worcestershire
countycouncil

Worcestershire County Council Pension Fund

Strategic Asset Allocation Review November 2016

1 Purpose of Report

1.1 The Worcestershire County Council Pension Fund (the Fund) is valued at £2.3 billion as at the end of October 2016. The Fund's value has risen by £615 million since the last triennial valuation in 2013 when it was valued at £1.7 billion.

1.2 The purpose of this Strategic Asset Allocation Report is two-fold:

a) to take stock on the performance and composition of the Fund's Strategic Asset Allocation as endorsed by the Shadow Pensions Committee in 2013;

b) to recommend for approval any changes required to the Fund's Strategic Asset Allocation with the aims of:

i. meeting the requirements of the Fund's draft 2016 Funding Strategy Statement;

ii. maintaining targeted returns, and

iii. improving the Fund's opportunity to minimise volatility of returns and optimising diversification of risk,

2 Summary of Recommendations

2.1 The Fund's Funding Strategy Statement is not proposed to change as a result of the 2016 Actuarial Revaluation and therefore the aim of the Strategic Asset Allocation should remain unchanged from that endorsed by the Shadow Pensions Committee as a result of the 2013 valuation.

2.2 The Pensions Committee should note that it is being asked to 'approve' rather than 'endorse' recommendations set out in this review due to the change in Scheme Manager from the Chief Financial Officer of the Administering Authority to the Pensions Committee in 2014.

2.3 Set out below is a summary of the recommendations contained in this report for approval at the Pensions Committee. The recommendations are to enable the Fund to continue to meet the assumptions contained within the Fund's Funding Strategy Statement with regards to ongoing expected returns in excess of CPI inflation and also take into account Central Government's asset pooling agenda and the establishment of the LGPS Central pool on 1st April 2018:

a) Recommendation 1 (paragraph 12.29).

Increase the allocation to Infrastructure or a mix of Infrastructure and Real Estate by 5% from the current strategic allocation of up to 10% of the Fund to 15%.

Delegation is sought for the Chief Financial Officer in consultation with the Chair of the Pensions Committee to procure appropriate investment managers to secure increases to existing investments or enter into new investments.

b) Recommendation 2 (paragraph 12.30).

The Fund's existing investment into both Property and Infrastructure result in Capital distributions in between Strategic Asset Allocation reviews as the capital element of those investments is depreciated.

Therefore, a "rolling" investment programme is proposed to be introduced for Property and Infrastructure investments to reinvest distributions that are received in that way in order that actual investment in this asset class is maintained at the levels up to those indicated in this Strategic Asset Allocation.

c) Recommendation 3 (paragraph 11.22 and 11.23).

Increase the Fund's allocation to alternative indices by 5% from the current strategic allocation of up to 10% of the Fund to 15% equities allocation.

Approval is sought for Fund officers with the support of the Fund's current alternative indices investment Manager, Legal and General Asset Management, to also consider the appropriate balance of alternative indices to support the Fund's investment objectives.

The 5% increase to alternative indices is to be conditional on the Chair of the Pensions Committee approving the proposed balance of alternative indices.

d) Recommendation 4 (paragraph 14.3)

To fund the above structural asset allocation changes, it is recommended that the asset allocation structural changes be implemented through an overall 2% reduction to each regional market capitalisation indices passive and active Equity allocation.

e) Recommendation 5 (paragraph 11.9).

The Fund returns the Strategic Asset Allocation to North American Equities to Passive Management.

f) Recommendation 6 (paragraph 12.7).

Maintain the Fund's current global corporate Bonds strategy.

g) Recommendation 7 (paragraph 14.8).

Tolerance ranges as set out below are implemented and maintained to allow the required portfolio flexibility.

Table 1: Summary Changes to the Strategic Asset Allocation

By Review Year	**2013**		**2016**	
Asset Type by %	**Allocation**	**Tolerance**	**Allocation**	**Tolerance**
Equities	80	75 – 90	75	70 - 85
Bonds	10	5 – 15	10	5 – 15
Infrastructure and Property	10	5 – 10	15	5 – 15

2.4 In addition to the recommendations set out above in relation to the Strategic Asset Allocation, no recommendations at this stage are being made in relation to the appointment of Investment Managers as these will naturally fall to the continued plan of reviews.

2.5 The following actions are recommended in accordance with the other responsibilities of the Pensions Committee to be included in the Forward Plan of the Pensions Committee.

a) Recommendation 8 (paragraph 11.16).

The Pension Investment Advisory Panel is tasked with overseeing further due diligence to be carried out on JP Morgan to confirm the application of their style given the slight bias to growth since 2010 indicated within this review.

b) Recommendation 9 (paragraph 12.23).

To plan in at appropriate intervals the Fund's exposure to currency and inflation risks given the global nature of the Fund's investments as well as the bias towards Equities.

c) Recommendation 10 (paragraph 10.18).

A review of regional Equity weightings and the Fund's Bonds Strategy is carried out before assets are transferred to LGPS Central pool. Once transitioned to the pool, a review of regional Equity weightings is recommended to form part of a more dynamic approach to asset allocation undertaken by the Pension Committee.

It is further recommended that the Bonds investment strategy is reviewed before transitioning assets into LGPS Central pool.

3 Setting the Scene for the Strategic Asset Allocation Review

3.1 This section sets out the emerging findings of the Triennial Actuarial valuation and summarises progress being made with Central Government's Local Government Pension Scheme (LGPS) reforms including the development of LGPS Central.

Triennial Actuarial Valuation

3.2 The Fund is nearing conclusion on its discussions with the Actuary, Mercer, on the triennial valuation. A full report will be presented to the Pension Committee at its meeting on 7 December 2016. In summary, the likely outcome will be:

a) Recognition of excess returns above Actuarial estimates made as part of the 2013 triennial actuarial valuation;

b) A decrease in the level of deficit mainly due to a change in methodology for valuing liabilities from Gilts to CPI+; and

c) An increase in the funding level from 69% to 76% with a similar funding strategy required.

3.3 This means that there is not a need to alter the Fund's Funding Strategy Statement in any significant way and therefore the aims of its investment strategy remain intact.

3.4 The Actuary has reflected on the Fund's ability to manage any future risk around inflationary pressures and volatility of returns and asset valuations due to the Fund's bias towards Equity as an asset class.

3.5 Whilst this bias is a conscious one that members of the Pensions Committee will be familiar with, it should also be recognised that the strategic allocation to this asset class has reduced from 90% in the 2010 Strategic Asset Allocation to 80% in the 2013 Strategic Asset Allocation. This reduction has been matched by an increase in Property and Infrastructure as an asset class, which by their nature have moved inherent protections against future inflationary pressures and historically have been less volatile in terms of valuation that Equities.

LGPS reforms

3.6 In the July Budget 2015, the Chancellor at the time announced Central Government’s intention to work with LGPS Scheme administering authorities to ensure that they pool investments to significantly reduce costs while maintaining overall investment performance.

3.7 On 25 November 2015, DCLG published its response to the May 2014 consultation (Opportunities for collaboration, cost savings and efficiencies). It said responsibility for asset allocation would stay with the 90 administering authorities and that savings could be delivered through the use of asset pooling and, in particular, collective investment vehicles.

3.8 Following discussions with local government and the fund management industry over the summer, Central Government prepared criteria against which the authorities’ proposals for pooling would be assessed. Authorities were asked to develop proposals for pooling assets in line with the timeline detailed below.

3.9 The 4 main pooling criteria are:

- Criteria 1: Asset pool(s) that achieve the benefits of scale c. £25bn
- Criteria 2: Strong governance and decision making
- Criteria 3: Reduced costs and excellent value for money
- Criteria 4: An improved capacity and capability to invest in infrastructure

3.10 Strategic asset allocation will remain a local decision for the administering authority and local pension committee. The pool will decide on investment manager appointments and the type and number of sub-funds. Elected members of each Fund will influence how each pool operates.

3.11 The Fund in collaboration with eight other Local Authorities under the brand ‘LGPS Central’ submitted their initial proposals to the Government by 19 February 2016.

3.12 Central Government responded to LGPS Central's February submission on 24 March 2016 welcoming the initial proposal and encouraged the pool to continue with the planned work to develop a detailed submission that fully addresses the criteria by 15 July 2016.

3.13 On 15 July 2016 LGPS Central made a final submission, including a Full Business Case, which fully addressed the criteria set out above, with enough information for the proposal to be evaluated by Central Government. Each pool made a submission which covered the proposals and described the proposed governance, structure and implementation plan.

3.14 The [September 2016] meeting of the Pensions Committee provided the Fund's Chief Financial Officer with delegation of up to [£0.4 million] to support the development of LGPS Central into an FCA Authorised ACS organisation with a proposal for launch by February 2018. Representatives from LGPS Central are meeting representatives from Central Government on 15 November 2016 to provide an update on current progress and received feedback. A verbal update will be provided on the outcome of this meeting to the Pension's Committee.

4 Taking Stock: Summarising the current Strategic Asset Allocation

4.1 The current long term strategic asset allocation for the Fund is listed below in Table 2:

Table 2

Asset Allocation	%	Manager, Method & Performance Target
Actively Managed Equities		
Far East Developed	12.0	Nomura Asset Management - FTSE All World Asia Pacific Index + 1.5%
Emerging Markets	12.0	JP Morgan Asset Management and Schroder Investment Management - FTSE - All World Emerging Market Index +2.0%
Passively Managed Equities - Market Capitalisation Indices		
United Kingdom	25.5	Legal and General Asset Management - FTSE All Share Index
North America	11.0	Legal and General Asset Management - FTSE All World North America - Developed Series Index
Europe ex - UK	9.5	Legal and General Asset Management - FTSE All World Europe ex UK Index - Developed Series Index

Asset Allocation	%	Manager, Method & Performance Target
Passively Managed Equities – Alternative Indices		
Global	10.0	Legal and General Asset Management: - 1/3 GPAE - FTSE-RAFI Dev. 1000 Equity Fund - 1/3 GPBK - MSCI World Mini Volatility Index - 1/3 STAJ - CSUF - STAJ MF36726/36727
Bonds Managed Actively	10.0	JP Morgan Asset Management - 100% Barclays Global Aggregate Corporate Bond Index – Hedged into GBP
Property & Infrastructure	10.0	Through a mix of Green Investment Bank, Invesco, Hermes, Walton Street and Venn Partners
	100.0	

5 Taking Stock: Overview of the Fund's current investment strategy

5.1 The current asset allocation has maintained a clear but reduced focus on equity assets. Equities are recognised as a growth asset class and can be both passively managed (linked to the respective indices) and actively managed. In addition to equities, the Fund targets a 10% investment into global corporate bonds. Following the endorsed recommendation, at the 2013 asset allocation review pension committee meeting, to transition 10% of the fund's assets from equities to property and alternatives, the fund currently has a commitment of 10% of its assets to a combination of five property and infrastructure pooled funds.

5.2 The Fund is low cost compared to the LGPS average Fund and to the other members of the LGPS Central pool. Significant work has been carried out over the past few years to negotiate fee discounts with the Fund's active managers and to gain savings through the joint re-procurement of the passive mandate.

5.3 The following Table 3 sets out the current Fund asset allocation as compared to the Local Authority average asset allocation as at 31st March 2016 derived from the WM universe. This universe does not differentiate between passive and active management.

Table 3: Comparison of Fund against Local Authority average

Asset Class	Fund	Local Authority Average*
	%	%
Equities	85.6	60.1
Bonds	6.1	16.4
Property	4.5	9.1
Alternatives	3.8	8.7
Cash	0.0	2.9
Pooled Multi Asset	0.0	2.8
Total	100.0	100.0

*The information for comparison is taken from the WM UK Local Authority Annual Review 2015/16

5.4 After taking the Fund's recent transition from equities to property and infrastructure into account, the Fund's allocation to Equities as an asset class remains significantly higher than the mean allocation. While this in itself is not necessarily a bad thing while the strategy works, it does expose the Fund to substantially increased volatility in performance when equities are out of favour, as has been seen over recent history.

