asset Allocation Guidelines represents a strategic decision, with the primary aim that CERS meet their performance objectives in the long-term, but understanding that this may not necessarily occur every year.

The CERS Trustees recognize that there is generally an inverse relationship between market efficiency and the ability for active management to produce excess returns. Therefore, investments in efficient markets will be made using index or index-like investments with the goal of replicating, or exceeding, index returns with low management fees and low tracking errors. Active management will be pursued in less efficient markets accepting higher tracking error and paying higher management fees with the expectation of producing excess returns over the long term. This allows the KPPA Office of Investments staff (KPPA Investment Staff) and consultant(s) to focus their efforts on identifying, selecting, and monitoring managers, as well as the overall management of fees paid, in the areas of the market most likely to produce excess returns.

The CERS Trustees recognize that, commensurate with their overall objective of maximizing long-term return given the appropriate level of risk, it is necessary that proper diversification of assets be maintained both across and within the classes of securities held to minimize/mitigate overall portfolio risk. Consistent with carrying out their fiduciary Responsibilities and the concept of Modern Portfolio Theory, the CERS Trustees will not systematically exclude any investments in companies, industries, countries, or geographic areas unless required to do so by statute. Within this context of proactive management and the necessity for adherence to proper diversification, the CERS Trustees rely upon appropriate professional advice from staff and service providers.

The CERS Trustees recognize the importance of responsible investing. Accordingly, the Trustees acknowledge that integrating Environment, Social, and Governance (ESG) policy principles that engages the issue from a risk, opportunity and fiduciary duty perspective will enhance investment results. The overriding consideration for the Trustees will continue to be investing to maximize the long-term returns for plan beneficiaries.

II. Responsibilities

The CERS Trustees and other fiduciaries shall discharge their duties with respect to CERS: (1) solely in the interest of the participants and beneficiaries; (2) for the exclusive purpose of providing benefits to participants and beneficiaries; (3) with the care, skill and caution under the circumstances then prevailing which a prudent person acting in a like capacity and familiar with those matters would use in the conduct of an activity of like character and purpose; (4) impartially; (5) incurring and paying appropriate and reasonable expenses of administration which may not necessarily be the lowest and (6) in accordance with a good faith interpretation of the laws, regulations, and other instruments governing CERS.

Additionally, the Trustees and other fiduciaries shall not engage in any transaction which results in a substantial diversion of CERS income or assets. Every fiduciary shall provide adequate security and a reasonable rate of return to a disqualified person or in any other prohibited transaction described in Internal Revenue Code Section 503(b).

A. CERS Board of Trustees

The CERS Investment Committee is created by Kentucky Revised Statutes 78.790(1)(b) and the CERS Board as set forth in the CERS Board's Statement of Bylaws and Committee Organization (Section 2.2(e)). The Chair authorizes and directs the appointment of a CERS Investment Committee with full power to act for the CERS Board in the acquisition, sale and management of the securities and funds of CERS in accordance with the provisions of any applicable statutes, and policies of the CERS Board. The CERS Investment Committee has the power to act on behalf of the CERS Board on all investment related matters, including the acquisition, sale, safeguarding, monitoring and management of the assets, securities and funds of CERS. The CERS Board shall require a vote of six (6) Trustees to ratify the actions of the CERS Investment Committee at the

CERS Board meeting following the CERS Investment Committee meeting where such action was taken.

B. CERS Investment Committee

The CERS Board of Trustees shall establish an investment committee as required by KRS 78.790(b). The CERS Investment Committee shall consist of five members of the CERS Board and shall be specifically composed as follows: The three (3) members with investment experience appointed by the Governor under KRS 78.782(1)(b); one (1) elected member to be appointed by the CERS Board Chair; and one (1) member appointed by the Governor under KRS 78.782(1)(b) with retirement experience, to be appointed by the CERS Board Chair. The CERS Investment Committee has the authority to implement the investment policies adopted by the CERS Board and to act on behalf of the CERS Board on all investment related matters.

The CERS Investment Committee has the following oversight responsibilities:

1. Assure compliance with this IPS and all applicable laws and regulations.
2. Approve the selection and termination of service providers. If the need arises to terminate a manager between CERS Board meetings, the KPPA Executive Director, Office of Investments, (CIO) will have discretion to do so after receiving approval from either the CERS Board Chair or the CERS Investment Committee Chair, with concurrence by the CERS CEO. The CERS Investment Committee and the CERS Board must be notified of the manager termination at the next scheduled CERS Investment Committee and CERS Board meetings.
3. Meet no less than quarterly to evaluate whether this IPS, the investment activities and management controls and processes continue to be consistent in meeting CERS goals. Mandate actions necessary to maintain the overall effectiveness of the investment program.
4. Review assessment of investment program management processes and procedures, and this IPS relative to meeting stated goals.

C. KPPA Investment Staff

The CIO, is responsible for the administration of investment assets of CERS consistent with the policies, guidelines and limits established by the federal and state laws, the CERS Board, and the CERS Investment Committee.

The CIO receives direction from and reports to the KPPA Executive Director. The CIO shall provide information to the CERS Investment Committee on all investment matters, including but not limited to the following:

i. Maintaining the diversification and risk exposure of the Funds consistent with policies and guidelines.
ii. Assessing and reporting on the performance and risk exposure of the overall investment program relative to goals, objectives, policies and guidelines.
iii. Monitoring and assessing service providers to assure that they meet expectations and conform to policies and guidelines.
iv. Recommending changes to service providers, statutes, policies or guidelines as needed to maintain a productive relationship between the investment program and its goals; and acting as liaison on all investment related matters.
v. Identifying issues for consideration by the CERS Investment Committee and preparing recommendations or reports regarding such matters.
vi. Preparing a memo for the CERS Investment Committee for each proposed investment

which shall cover the pertinent details of the investment, which should include, but not be limited to: the amount of the investment, type of investment, purpose, opportunity/goal, risks, volatility assumptions, liquidity, structure, fees, background of investment firm with reasons for selection, list of other firms considered, which CERS funds will invest, and the specific reasons, if any, why a CERS plan may be excluded from the investment.

vii. Engaging in a monthly meeting with the CERS Investment Committee Chair and the CERS CEO to discuss market trends and all things relevant to the CERS plans positioning.

The CIO or designee is authorized to execute trades on fixed income and equity securities (including exchange-traded funds (ETFs) and to execute proxies for the CERS Board consistent with this IPS.

To carry out this IPS and any investment related decisions of the CERS Board, the CERS Chief Executive Officer (CEO), and the CIO or designee are authorized to execute agreements and other necessary or proper documents pertaining to investment managers, consultants, investment related transactions, or other investment functions. All investment decisions of the CEO and/or the CIO not addressed in this IPS will be ratified by the Investment Committee and the Board of CERS.

D. Investment Managers

In instances where the CERS Investment Committee, in consultation with the CIO, has determined it is desirable to employ the services of an external Investment Manager, the following shall be applicable:

i. Investment Managers shall be qualified and agree to serve as a fiduciary to CERS and should be of institutional quality as deemed by KPPA Investment Staff in collaboration with the investment consultant(s).

ii. Notwithstanding the CIO responsibilities when selecting a new investment, when the KPPA Investment Staff seeks a new external Investment Manager, the Investment Committee shall interview the top three candidates identified and considered by KPPA Investment Staff and the Investment Committee will participate in the selection of the Manager.

iii. Investment Managers shall manage assets in accordance with this IPS and any additional guidelines established by contract, as may be modified in writing from time to time.

iv. Total assets assigned to the selected manager shall not exceed 25% of that firm’s total assets under management and shall not exceed 25% of a firm’s total assets under management in a commingled product. Separate accounts or funds of one are not included in this 25% limitation for commingled products.

v. The assets managed by any one active or passive investment manager shall not exceed 15% of the overall assets in the pension and insurance funds.

vi. All investment management services will be contracted according to the CERS Investment Procurement Policy established by the CERS Board.

