GRS Gabriel Roeder Smith & Company
Consultants & Actuaries

NEW YORK CITY RETIREMENT SYSTEMS

ACTUARIAL EXPERIENCE INVESTIGATION
FOR THE TWO-YEAR AND TEN–YEAR PERIODS ENDING
JUNE 30, 2011

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Gabriel, Roeder, Smith & Company (GRS) was retained by the Comptroller to serve as Independent Actuary under Section 96 of the New York City Charter and provide other services related to the review of the funding of the following five actuarial pension funds (collectively NYCRS or the Systems):

- New York City Employees' Retirement System (NYCERS)
- Teachers' Retirement System of the City of New York (TRS)
- Board of Education Retirement System of the City of New York (BERS)
- New York City Police Pension Fund (POLICE)
- New York Fire Department Pension Fund (FIRE)

GRS will conduct two consecutive biennial actuarial engagements, encompassing the following:

- Biennial Contribution Audits of the computed employer contributions for each System in NYCRS for fiscal years 2012 and 2014 (including an audit of actuarial accrued liabilities and actuarial valuation of assets);
- Biennial Experience Studies for the periods ending June 30, 2011 and June 30, 2013, for each System in NYCRS;
- Two Administrative Reviews of the data gathering and maintenance practices of the Office of the Actuary (OA) and each System in NYCRS (one review corresponding with each Contribution Audit); and
- Two Independent Actuarial Statements (one for each engagement); GRS, as the independent actuarial auditor, will submit a statement that will briefly describe the scope of the entire engagement, will review the entire engagement and comment on the financial condition and financing progress and policies of each System, and certify that the Systems are being funded on a sound actuarial, financial, and legal basis.

This report constitutes the deliverable with respect to the Experience Study for the first engagement. GRS has elected to wait until the second engagement before recommending any changes to assumptions. The purpose of this study is to:

- Update the Experience Study database with membership data as of June 30, 2010 and June 30, 2011;
- Mature the database with status changes that have occurred since June 30, 2009;
- Review actual experience for the two-year period ending June 30, 2011 and compare with assumed experience;
- Review actual experience for the ten-year period ending June 30, 2011 and compare with assumed experience; and
- Indicate areas where experience indicates that revised/updated assumptions are likely to be recommended as part of the second engagement.

Specific detail on each System is provided throughout the report. In general, we have the following initial comments:

- We find the current investment return, inflation, and wage inflation assumptions reasonable.
- Longevity continues to improve for the NYCRS plans and the country as a whole.
- For most groups, the observed number of withdrawals has outpaced the number expected by the current assumptions and the observed number of retirements has been less than the number expected by the current assumptions.
- The OA currently utilizes the nearest age and service at the beginning of the year to index the assumption tables and determine eligibilities for specific decrements. We believe an approach that better estimates actual patters of retirement would be for the model to determine eligibilities (ages and services) as of the decrement time, or middle of year. This is similar to using what age and service the member will attain during the next fiscal year. We will discuss this adjustment with the OA between the first and the second engagement because a change of this type must be replicated in the reconciliation process.

ORGANIZATION OF REPORT

Section II contains documentation on our processes and procedures. Section III contains an analysis on the economic assumptions, including inflation, wage inflation, and investment return. Section IV contains an aggregate analysis on post-retirement mortality. Section V contains five subsections for a summary of the results for each System. Finally, Section VI provides the reconciled data for each group for each assumption by age and/or service compared to the current assumptions.

This study was conducted in accordance with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board. The undersigned all have extensive experience providing actuarial and consulting services to large public retirement systems.
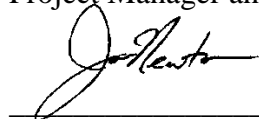
Joseph Newton and Danny White are Members of the American Academy of Actuaries (M.A.A.A) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

We wish to thank the Office of the Actuary ("OA") for their assistance in providing data and support information for this study.

Respectfully Submitted,

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Kenneth G. Alberts
Project Manager and Contribution Audit Director

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Experience Study Director   Date

SECTION II
KEY METHODOLOGIES AND PROCEDURES

KEY METHODOLOGIES AND PROCEDURES

A periodic review and selection of the actuarial assumptions is one of many important components of understanding and managing the financial aspects of a Retirement System. Use of outdated or inappropriate assumptions can result in understated costs which will lead to higher future contribution requirements or perhaps an inability to pay benefits when due; or, on the other hand, produce overstated costs which place an unnecessarily large burden on the current generation of members, employers, and taxpayers.