5.5 The Fund's liabilities are now discounted by a CPI+ methodology, giving more stable liabilities going forwards. Significant volatility in the Fund's asset value will directly impact on the funding level and subsequent recovery plans, rather than being potentially offset by increases in gilt rates, which were previously used as the discounting factor for the liabilities. Therefore the Pensions Committee should note this risk that the Fund holds and whilst this risk may be reduced by exposure to this Asset Class, the Fund still needs to recover a Funding Deficit in line with its Funding Strategy Statement.

5.6 The Pensions Regulator now holds an oversight role for LGPS Funds, and along with GAD and the LGPS Scheme Advisory Board will be monitoring funding levels and recovery plans closely in future years.

a) The five asset classes currently utilised by the Fund are summarised below. Active equities

To justify the higher cost of management and the greater risk profile, it is reasonable to assume that higher rewards should come from this element. For this to be fully effective it has been expected that appointed managers should have a high level of conviction in their stock selections and therefore be relatively unconstrained within their mandate.

b) Passive equities

These investments remove the risk of potential poor performance from active managers. These investments do not remove the impact on fund values from oscillations in the tracked indices. We have seen considerable volatility in world markets over the last decade or so, this may well continue.

c) Corporate Bonds

A corporate bond is a bond issued by a corporation in order to raise financing for a variety of reasons such as to on-going operations, M&A, or to expand business. The term is usually applied to longer-term debt instruments, with maturity of at least one year.

d) Property pooled funds

A Property pooled fund is a type of mutual fund that primarily focuses on investing in securities offered by public real estate companies. The majority of real estate funds are invested in commercial and corporate properties, although they also may include investments in raw land, apartment complexes and agricultural space.

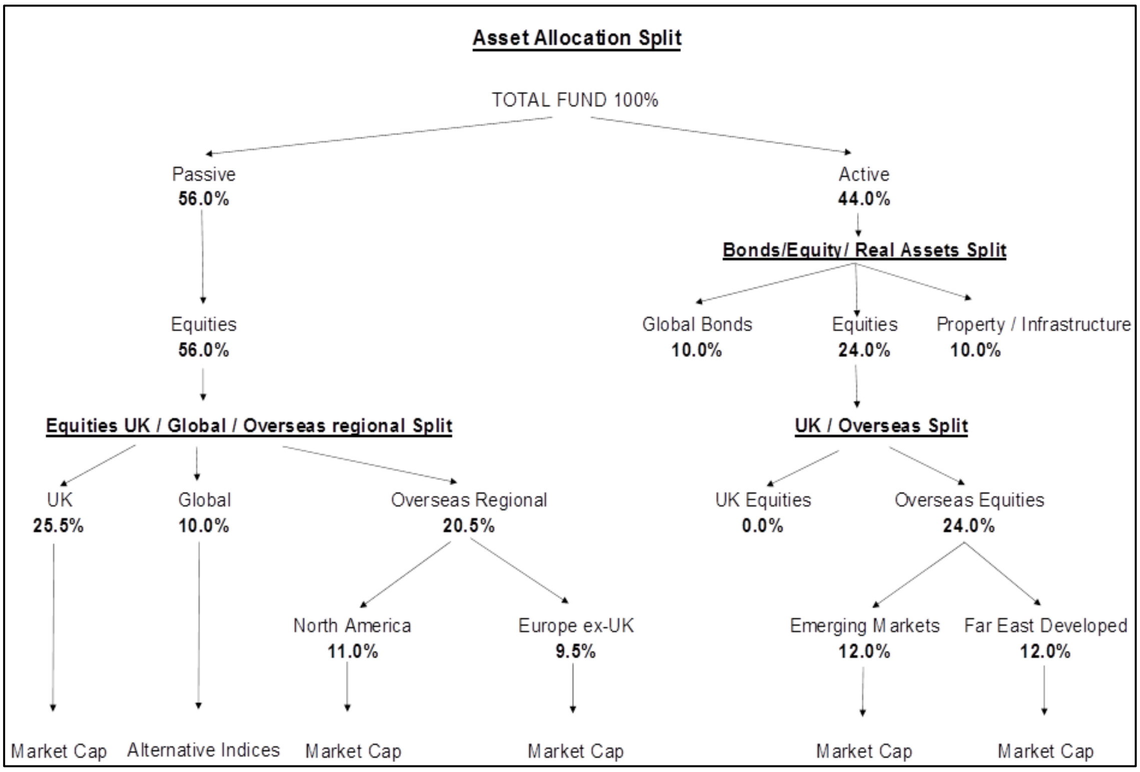
e) Infrastructure pooled funds

Infrastructure can be defined as the essential facilities and services upon which the economic productivity of society depends. These assets are typically involved in the movement of goods, people, water, and energy. Infrastructure returns can be accessed through listed Infrastructure, which is more correlated to Equity returns, unlisted

Infrastructure equity investments accessed through pooled funds and Infrastructure Debt, again usually accessed through pooled funds. Direct investment is also possible depending on available internal skill and resource.

5.7 Equities are primarily split on a regional geographic basis, with the exception of the alternative indices allocation in the passive equity portfolio, which is on a global basis. The current allocation is set out in the diagram below. Bond investments are in global corporate debt. All active equity indices are 'Market Cap' based, whilst the passive allocation is 'Market Cap' based for the developed regional equity investments and a mix of alternative indices for the global allocation.

Figure 1: Current allocation of assets



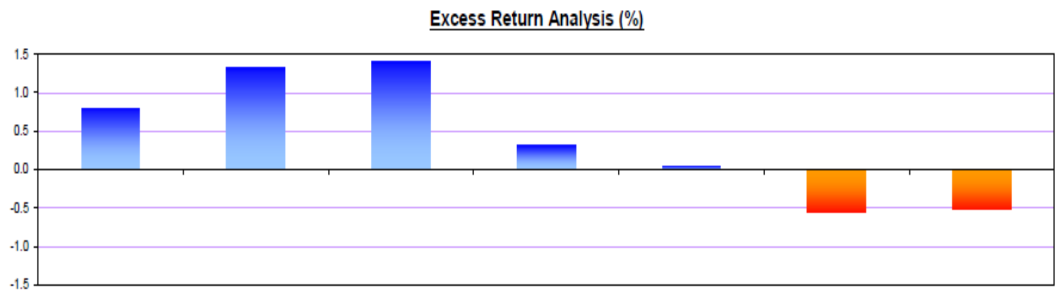
5.8 Over the past three years the Fund has started to diversify away from the traditional asset classes of equities and bonds, to help achieve a lower risk and volatility profile, alongside seeking additional sources of income and growth. This strategy is in-line with the actions taken by other LGPS Funds. At present the Fund has diversified into property and infrastructure pooled funds.

6 Taking Stock: Summary of Fund performance

Fund performance over 1, 3 and 10 years

6.1 The Fund's performance, as at 30th September 2016, can be analysed against the bespoke benchmark, which reflects the specific assets that the Fund invests in, or against a peer group of other Funds (usually specifically other LGPS Funds). A comparison will be made against other Funds later in this section. Therefore this will concentrate on performance against the Fund's own benchmark.

Figure 2: Summary performance of total Fund against Fund benchmarks



	QTR	YTD	1 Yr	3 Yr	5 Yr	10Yr	Mar-87
Portfolio Return	8.3	15.8	24.9	10.1	12.0	6.5	8.0
Benchmark Return	7.5	14.4	23.5	9.8	11.9	7.0	8.6
Excess Return	0.8	1.3	1.4	0.3	0.0	-0.6	-0.5

All returns for periods in excess of 1 year are annualised.

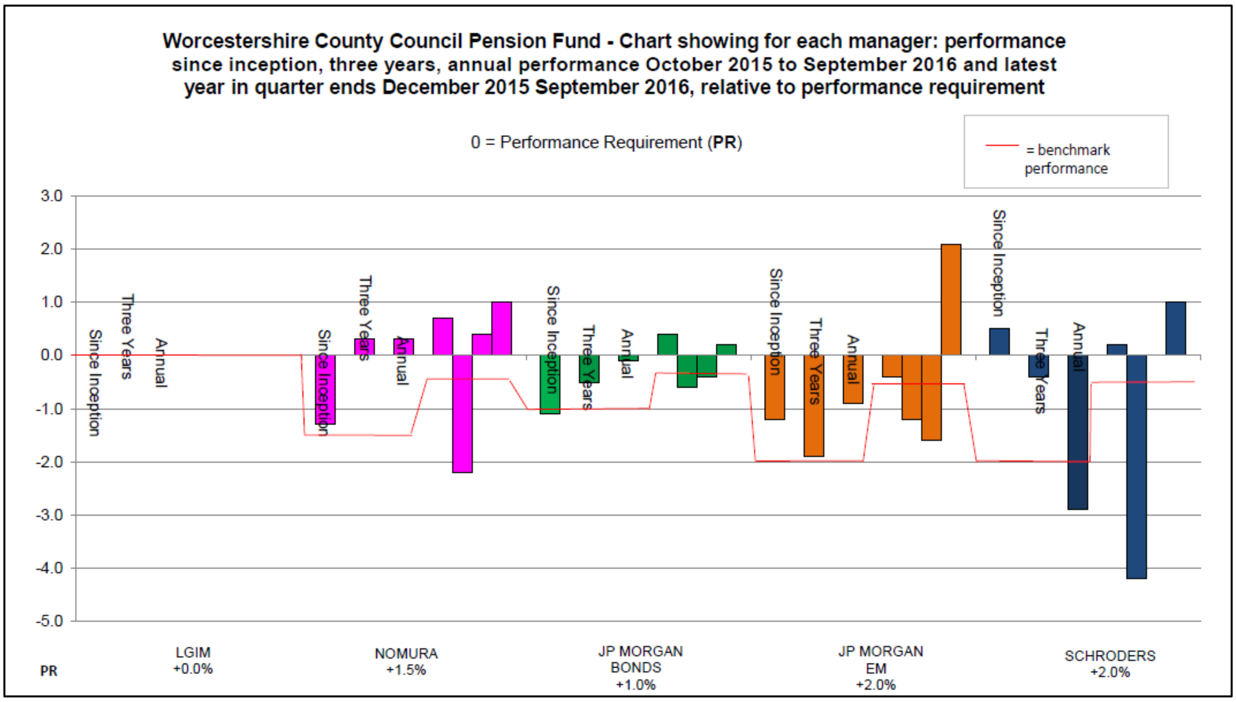
6.2 Over one year the Fund has outperformed the benchmark by 1.4%, over three years has outperformed by 0.3% per annum but has underperformed over the past ten years by 0.6% per annum.

6.3 The Fund's performance represents a minimal divergence from benchmark and can be explained by the high percentage of assets (56%) that are managed on a passive basis. The reversion to passive equity investment that has happened since the last triennial valuation and asset allocation review was made with the intention to reduce the risk of significant underperformance occurring on any timescale. It also recognises that it is increasingly hard for active managers to outperform general market movements in developed markets such North America. The underperformance illustrated above over the ten year period is directly attributable to the active managers employed at the time, one of which has been relieved of their mandate since 2013.

Investment managers performance

6.4 The performance by Fund Manager is illustrated in Figure 3 below.

Figure 3: Summary performance by Fund Manager



£1,308.0 million – Passively managed Equities

6.5 The passive equities mandate is managed by Legal and General Asset Management (LGIM). The mandate has been held by LGIM since December 2015 following the joint procurement by six Midlands based Funds, five of which are also members of the LGPS Central pool. The joint procurement exercise generated significant fee saving for the six Funds involved and has since been replicated by other LGPS Funds across the country. The mandate covers the UK, Europe ex-UK, North America and a global alternative indices allocation.