E. Custody Bank

KPPA shall hire custodians and other agents who will be fiduciaries to CERS and who will assume responsibility for the safekeeping and accounting of all assets held on behalf of CERS and other duties as agreed to by contract.

F. Investment Consultants

Qualified independent investment consultants may be retained by the CERS Investment Committee for asset allocation studies, asset allocation recommendations, performance reviews, manager searches, and other investment related consulting functions and duties as set forth by contract.

G. Selection

Qualified investment managers, investment consultants, and other investment related service providers shall be selected by the CERS Investment Committee in accordance with the IPS. The selection shall be based upon the demonstrated ability of the professional(s) to provide the required expertise or assistance described in the Request For Proposals (RFP) or Request For Information (RFI),if utilized. In order to create an efficient and effective process, the CERS Investment Committee or CIO may, in their sole discretion, utilize an RFI), an RFP), third party proprietary software or database, review of existing service provider capabilities, or any combination of these or other methods to select a service provider.

III. Asset Allocation Guidelines

In establishing asset allocation guidelines, the CERS Board recognizes that each CERS plan has its own capacity to tolerate investment volatility, or risk. Therefore, each CERS plan has been studied and asset allocation guidelines have been established on a plan by plan basis. The CERS Board will ensure the asset allocation guidelines of each plan are reviewed annually. The CERS Board will provide the CERS Investment Committee with the results of any asset liability valuation study and guidance for determining the needs of any particular CERS plan.

This asset allocation is the result of an update to the Investment Policy enacted on January 1, 2021. The changes to the asset allocation were arrived upon after the Asset Allocation study of November 2020 and an Efficient Frontier analysis conducted in November 2021. The CERS Board has established the following Asset Allocation Guidelines, effective November 10, 2021.

Asset Class	**Target**	Minimum	Maximum
Equity			
Public Equity	**50%**	35%	65%
Private Equity	**10%**	7%	13%
Fixed Income			
Core Fixed Income	**10%**	8%	12%
Specialty Credit*	**10%**	7%	13%
Cash	**0%**	0%	3%
Inflation Protected			
Real Estate	**7%**	5%	9%
Real Return	**13%**	9%	17%

*includes High Yield Fixed Income

The intent of the CERS Board in allocating funds to the investment managers is for the investment managers to fully invest the funds. However, the CERS Board is aware that from time to time the investment manager will require a portion of the allocated funds to be held in cash provided the cash holdings do not exceed five percent (5%) of the manager's allocation for any given quarter, unless such cash holdings are an integral part of a fixed income manager's investment strategy.

The individual CERS plan level asset allocations will be reviewed monthly by KPPA Investment Staff relative to its target asset class allocation taking into account any tactical asset allocation shift directed by the CERS Investment Committee.

Regarding individual investment manager initial allocations, KPPA Investment Staff will get approval at the CERS Investment Committee meeting for a specific dollar amount intended to be committed to a closed-end fund such as private equity or real estate funds and will get approval for a percent of the appropriate asset class target for open-end managers. For those open-end funds where assets can be added or subtracted, the CIO will have discretion to reduce or increase an investment manager's allocation between 50% and 150% of the approved target. The target will not be raised prior to the one-year anniversary of the amount approved by the CERS Investment Committee, and must be reported to the CERS Investment Committee at the next scheduled meeting. If the need arises to terminate a manager between CERS Board meetings, the CIO will have discretion to do so after receiving approval from either the CERS Board Chair or the CERS Investment Committee Chair with concurrence by the CERS CEO. The CERS Investment Committee and the CERS Board must be notified of the manager termination at the next scheduled CERS Investment Committee and Board meetings.

Short-term market shifts may cause the asset mix to drift from the allocation targets. Should the target percentage fall out of the indicated range for a particular asset class, KPPA Investment Staff shall direct rebalancing transactions to reallocate assets from the over-allocated asset class to the under-allocated asset class. Within the allowable ranges, KPPA Investment Staff should use regular cash flows to rebalance toward targets to avoid incurring additional trading costs to correct minor deviations from asset allocation targets. Except when there is a perceived extraordinary downside risk in a particular asset class, movement outside the normal ranges should be avoided.

Investments in private assets are generally less liquid than investments in public markets securities and are typically implemented via periodic commitments to funds with limited partnership structures. As a result, actual allocations to these asset classes may deviate from their strategic targets for extended periods. Actual vs. target deviations for these asset classes shall not be considered in violation of the Asset Allocation Guidelines. However, when identified by the KPPA Investment Staff the deviation must be reported to the CERS Investment Committee Chair within ten (10) business days and at the next Quarterly CERS Investment Committee meeting and each Investment Committee meeting thereafter until the allocation is in compliance with the target. Under/overweights to these asset classes shall be invested in public markets securities with the most similar risk/return characteristics as a short-term proxy for the private asset classes.

In keeping with its responsibility as a CERS Board and wherever consistent with its fiduciary responsibility, the CERS Board encourages the investment of the fund's assets in investments, funds, and securities of corporations which provide a positive contribution to the economy of the Commonwealth of Kentucky. However, where any security is not a prohibited investment under the governing laws and policies, discretion will be granted to the appointed investment managers in the selection of such securities and timing of transactions consistent with the following guidelines and restrictions.

A. Equity

Public Equity

Investments may be made in common stock, securities convertible into common stock, preferred stock of publicly traded companies on stock markets, asset class relevant ETFs or any other type of security contained in a manager's benchmark. Each individual equity account shall have a comprehensive set of investment guidelines prepared by the CIO, which contains a listing of permissible investments, portfolio restrictions, and standards of performance for the account.

The KPPA Investment Staff internally manages approximately fifteen (15%) percent of US equity index funds that are intended, consistent with the governing Plan documents, to gain exposure to a broad asset sector to replicate the characteristics of the asset class, to minimize administrative expenses and to help achieve overall portfolio objectives. The KPPA Investment Staff may passively manage up to twenty (20%) percent of the overall portfolio dedicated to these efficient markets. Beyond this level the CIO shall seek the approval of the Investment Committee by explaining how further passive management would help achieve the overall portfolio objectives. These objectives can be achieved through several management techniques, including, but not limited to, portfolio optimization, non-reinvestment of index dividends, and other management techniques intended to help achieve the investment objectives of CERS.

Private Equity Investments

Subject to specific approval of the CERS Investment Committee, investments may be made for the purpose of creating a diversified portfolio of alternative investments. Private equity investments are expected to achieve attractive risk-adjusted returns and, by definition, possess a higher degree of risk with a higher return potential than traditional investments. Accordingly, total rates of return from private equity investments are expected to be greater than those that might be obtained from conventional public equity or debt investments. Examples of such investments include, but are not limited to: private investments into venture capital; leveraged buyouts; special situations; distressed debt; private debt; timberland, oil and gas partnerships; infrastructure; commodities; and private placements. While it is expected that the majority of these assets will be invested within the United States, a portion has been allocated to non-US investments. These non-U.S. investments are not restricted by geography.

The private equity market is highly sophisticated and specialized with respect to variety and types of investment structures. There exists major competition for deal flow on the part of both investor and general partners. To a great extent, market forces drive the bargaining of economic terms. Most investment vehicles are structured as commingled vehicles and often blind pool investment partnerships. The most common offering forms are equity private placements where the governing laws of the partnership impose a passive role of the limited partner investor. These contractual arrangements are long-term in nature and provide the general partner or sponsors a reasonable time horizon to wisely invest capital, add value through intensive operational management, then realize the proceeds of such an investment. Moreover, terms of the partnership are proposed by the general partner and are critical to the economic incentives and ultimate net performance of the partnership.

