NEW YORK CITY TEACHERS' RETIREMENT SYSTEM
INVESTMENT MEETING
held on Thursday, September 6, 2012
at
55 Water Street
New York, New York

ATTENDEES:

MELVYN AARONSON, Chairperson, Trustee, TRS
SANDRA MARCH, Trustee, TRS
MONA ROMAIN, Trustee, TRS
LARRY SCHLOSS, Comptroller's Office, Trustee
JANICE EMERY, Trustee, Finance
JOEL GILLER, TRS
MARC KATZ, TRS
LIZ SANCHEZ-PAZ, TRS
SUSAN STANG, TRS
JOHN BRIGHT, Comptroller's Office
ADI DIEGI, Comptroller's Office
MARTIN GANTZ, Comptroller's Office
MARK GROSS, Comptroller's Office
SEEMA HINGORANI, Comptroller's Office
THADDEUS McTIGUE, Comptroller's Office
BARRY MILLER, Comptroller's Office
YVONNE NELSON, Comptroller's Office
PETRA NIKOVA, Comptroller's Office
PAUL J. RAUCCI, Comptroller's Office
TATIANA POHOTSKY, Comptroller's Office
ROBERT C. NORTH, JR., Actuary
ROBIN PELISH, Rocaton
CHRIS LYON, Rocaton
MIKE FULVIO, Rocaton
MARINA MEKHLIS, Rocaton
RENEE PEARCE, Broome Law Group
ROBERTA UFFORD, Corporation Counsel
JUSTIN HOLT, Finance

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P R O C E E D I N G S

(9:30 a.m.)

MR. KATZ: Good morning. This is the September 6, 2012 Investment Meeting of the Teachers' Retirement System. We'll start with the roll call.

Melvyn Aaronson?

MR. AARONSON: Here.

MR. KATZ: Kathleen Grimm?

(No response.)

Larry Schloss?

MR. SCHLOSS: Here.

MR. KATZ: Sandra March?

MS. MARCH: Here.

MR. KATZ: Mona Romain?

MS. ROMAIN: Here.

MR. KATZ: We have a quorum.

The variable public agenda is a departure from normal procedure, and we're going to continue then with the variable executive agenda.

Mr. Chairman, I'll turn it over to you.

CHAIRPERSON AARONSON: Robin?

MS. PELISH: Yes. Mr. Lyon.

MR. LYON: Good morning. Nice to see everyone. Today we're going to start by going through the second quarter report for the Passport funds, also

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known as variable funds. And since we are going first this time, I will provide a brief amount of market color for that time period, and there will be more of that in the other part of the public session.

So, if you turn in the green bound book, you can see on the first page of the first tab the market performance of various parts of the market through June 30 for the quarter year and longer term.

And you can see that in the second quarter, this is a reminder that most equity markets were negative. And as you move into smaller cap within the U.S., a little more negative. And as you move outside of the U.S. into emerging markets, most negative.

So the U.S. broad market was down about 3 percent, and emerging markets down almost 9 percent. Everything else I mentioned in that sequence somewhere in between.

On the fixed income side of the spectrum, the U.S. market was up in terms of the aggregate benchmark, about 2 percent. While long Treasuries -- and this will be important later when we talk about relative performance in benchmarking -- long Treasuries were up 11.8 percent for the quarter. And that brings the one year return to 37.2 percent. That's not normally Treasuries that you have to expand the Y axis

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on the chart to accommodate.

If you look over further toward the right, you can see other parts of the fixed income market. And of course it's the cash markets that you have to squint in order to see. The returns are more than in some recent quarters.

So with that as a backdrop, I will get into subsequent performance later, but I'd like to briefly review these results. If you turn to page 3 behind tab 2, we have some commentary. And that commentary focuses first on the diversified equity fund. The fund was down about 3.3 percent. All the results I'm going to talk about are net of fees. And that compared with -- somewhat similar, slightly better returns for the Russell 3000 and the hybrid benchmark. And over the one year period there was a positive 1.4 percent return, which lagged those two benchmarks.

There's some info about the longer term performance as well. And in addition, we continue to look at regularly, as we do, at the volatility of this strategy versus the broad U.S. Equity market. And you consistently had less volatility on a rolling 5 year basis than that of the broad U.S. Equity benchmarks.

Part of the reason for that is the diversified nature, and also the emphasis of some of the

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underlying strategies on downside protection, and that comes through the defensive strategies composite.

So, the diversifying composites that are highlighted here, the defensive strategy composite did provide some downside protection this quarter and was basically flat, while the rest of the fund was down. But you can see that relative to its benchmark it underperformed.

One of the issues which we will eventually be addressing with the board again is whether that really is the best benchmark. Again, we're focused on the characteristics of the composite first and foremost, and what we're investing in. But it is a difficult composite to benchmark, and that's something that may be revisited over time.

One of the reasons for that is that a proxy for just the conservative nature of the composite, we've included a slice historically of long Treasuries in the benchmark. But we don't always have a significant allocation to long Treasuries through the underlying strategy.

And so, as those have performed so significantly to the upside, that has made it a very difficult benchmark to be, and it wasn't a benchmark that we expected to track closely, but we're tracking

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it, although less closely, for that reason in particular.