6.6 The passive equity mandate has performed in line with the benchmark, which is as expected. Therefore this section on manager performance will concentrate on the Bonds mandate, Active Equity mandates and the Property and Infrastructure investments.

£821.9 million – Actively managed Equities and Bonds

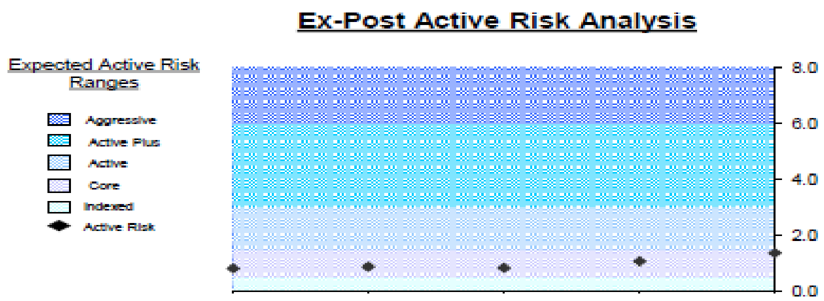
6.7 The Far East Developed Equities mandate managed by Nomura and the Bonds mandate managed by JP Morgan have been in place for just over ten years, whilst the Emerging Markets Equities mandates managed by JP Morgan and Schroders have been in place since 2011.

6.8 The Far East Developed Equities mandate and the Bonds mandate performed well for the first five years until the financial year 2007/08. Since 2008 the active elements have delivered relatively poor performance relative to target. JP Morgan have also struggled with performance on their Emerging Markets mandate, however Schroders have performed relatively well since inception. Over the past three years, in absolute annualised returns terms Emerging markets have delivered +8.4%, the Far East has provided +10.6% and the Bond mandate benchmark returned +5.8%.

6.9 Across the life of these mandates performance has been volatile, with many months showing negative returns, which has hampered achieving consistent performance. This volatility is illustrated in the individual manager sections shown in Figure 3 above.

6.10 The amount of risk taken by the active managers is shown in Figure 4 below, which shows how active management adds to total portfolio risk.

Figure 4: Ex Post Active Risk Analysis



	1Yr	3Yr	5Yr	10Yr	Mar-87
Active Risk	0.8	0.9	0.8	1.1	1.4
Portfolio Risk	8.1	8.8	9.3	13.2	13.0
Benchmark Risk	7.9	8.5	9.1	12.6	12.8

£379.8 million – Nomura Asset Management UK Limited – Japan and Developed Asia ex-Japan

6.11 Nomura have outperformed over the last 12 months by 1.4%, and over 3 years have also outperformed by 1.7% (per annum). Since inception Nomura have equalled their benchmark. Their outperformance target is 1.5% per annum over rolling three year periods above their benchmark, which is the FTSE Developed Asia Pacific Index.

6.12 Following the 2013 Asset Allocation Review Nomura's benchmark was changed from Japan and Asia ex-Japan to Japan and Developed Asia ex-Japan. This change removed the Emerging Markets economies from their benchmark. The Emerging Markets active Equities mandates are managed as two separate portfolios by Schroder and JP Morgan. The inception of these portfolios dates back to October 2011 and December 2011 respectively.

6.13 Nomura's performance profile has followed the general trend, performing well initially, less so following the 2007/08 financial crisis but has recovered somewhat recently. The difference is that having suffered the same dip in returns experienced elsewhere in the financial year 20070/8, returns recovered back into positive territory until 2011, before tailing off again through to 2013.

6.14 The recent improvement in performance follows the change in benchmark and a fee discount negotiated on the Developed Asia ex-Japan segment of the portfolio. This tiered discount remains in place until performance target is achieved on a rolling three year time horizon.

6.15 This remains a diverse mandate, covering a lot of territory, which brings considerable challenges in making sure money is actually invested in the right markets at the right time. Since 2013 and until the second quarter of 2016 Nomura had "given up" on trying to make active returns in Australia and moved that element of their portfolio onto a passively managed basis.

6.16 In broad terms the Japanese element of the mandate has performed better than the rest of the region. Although Nomura have implemented a new portfolio manager to manage the non-Japanese element of the mandate and performance has been on an upward trend since his appointment.

<u>£146.1 million – JP Morgan Asset Management – Emerging Markets</u>

6.17 JP Morgan has outperformed over the last 12 months by 0.9% and since inception (12/12/2011) outperformed their benchmark by 0.2% per annum. Their outperformance target is 2.0% per annum over rolling three year periods above their benchmark, which is the FTSE All World Emerging Markets Index.

6.18 JP Morgan is a long way behind their performance target. JP Morgan seeks to achieve superior risk-adjusted returns over the long term by using diversified sources of alpha whilst maintaining a value bias.

6.19 The underperformance achieved over the past three years (0.3% behind benchmark) is largely attributable to 2014, which was according to JP Morgan, the worst year for Value style investing in the past twenty years. 2015 was not as bad for JP Morgan's Value-orientated style of investing, but it was apparently not a good environment. JP Morgan state that it has been frustrating to underperform in early 2016 because the cyclical rally they expected did materialise, but the portfolio didn't benefit. JP Morgan's move to increase Russia late in 2015 worked but they missed the large rally in Brazil. However, relative performance for the quarter ended September is substantially above benchmark at +2.5%. Further analysis of JP Morgan style bias is shown in Section 12 of this paper.

<u>£159.3 million – Schroder Investment Management Limited – Emerging Markets</u>

6.20 Schroders have underperformed over 12 months by 1.5% but have outperformed since inception (20/10/2011) by 2.2% per annum. Their outperformance target is 2.0% per annum over rolling three year periods above their benchmark, which is the FTSE All World Emerging Markets Index.

6.21 As the performance numbers show, Schroders are currently the leading Emerging Markets manager for the Fund. They have also shown a better level of consistency in their performance.

6.22 Schroders have provided some exposure to Frontier Markets, thus extending the geographical spread for the Fund.

<u>£136.7 million - JP Morgan Asset Management - Bonds</u>

6.23 JP Morgan have outperformed their benchmark over the past 12 months by 0.8% and have outperformed over the last 3 years per annum by 0.4%. Since inception (31/3/03) they are behind benchmark by -0.3% per annum. Their outperformance target is 1.0% per annum over rolling three year periods above their benchmark, which is the Barclays Global Aggregate Corporate Bond Index.

6.24 This mandate has been subject to two restructures since inception. The first change was made in 2009 and the most recent change was in 2012, when a major switch from Government bonds into Corporate bonds was undertaken, reflecting the valuation differential between the two sectors.

6.25 Since inception the cumulative return has been disappointing. In more detail, initial returns were positive, but then tailed off sharply in late 2007/2008. Subsequently there has been a gradual improvement, particularly following the changes made to the mandate in 2009 and 2012.

6.26 Concerns exist that JP Morgan have not utilised their risk budget effectively in order to achieve their performance target and that the portfolio manager responsible for the mandate has recently been changed.

6.27 Fund Officers obtained external benchmarking information on performance achieved by JP Morgan's peers and also market fees for similar mandates. The research showed that JP Morgan had performed at the bottom of the second quartile and top of the third quartile of equivalent managers over the past three years. The 1% performance target has therefore been achieved by the top performing managers.

6.28 Following a proposal by JP Morgan to reduce their performance target as it was deemed unachievable in the current market environment, combined with a fee reduction offer, on 16 September 2016 Fund Officers met with JP Morgan to discuss their proposal.

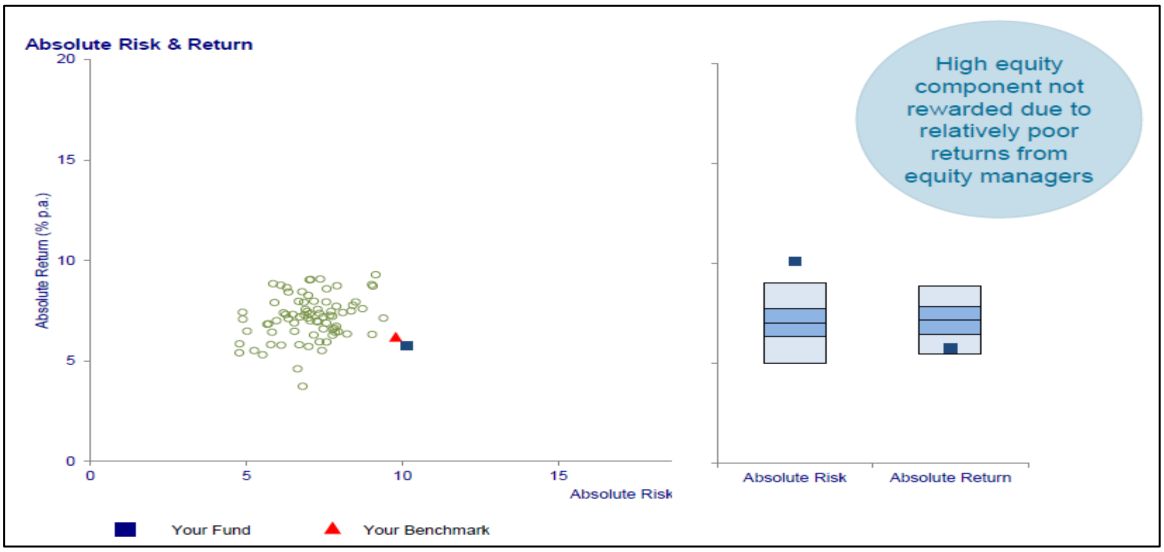
6.29 The Chief Financial Officer informed JP Morgan that the contracted target performance requirement of +1% would remain, as top performing managers had achieved this target and there would be a procurement issue if the target were changed at this stage. JP Morgan stated that the portfolio's target performance is an outlier for them when compared to other clients but accepted the procurement issue of changing the contracted target. Following further discussions, JP Morgan agreed to further revise their fee proposal and subsequently this was accepted.

Comparisons with the absolute risk and return of other LGPS Funds

6.30 The chart below provides the range of absolute risk and returns seen across the WM LGPS universe for the five years to 31st March 2016. This illustrates how wide the range of returns and risk positions are, and also the high risk position taken by the Fund over this time period.

6.31 The high level of absolute risk is driven by the Fund's significant overweight to Equities compared to the average LGPS fund. Equities in comparison to other asset classes such as Bonds have not demonstrated such a differential in return that has been the experience over the last 30 years. This is due, in the main to the impact of Quantitative Easing on Bond Valuations since 2010. Over the medium term, Equities are still anticipated to be an Growth Asset Class where the risk and volatility of this Asset Class should be rewarded through additional yield and capital appreciation.

Figure 5



7 Review of the Fund's Strategic Asset Allocation Conditional Value at Risk

Risk analysis

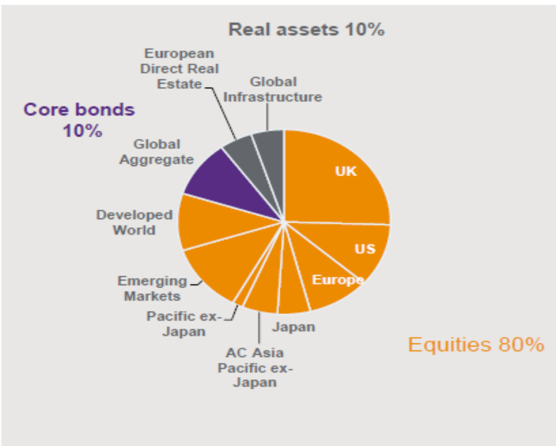
7.1 The table below details the 6.59% expected return from the Fund's current strategic asset allocation based on JP Morgan's Long-term capital markets assumptions 2017. Expected asset volatility is 11.84% mainly driven by the high allocation to equities. Down side risk, also known as Asset Value at Risk gives the average portfolio return in the worst 5% of scenarios. The result of -12.88% is relatively high compared to the average LGPS Scheme due to the Funds significantly higher than average allocation to 'Market Cap' benchmarked equities, which on average have a higher volatility over the long term than Bonds, Property and a number of other types of 'alternatives'. High correlation between asset classes and Equity indices within the portfolio also increases the Asset Value at Risk.