Investment Strategy and Plan Guidelines

To strengthen the diversification of the investments, several guidelines will be utilized in KPPA Investment Staff's formulation and recommended annual investment strategy and plan for private equity investments. These guidelines encompass annual commitment levels to the asset class, types of investment vehicles that can be utilized, controlling financing stage risks, industry, manager and geography concentration/diversification limits, acceptable contract negotiations, appropriate sizes for investments, and the preferred alignment of interests.

Investment Vehicles: CERS plans will gain exposure to private equity investments by hiring external investment managers either directly or through participation in secondary private equity markets. Typically, CERS plans will subscribe as a Limited Partner (LP) to limited partnership vehicles sponsored by such specialty external investment managers. CERS will also at times structure separately managed accounts with specific investment objectives to be implemented by external investment managers. CERS plans may also gain private equity exposure by utilizing the following vehicles: limited liability companies and co-investments alongside CERS existing or potential limited partnerships.

Investment Timing Risks: KPPA Investment Staff should limit the potential for any one investment to negatively impact the long-term results of the portfolio by investing across business cycles. Moreover, the portfolio must gain exposure to the array of financing stages by opportunistically exploiting the best investments at different stages of the business cycle. KPPA Investment Staff may also consider purchasing secondary partnership interests to shorten the effective life of the partnership interest and therefore positively impacting the current and long-term net return of the portfolio. Should KPPA Investment Staff anticipate the need of entering a secondary partnership such agreement would need the approval of CERS Investment Committee and ratification by the CERS Board. In addition, mindful of vintage year diversification, CERS should seek to identify attractive commitments annually, further ensuring the portfolio invests across business cycles.

General Partner Diversification: KPPA Investment Staff will seek to work with a variety of general partners due to their specialized expertise in particular segments of the private equity market and source of their deal flow. No more than fifteen (15) percent of CERS Pension or Insurance total allocation to private equity investments may be committed to any one partnership.

Total Exposure to Private Equity*:* Given the illiquid nature of the asset and the complexity of each private equity transaction, it is important that the CIO actively manage the maximum amount of CERS Plan assets allocated to this asset class. The asset allocation authorizes a maximum of thirteen (13%) percent of total CERS Plan assets to this asset class. Should circumstances arise and the allocation go beyond the maximum allocation, the CIO will inform the Investment Committee Chair as soon as possible and report to the Investment Committee Chair and the CEO at the next monthly strategic planning meeting and all subsequent quarterly CERS Investment Committee meetings until the allocation is back in compliance.

B. Fixed Income

Core Fixed Income

The core fixed income accounts may include, but are not limited to the following fixed income securities: U.S. Government and Agency bonds; investment grade U.S. corporate credit; investment grade non-U.S. corporate credit; municipal bonds; Non-U.S. sovereign debt; mortgages including residential mortgage backed securities; commercial mortgage backed securities; and whole loans, asset-backed securities, and asset class relevant ETFs.

The high yield fixed income accounts may include, but are not limited to, the following fixed income securities: non-investment grade U.S. corporate credit including both bonds and bank loans; non-investment grade non-U.S. corporate credit including bonds and bank loans; municipal bonds; non-U.S. sovereign debt; mortgages including residential mortgage backed securities, commercial mortgage backed securities, and whole loans, asset-backed securities; and emerging market debt (EMD) including both sovereign EMD and corporate EMD and asset class relevant ETFs.

Each individual core fixed income account shall have a comprehensive set of investment guidelines prepared by the CIO which contains a listing of permissible investments, portfolio restrictions, risk parameters, and standards of performance for the account.

Specialty Credit

Each individual Specialty Credit account shall have a comprehensive set of investment guidelines prepared by the CIO which contains a listing of permissible investments, portfolio restrictions, risk parameters, and standards of performance for the account.

Cash Equivalent Securities

Selection of particular short-term instruments, whether viewed as liquidity reserves or as investment vehicles, should be determined primarily by the safety and liquidity of the investment and only secondarily by the available yield. The following short-term investment vehicles are considered acceptable: Publicly traded investment grade corporate bonds; variable rate demand notes; government and agency bonds; mortgages, municipal bonds, and collective short-term investment funds (STIFs), money market funds or instruments (including, but not limited to, certificates of deposit, bank notes, deposit notes, bankers' acceptances and commercial paper) and repurchase agreements relating to the above instruments. Instruments may be selected from among those having an investment grade rating at the time of purchase by at least one recognized bond rating service. In cases where the instrument has a split rating, the lower of the two ratings shall prevail. All instruments shall have a maturity at the time of purchase that does not exceed 397 days. Repurchase agreements shall be deemed to have a maturity equal to the period remaining until the date on which the repurchase of the underlying securities is scheduled to occur. Variable rate securities shall be deemed to have a maturity equal to the time left until the next interest rate reset occurs, but in no case will any security have a stated final maturity of more than three years.

CERS fixed income managers that utilize cash equivalent securities as an integral part of their investment strategy are exempt from the permissible investments contained in the preceding paragraph. Permissible short-term investments for fixed income managers shall be included in the investment manager's investment guidelines.

C. Inflation Protected

Real Estate

Investments are made in equity and debt real estate for the purpose of achieving the highest total rate of return possible consistent with a prudent level of risk. Allowable real estate investments include open-end and closed-end commingled real estate funds, joint venture investments, public and private real estate investment trusts (REITs), public real estate operating companies, and real estate related debt. CERS has determined that the primary role of the real estate asset class is to provide for the following:

- Attractive risk adjusted returns through active management and ability to access managers with the expertise and capabilities to exploit market inefficiencies in the asset class. The illiquid nature of real estate investments combined with the complexity of investments makes it difficult for casual investors to effectively access the asset class effectively. It is our belief that through active management and by investing in top tier managers with interests aligned through co-investment and incentive-based compensation, CERS can maximize their risk adjusted returns. This active management approach will be pursued.

- Diversification benefits through low correlations with other asset classes, primarily the U.S. equity markets.

- Provide a hedge against unanticipated inflation, which real estate has historically provided due to lease structures and the increases in material and labor costs during inflationary periods.

- Permit CERS to invest in unique opportunities that arise due to dislocations in markets that occur from time to time.

Real Return

The purpose of the Real Return Portfolio is to identify strategies that provide both favorable stand-alone risk-adjusted returns as well as the benefit of hedging inflation for the broader plans. Real Return strategies are not necessarily a separate asset class but may include real assets, such as infrastructure, real estate, commodities, and natural resources among others, as well as financial assets that have a positive correlation to inflation. This can include real bonds such as Treasury Inflation-Protected Securities (TIPs) (and other inflation linkers) or real stocks such as REITs, Master Limited Partnerships (MLPs), and oil & gas stocks. Additionally, Real Return managers may attempt to add value by tactically allocating to various asset classes according to how each asset class performs across an economic cycle and the manager's perception of where we are in the cycle. The goal is to invest in inflation sensitive assets during inflationary periods, and avoid those assets in deflationary periods, thus providing a positive real return across the cycle.

The real return opportunity set may include numerous vehicles to access a wide variety of investment styles and strategies. These investment vehicles may include mutual funds, ETFs, separately managed accounts as well as hedge funds (open-end limited partnerships) and private equity (close-end limited partnerships). The list of strategies that CERS' Real Return Portfolio may use includes, but is not limited to, the following:

- Global Tactical Asset Allocation (GTAA)/Global Macro: GTAA or macro strategies are those that make directional bets on major markets or asset classes instead of individual securities. GTAA and macro strategies typically invest in all major assets classes including equity markets, credit and debt instruments, currencies/interest rates, and commodities. These strategies tend to focus on economic factors that would suggest an opportune time to invest in a given asset class, and will change their allocations actively over time. These strategies may use inflation as the economic factor to gain exposure to and will target a real rate of return over time.