So, there are some of the comments on the international composite. During the quarter international did have more negative performance than the U.S. markets, but the composite was ahead of its benchmark.

I'll flip ahead through a couple of pages of highlights. On page 4 you can see that the total fund had slightly less volatility, as I alluded to earlier, than the broad U.S. Equity benchmark over the past five year period.

And if you flip ahead to page 6 and 7, you can see some information about, on page 6, the various composites within the strategy; and in particular, that the defensive composite, which is the upward facing orange triangle, that that has had significantly less volatility than the other components and the total fund.

And lastly for this section, on page 7, this is a relatively new format that we went over, I believe, last quarter as well, but we have picked apart the strategies in the defensive composite in more detail to look at their up market and down market capture ratios.

And these continue to be in line with expectations, in that they haven't necessarily fully

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participated on the upside in terms of capturing the full broad equity market return. But in exchange, it provided significant downside protection, provided for a relatively attractive total return profile with significantly reduced volatility, and making it a good complement for the rest of the program.

Any questions before I move to other passport funds?

Behind tab 3 we have information on the bond fund. The bond fund continues to migrate from a former stable value option, and a significant portion of the fund at the beginning of the year became a market value option. And that migration has continued.

And you can see now that an overwhelming majority of the portfolio is invested in a government credit strategy that is market valued and managed by NISA. And NISA is helping oversee to get super-value instruments housed within this fund. And so we have one less manager of this fund than we had in prior periods. And so the performance would be helpful.

If you flip ahead I will mention the performance on page 19. For the quarter, the total bond fund was up 51 basis points. And again, this is a shorter duration and conservative strategy, not up as much as long Treasuries in a market like we just had, of

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course. And the benchmark was up 59 basis points.

On a year to date basis, which is since inception of the new strategy, we are up 1.23 percent for the bond fund, which is 10 basis points ahead net of fees of the benchmark.

Behind tab 4 we have information on the other passport fund choices, international equities fund, inflation protection and the socially responsive equity funds. And what you can see on page 21 are highlights about the quarter and longer term performance. And you can also see the market values, which are largely unchanged in round numbers from prior reports.

For the quarter, the international equity fund, similar to the international equity composite of the first fund I talked about, was negative, but outperformed its benchmark. These assets are unified positions and should perform similar to each other in terms of the international composite, in terms of funds.

The inflation protection fund for the quarter was down about 72 basis points against the benchmark, which I mentioned many times we don't expect to closely track in the short term, but up in the positive 1.3 percent territory.

And the socially responsive equity fund was

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down about 6 and a half percent, which lagged its benchmark.

Since inception, the international fund is ahead by almost 4 percent on a net of fees basis, annualized versus its benchmark.

The inflation protection fund is ahead by over a percent net of fees.

And the socially responsive equity fund is slightly ahead net of fees.

I will pause again for questions. There's a lot more information here in the reports. I'm happy to take questions now or at a later time.

Okay. Then I'd like to fast forward a month, and there was a negative quarter in the second quarter. But the good news is, in July we had a stronger market and equities in equities in particular.

And so, if you fast forward to diversified equities, the handout distributed in advance, you can see on page 3 the total return for July was positive 1 percent, bringing the year to date to 9 and a half percent. For the months we were slightly ahead of the Russell 3000 and a little behind the hybrid benchmark.

And if you look back to see what was behind that return, it was really pretty broad based. All the major composites returned between 99 basis points and

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138 basis points. I won't highlight the particular parts at this time.

And if you flip back to page 1, you can see asset levels, $9.5 billion roughly, spread out across the major composites, which are all within 1.2 percent of their targets. So we feel this is an ongoing rebalancing process that continues to work as planned, and are all materially close to target.

Any questions?

And then, the other passport fund options of the known shorthand variables, B, C, D, and you can see the information section handout distributed in advance for the months. The bond fund on page 1 was up 49 basis points and behind its benchmark for the year to date results, still 2 basis points ahead, at 1.72 percent return for this conservative bond fund option. We think it's a reasonable return in this market environment.

And then variables C, D and E start on page 2. You can see the asset levels are not dramatically different than the quarterly reports. And for the month the international fund was slightly ahead of EAFE in positive territory, 1.35 percent net of fees. And so year to date results are 6 percent, which is a percent and a half above EAFE for the year to date period.

The inflation protection strategy

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outperformed its benchmark pretty meaningfully, 2.3 percent versus 1.05. And the socially responsive equity fund lagged the strategies benchmark slightly, but was in positive territory.

Any questions on that?

The last thing we have is the preview of August. And for August, the equity markets are generally pretty strong, fixed income markets were mixed. And what you see is that equities, whether talking about the Russell 3000 or EAFE, were up 2 and a half percent or so. And you can see other information highlighting the performance of some of the underlying strategies in the other funds. And so we expect that most passport options had a positive month in August.

Any questions?

CHAIRPERSON AARONSON: Anybody?

MR. LYON: That's everything we had for the variable funds for the public agenda.

CHAIRPERSON AARONSON: Thank you very much, Chris.

Now we'll do variable funds for executive session.

MS. MARCH: I move we go into executive session for purposes of discussing sales and securities under Public Officers Law 105.

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CHAIRPERSON AARONSON: A second?

MR. SCHLOSS: Second.