7.2 Please note that this analysis is based on benchmark risk and does not take into account risk introduced by active managers. Therefore in reality the Fund's Asset Value at Risk is slightly higher than -12.88%.

7.3 This analysis supports the moves made as a result of the last Strategic Asset Allocation into other Asset Classes and Index trackers that are based on alternative characteristics of companies than Market Capitalisation.

<u>Figure 6</u>

Current portfolio



Observations

- The current asset allocation has a high allocation to equities
- The impact of this is a high expected return of 6.59%, against a volatility of 11.84%
- Downside risk, as measured by Value at Risk, stands at -12.88%

Summary portfolio characteristics:	
Asset Value (GBP)	1952.3
Arithmetic Return (%)	6.59
Compound Return (%)	5.95
Asset Volatility (%)	11.84
Sharpe Ratio	40.88
Asset Value at Risk 95% (GBP)	-251.42
Expected Shortfall (GBP)	-347.98
Worst Quarter Return (%)	-11.65
Maximum Drawdown (%)	23.79
Asset VaR (%)	-12.88

8 The existing Strategic Asset Allocation compared against the WM Local Authority Universe

8.1 The 2015/16 annual WM report provides data that analyses the contribution to performance, positive and negative, at:

- the asset allocation level; and also
- the effectiveness of stock selection by asset class and geography.

8.2 It is worth bearing in mind that this information reveals the impact of non-ownership of asset classes as much as it does for the classes that are represented within the Fund.

8.3 The outcome as at 31st March 2016 is summarised in Table 4 below.

Table 4 Summary of effectiveness of the current asset allocation

Outperformance per annum	Asset Allocation	Stock Selection
Over 1 Year	-2.0%	-0.1%
Over 3 Years	-0.1%	-1.1%
Over 10 years	0.4%	-1.0%

8.4 The table shows that active managers over the short, medium and long term have been a detractor to Fund returns compared to LGPS average through their active stock selection decisions, even though in some cases they have outperformed their own indices. The Fund's active managers' performance has improved since the last Strategic Asset Allocation review in 2013.

8.5 The Fund's asset allocation compared to the average LGPS Fund has been a positive factor over the long run but has detracted slightly over the medium term and has been poor over the past year. This is largely due to the Fund's underweight allocation in Bonds, at a time when Bond yields have fallen to record lows, and also due to the overweight position in Emerging Markets and Far East Equities. The returns of which have been negatively impacted by the strong U.S. Dollar. Bond yields now appear to be on the turn and the U.S. Dollar bull-run is running out of steam including recent falls following the U.S election result. The Fund's exposure to Emerging Markets and Far East Equities is for the Long Term and it is anticipated that returns will revert to long term average over the longer term.

9 Market returns achieved across different asset classes

9.1 Table 5 below details market returns to 31 March 2016 across Equity markets, Bond Markets and other Alternatives, including Property. The purpose of this table is to demonstrate how asset allocation decisions can outweigh the relative returns achieved by the Fund's active managers.

Table 5 Summary of effectiveness of the current asset allocation by geography

Outperformance by Region	One Year	Three Years	Ten Years
UK Equities	-3.9%	3.7%	4.7%
North America Equities	3.6%	12.6%	8.8%
Europe ex-UK Equities	-4.2%	6.5%	4.9%
Japan Equities	-3.3%	6.6%	1.7%
Pacific Equities	-5.4%	0.1%	7.6%
Other International Equities (Emerging Markets)	0.4%	9.0%	7.0%
UK Bonds	3.2%	4.6%	5.7%
Overseas Bonds	9.8%	2.6%	6.5%
UK Index Linked Bonds	1.7%	5.1%	7.4%
Cash/Alternatives	0.3%	0.3%	1.7%
Property	11.7%	14.6%	5.0

10 A review of Active Equities Management Structures

Global Based Mandates

10.1 These mandates are popular as asset managers strive to concentrate their attentions on markets with the best prospects, wherever they are, developed, emerging or even frontier. However the scale of operations needed to support a global investment manager usually means that their focus tends to be on larger, more tradable company names, meaning that there are plenty of opportunities for regional specialists to identify smaller, less well-known companies with good long term prospects for their investors.

10.2 Out of the main developed market areas (USA, Europe and Far East); in the medium term Emerging Markets and the Far East probably have the best potential upside. Good unconstrained global managers can respond to the fundamentals for each market accordingly.

Far East and Emerging Markets

10.3 It is important to focus on the relative attractions of the various parts of the region to ensure that the Fund has exposure to the most attractive areas. The current mandate with Nomura is focused purely on Japan and Developed Asia ex-Japan. This increased mandate concentration and change in portfolio manager in the ex-Japan element of the portfolio has allowed Nomura to focus their analysis and to start to achieve some positive returns against benchmark.

10.4 The fee discount for the Developed Asia ex-Japan element of the portfolio remains in place until target returns are achieved over a rolling three year period. The Japanese element has also been performing well recently. The region still has great potential for investors, but the Fund needs to ensure the correct expertise is contracted to exploit available opportunities.

10.5 Emerging Markets have been cast into the shadows by the performance of developed markets in over 2013, 2014 and 2015. They have shown some significant signs of recovery in 2016. The long term investment case for Emerging Markets remains intact. Active managers can make good returns by ensuring that they do invest in the markets with the best prospects.

North America

10.6 The rise of the U.S. shale gas industry has had a significant impact on global energy prices and has forced OPEC to increase oil supply to lower the oil price and undercut shale gas providers to try and force them out of business. This has had limited effect and has led to a sustained low oil price. The side effect has been considerably positive for the United States (U.S.) economy. Lower cost of production has made industry more cost competitive.

10.7 The U.S stock market has performed strongly in local currency terms and in GBP but further substantial market increases look less likely and over the long-run JP Morgan expect the U.S. Dollar to depreciate against Sterling.

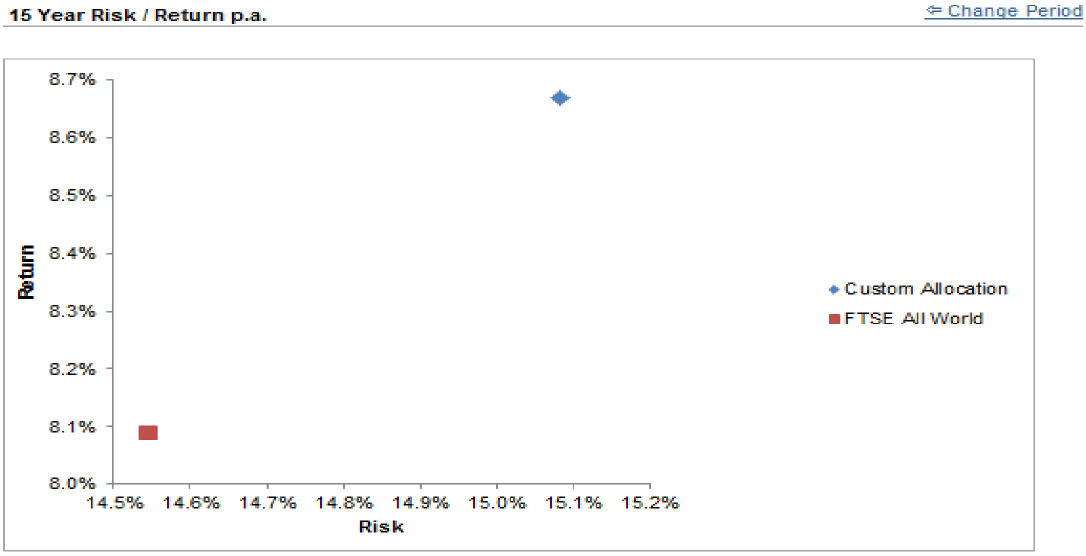
Europe

10.8 Following years of sub-par growth it is, at present, difficult to see what course of events will trigger a substantial and sustainable recovery in most of the Eurozone, given the sheer scale of sovereign debt and potential banking issues. Active investors in Europe will be in for a bumpy ride, especially following the decision of the United Kingdom to exit the European Union. The divorce process is likely to be challenging and further volatility in the currency markets is expected.

Performance Analysis

10.9 Figure 7 below provided by Legal and General Asset Management shows the Fund's current regional market cap equity allocation versus a global index (FTSE All World) performance over the past fifteen years. The analysis shows that over the fifteen years the regional allocation has outperformed global by 0.6% per annum at a slight increase in risk / volatility of 0.6%

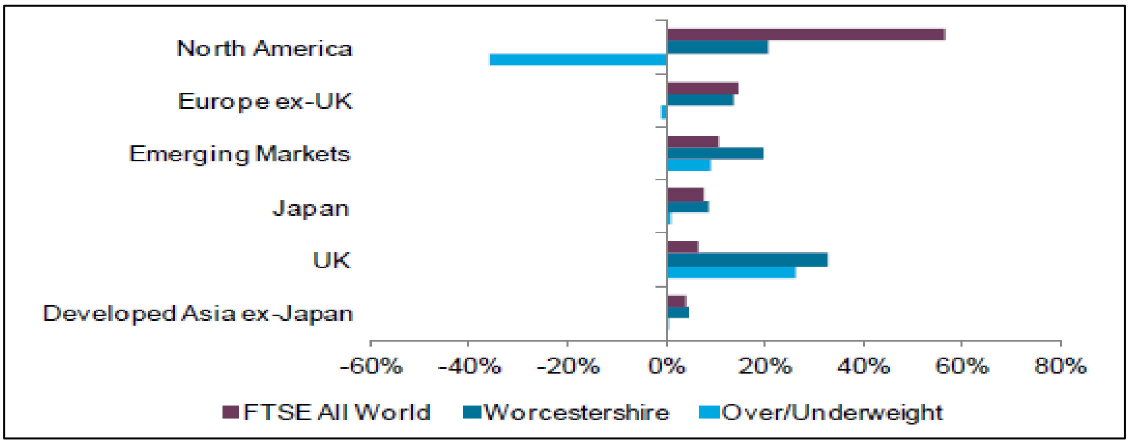
Figure 7



Regional weights compared to global index

10.10 Figure 8 below sets out the Fund's equity exposure via regional portfolios relative to the FTSE All-World Index.

Figure 8



10.11 Compared to the FTSE All-World Index the Fund has a significant underweight to North America, a significant overweight to the UK and a moderate overweight allocation to the Emerging Markets. Over the long term the process of determining regional weights is likely to be a major driver of the Fund's equity allocations performance. Table 6 below shows the performance of the three regions to which the Fund had material deviations relative to the global standard benchmark over one year, three years and five years to September 2016.

Table 6

Region	Index	1 Year	3 Years (p.a.)	5 Years (p.a.)
North America	S&P 500 (USD)	15.4	11.2	16.4
UK	FTSE 100 (GBP)	18.3	6.0	10.1
Emerging Markets	FTSE Emerging (USD)	17.2	0.7	3.5
Global	FTSE All World (USD)	12.6	5.8	11.3

10.12 Over the past five years North America has performed very strongly compared to the UK and significantly better than Emerging Markets. Therefore over this shorter time horizon allocating to equities on a global basis would have been optimal for the Fund.

10.13 Performance of regional vs. global allocations will fluctuation over time but investing via a series of regional weightings does offer the Fund better opportunities to fully tailor regional weights and provides the option of dynamic asset allocation by the Pension Committee. This option may become increasingly utilised once assets have transferred to the pool and the Pension Committee has more time and resource at its disposal to concentrate on strategic asset allocation decisions.

10.14 Table 7 below provided by BFinance sets out the benefits of a regional and global approach to equities asset allocation.