- Inflation Linked Securities are securities that directly tie coupon payments or principal increases to an inflation index, such as Consumer Price Index (CPI). These strategies could include not only US TIPS, but also global sovereign inflation linked bonds, corporate or infrastructure inflation linked bonds, and possibly short duration floating rate bonds.

- Inflation Sensitive Equities include publicly traded equity and equity related securities in companies which have a high sensitivity to inflation in their profit margins via the nature of their operating assets, such as energy companies, basic materials and miners, natural resource stocks, and listed infrastructure. This category can also include, but are not limited to, REITs, MLPs as well as ETFs and index products on REITS, MLPs, and natural resource stocks.

- Commodities: Commodities are the raw materials that are physical inputs into the production process. Managers that invest in liquid commodity strategies using exchange traded futures can span from simple indexing (matching a long-only commodities index), to enhanced indexing or active long (selecting positions that vary from the index but within fairly tight ranges), as well as unconstrained long-short managers.

- Private Property: For the purposes of this IPS, private property refers to the ownership of an idiosyncratic, physical asset that is predominately fixed and/or permanent or at least substantially long-lived. This includes real estate, such as land and any improvements to or on the land, as well as timberland and farmland. Timberland investing involves the institutional ownership of forest for the purpose of growing and harvesting the timber. The timber may be used for furniture, housing lumber, flooring, pulp for paper, woodchips, and charcoal, among other things. Farmland investing entails ownership of land used primarily, if not exclusively, for agricultural production both for crops, including row crops and permanent crops, as well as livestock. Private property can also include infrastructure investing, which refers to financing the manufacture or development of the underlying fundamental assets and basic core infrastructure that are necessary for an economy whereby such assets are largely fixed and long-lived. These tend to be high cost, capital-intensive investments that are vital to a society's prosperity and facilitate the transfer, distribution, or production of basic goods and services.

- Natural Resources: Natural resources can include investing in the financing, development, extraction, and production of minerals, basic materials, petroleum products, and water as well as renewable resources such as agricultural commodities and solar energy. As opposed to property, the returns generated in these investment strategies come more from the actual production of the resource itself. Further, these are depleting and/or consumable assets that are also portable and fungible and which in the aggregate comprise a majority of the inputs into most measurements of inflation.

- Private Assets: Private assets can include tangible or intangible assets that are not easily sold in the regular course of a business' operations for cash, and which are held for their role in contributing directly to the business' ability to generate profit. As the useful life of the asset tends to extend across many years and the assets tend to be capital intensive as well, they have some similarity to private infrastructure. Further, given that the assets contribute directly to the production process as well as often retaining intrinsic value, there is a fundamental link to inflation somewhat similar to natural resources.

- Other (Opportunistic Inflation Hedge): Other/opportunistic strategies include those that have a propensity to provide a positive real return or positive correlation with inflation over time. Liquid strategies such as inflation swaps, diversified inflation hedging mutual funds, or nominal bonds backed by inflation sensitive assets may be included in this allocation, while other illiquid strategies that may provide the same real profile can include private equity in inflation sensitive companies, hard asset-backed private credit, and structured inflation-linked products among others.

Portfolio Guidelines

No more than 50% of the total net assets of the Real Return portfolio may be invested in any one registered investment vehicle, mutual fund, or separately managed account.

No more than 20% of the total net assets of the Real Return portfolio may be invested in any single closed-end or open-end limited partnership or other unregistered investment vehicle.

The relative allocations to the liquid and illiquid portfolios will be determined according to each individual System's liquidity needs, funding status, and allocation targets on an investment by investment basis.

D. Co-Investment Policy

The CIO has discretion to make direct co-investments in companies alongside of current general partners. Any co-investment opportunity must also be part of the main account or fund into which CERS has already invested before it can be considered. For purposes of this IPS, a direct co-investment is defined as a direct investment in a portfolio company alongside an existing CERS' partnership deemed in good standing.

The maximum investment in any co-investment vehicle shall not exceed 50 percent of the total capital committed by all partners at the time of the final closing. The maximum investment in any single direct co-investment shall not exceed 20 percent of the original partnership commitment. Total investment in direct co-investments shall not exceed 20 percent of the asset class portfolio on a cost basis at the time of investment.

IV. Monitoring

Performance Measurement

CERS overall fund performance is measured relative to CERS Pension or Insurance Total Fund Benchmark. The benchmark is calculated by means of a weighted average methodology. This method is consistent with the CFA Institute Global Investment Performance Standards (GIPS®), a set of standardized, industry-wide ethical principles that guide investment managers and asset owners on how to fairly calculate and present their investment results, with the goal of promoting performance transparency and comparability. It is the product of the various component weights (i.e., asset classes' percentages) by their respective performance (returns). Due to market fluctuations and acceptable divergence, the asset classes' weights (percentages) are often not equivalent to the benchmark's weights. Therefore, the performance may indicate that the Funds have outperformed (underperformed) relative to their respective benchmarks, even when the preponderance of lesser weighted categories have underperformed (outperformed) their indices.

CERS measures its asset classes, sub-asset classes, sectors, strategies, portfolios, and instruments (investment) performance with indices that are recognized and published). These indices are determined to be appropriate measures of investments and composites of investments with identical or similar investments profiles, characteristics, and strategies. The benchmarks and indexes are intended to be objective, investable, replicable, representative and measurable of the investment mandate and, developed from publicly available information that is acceptable to CERS and the investment manager/advisor as the neutral position consistent with the underlying investor status. The CERS investment consultant and KPPA Investment staff recommend the benchmarks and indexes. These measures shall be subject to the review and approval of the CERS Investment Committee with ratification by the CERS Board when asset allocation studies are performed, or when a change to existing benchmarks is recommended by KPPA Investment Staff and the CERS investment consultant. The current asset class benchmarks, effective as of November 10, 2021 with the adoption of the asset allocation, are as follows:

Asset Class	Benchmark
Equity	
Public Equity	MSCI ACWI
Private Equity	Russell 3000 + 300 bps (lagged)
Fixed Income	
Core Fixed Income	Bloomberg Barclays US Aggregate
Specialty Credit	50% Bloomberg Barclays US High Yield/ 50% S&P LSTA
Cash	Citi Grp 3-mos Treasury Bill
Inflation Protected	
Real Estate	NCREIF ODCE
Real Return	US CPI + 3%
Absolute Return	HFRI Diversified Fund of Fund Composite

The following descriptions represent general standards of measurement that will be used as guidelines for the various classes of investments and managers of CERS. They are to be computed and expressed on a time-weighted total return basis:

<u>Total Public Asset Class Allocations</u>

Short-term

- For periods less than five years or a full market cycle, the Asset Class Allocation should exceed the returns of the appropriate Index.

Intermediate & Long-term

- For periods greater than five years or a full market cycle, the Asset Class Allocation should exceed the appropriate Index, compare favorably on a risk-adjusted basis, and generate returns that rank above the median return of a relevant peer group. Volatility, as measured by the standard deviation of monthly returns, should be comparable to the Index.

Individual Public Security Portfolios: Individual portfolios shall be assigned a market goal or benchmark that is representative of the style or market capitalization of the assignment. Individual accounts should be monitored using the following Standards:

Short-term

- For periods less than five years or a full market cycle, individual portfolios should exceed the returns of their market goal or benchmark.