CHAIRPERSON AARONSON: Any objection?

We are now in executive session.

(At this time, the meeting went into executive session.)

We're now out of executive session. We will go into public session and we will then, after public session, read into the record whatever we discussed at the executive session.

Mr. Schloss?

MR. SCHLOSS: In light of the hour, I think we will push a few things off to the next meeting, particularly the discussions of the IPSs. Sorry.

(Laughter.)

And we handed out the quarterlies as well as the monthlies. If there's no questions on the quarterlies or the monthlies, we'll assume the numbers are what the numbers are.

With that, let's discuss infrastructure investing. Petra and Evan.

Well done, Martin. Great job as always.

(Laughter.)

We'll get Townsend. It's on page 166.

(Discussion off the record.)

MR. SCHLOSS: As you know, we've been trying to expand the different asset classes that we have. One of the asset classes that we're working on is infrastructure. And you've all met Petra before. Petra

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is in our infrastructure group. Townsend does infrastructure consulting. As you know, Townsend is our real estate consultant. So this is supposed to be an interactive Infrastructure 101. And then we will proceed apace to infrastructure.

MS. NIKOVA: Good afternoon. We are very excited to have the opportunity to present to you infrastructure as an asset class, and tell you why we think it is a good complement to the portfolio.

What we are going to discuss today is, what is infrastructure? How we define infrastructure, what are the characteristics? We are going to talk about the different sectors in infrastructure. We are going to discuss the market. Who invests in infrastructure? And then we are also going to present investment pieces and how can we access the market, and what the special benchmarks may be.

So, starting with the definition of infrastructure on page 36, you can see we have defined infrastructure as fundamental facilities and systems serving the community. But even more importantly, what are the targets for the infrastructure assets?

They provide essential services to the community. These are water, transportation, waste water, gas. These are the services that infrastructure

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provides, and we need those in our daily lives.

Infrastructure has multiple characteristics. And this is related to the fact that they are very high, very -- infrastructure projects are very capital intensive projects. Oftentimes they're in the billions. So it's very difficult to create and build the competing assets.

Another characteristic is the long life of the asset. When we think about bridges, tunnels, wind farms, plants, these are assets sometimes with over 100 years' life.

And finally, another very important characteristic of the infrastructure assets are the stable and predictable cash flows. And the reason why they are stable and predictable is that these assets typically have contracts, an electric utility with a purchase power agreement for their output. So we know we have the ability and what to expect cash flows to be over long periods of time.

And with that, I'll turn it over to Evan to speak a little about the sectors that we see in infrastructure based on asset type.

EVAN: There are several ways to characterize the infrastructure investments. One is by the physical characteristics of the underlying assets,

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whether they are economic or social in nature.

Economic assets are those for which the end user would be accustomed or willing to pay a user fee, whether or not those taxes are actually levied.

A social infrastructure asset refers to government provided assets that support a public function that's not traditionally associate with an end user.

And if you turn to the next slide, on page 5 we have a list of some of the sectors. Looking first at the economic infrastructure characterization on the left, as we move left to right on this chart, we generally move from assets that have a higher level of government involvement and ownership on the left side to those with less on the right.

Social infrastructure, all the way on the right, generally reside at the bottom here of the risk return spectrum. As revenue derives from the private sourcing of educational, judicial, administrative or government owned health care facility, it derives directly from the procuring government entity. So this is where you get the predictable, dependable cash flows.

MS. EMERY: A question about characteristics. What are the liquidity characteristics of the asset class? Are they considered to be totally

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illiquid?

MS. NIKOVA: They're similar to real estate and private equity. So yes, you have liquidity; but yes, assets being sold. So I'm not sure if that answers your question.

MS. EMERY: In terms of, if you own the asset and are looking for a buyer of that asset, do you have the same number of buyers in the marketplace as you would for real estate or office buildings, something of that nature? Or is it more illiquid with fewer transactions in the market?

MS. NIKOVA: We are going to go into the investor base a little later. But to respond to your question, there is a very diverse investor base. You have strategic players such as companies who own and operate the assets. You have insurance companies that also have these assets, with characteristics we just discussed and are going to discuss further.

So you do have various players, pension funds, the ones that actually directly and indirectly want to own these assets. And the appeal, again, we are going to go further into investment specifics. But they do provide lower volatility.

EVAN: One thing I'd add to that, too. The same way that you do real estate, if Blackstone does a

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$20 billion dollar Hilton deal, that will be a lot less liquid than a small suburban office. The same with infrastructure. And then if you look at some of the large potential privatizations of billion dollar equity, those are going to be much less liquid than the smaller power plants or other assets.

MS. EMERY: Thanks.

CHAIRPERSON AARONSON: This is an ideal investment for people like pension funds who are long term investors and want to own something long term.

MS. NIKOVA: Right. These type of assets provide a very good match of long term liabilities with long term assets.

MR. SCHLOSS: But it's not riskless. Depending on what they are. I'd say the closest analogy is a business. It's not as liquid as real estate, you'd say, here's a building, let's sell it. They're very big and very expensive. So the fact that a typical infrastructure project costs billions of dollars limits the number of buyers and limits your liquidity.