Table 7

Regional Equity Portfolios	Global Equity Portfolios
- Easy to fully express customised regional tilts;	- Delegation of regional tilts to managers;
- May benefit from specialist regional managers;	- Managers have full flexibility of global stock universe.
- Domestic allocation tax/local knowledge benefits;	- Global managers now have meaningful track records;
- Appropriate resourcing required for implementation.	- Easy implementation of global equity exposure.

Conclusion

10.15 There is no clear case to move from regional allocation of equities to global at this time.

10.16 Over the past 15 years, following the change from global to regional allocation of equities in 2001/02, the regional allocation has outperformed global by 0.6% per annum for a small increase in risk (0.6%). Analysis of shorter time periods shows different results but a change to global allocation at present would increase the Fund's weight to U.S. equities at a time when U.S rates are likely to rise and the U.S equities market, after a very strong period, appears to be levelling off.

10.17 Global exposure is also gained through the Fund's passive alternative indices allocation, so in reality the Fund employs a mixed approach to equities asset allocation.

10.18 It is recommended that a review of regional equity weightings be carried out before assets are transferred to LGPS Central pool. Once transitioned to the pool, review of regional equity weightings is recommended to form part of a more dynamic approach to asset allocation undertaken by the Pension Committee.

11 Review of Equities Management in North America

Investment theory

11.1 Investment theory and empirical evidence suggests that net of fees the average active equity manager will underperform their benchmark, especially in highly efficient developed markets. There is little evidence to support a view that the U.S. market is more efficient than other developed equity markets. Tables 8 and 9 below show the calendar year outperformance of active U.S. equity managers and the rolling three year annualised outperformance of active U.S. equity managers.

Table 8 Calendar year outperformance of active U.S. equity managers

	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006
Managers	1142	1123	1099	1054	1022	988	958	930	889	850
Median Outperformance vs Index	-1.46	-1.85	10.7	-0.84	-1.63	-0.55	2.15	0.43	1.84	-0.66
Top Quartile Outperformance vs Index	1.71	0.14	3.97	1.46	1.58	2.17	9.45	4.06	7.34	2.45
% Outperforming Index	**38%**	**27%**	**58%**	**41%**	**34%**	**44%**	**58%**	**54%**	**61%**	**45%**

Source: eVestment, U.S. Large Cap Equity universe.
All manager returns are net of a 0.50% annual management fee. All managers are compared against the S&P 500 index

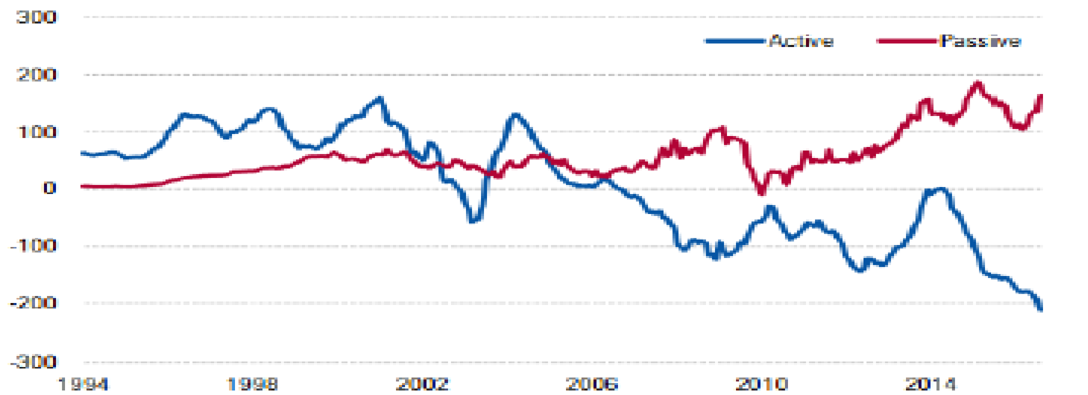
Table 9 Rolling three year annualised outperformance of active U.S. equity managers

	July'13-June'16	July'12-June'15	July'11-June'14	July'10-June'13	July'09-June'12	July'08-June'11	July'07-June'10	July'06-June'09
Managers	1018	1005	980	960	933	905	870	828
Median Outperformance vs. Index (P.A.)	-1.41	0.16	-0.73	-0.72	-1.07	0.63	1.60	1.69
Top Quartile Outperformance vs. Index (P.A.)	0.16	1.87	0.46	0.47	0.44	2.22	3.55	3.56
% Outperforming Index	**28%**	**53%**	**34%**	**35%**	**31%**	**61%**	**70%**	**70%**

Source: eVestment, U.S. Large Cap Equity universe.
All manager returns are net of a 0.50% annual management fee. All managers are compared against the S&P 500 index

11.2 The tables show that U.S. equity managers' performance against benchmark net of fees since 2010 has been poor with the exception of 2013 when 58% of managers outperformed the index. One possible reason for the fall in performance is the impact of the flows of investments from actively managed strategies to passively managed strategies in the U.S. Active managers who invest based on fundamentals would have faced headwinds as passive funds will flow towards all stocks in the index without taking into account their fundamentals. Figure 10 below, provided by BFinance, shows the U.S equity twelve month flows (USD billion).

Figure 9

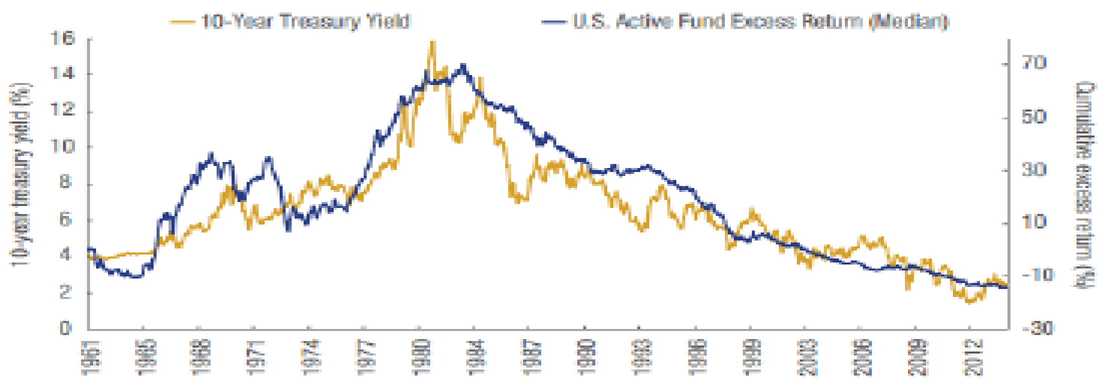


Source: Morningstar Direct Asset Flows.

11.3 There is also evidence to suggest that there is a link between U.S. treasury yields and the performance of U.S. active equity managers. Figure 10 below shows that active managers tend to add greater levels of outperformance in rising interest rate environments.

Figure 10

10Y Treasury Yield vs. Active Fund Return



Source: CRSP, S&P, Russell, Nomura Research.

Independent Performance Analysis

11.4 Table 10 below sets out the findings of an independent report from SPIVA (S&P Indices versus Active - based on S&P Dow Jones Indices' analysis), which shows research into the active / passive manager performance in North American equities.

Table 10 SPIVA H1 2016: Percent of Time Indices Outperformed Active Managers

Fund category	1 year	3 years	5 years	10 years
All Domestic US Equity Funds	90.20%	87.41%	94.58%	87.47%
Global Equity Funds	75.35%	76.96%	82.45%	81.19%
Emerging Market Equity Funds	42.22%	77.42%	67.63%	81.94%

11.5 There is no conclusive evidence that over the short or medium term active U.S equity managers on average can outperform their index net of fees. There will be managers in the market than can and have outperformed the index over the long term but manager selection risk is high. It is therefore recommended that the Fund remains passive in North America.

Conclusion

11.6 During 2016, the Fund moved its Actively Managed Fund in North America into Passive management due to on-going performance issues with the Active Manager.

11.7 There is no clear evidence that the Fund will be able to pick an active manager that will outperform the index in North America and on average the majority of managers over recent periods including the last ten years, after fees, have underperformed the index.

11.8 The flow of investments from active to passive strategies may have been a headwind for active managers over recent years and for that reasoning is not deemed sufficient evidence on which a retain active management in North America.

11.9 It is recommended therefore that the Strategic Asset Allocation to Actively Managed North American Equities is changed to Passively Managed North American Equities.

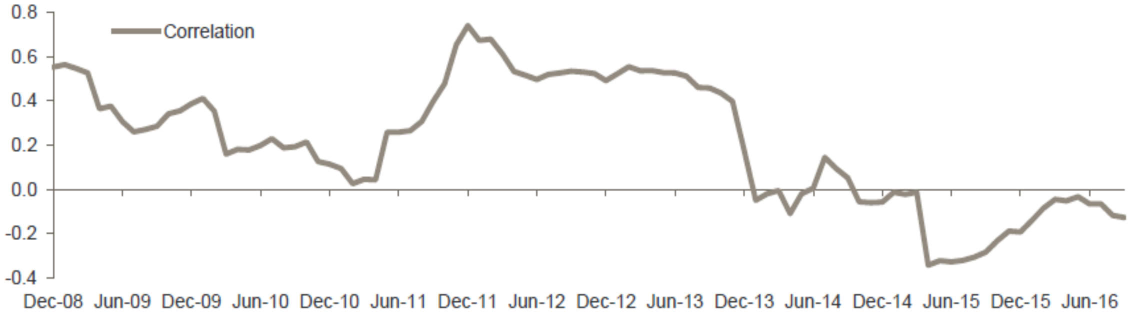
Review of active Emerging Markets managers' investment style blend Manager Style Correlation

11.10 Research provided by JP Morgan shows clear advantages of combining managers with different style exposures in Emerging Market equities. Figure 11 below shows the three year correlation of a basket of Value style managers and a basket of Growth style managers, as defined by Morningstar.

11.11 A negative correlation implies the two styles provide a good compliment. Correlation has been positive in the past but JP Morgan expect it to remain low going forwards and will therefore provide diversification benefits to the overall Fund portfolio.

Figure 11

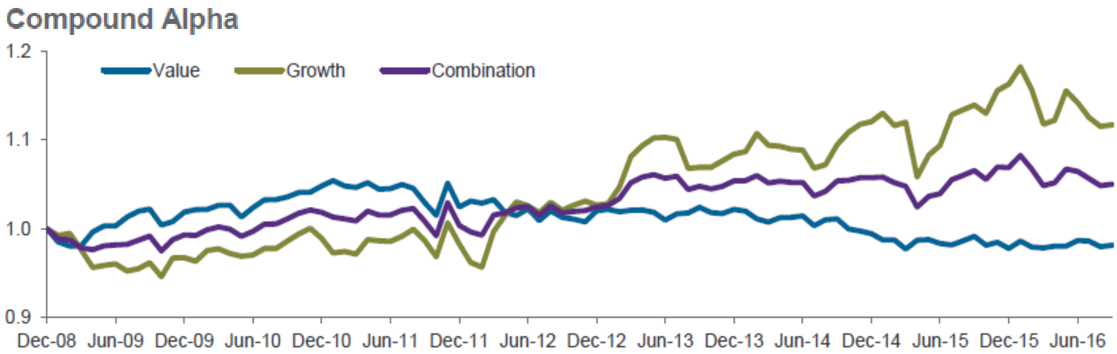
Three year correlation of Value & Growth managers



Source: Morningstar. JPMorgan Asset Management. Data as at 30th September 2016.

11.12 Figure 12 below shows how different manager styles have performed in market environments since December 2008. The combined approach has reduced volatility from its Emerging Markets equities exposure over the past eight years.

Figure 12



Source: Morningstar. JPMorgan Asset Management. Data as at 30th September 2016. Past performance is not necessarily a reliable indicator for current and future performance.