Intermediate & Long-term

- For periods greater than five years or a full market cycle, individual portfolios should exceed the return of their market goal or benchmark, compare favorably on a risk-adjusted basis, and generate returns that rank above the median return of a relevant peer group. Volatility, as measured by the standard deviation of monthly returns, should be comparable to the benchmark.

Alternative Assets:

Private Equity

The Private Equity portfolio should also seek to achieve both short-term and intermediate/long term Net Internal Rate of Returns (IRR) that provide yields in excess of core equity investments. The KPPA Investment Staff shall quarterly complete a comparison of performance between equity portfolio performance and Private Equity portfolio returns. The KPPA Investment Staff will report to the Investment Committee the following:

Short-term

- Alternative investments should earn a Net Internal Rate of Return (IRR) that place the investment above the median Net IRR of other similar funds, of the same vintage year, as reported by industry benchmarks.

Intermediate & Long-term

- The private equity portfolio should earn a return that meets or exceeds CERS Private Equity Index. Individual private equity investments should earn a Net IRR above the median Net IRR of other similar funds, of the same vintage year, as reported by industry benchmarks.

Inflation Protected

Real Estate

Private Real Estate investments are unique and can be illiquid and long term in nature. Given that this may lead to large short-term performance discrepancies versus public benchmarks, CERS more appropriately measures its real estate investments based on both relative return and absolute return methodologies:

Relative Return: The Real Estate portfolio is expected to generate returns, net of all fees and expenses, in excess of the National Council of Real Estate Investment Fiduciaries Open End Diversified Core Equity Index (NCREIF ODCE) lagged 1 calendar quarter.

Absolute Return: The long-term real return objective (returns adjusted for inflation) for CERS' Real Estate portfolio is five percent (5%) over the Barclays Capital U.S. 7-10 Year Treasury Bond Index, net of investment management fees. This return shall be calculated on a time-weighted basis using industry standard reporting methodologies.

Real Return

The total Real Return investments shall seek to:

1. Short-term benchmark: For periods less than five (5) years or a full market cycle, the allocation should achieve an annual rate of return that exceeds the appropriate benchmark (the weighted average return of the underlying investment benchmarks) annually over a complete market cycle, net of all investment management fees.
2. Strategic objective: For periods greater than five (5) years or a full market cycle, the allocation should not only outperform the short-term benchmark, but also achieve a rate of return that exceeds (CPI + 300 basis points) as well.
3. Achieve a positive risk/reward trade-off when compared to similar style Real Return Investment Managers.

Performance Review

On a timely basis, but not less than quarterly, the CERS Investment Committee will review the performance of the portfolio for determination of compliance with this IPS. This will include a quarterly performance peer review analysis comparing CERS with other public pension plans. On an annual basis, a comprehensive review of each asset class and underlying portfolios shall be conducted by the KPPA Investment staff and presented to the CERS Investment Committee. The review shall consist of an organizational, performance and compliance assessment.

The Compliance Officer shall perform tests at least monthly to assure compliance with the restrictions imposed by this IPS. These tests shall be performed at the asset class and total fund level. Quarterly, the Compliance Officer shall prepare a report to the CERS Investment Committee detailing the restrictions tested, exceptions, the cause of the exception and the subsequent resolution. The CERS Investment Committee shall report the findings to the CERS Board at the next regularly scheduled meeting. Internal Audit will schedule periodic reviews/audits of this function to ensure compliance with this IPS.

The following restrictions shall be tested at least monthly:

1. The amount of stock in the domestic or international equity allocation in any single corporation shall not exceed 5% of the aggregate market value of CERS' assets.

2. The amount of stock held in the domestic or international equity allocation shall not exceed 3% of the outstanding shares of any single corporation.

3. Investment in frontier markets (those countries not included in the MSCI EM Index) shall not exceed 5% of CERS' international equity assets.

4. The duration of the core fixed income portfolios combined shall not vary from that of CERS' Fixed Income Index by more than +/- 25% duration as measured by effective duration, modified duration, or dollar duration except when the CERS Investment Committee has determined a target duration to be used for an interim basis.

5. The amount invested in the debt of a single issuer shall not exceed 5% of the total market value of CERS' fixed income assets, with the exception of U.S. Government issued, guaranteed or agency obligations (or securities collateralized by same), and derivative securities used for exposure, cost efficiency, or risk management purposes in compliance with Section VII of this policy.

6. 50% of the core fixed income assets must have stated liquidity that is trade date plus three days or better.

The CIO shall develop a comprehensive set of investment guidelines for each externally managed account. These guidelines should ensure, at the total fund and asset class level, that the restrictions set forth above are preserved.

Under the CIO's direction, KPPA Investment Staff shall perform site visits with all current CERS investment managers over 3-year rolling market cycles, with at least 1/3 of all current managers occurring on a yearly basis.

V Additional Items

Derivatives Permitted Use:

CERS permits external managers and KPPA Investment Staff to invest in derivative securities, or strategies which make use of derivative investments, for exposure, cost efficiency and risk management purposes, if such investments do not cause the portfolio to be leveraged beyond a 100% invested position. Any derivative security shall be sufficiently liquid that it can be expected to be sold at, or near, its most recently quoted market price. Typical uses of derivatives in the portfolio are broadly defined below:

Exposure:

Derivatives are an effective way for a portfolio manager to gain exposure to a security that the manager does not want to purchase in the cash market. Reasons for gaining exposure to a security through the use of derivatives may include cheaper transactions costs, liquidity/lack of supply in the underlying market, and the flexibility to implement investment views with minimum portfolio disruption. An example is a cash equitization program.

Cost Efficiency:

Derivatives are often used due to the cost efficiency associated with the contract properties. Given the fact that derivatives can be used as a form of insurance, upfront trading costs must be sufficiently low for investors to purchase the contract and insure their portfolios efficiently. Furthermore, due to properties associated with derivatives and cash outlay characteristics (minimal cash outlay at inception of the contract) derivatives are generally a vehicle of gaining cost efficient exposure. An example is the cost (zero) to purchase a futures contract.

Risk Management:

Derivatives can be used for mitigating risk in the portfolio. When used as a risk management tool, derivatives can significantly reduce an identified financial risk or involuntary risk from investment areas by providing changes in fair values or cash flows that substantially offset the changes in fair values or cash flows of the associated item being hedged. An example is the use of currency forwards to offset periods of dollar strength when international equity markets increase in value, thereby protecting foreign asset gains in the portfolio.

Derivatives Restricted Use:

Settlement:

Investments in futures contracts are to be cash settled unless physically settled and stored by external managers. At no time shall CERS plans agree to take physical delivery on a futures contract.

Position Limits:

Futures and options positions entered into by CERS, or on its behalf, will comply with all position and aggregate limits established by the local governing authorities within each jurisdiction.

Over-the-Counter (OTC):

Investments in securities not traded on public exchanges that are deemed OTC in nature are allowed provided that a counterparty risk monitoring component is delineated in the manager's guideline section of the manager's contract. All counterparties must have a short-term credit rating of at least BBB (Standard and Poor's or Fitch) or Baa2 (Moody's).

All OTC derivative transactions, including those managed through Agency Agreements, must be subject to established International Swaps and Derivatives Association, Inc. (ISDA) Master Agreements and have full documentation of all legal obligations of CERS under the transactions. All ISDA Master Agreements entered into by or on behalf of CERS by the KPPA Investment Staff and external manager pursuant to an Agency Agreement shall provide that netting applies (netting allows the parties to an ISDA Master Agreement to aggregate the amounts owed by each of them under all of the transactions outstanding under that ISDA Master Agreement and replace them with a single net amount payable by one party to the other.) The KPPA Investment Staff and external managers may also use collateral arrangements to mitigate counterparty credit or performance risk. If an external manager utilizes a collateral arrangement to mitigate counterparty credit or performance risk the arrangement shall be delineated in the manager's guideline section of the manager's contract.