That said, they are essential assets. So if someone want to buy LaGuardia, they buy LaGuardia at a price, it takes a little time. But if you want to turn around and sell LaGuardia, it will take a little time to find a buyer. But this is an essential asset, so there

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is a buyer and a seller.

To your point, you should have LaGuardia. So it is essential, it is long term. But there are fees, if you will, LaGuardia goes up and down with the economy. So it goes up and down, it's like real estate, you can overlever it and have a problem.

Again, they're very complicated, they have very, very long lives, they have limited competition. LaGuardia has no competition; right? They slice up the air traffic, JFK, LaGuardia and Newark; period. But they're complicated, they're essential, that's why they're good for pension funds. As long as you like real estate, don't overlever, don't overpay, operate correctly and get a license. For something like LaGuardia, it creates value. Again, you should view it as very long term.

MS. PELISH: To add one other point. If you look at the list of deals relative to the need in the U.S., I almost wonder if we shouldn't think about infrastructure as sort of a perpetual bond, and not place too much emphasize on valuing the total return. Because it's all highly speculative to figure out what it's going to be worth in twenty years; right?

And it's very hard developing assumptions. We develop assumptions, too, but sort of what to do off

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real estate. And I almost wonder, I think there are lots of characteristics of infrastructure that make it a very good match for a pension fund, which doesn't need full liquidity in all of its asset classes.

But isn't it fair to say we're looking at really an income generating device rather than a total return investment? And the beauty of it is the reinvestment risk is very low, because it's almost like a perpetual bond.

MS. NIKOVA: You're absolutely right, depending on the strategy deployed.

MS. PELISH: The strategy this fund will deploy.

MS. NIKOVA: Right; yes.

MR. SCHLOSS: It's like a bond, to make at the end, you get your money back.

MS. PELISH: But it's not guaranteed that you'll get your money back, but you're not looking to trade. I almost think that worrying about how much it will appreciate over the next three to five years is so speculative, built on so many assumptions, that it doesn't have a lot of credibility, really. There aren't a lot of data points.

MS. NIKOVA: It's a longer term asset.

MS. PELISH: Really longer term assets.

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Which is okay, the liabilities of this fund stretch out for -- Mr. North can tell us -- easily 60 years.

MR. NORTH: A long time. But I like your point about the valuation of these things. They are different, they are long term. If you buy them at a reasonable price, which may be related more to a really long bond with some level of risk yield, then you've got a possible winner. The challenge is always to find one that provides enough for the risk you are taking.

But they are very well suited if you pay the right price for them, the long term liabilities of the system.

MS. PELISH: At the risk of mitigating a little bit -- or really a lot by what Larry referred to, typically essential services. Things can change, but often they're still monopolies.

EVAN: The key still being that you need to operate them well. You can't lose track of that, unlike the bond, you have to consistently deliver good operating performance year in year and year out to generate that cash yield you're looking for.

MS. PELISH: The company that is selling the bond needs to do the same thing.

MS. EMERY: U.S. infrastructure assets, do they go into the basket or not as part of the basket

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clause?

MR. SCHLOSS: I'm sure they're basket clause.

MR. GANTZ: It depends. It could be real estate. If it qualifies as real estate, it might not. It really depends what you are buying and the structure of the --

CHAIRPERSON AARONSON: I think we should go on with the presentation.

(Laughter.)

MS. NIKOVA: To go a little further on the sector. Another way to look at infrastructure sectors is in terms of a life cycle stage. And there are two types of assets, greenfield and brownfield. Greenfield assets are essentially assets that have development or construction in them. And brownfield assets are assets that are already in operation and are generating income. Greenfield assets are not generating income during the construction period.

And by the nature of the construction risks or development risk involved in that, they have generally higher risk than brownfield assets.

Just two quick examples. One is the Port of Miami in Florida, approximately a billion dollar project, five year construction period, greenfield. For

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five years the project will not generate assets.

An example for brownfield. The P.R. toll road, $1.2 billion, forty years of operating; very different risk profile.

So what the different sectors, in terms of what the deals are getting down into the markets. Please turn to page 67. On the pie chart on the left-hand side, you will see the views by life cycle stage globally. And you will notice that the majority of the deals are 70 percent brownfield and 30 percent greenfield.

The mix is very similar in the U.S., although it's a little bit higher, 89 percent brownfield and 11 percent greenfield.

On the right-hand side, the pie chart illustrates the infrastructure view by sector. And you can see energy is a little sector. Most of the transactions are done in the energy space, followed by transportation and utilities. And this is, again, a similar need that we are observing in the U.S.

We have prepared four case studies for you, two greenfield and two brownfield assets. We are not planning on discussing the case studies right now. But if you have any questions later, we will be happy to answer them.

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With that, I will turn to Steve and his team.

MR. BURNS: I know you've met Mike Golubic before. He's been in for Carlyle and Brookfield. Mike has led our infrastructure efforts since about the middle of the last decade, since 2005.

You've had discussions about this in years past. And since that time, we have all had about 10 clients, about 30 investments, we monitor about 150 different available funds in the marketplace. Some of the notable clients are the United Nations, Texas Teachers, Chicago Teachers, et cetera.

We probably have 75 pension fund clients, so that's a decent number. But Ishika and Mike worked together on the space, and I want to turn it over to them to talk through you some of these slides quickly.