JP Morgan and Schroders style diversification

11.13 BFinance have provided a regression analysis indicating that both JP Morgan's GEM Diversified strategy, with its value and momentum style factors, and Schroder's GEM Equity Core strategy, which is more of a growth style, have displayed a growth bias since the beginning of 2010, albeit JP Morgan to a lesser extent. Therefore this initial analysis would not suggest that they offer the best complementary aspects to each other. Further analysis is required to determine whether JP Morgan's growth style bias has been in the main driven by benchmark movements and then offset by their active portfolio decisions or whether their active management of the portfolio has not been in line with their value and momentum strategy style.

11.14 The strategies do however have a reasonably low correlation of relative returns; 0.41 over the last three years and 0.34 over the last five years, which means there are risk reducing benefits of combining the two strategies.

Conclusion

11.15 The analysis provided by JP Morgan suggests that using a value and a growth style combined manager approach to investing in Emerging Markets active equities adds diversification and reduces risk, whilst maintaining returns.

11.16 It is recommended that the Pension Investment Advisory Panel is tasked with overseeing further due diligence to be carried out on JP Morgan to understand why the Emerging Markets portfolio has resulted in a slight growth style bias since 2010 and has therefore not provided the optimal diversification from the manager style blend.

Review of the passive equities alternative indices blend Passive equities investment strategies

11.17 Passive investment removes active manager risk, but the investor is still exposed to the full impact of market volatility, which can have a profound impact on Fund values when markets fall sharply. The Fund currently gains exposure to passive equities through the following two different types of indices:

a) Regional Market capitalisation weighted Indices

A capitalisation-weighted index is a type of market index with individual components that are weighted according to their total market capitalisation. The larger components carry higher percentage weightings, while the smaller components in the index have lower weights.

b) Global Alternative Indices

A set of investment strategies that emphasise the use of alternative index construction rules to traditional market capitalisation based indices. Alternative indices emphasise capturing investment factors or market inefficiencies in a rules-based and transparent way. The aim is to remove some of the market driven volatility from the measurement process.

Alternative indices performance vs market capitalisation indices

11.18 Legal and General have run the performance as per Table 11 below for the last five years, to give an indication of how the alternative indices strategies have performed both individually, as a blend, and against the world market capitalisation indices (GBP unhedged).

Table 11 Performance table to 30th September 2016

	FTSE RAFI Developed 1000	MSCI World Min Vol (GBP Optimised)	MSCI World Quality	WCC Smart Beta Blend	FTSE World Developed
Annualised Return	15.19%	16.01%	18.01%	16.55%	16.32%
Annualised Volatility	10.30%	10.10%	10.01%	9.29%	9.85%
Return/Risk	1.47	1.59	1.80	1.78	1.66

11.19 The Alternative Indices blend (30% RAFI / 35% Min Volatility / 35% Quality) is effectively the current weighting of the holdings within the Legal and General Pooled Fund, which equates to the original blend managed by UBS Asset Management. The current blend has an underweight to Value style. Key points from table 8 are detailed below:

- The table shows that the Alternative Indices blend has slightly outperformed FTSE World whilst also reducing volatility;
- The Alternative Indices blend has had a lower volatility than any of the other strategies; and
- The Minimum Volatility strategy does not have the lowest volatility over this period. Currency effects have been strong, particularly within the last year, and Legal and General believe this has in part driven this result.

11.20 The alternative indices blend has provided additional diversification as intended at the point of implementation and due to market environment has provided additional return since 2013.

Conclusion

11.21 The passive alternative indices have added additional returns and reduced volatility compared to market capitalisation indices. The blend is underweight to Value but that was the intention at the time of implementation due to the Fund's allocations to Value style active managers.

11.22 It is recommended to increase the Fund's allocation to alternative indices by 5% of the Fund's equities allocation.

11.23 Further analysis is recommended to be carried out by Fund officers with the support of Legal and General Asset Management to consider the removal of the underweight to Value style in the blend based on:

- the termination of Capital International, a Value style active manager; and

- the understanding that Value has underperformed Growth for a few years and appears to be on the turn, according to the JP Morgan Emerging Markets portfolio manager.

12 Review of the Bond portfolio benchmark

Absolute Return Credit strategy definition

12.1 Absolute return credit strategies allocate tactically across credit asset classes. Most commonly investment grade credit, high yield Bonds, Emerging Market debt, depending on the perceived relative value. These strategies will often use a LIBOR+ benchmark.

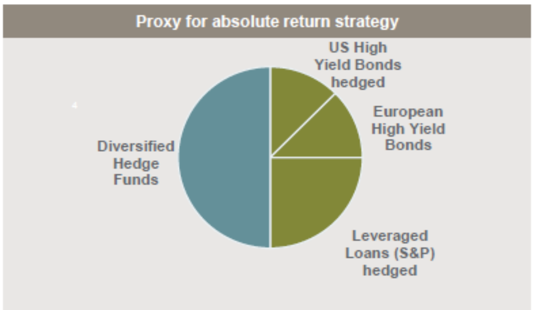
12.2 Return and risk analysis of implementing an Absolute Return Credit strategy

12.3 Figure 13 below provided by JP Morgan shows the risk / volatility and potential return of investing in an Absolute Return Credit strategy as opposed to the current global corporate bonds strategy.

Figure 13

Impact of investing in absolute return credit

- For the purposes of this analysis, we replace the allocation to global corporate bonds with a proxy for absolute return credit, as shown in the chart.
- The term 'absolute return credit' covers a very broad range of possible strategies, and any conclusion would need to be based on an appropriate proxy for a specific strategy.
- The expected impact of investing in absolute return credit is to increase expected return and volatility, and to increase the portfolio's Sharpe ratio.



	Current asset allocation	Inclusion of absolute return credit
Arithmetic Return (%)	6.59	7.31
Compound Return (%)	5.94	6.55
Asset Volatility (%)	11.84	12.81
Sharpe Ratio	40.88	43.38
Asset Value at Risk 95% (GBP)	-251.42	-268.57
Expected Shortfall (GBP)	-347.98	-373.05
Worst Quarter Return (%)	-11.65	-12.92
Maximum Drawdown (%)	23.79	27.86
Asset VaR (%)	-12.88	-13.76

12.4 The Absolute Return Credit strategy potentially increases portfolio returns from 6.59% to 7.31% but also increases volatility 11.84% to 12.81%. The downside risk would also increase from -12.88% to -13.76%. Please note that these results are gross of management fees and Absolute Return Credit strategies tend to demand higher fees than a standard global corporate Bond fund.

Government Bonds

12.5 As a result of Central Banks' Quantitative Easing (QE) programmes and very low, even negative interest rates, government bonds have become expensive with low yields and correlated to Equities. Government Bond prices are likely to come under pressure as QE is wound up, and rates start edging up to more acceptable / normalised levels. The capital value of the Government Bonds in the secondary market will fall as rates rise. Once that "normalisation" has taken place, the correlation to equities may well uncouple. In the meantime traditional Government Bonds are not serving their purpose as a diversifier to Equities.

Investment strategy

12.6 As detailed in Figure 5 the Fund is currently an outlier in terms of portfolio risk compared to LGPS average and therefore it is recommended to maintain the current global corporate Bonds strategy (hedged to GBP) as opposed to investment in an absolute return strategy. Maintaining a nil investment to Government Bonds in the short to medium term is also logical given the current market environment.

Conclusion

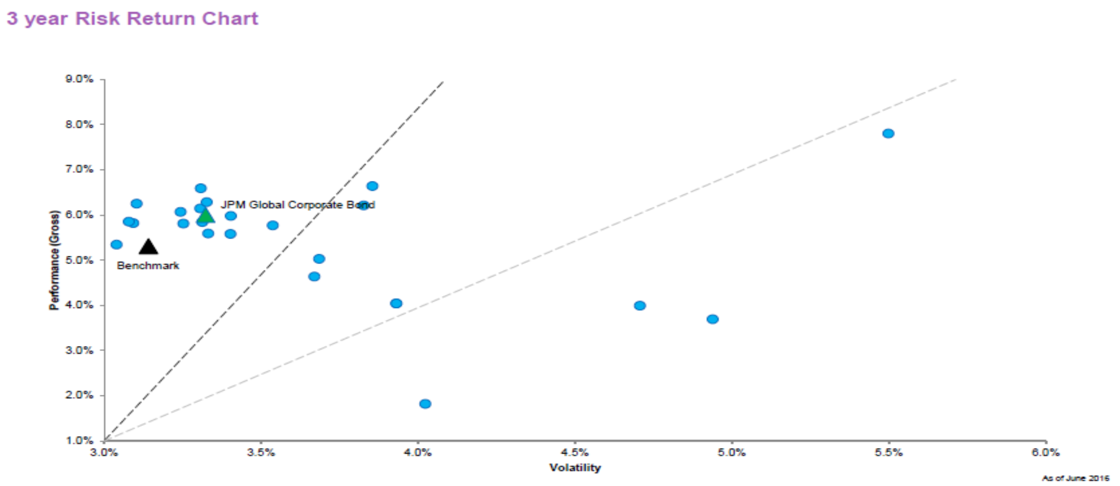
12.7 Due to the increased volatility and fees associated with absolute return credit strategies and the high price / low yields of Government Bonds it is recommended to maintain the Funds current global corporate bonds strategy. It is further recommended that the Bonds investment strategy is reviewed before transitioning assets into LGPS Central pool.

Active fund managers peer performance comparison JP Morgan - Bonds

12.8 The strategy has outperformed its peer group in the last three years, however only modestly by 0.20% relative to the median of the peer group. The strategy sits in the second and third quartiles over the different trailing periods in the last three years. Risk utilisation has been higher than the index, however on a risk adjusted basis has been lower than some of the top managers.

12.9 Figure 14 below shows JP Morgan's performance and volatility over the past three years to 30 June 2016 compared to their peer group.

Figure 14

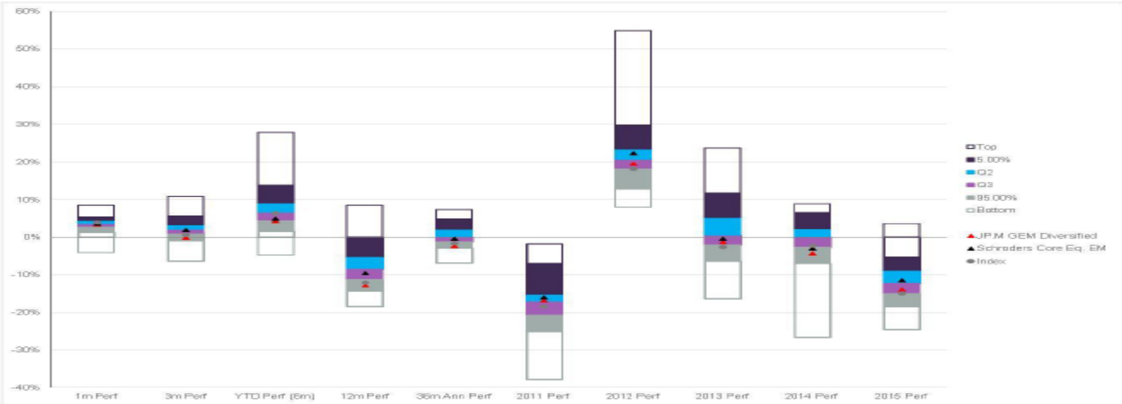


12.10 The Pension Committee on 26th September 2016 agreed a further discount proposal with JP Morgan, which reduced the basis point fee to 16.8bps, which equates to a £75,000 per annum fee reduction compared to the fee agreement in place between January 2016 and September 2016 and a £118,500 reduction compared to that paid prior to 1st January 2016.

JP Morgan and Schroders - Emerging Markets equities

12.11 BFinance have provided analysis of both JP Morgan's performance and Schroder's performance relative to peers over various periods over the past three years. Figure 15 below shows where each strategy on an MSCI EM index and not FTSE as per the Fund's bespoke benchmark falls in terms of quartiles relative to peers. Due to the index difference there will be a slight variance compared the Fund's portfolio returns.