Derivatives Applications Not Permitted:

Speculation:

Except for investments in Real Return investments, derivatives may not be used for any activity for which the primary purpose is speculation or to profit while materially increasing risk to CERS. Derivatives are considered speculative if their uses have no material relation to objectives and strategies specified by the CERS IPS or applicable to the CERS portfolio. Derivatives may not be used for circumventing any limitations or restrictions imposed by the CERS IPS or applicable regulatory requirements.

Leverage:

Leverage is inherent in derivative contracts since only a small cash deposit is required to establish a much larger economic impact position. Thus, relative to the cash markets, where in most cases the cash outlay is equal to the asset acquired, derivative investments offer the possibility of establishing substantially larger market risk exposures with the same amount of cash as a traditional cash market portfolio. Therefore, risk management and control processes must focus on the total risk, i.e. the net notional value, assumed in a derivative investment.

The above is not intended to limit CERS from borrowing to cover short-term cash flow needs nor prohibit CERS from loaning securities in accordance with a securities lending agreement.

The CERS Board recognizes that the voting of proxies is an important responsibility in assuring the overall performance over a longtime horizon. The CERS Board has delegated the responsibility of voting all proxies to an outside Proxy Voting service provider or contracted external investment manager. The CERS Board expects that the proxy voting service will execute all proxies in a timely fashion, and in accordance with the voting policy which has been formally adopted.

The CERS Board has adopted the ISS U.S. Proxy Voting Guidelines as the CERS approved Proxy Voting Policy for all internally voted items. This policy is updated at least annually by ISS is and hereby incorporated by this reference. The policy can be found publicly using the following link:

ISS U.S. Proxy Voting Guidelines.com

Additional CERS Investment Administrative Policies

A. Investment Procurement Policy as amended and the as amended are hereby incorporated by reference.
B. KPPA Investment Brokerage Policy as amended is hereby incorporated by reference.
C. KPPA Transactions Procedures Policy as amended is hereby incorporated by reference.
D. KPPA Securities Litigation Policy and Procedures as amended is hereby incorporated by reference.
E. KPPA Investment Securities Lending Guidelines as amended is hereby incorporated by reference.
F. KPPA Securities Trading Policy for Trustees and Employees as amended is hereby incorporated by reference.
G. KPPA Manager and Placement Agent Statement of Disclosure Policy as amended is hereby incorporated by reference.
H. KPPA Real Estate Policy as amended and hereby incorporated by reference.
I. CERS Conflict of Interest and Confidentiality Policy as amended and hereby incorporated by reference.
J. KPPA Proxy Voting Policy as amended and hereby incorporated by reference.

Signatories

As Adopted by the CERS Investment Committee	As Adopted by the CERS Board of Trustees
Date:_______________________________________	Date:__________________________________
Signature:___________________________________	Signature:______________________________
Dr. Merl Hackbart	Ms. Betty Pendergrass
Chair, CERS Investment Committee	Chair, CERS Board of Trustees

Wilshire

CERS Investment Policy Update

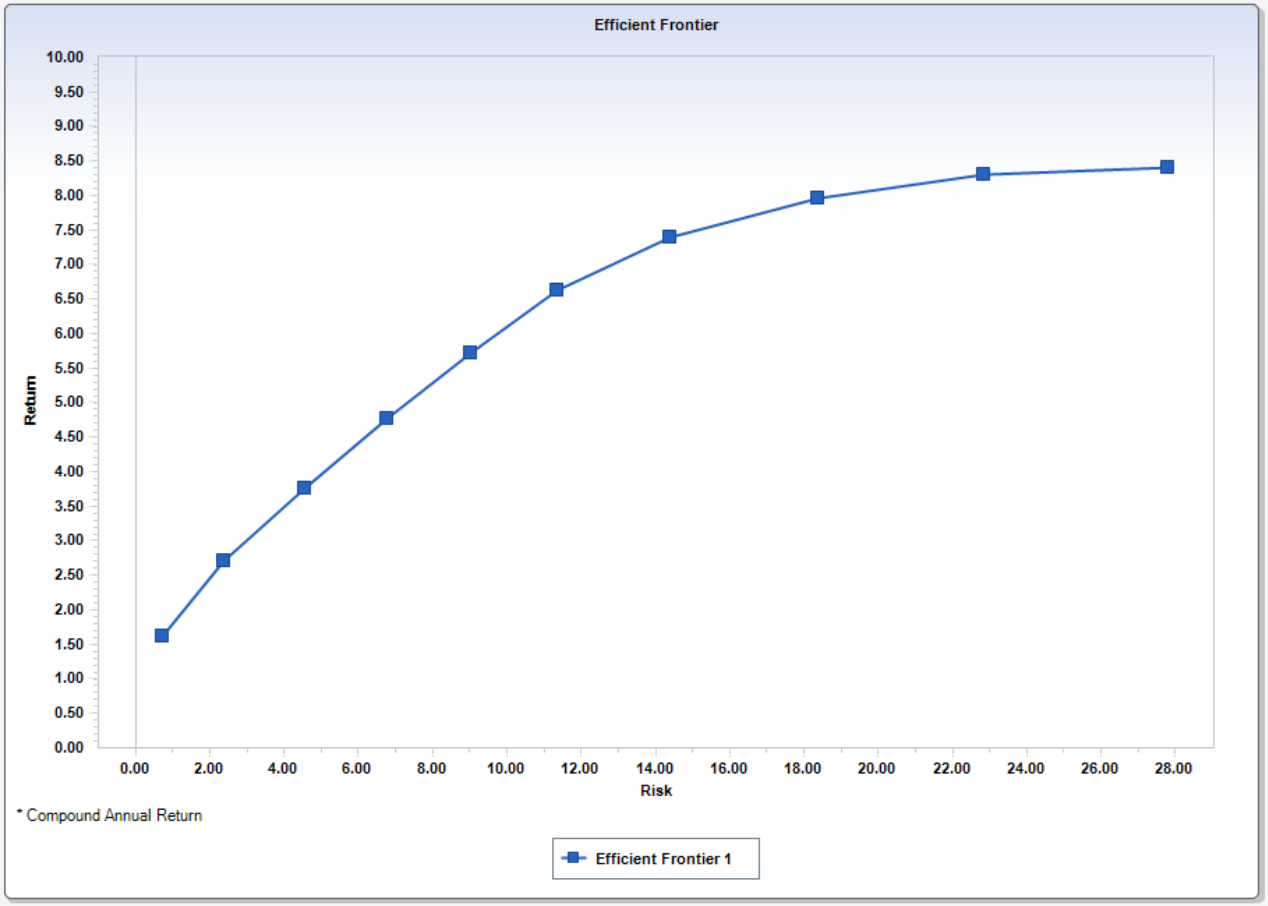
Asset Allocation Review

November 8, 2021

Wilshire

Unconstrained

- The unconstrained efficient frontier shows portfolios with the maximum level of return possible for various levels of risk
- At this point the only risk being considered is volatility risk
- The unconstrained frontier results in portfolios that are highly concentrated and illiquid