MS. BANSAL: So, turning to slide 12, slide 12 talks about the demand drivers for infrastructure investment. There are three primary drivers driving the need for investing in infrastructure.

For instance, population has created a need for building new infrastructure. Second, existing infrastructure that's more than 50 years old needs to be replaced. And third, budget deficits in the U.S. and Europe have created a need to look for a new source of

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capital.

An example close to home is the LaGuardia Airport here in New York. LaGuardia has been rated as one of the worst airports, based on the time it takes to get through the security lines, the design of the airport and the flight delays.

It is estimated that over $3.6 billion will be required to rebuild the largest terminal to make LaGuardia more modern and efficient. LaGuardia is a great example of an aging infrastructure in the country that needs to be replaced.

MS. MARCH: We should buy the airport. We have the rest of our real estate investment right there. I guarantee it will make a profit. We have our second chance at Madison Square Garden.

MS. BANSAL: It is profitable. It can be made more efficient.

So it is also not just about maintaining the existing infrastructure. It also about creating new infrastructure. The U.S. is expected to add 30 million people to its population every ten years, and the world's population is expected to increase from 7 billion to over 9 billion. Turning to page 13.

CHAIRPERSON AARONSON: I like that figure, 30 million people every ten years. That will solve the

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Social Security problem, having all these young people pay into the Social Security system. So that's great. Thank you for that.

(Laughter.)

MS. BANSAL: It is estimated that over $50 trillion of infrastructure investments are required in the next 20 years in the U.S., and in a recent research report, most infrastructure systems were graded a D or worse. It is estimated that 25 percent of the U.S. bridges are inefficient. Time spent in traffic jams wastes over 4 billion hours a year.

Water systems leak over a billion gallons of water every day, and 4,000 dams in the country are over 50 years old.

Infrastructure spending as a percent of GDP has declined continuously over the years, and it is lowest in the U.S. when compared to other developed markets. Similarly in Europe, a combination of underinvestment and increased use has created a significant need to make investments in infrastructure. It is estimated that over 2 trillion euros would be required in infrastructure investments by 2020.

Turning to the next page, the chart shows infrastructure deals completed by region and the capital raised in infrastructure by region. Europe, North

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America and Australia account for most of the infrastructure deals that have been completed historically.

In terms of the capital raised, again, Europe and North America are the largest countries where most of the infrastructure capital gets raised.

Infrastructure investors tend to have a preference to invest in developed markets, as a result of more capital being raised in these regions.

Turning to slide 15, the structure for investing in infrastructure is still evolving. Within public private partnerships, it has been difficult to find investments that are mutually beneficial to the interests of public stakeholders and private stakeholders, but it is a growing area.

In the current market environment, the energy sector presents the most actionable opportunities. There is significant demand to build new power transmission and generation and renewables. State energy policy is driving the investment in renewables, and most states are adopting renewable portfolio standards.

There's also a shift from coal to natural gas as coal plants are shutting down due to regulation.

Slide 16 just presents some of the largest

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investors in the infrastructure space. The investable universe of funds has come a long way since 2005 and 2006, where there were a handful of infrastructure funds in the market.

Today it is possible to segment the market by geography and the type of infrastructure strategy, and investors can choose where to invest and how to invest.

Moving to Slide 17, the largest category of investors in the infrastructure space are public pension funds, asset managers and insurance companies. Of the 100 institutional investors, public pension funds are the largest category of infrastructure investors. And as we discussed earlier, these pension funds are looking for long term assets to match the long dated liabilities.

Moving to Slide 18, Australian, Canadian and European investors have had the longest history of investing in the infrastructure asset class. U.S. pension funds are one of the recent entrants. And typically we see a 2 to 6 percent allocation to infrastructure of the total plan assets.

MR. GOLUBIC: We know there's no shortage of demand for capital that needs to invest in infrastructure to both rebuild and develop, here or

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abroad. The next logical question is, what is the investment thesis for why you should be considering this as an asset class within your portfolio?

Especially in an environment today where investors are hungry for yield in a low bond rate environment and a tough equity market, real estate also with the cap rate coming down. Infrastructure does offer a good yield, and also diversification benefits for the overall portfolio.

One of the most important things to keep in mind is, despite the fact that there's plenty of demand, the projects that you look at have to earn a competitive rate of return. There are plenty of opportunities to put money to work, but unless that delivers an appropriate return for private capital, then it may not be appropriate.

Inflation protection. We'll talk a little about that. Ultimately the characteristics of each of the underlying sectors do vary, but an overriding theme is that there is some level of inflation protection there.

We talked about two other aspects here. The overall volatility in earnings is expected to be lower, given that a large majority of the sectors are contracted and others have less exposure to overall

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economic cycles. We already talked a little around the length of contracts and duration many of the assets do have.

The biggest challenge is that all of this is a great thesis. Where is the data that then supports this thesis? One of the issues the sector has run into is that the data has been relatively limited for the past five or ten years. The good is that it's starting to grow. We're starting to add more access to return history, good projects, bad projects, that we can analyze from an equity standpoint and determine whether this thesis is actually coming to bear.