Figure 15

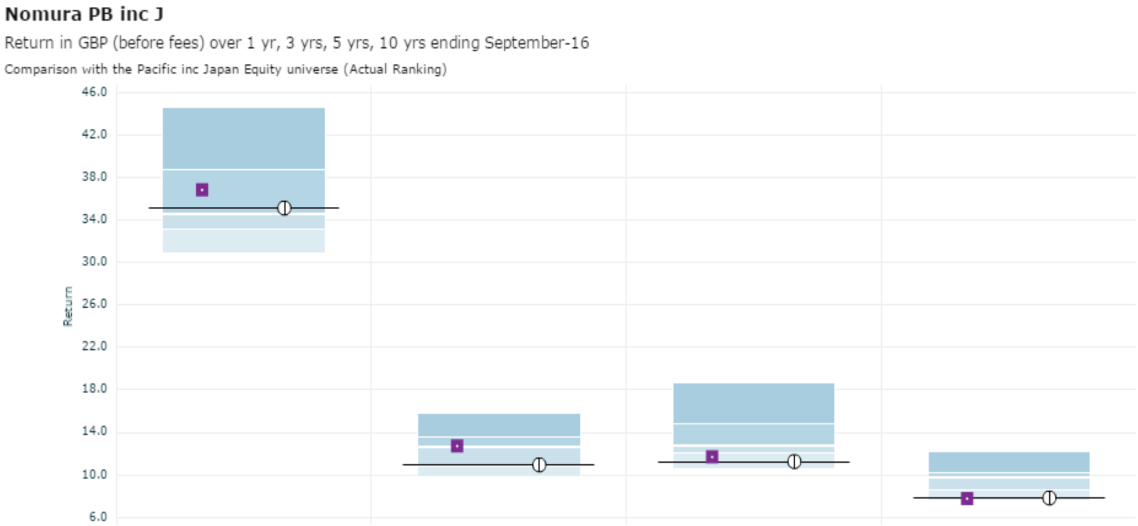


12.12 In terms of percentile numbers Schroders were 38th over one year, 55th over the last three years and 35th over the past five years. JP Morgan fell behind Schroders over each of these periods but argue this is due to their Value style underperforming Growth style over the same periods.

Nomura – Developed Far East equities

12.13 Figure 16 below has been provided by Nomura to evidence their performance compared to peers for various periods over the past ten years. The analysis has been run from the Mercer Insight database.

Figure 16



	1 yr (%)	3 yrs (%pa)	5 yrs (%pa)	10 yrs (%pa)
PBincJ	36.8 *(8)*	12.7 *(10)*	11.7 *(16)*	7.7 *(15)*
FTSE AW AP	35.1 *(9)*	10.9 *(16)*	11.3 *(18)*	7.8 *(15)*
95th Percentile	44.6	15.8	18.7	12.2
Upper Quartile	38.8	13.6	14.8	10.2
Median	34.5	12.6	12.7	9.8
Lower Quartile	33.2	10.8	12.0	8.6
5th Percentile	30.9	9.8	10.6	7.5
Number	20	20	19	16

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12.14 The analysis is consistent with the message Nomura have conveyed to the Pension Committee in terms of their continued improvement in relative performance, evidenced by the fact that the 1 year return comparison shows Nomura above median and the 3 year number also moving back above median with the portfolio right in the middle of the universe.

Conclusion

12.15 It is best practice to review active manager arrangements to ensure that the Fund is still employing the best managers for the selected mandates.

12.16 From the peer group evidence provided it is clear that the Fund doesn't currently contract best in class active managers but neither do we have the lowest performing. There is significant manager selection risk involved with trying to select the best in class managers, with manager performance rotation an issue over the short term, and therefore it is not recommend to change managers at this time and potentially incur double transaction costs when asset pooling involving LGPS Central is due to commence in April 2018.

Review of the Fund's exposure to currency and inflation risk Background

12.17 There exists the potential for the Fund to be impacted by rising inflation and currency movements. As part of the review of potential risks to the Fund's assets and returns, an assessment of the potential impact of an increase in inflation and substantial movements in key currencies has been undertaken.

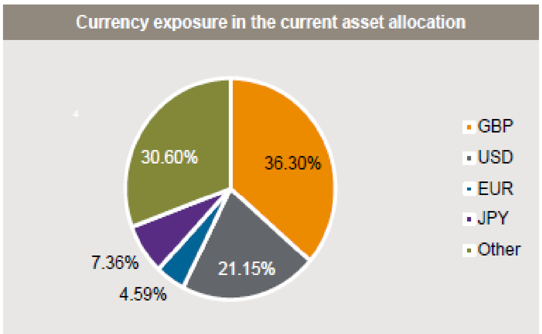
12.18 Mitigating the impact of currency movements can be considerably more complicated, but again this is a potential key risk when investing in non-Sterling assets, at both the asset level and to interest payments. The usual arrangement would be to hedge against the impact of adverse currency movements, but as this comes at a cost it would need to be considered as part of the investment assessment. Some Funds use their custodian to arrange currency hedging on a passive basis; others have employed managers to hedge currency exposures in a more dynamic process.

Currency hedge risk and return analysis

12.19 Figure 17 below shows analysis provided by JP Morgan comparing the current unhedged Fund equities exposure vs a fully hedged portfolio.

Figure 17

- In the current asset allocation, equity exposure is unhedged against currency risk.
- We test the effect of hedging currency exposure within the allocation to equity.
- In our Long Term Capital Market Assumptions, we expect a depreciation of the US Dollar, which results in an expected gain from hedging against currency risk.
- Global Aggregate bonds are currency hedged throughout the analysis, and real assets are unhedged.



	Current asset allocation	Hedging the equity exposure
Arithmetic Return (%)	6.59	7.03
Compound Return (%)	5.94	6.37
Asset Volatility (%)	11.84	11.95
Sharpe Ratio	40.88	44.21
Asset Value at Risk 95% (GBP)	-251.42	-246.35
Expected Shortfall (GBP)	-347.98	-343.82
Worst Quarter Return (%)	-11.65	-12.07
Maximum Drawdown (%)	23.79	32.78
Asset VaR (%)	-12.88	-12.62

12.20 The above analysis contains a key prediction that the US dollar will depreciate over the long-term. Based on this expectation hedging currency risk results in a higher return expectation with little increase in risk. However in the short term there is likely to be significant currency volatility given the recent Brexit referendum decision and the recent fall in Sterling. Hedging currency also comes at a cost albeit on the low side, therefore the cost of a hedge has to be measured against the potential benefit in each case. Any hedging strategy could be quickly implemented through LGIM either for only the passive holdings through alternative LGIM currency hedged pooled funds or across the Fund's entire equity holdings through a currency overlay service offered by LGIM.

Inflation hedge

12.21 Based on JP Morgan's assumptions and analysis there is no statistical relationship between the Fund's current portfolio and UK inflation. Inflation only accounts for approximately 10% to 12% of portfolio returns and most of this can be attributed to the Fund's Infrastructure and Real Estate investments. Equities are a poor hedge for inflation and the Fund's current 80% allocation to equities explains the low total portfolio statistical relationship to UK inflation and therefore inflation risk is currently considered high for the total portfolio.

Conclusion

12.22 Based on JP Morgan's expectation that the U.S. Dollar will depreciate in the long term the analysis provided makes a decent case for hedging overseas currencies for the Fund's equities portfolios. However in the short term Sterling is likely to be volatile, so it is recommended to keep currency hedging under review rather than implement at present. The Fund is also running significant inflation risk and strategies should be considered to reduce this risk overtime.

12.23 It is recommended that the Fund's equities remain unhedged in terms of currency at least until the Brexit negotiations are finalised, as this is likely to be a volatile period for Sterling with potential further falls in the currency over the next few years. The decision of whether to currency hedge overseas equities should be kept under review by the Pension Committee at least annually.

Review of the Property and Infrastructure allocation Current allocation to Infrastructure and Real Estate

12.24 Following the Shadow Pension Committee's decision at the November 2013 asset allocation review to transition 10% of the fund's assets into Infrastructure and Real Estate Funds, on 8th June 2015 the Shadow Pension Committee approved the appointment of three Property pooled fund managers and two Infrastructure pooled fund managers. This followed a competitive procurement exercise run by Bfinance and associated due diligence carried out on shortlisted managers.

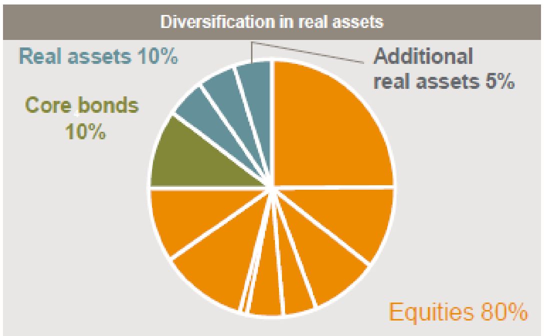
12.25 The current allocation targets a net IRR of 7.7% with a total fee load of 1.04%. The Pension Committee on 26th September 2016 also approved an additional £10m investment to one of the Fund's Infrastructure managers, Green Investment Bank, following appropriate due diligence carried out by Fund officers.

Impact on the total portfolio return and risk profile of an increased 5% allocation to Infrastructure, Real Estate or a combination of each.

12.26 Figure 18 below shows analysis carried out by JP Morgan regarding a 5% transition of assets from Equities to Infrastructure, Real Estate or a combination of each.

Figure 18

- Relative to the current portfolio, diversifying into real assets should maintain expected return, but reduce volatility
- The impact on downside risk should also be beneficial.



	Current asset allocation	5% diversification into real estate	5% diversification into infrastructure	2.5% diversification into each of real estate and infrastructure
Arithmetic Return (%)	6.59	6.58	6.58	6.58
Compound Return (%)	5.94	5.97	5.97	5.97
Asset Volatility (%)	11.84	11.48	11.42	11.44
Sharpe Ratio	40.88	42.04	42.28	42.19
Asset Value at Risk 95% (GBP)	-251.42	-240.24	-238.22	-238.94
Expected Shortfall (GBP)	-347.98	-333.90	-331.38	-332.28
Worst Quarter Return (%)	-11.65	-11.07	-10.71	-10.89
Maximum Drawdown (%)	23.79	22.26	21.41	21.83
Asset VaR (%)	-12.88	-12.31	-12.20	-12.24

12.27 The analysis shows that a 5% allocation change would maintain total portfolio expected returns whilst reducing asset volatility by 0.4% and downside risk by around 0.6%.

Conclusion

12.28 Increased allocation to Infrastructure, Real Estate or a combination of each is expected to maintain expected return, reduce risk / volatility and add some inflation hedge to the overall portfolio.

12.29 It is recommended that a 5% increased allocation to Infrastructure is implemented or a mix of Infrastructure and Real Estate. It is recommended that the 5% be transitioned from the Fund's Equity allocation. The allocation change is expected to maintain expected return, reduce risk / volatility and add some inflation hedge to the overall portfolio. The 5% change as opposed to 10% is recommended at this stage to ensure the appointment and monitoring of the investments is manageable given the Fund's current resources.

12.30 It is further recommended that Fund Officers:

a) Determine the optimal allocation of the 5% increase to Infrastructure or a mix of Infrastructure and Real Estate either through a tender or increased allocation to the Fund's current pooled funds or a mix of both options.

b) Start "rolling" the investment programme to reinvest distributions and to provide a spread over "vintage" years. Hopefully this will also enable investments to be made as attractive opportunities occur, when valuations in sub sectors look particularly attractive.