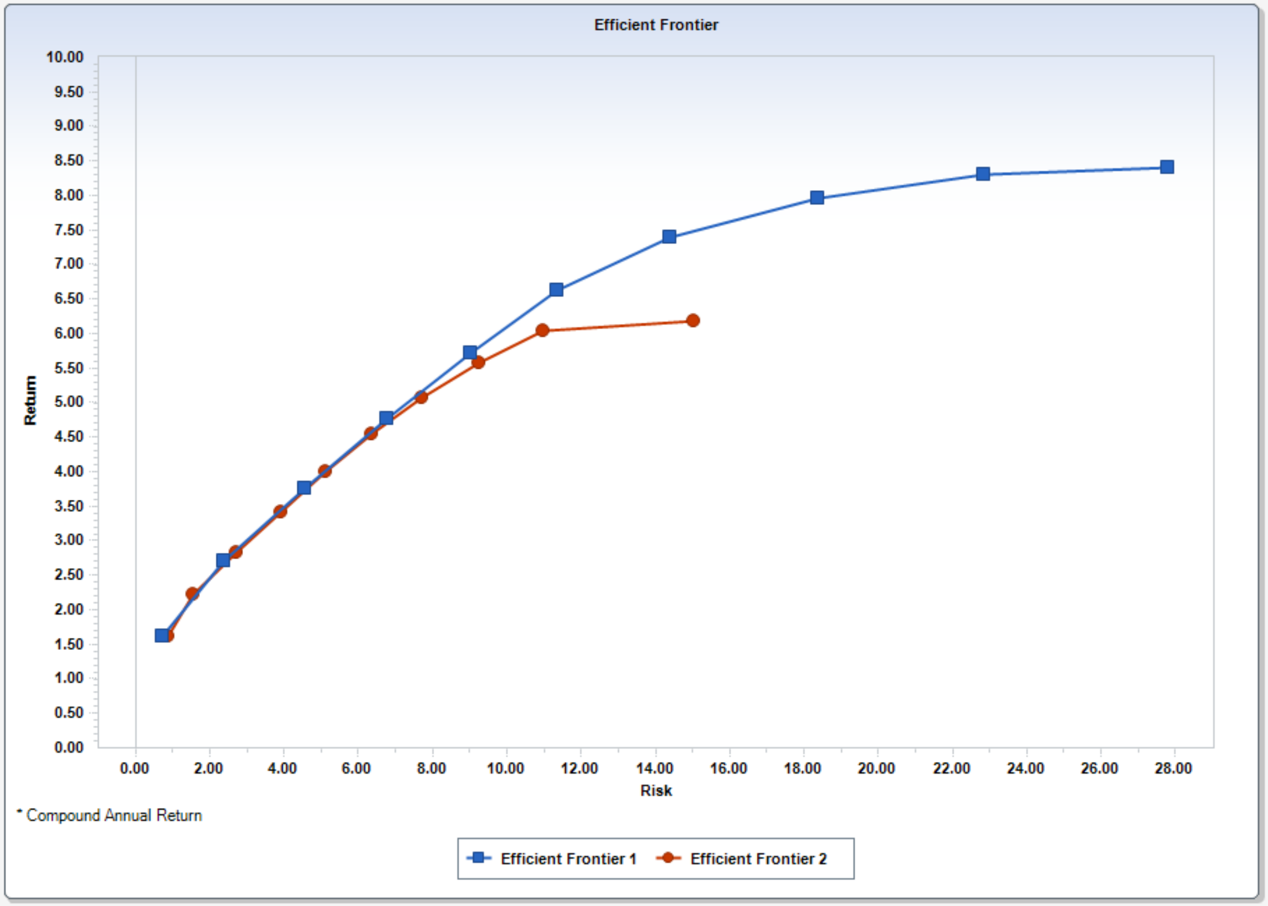


Asset class assumption, frontier constraints, and portfolio details can be found later in this presentation.

Wilshire

Asset Class Risk

- To control asset class risk concentration, practitioners apply constraints that reduce the maximum allowable allocation to specific asset classes
- Here we see the impact of these constraints, moving from the unconstrained EF1 to the asset constrained EF2



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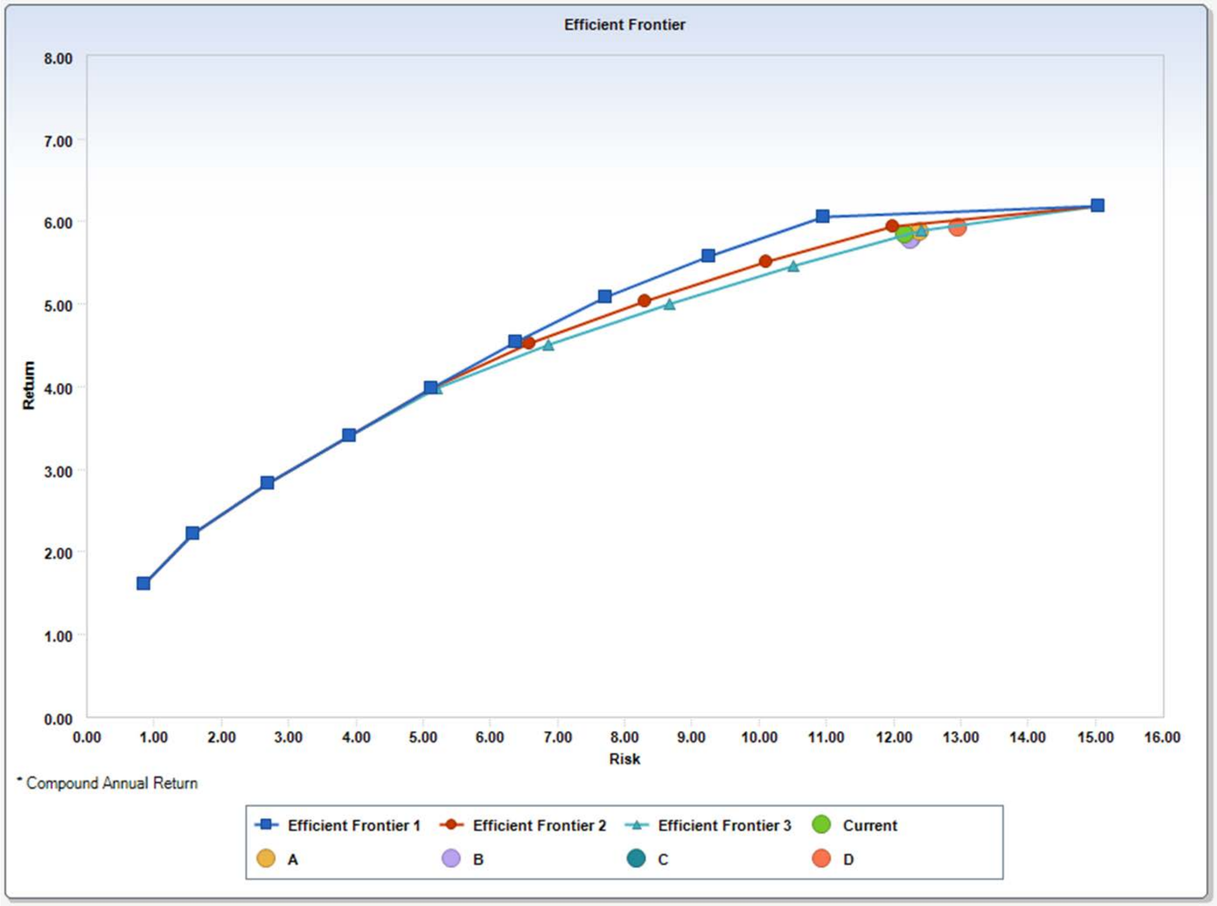
Wilshire

Liquidity Risk

- The efficient frontier can be further constrained to control the overall level of illiquid assets allowable
- Here we see EF1, which is the asset risk constrained portfolio from the previous page, which is then further constrained to only allow 35% (EF2) or 30% (EF3) illiquid assets
- Private equity and real estate are illiquid, while specialty credit and real return are treated as 50% illiquid



Asset class assumption, frontier constraints, and portfolio details can be found later in this presentation.