What we started off with you on 20 is, a view on the overall correlations of infrastructure to the other asset classes, for the purpose of looking at infrastructure, using both the public market index as well as a private index of funds that Townsend tracks that we have clients invested in. This isn't meant to be an end all, be all fully significant data set. But rather, it's a move toward analyzing the thesis and using the best information we have, do we think it is supportable?

And based on what we've been able to look at, and the funds that we've invested in, in the public markets, to date the good news is that the thesis is

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playing out. So far the correlations and the diversification benefits that we observed in both public and private infrastructure have been beneficial to investors.

MS. EMERY: This Dow Jones infrastructure index, it's got a pretty high correlation to equities, which is not what we are looking for.

MR. GOLUBIC: Exactly. This is a public market index. There's a few options in the market, this being one of them. It is publicly listed, publicly traded infrastructure companies within this specific index, centered around finding those infrastructure companies that have the largest percentage of their earnings driven purely by the underlying assets.

That said, much like REITs or other public markets, you are going to see a higher correlation to public markets. That's a reduction of the overall diversification benefits; which is one of the reasons we tend to focus more on the private end of this asset class to deliver that kind of profile you are looking for.

Over all, while this number is relatively high, if you go back over longer time periods and you adjust for the global financial crisis, even that correlation does come down closer to a point 5 or point

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6, given the financial crisis, everything is closer to one, a higher number, a higher relationship there.

On 21, what are the returns we have seen so far out of this sector? Again, the good news is that it's actually been pretty much as expected. The public market data shows very competitive returns relative to broad equities, relative to listed real estate, relative to fixed income.

The private market data, while again shorter in length, so we're talking here about approximately a five year period. It delivered essentially about what you would expect, 8 percent total return.

We analyzed other sources of private market data in looking at open end funds that have been available in the early 2000s, and other vehicles. They also support a very similar return profile.

MS. ROMAIN: When you're looking at the assets, what do you look at for value? How do you know the value?

MR. GOLUBIC: In this case, we are reporting fund level returns. Those funds are going to vary in valuation policies. Open end funds are going to have a third party appraisal; whereas closed end funds are going to be very typical to private equity or an opportunistic real estate fund in which they tend to

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value internally, and then potential use outside appraisers every couple of years. It's very similar to other private market asset classes.

MS. PELISH: There haven't been that many deals. If you had a more robust data set of actual sales, then you could use that to calculate the returns. This is all funds valuing what they think the properties are worth. That's why they need to value on income rather than a guess on what the appreciation is going to be.

MR. GOLUBIC: The challenge is more about the benchmarks. But unlike a NCREIF property index or other established standard for return index or a group of assets that fall into a category that doesn't exist yet.

So the a whole point we're trying to do here is, can we support the thesis with what we know? It's not perfect, there's issues to it. But generally from what we have seen, we're becoming comfortable with that return profile that's been delivered to date is consistent with the thesis rationale for why you're looking to invest.

On 22, I won't spend a lot of time on this chart. The key takeaway is that, through various structures, these assets, either at revenue line or

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through replacement cost viewpoint, do have a correlation to it and benefit from inflation protection; some more than others. And in building a portfolio you have to be very cognizant of what the underlying characteristics are.

But we do expect, and we have seen that benefit in inflationary environments, that passed through, and ultimately support the return profile over the longer term.

MS. EMERY: How do they react to the surprise inflation versus steady inflation?

MR. GOLUBIC: It's going to vary depending on the asset.

MS. EMERY: What would be a good asset that would -- inflationary environment?

MR. GOLUBIC: Much like, if you think about a multi-family asset that you could move or rent tomorrow. In certain agreements there may be a contractual link with the total to the inflation rate. And that could be something, again, that could react more immediately, versus a utility that may require a regulatory review that then you have to go back for the costs for recovery.

EVAN: Many of the contracts allow you to adjust what you're getting based on the cost of your

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input, so there's an automatic CPI adjustment in there.

MR. GOLUBIC: On 23, one of the key issues we talked about is stability; stability and earnings, cash flow. Here, similar to what we've seen in the other areas of the thesis, your early data does support that infrastructure as a whole is generally more stable than broader or other asset classes.

The example we used here within the chart is the actual earnings growth of that same public market infrastructure index relative to the broad MSCI equity index. And what you can see is, even throughout the financial crisis, the infrastructure companies were able to maintain their earnings growth over that time period, while other general companies that were more exposed to the economic cycles had meaningful declines in earnings.

We have seen similar evidence of that on the private side. Again, there's not an index we can point to, but in just analyzing deals that we've had exposure to through our funds, the same trend has really evolved, in that certain assets were able to survive the crisis well, grow earnings; where other that may have had more correlation to economic cycles did have ultimately declines, but on less of a scale than you've seen in the broader markets.

MS. NIKOVA: Page 24, we discuss the

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strategies and targeted returns. The strategies vary according to the risk return profile, and the lowest risk core strategy, where investments are made in mature assets in OCB countries their output is contracted or the assets are regulated.

Expected returns are between 8 and 11 percent. Going back to the example with the Puerto Rican toll road, 40 year operating history in a territory of the U.S. It is a good example for a core asset.

Another strategy is the value added strategy, we continue to invest in mature assets in OCB countries, but there is some room for expansion of the asset, or bringing operational efficiencies. And under this scenario, the expected returns are 12 to 14 percent. And using the toll road example, if we have an operating toll road but we add a new segment, we should be more of a value added.