13 Future Strategic Asset Allocation considerations

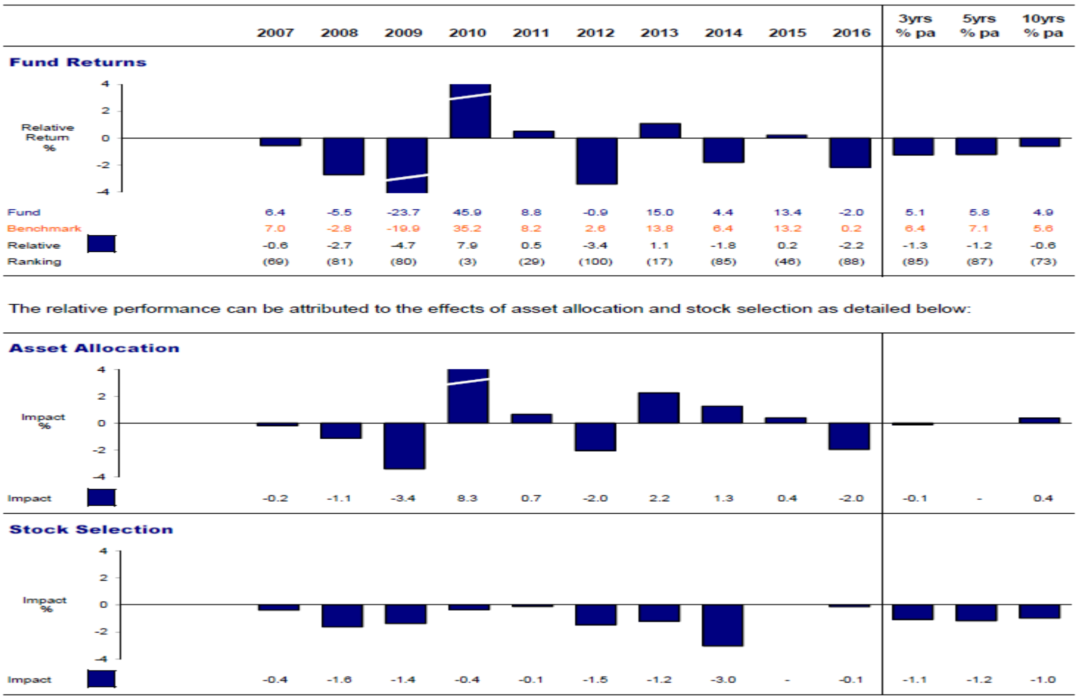
13.1 This section sets out future considerations that will the Fund will need to plan for, clarification of the Fund's main investment objective as well as proposals around potential increased investment to Infrastructure and potentially Real Estate, along with potential increase to alternative indices within the Fund's passive equities portfolio.

Clarification of the Fund's investment objectives from 2017 onwards

13.2 The objective of the Fund should be to maintain returns that the Fund is currently delivering within a structure that achieves reduced volatility and improved diversification.

13.3 Figure 19 below illustrates the Fund performance versus the WM LGPS universe over the last 10 years and demonstrates the volatility of returns against that benchmark. It does however show that over the long term asset allocation has been a positive relative factor for the Fund, whilst stock selection by the Fund's active managers has resulted in underperformance against the LGPS average Fund.

Figure 19



13.4 The level of volatility that is displayed can have implications for contribution levels. Fund contributors, both employers and employees, wish to see stable contribution levels. These contributors can be put under pressure by large falls in Fund values.

13.5 While the larger employers in the Fund maybe in a position to manage a wide range in valuations over a number of years, the smaller admitted bodies may not wish to see this level of volatility in returns. If lower volatility can be achieved without reducing total returns, this will enable a closer correlation between the Fund’s assets and the longer term liability profile.

13.6 A diversification of asset classes not only helps to reduce volatility by being potentially contra cyclical, but some asset classes can help mitigate against the potential negative impacts of inflation, For example some property and infrastructure investments can be structured so as to produce returns that are on an RPI/CPI uplift basis.

13.7 In support of the funding recovery plan the portfolio of assets held by the Fund needs to be managed in a manner that produces the best possible returns while controlling the potential risk of a diminution in the value of the asset base. In reality this is a balancing act between risk and reward, often with a core of low risk assets producing low returns alongside an element of higher risk assets in the expectation that higher returns will result.

13.8 As part of this review an analysis has been undertaken of the risk profile of the Fund with the existing asset allocation, alongside some potential scenarios were we would seek to maintain the returns available with a reduction in the risk profile. It should be stressed that this analysis can only be based on existing known risks, as often risk profiles change as circumstances change in the future. This is similar to the assumptions that lie behind the actuarial valuation changing, thereby changing the funding position by default.

13.9 The main objective here is to understand the risk profile, both now and in the future, because this enables action to be taken to mitigate that risk as necessary.

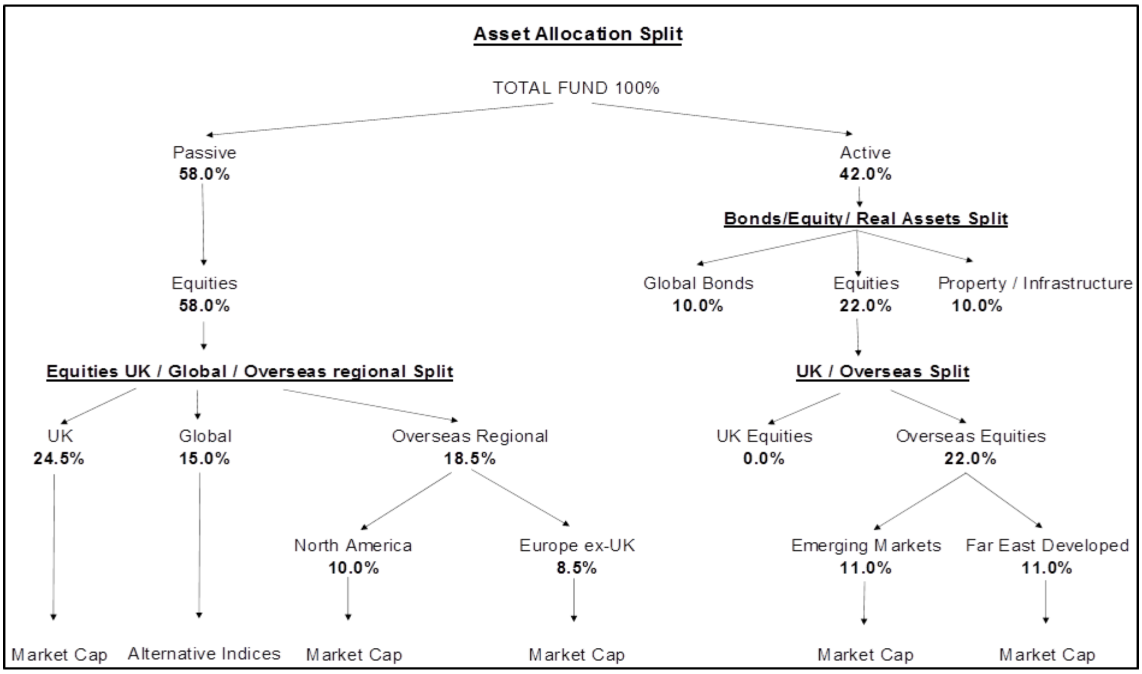
13.10 The aim of investment risk management should be to minimise the risk of an overall reduction in the value of the Fund and to maximise the opportunity for gains across the whole Fund portfolio. This is achieved by asset diversification to reduce exposure to market risk (price risk, currency risk and interest rate risk) to an acceptable level.

14 Summary of the proposal's impact on the Strategic Asset Allocation

Proposals Summary

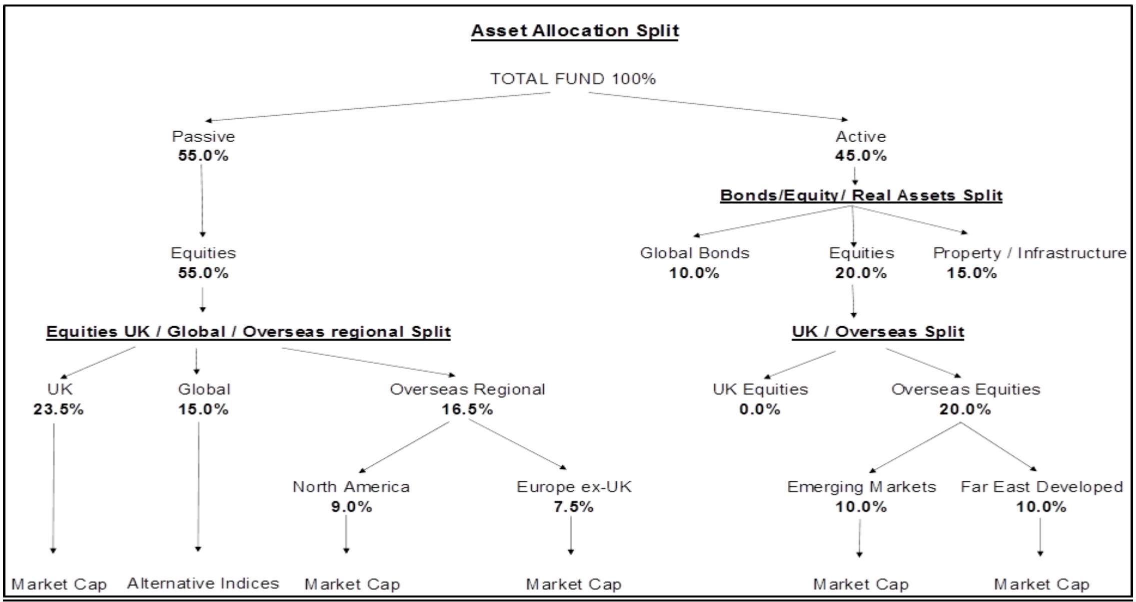
14.1 The tree diagram, Figure 20, below details the structure change from increasing the Fund's allocation to alternative indices within the Fund's passive Equities allocation, whilst reducing exposure to purely Market Cap indices. The change has been implemented through a 1% reduction to each regional Equity allocation.

Figure 20



14.2 The tree diagram, Figure 21, below details the structure change after increasing the Fund's allocation to alternative indices within the Fund's passive equities allocation, whilst reducing exposure to purely Market Cap indices and including a 5% increase to Infrastructure / Real Estate. The change has again been implemented through a 1% reduction to each regional equity allocation.

Figure 21



14.3 It is recommended that the asset allocation structural changes be implemented through an overall 2% reduction to each regional market capitalisation indices passive and active Equity allocation in order to; reduce portfolio active risk, which is not necessarily rewarded, and reduce portfolio concentration to large cap companies and therefore increase diversification across the number and size of companies in which the portfolio invests. Proposed asset allocation structure and tolerance ranges

14.4 The new structure is designed to maintain current long term expected returns whilst reducing asset volatility and downside risk and thus reducing the volatility of the Fund during periods of economic crisis.

14.5 The 5% increased allocation to Infrastructure and Property from Equities is designed to maintain expected returns, reduce volatility and increase the level of inflation hedge within the portfolio. The increase in global alternative indices passive Equities from the Fund's active and passive regional Equity allocation is expected to at least maintain expected returns whilst further diversifying the portfolio and therefore reducing portfolio volatility.

14.6 The recommendation to move to passive investment in North America Equities, following the termination of Capital International, is aimed to at least maintain returns whilst removing unrewarded active risk from the portfolio.

14.7 Whilst a number of academic papers exist that argue rebalancing investment portfolios on a regular basis can add a rebalancing premium in market capitalisation equity indices, one must also fully take into account the transaction costs associated with rebalancing. It is important to maintain flexibility within the portfolio in order to take into account external risks such as Central Banks unwinding Quantitative Easing programmes and the impact that will have on markets. Flexibility is also required when investing in Infrastructure and Property funds, as drawdown periods can be lengthy and a programme of rolling reinvestment will require time to fully implement efficiently.

Tolerance ranges

14.8 It is recommended that tolerance ranges as set out in Table 12 below are implemented and maintained to allow the required portfolio flexibility.

Table 12

Asset Type	Core Asset Allocation	Range %
Equities	75%	70 - 85
Bonds	10%	5 – 15
Infrastructure and Property	15%	5 – 15