Wilshire

Modelled Portfolio Details

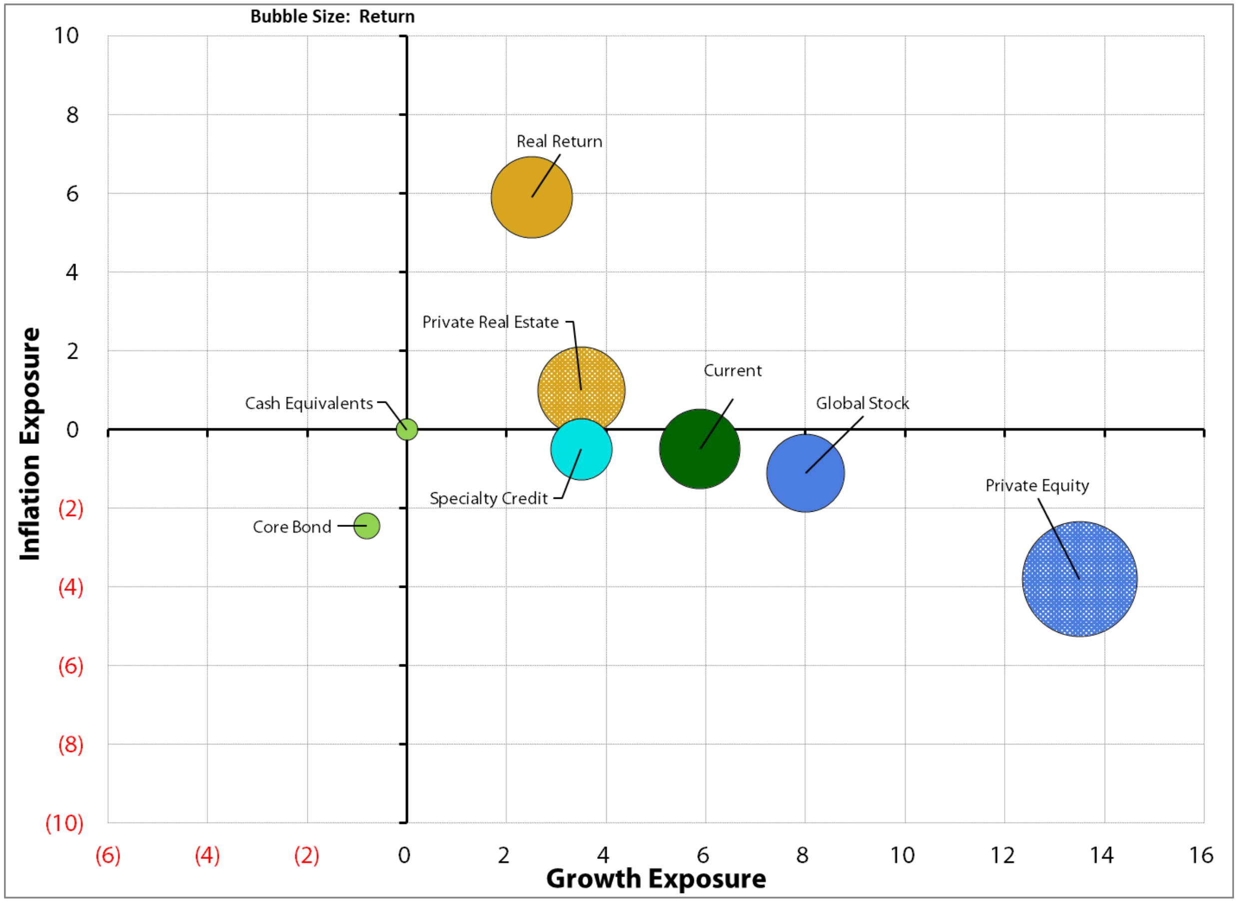
The following portfolios were chosen from the 30% illiquid efficient frontier for further consideration :

Asset	Constraints	Current	A	D
Public Equity	0-60	43.5	45.0	50.0
Private Equity	0-15	10.0	10.0	10.0
Core Fixed Income	10-100	10.0	10.0	10.0
Specialty Credit	0-20	15.0	15.0	10.0
Cash	0-100	1.5	0.0	0.0
Real Estate	0-15	10.0	7.5	7.5
Real Return	0-20	10.0	12.5	12.5
Return - 10 Year		5.84	5.88	5.92
Risk		12.18	12.40	12.97
Return/Risk		0.48	0.47	0.46
Yield		2.60	2.60	2.33
Growth Factor Exposure		5.88	5.97	6.19
Inflation Factor Exposure		-0.49	-0.38	-0.41
Liquidity (Market Level)		0.55	0.55	0.58
Liquidity (Stressed)		0.10	0.09	0.09
Return - 30 Year		7.12	7.17	7.22

The Growth and Inflation factor exposures, as well as the Liquidity metrics, are proprietary Wilshire metrics that will be discussed further in the meeting.

Wilshire

Factor Exposure Chart



Wilshire

Asset Class Assumptions

Wilshire's forward looking, 10 year asset class assumptions as of 9/30/2021 were used for this analysis

10 Year Asset Class Assumptions

	Public Equity	Private Equity	Core Fixed Income	Specialty Credit	Cash	Real Estate	Real Return
Return	5.65	8.41	1.85	4.50	1.55	6.34	5.90
Risk	17.15	27.78	4.30	8.16	0.75	13.93	11.44
Yield	1.75	0.00	3.00	7.15	1.55	2.29	2.12

Correlations

Public Equity	1.00						
Private Equity	0.74	1.00					
Core Fixed Income	0.20	0.32	1.00				
Specialty Credit	0.56	0.32	0.18	1.00			
Cash	-0.07	0.00	0.19	-0.10	1.00		
Real Estate	0.53	0.52	0.19	0.63	-0.05	1.00	
Real Return	0.62	0.51	0.16	0.61	-0.01	0.51	1.00

Specialty Credit is a 50%/50% blend of high yield and direct lending; Real Return is a 50%/50% blend of public and private real assets, split evenly between TIPS, Commodities, Listed Infrastructure, Timber, Oil & Gas, and Private Infrastructure

Wilshire

Important Information

Series, Episode 17

Executive Series: Social Engineering the Executive

This two minute course was created to show executives and board members techniques social engineers and hackers use to trick senior executives and steps they can take to reduce the risk of falling victim to sophisticated phishing attacks.

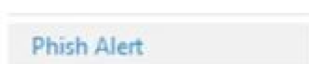
Series, Episode 3

Using the Phish Alert Button: Report Unsolicited Emails

When using your KRS/KPPA email address, you have access to functionality to report phishing emails. In this module, you'll learn about the Phish Alert Button (PAB), an email plugin that gives you a safe way to handle unsolicited emails (SPAM and Phishing).

Using the PAB will forward any unsolicited emails to your organization's security team for analysis and delete the email from your user's inbox, preventing future exposure.

In the Phish Alert Module, it will ask you which version of email you use. KPPA currently utilizes Exchange, so you will need to choose the Blue icon. We also chose to use the Phish Alert link found in emails that come from outside KPPA.



2021 Kevin Mitnick Security Awareness Training - 15 Minutes

This module gives you the insider information you need to identify common techniques hackers use against you in an attempt to gain access to your organization's valuable resources. It actually happens way more than you would think. Join Kevin Mitnick as he takes you behind the scenes to demonstrate how the bad guys do what they do. Finally, discover the warning signs of a hacker's attack and the actions you should take to protect yourself and your organization from them.

Internet Security When You Work From Home

The concept “Working From Home” (WFH) has gone mainstream, and is often the preferred way for some positions to get maximum productivity. Apart from that, it’s also an effective way for organizations to assure business continuity when unexpected circumstances like natural disasters or pandemics crop up. This training module helps you understand the challenges and trains you to stay secure online while working from home.