On the highest end of the risk spectrum would be an opportunistic PE strategy, where the assets would be in emerging markets or they would be greenfield involving construction waste, generally speaking, and we would be looking at higher returns, about 15 percent.

If you turn to the next page, 25 --

MR. SCHLOSS: If you look at this page, it

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sure sounds like real estate. It's got core, it's mature, it's got value added, you can do something to it, you have opportunistic. So it looks the same, it feels the same. The biggest difference is, these are bigger and clunkier things than buildings, and are monopolies.

MS. EMERY: I have a question about returns. These returns assume leverage; is that correct?

What would an unlevered return be if you backed up leverage?

MR. GOLUBIC: Interesting enough, the level of risk typically inherent in the revenue stream is going to determine the amount of leverage that they put on the asset; almost as an inverse to real estate, where we tend to have core as the lowest levered. In many cases core assets may be higher levered.

Typically, among the unlevered deals we're seeing today from an equity perspective, they would fall similar to real estate, in that 7 to 9 percent range.

MS. EMERY: I'm trying to tie this back to the CPI plus 4 percent that you have as a benchmark later on in the portfolio. These returns look considerably higher. That seems a bit low -- and that's why I asked about -- that CPI plus 4 unlevered assumption?

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MS. NIKOVA: We can get to that point later, because there are quite a few factors that go toward the benchmark.

EVAN: These are gross returns.

MS. NIKOVA: On page 25, what we illustrated is, again, the risk return profile of the various strategies. And as you notice, different asset types are typically associated with different strategies. For example, for core we have transmission and we have pipelines. For value added we have airports and ports.

And although we typically associate certain asset types with certain strategies, another key determinant of risk is the revenue model, whether or not these assets are under contract, are they regulated?

So if you turn to page 26, you see that some of the same assets, like power generation, they have different returns. Power generation is a great example, because the returns vary significantly, 12 to 25 percent. The reason for that is, we can have power plants which have long term purchase power agreements for 30 years. And we know what the cash flows would be.

We have very little volatility, potentially. Whereas, if we're standing on the stock market we don't have any contract risk involved. We have a lot of unpredictability. That's why we see this variation.

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Then, if you turn to page 27. Robin touched upon that, the income versus appreciation. Where does the return come from with these assets? Again, it varies depending on the strategy. And the lower risk strategy the core evaluated, their expected returns relies more on income and dividends. For core strategies, more than half of the returns, and for value added, close to half.

And for opportunistic they may be zero, because of the different nature of the assets that are involved in the strategy.

With this, I will turn back to Townsend.

MR. GOLUBIC: You hit the benchmark, and the benchmarking in this sector is difficult. There is no established index of private market infrastructure that you can compare yourself to. The fund composites that we're putting together and others are building are still relatively early and don't necessarily provide the best data set to make a direct benchmarking comparison to.

Because of that, there really is no industry standard at this point. We do see a wide range of different benchmarks that are used. CPI plus has been the one used the most. Other attempts have been made using a combination of fixed income and an equity index plus or minus a premium in certain cases.

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But for the most part, you see CPI really has been the primary approach to benchmarking sector for now, with the expectation that over time there will be better options that are developed.

MS. EMERY: What do the Australians and the Canadians do?

MR. GOLUBIC: They vary; they also vary, as well. Some are CPI based, others are total return based, others adjust -- one of the larger investors in Canada uses what amounts to a floating benchmark by assets they acquire, looking at the underlying country, the risk premium, building up from the ground up into an expected return.

So it varies even among established investors.

On 29, accessing the infrastructure market today, it's getting better. Ishika mentioned that the opportunity to segment your investment across different strategies, sectors, geographies, that's improving. In 2005 and 2006 you could probably count ten funds that you were comfortable investing with at that time, and today that number is probably closer to 40 or 50.

Different models have been pursued for how to actually access this market. And for the most part, the majority of investors have tended to start at the

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commingled fund strategy.

Some of the more established investors today, the Canadians and Australians, have moved past that, typically following this progression you see on page 29 in that they gain their experience and knowledge through investing in funds. Through them they consider looking at co-investments alongside of those managers.

And then finally, as they look to build out a full team, they then will consider sourcing and underwriting and investing on a purely direct basis, all in-house.

Each of these different methods brings its own pros and cons. In accessing pure core infrastructure that we talked about a lot today, one of the best ways to do that is through direct. That requires a large staff and expertise to do it. The infrastructure commingled funds provide easy access, immediate access, but you lose some of your controls and risk mitigation tools in accessing it that way.

But really, this market, we continue to think will grow over time. And the options that are available to you as a plan investor will be very suitable to meet your expectations for both return and exposure out of infrastructure.

MS. NIKOVA: So we hope that we have

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convinced you today that infrastructure can provide diversification to the portfolio, attractive risk adjusted returns and inflation environment protection in an environment that is highly volatile today.

And the next steps will be coming back to you with an IPA and a strategy how to implement the policy. We would be recommending pursuing predominantly a lower risk core value strategy. We would be recommending a U.S. global strategy and a benchmark of CPI plus 4.

Going back to the benchmark, a lot of consideration will go on as to where exactly the benchmark should be set. But one thing to consider is the piece and how investors are investing in the sector. Is it direct or is it through funds? Because there is a lot of carry, management fees, et cetera. So the returns that we show are on a gross basis.

And when you looks at different funds and you compare, I'd say it's important to look at the way they are accessing the sector.

CHAIRPERSON AARONSON: I want thank you for the presentation; very educational. It's something that myself and other members of the board are interested in getting involved with. We would rather do it sooner than later.

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Is it possible have the IPS done by the next investment meeting? And have an investment available for us for the meeting after that, or no later than January?

I think it's important that when you consider some of the things that may occur with these types of investments, that we make sure that we have a provision to make sure that the wages that are paid to employees for construction or the management of anything are prevailing wages. And we must also make sure that any people we deal with in these matters are responsible contractors.

And as far as I'm concerned, some members of the board -- come back as soon as quickly as possible so that we act in a responsible way and we add to this field and all of the benefits that it provides for the welfare of our members and retirees, such as long term income related investment, perhaps; such as an investment that is reliable.

MS. NIKOVA: Thank you.

MS. EMERY: I was thinking about what Larry talked about earlier, about other real asset classes like timber and investor limited partnerships. Can we think about this as maybe a real asset allocation instead of just an infrastructure allocation? And come

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back to us with a plan for real assets and how infrastructure fits into that?

MR. SCHLOSS: I think what we would like to do is come back. We have 6 percent allocated to real estate which, as I said before, I don't think we can execute on with current staffing. So I think I'll work with Robin to do a little modelling within the flow in timber and in infrastructure.

I'm not quite sure if MLPs need an educational session, as does timber. I'm not sure we have to look at the public securities versus real assets, but it's something we can put in the hopper. Put the whole thing into the six to start. Again, it begs the theory, you can't have an asset unless it's 2 or 3 percent. This isn't 2 or 3 percent. All I ended up doing is creating one of these parking place issues, again, which I really have an issue with.

So, again, if we view the whole thing as real assets, it's the right way to go. And we'll work with Robin to figure how it affects the modelling of the asset allocation. This will take time to ramp up.

MS. PELISH: And also recognizing the modelling in this case is mostly projecting what the pattern of returns from this asset class are going to be, and it's hypothetical. Not that it's a bad idea,

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but I think it's very heavily qualitative. And you want to figure out what percentage makes sense, given the available universe.

MR. SCHLOSS: Right. Again, like real estate, this could take a long time to ramp up. So, one at a time, but we should at least have a vision and a plan to work on, here's how it's supposed to look.

MS. MARCH: In my lifetime.

MR. SCHLOSS: We shouldn't slow down to analyze.

CHAIRPERSON AARONSON: There are potential investors in this area, public employees retirement systems, that we might be able to get some ideas from. For instance, the Ontario municipal employees retirement system has a huge portion of their funds invested in infrastructure. They do very well with it, and I want to do well for our system.

MR. SCHLOSS: This is day one, on a long journey.

CHAIRPERSON AARONSON: Sooner than that.

MR. SCHLOSS: This is day one.

CHAIRPERSON AARONSON: And the first week in January will be day two.

MR. SCHLOSS: We have two people that understand it well. They've been in infrastructure and

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we're on our way. I have to find a lumberjack.

(Laughter.)

We have consensus to move forward on infrastructure?

CHAIRPERSON AARONSON: Yes.

MR. SCHLOSS: I'll take your point, Janice, on the real assets.

That concludes the public session.

CHAIRPERSON AARONSON: That doesn't quite conclude the public session, because as part of the public session we have to have a report on what we did in the private session.

MR. SCHLOSS: That's why you're the chairman.

CHAIRPERSON AARONSON: Then we can have a motion to adjourn.

Susan, could you please give us a report?

MS. STANG: Absolutely.

In the executive session of the variable fund, an update on several managers was presented.

There was a presentation and discussion of the structure of the composite within the diversified equity fund.

In the executive session of the pension fund, the board discussed matters regarding personnel.

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There was a discussion of the private equity program. An annual plan for the private equity opportunistic income and real estate investment program were presented and discussed and adopted by consensus.

A detailed review of the fiscal year accomplishment was presented. The results of the active international manager search was presented and discussed.

Two presentations by international managers were received. Consensus was reached, which will be announced at the appropriate time.

CHAIRPERSON AARONSON: Thank you very much.
Do I hear a motion?

MS. MARCH: So moved.

MR. SCHLOSS: Second.

CHAIRPERSON AARONSON: Objections?
I believe that motion was a motion to adjourn. And a second.
Seeing no objection, we are adjourned.
Thanks, everybody, for putting in a long, hard day.

(Time noted: 4:49 p.m.)

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C E R T I F I C A T I O N

I, Jeffrey Shapiro, a Shorthand Reporter and Notary Public, within and for the State of New York, do hereby certify that I reported the proceedings in the within-entitled matter, on Monday, September 6, 2012, at the offices of the NYC TEACHERS RETIREMENT SYSTEM, 55 Water Street, New York, New York, and that this is an accurate transcription of these proceedings.

IN WITNESS WHEREOF, I have hereunto set my hand this _____ day of _____________, 2012.

____

JEFFREY SHAPIRO