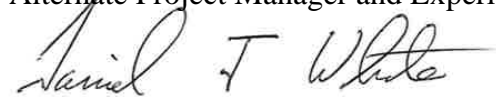A single set of assumptions is typically not expected to be suitable forever. As the actual experience unfolds or the future expectations change, the assumptions should be reviewed and adjusted accordingly.

In the second engagement, we will make recommendations for possible improvements in certain assumptions and methods to better align assumed and actual experience and to add in a margin for anticipated changes in future experience where appropriate.

SUMMARY OF PROCESS

In determining liabilities and contribution probabilities for retirement plans, actuaries must make assumptions about the future. The assumptions that must be made include:

- Retirement probabilities
- Mortality probabilities
- Turnover probabilities
- Disability probabilities
- Investment return rate
- Salary increase rates
- Inflation rate

For some of these assumptions, such as the mortality probabilities, past experience provides important evidence about the future. For others, such as the investment return assumption, the link between past and future results is much weaker. In either case, actuaries should review the plan's assumptions periodically and determine whether these assumptions are consistent with actual past experience and with anticipated future experience.

In conducting experience studies, actuaries generally use data over a period of several years. This is necessary in order to gather enough data so that the results are statistically significant. In addition, if the study period is too short, the impact of the current economic conditions may lead to misleading results. It is known, for example, that the health of the general economy can impact salary and withdrawal behavior. Using results gathered during a short-term boom or bust may not be representative of the long-term trends in these assumptions. Also, the adoption of legislation, such as plan improvements or changes in salary schedules, will sometimes cause a short-term distortion in the experience. For example, if an early retirement window was opened during the study period, we would usually see a short-term spike in the number of retirements followed by a

dearth of retirements for the following two-to-four years. Using a longer period prevents giving too much weight to such short-term effects. On the other hand, using a much longer period may suppress the ability to identify or adjust for real changes in patterns that may be occurring, such as mortality improvement or a change in the ages at which members retire. In our view, using a four- to ten-year period is reasonable. In a few instances, we chose to use a longer period in order to further increase the soundness of our conclusions.

The last actuarial experience investigation was performed as of June 30, 2009. For the current experience study, we have added two new years of experience data. Note that the remainder of the data overlaps with prior experience studies.

If the data leads the actuary to conclude that new tables are needed, the actuary may "graduate" or smooth the results, since the raw results can be quite uneven from age to age or from service to service.

Sources of Data

For each System, we received the experience study database that was developed by the prior actuarial auditor, referred to in this document as the "Historical Database." GRS also received the source valuation files for the June 30, 2010 and June 30, 2011 valuation dates from the OA.

The Historical Database, consisting of data from June 30, 2001 through June 30, 2009, was rolled forward to June 30, 2011 using the same status-assignment methodology as the prior actuary.

Social Security Numbers (SSN) were used as the Unique Identifier in this database. Any record without an SSN was removed. If two (or more) records contained identical Social Security Numbers, the record(s) carrying less liability was (were) removed. Additionally, if a record had statuses associated with those of a deceased member or a beneficiary for the entire experience study period, the record was removed.

When statuses were initially assigned to the database for years June 30, 2001 to June 30, 2011, GRS determined the statuses taken together were not yet an accurate reflection of how members progress through the retirement System. GRS then matured the database by applying certain business rules. This is the process of updating past and current status fields in the experience study database, based on the more recent source data. For example, based on the timing of the data file, a member could be active in year 1, filed for disability retirement late during year 1, was being processed as the data file for year 2 was created and thus showed up in year 2 as a termination or a service retirement, received approval for disability during year 2 and thus showed up as a disability in the year 3 data file. For the valuation process, this member should be treated as a disability retirement from year 2 (the initial decrement year). The maturation process would reset the status in year 2 to be a disability retirement. In Section V we show the business rules used for the maturation process and the changes that resulted from application of the business rules for each System individually. All business rules were applied to mature the database so that all members appear to have a more reasonable progression of statuses. The specific business rules for each System are described in Section V.

The data was then exported from the database and run through GRS's experience study software. The results of all valuation runs were imported into a single workbook. This workbook was used to complete the analysis of the different decrements and prepare all tables for the report.

Data Elements and Application

In an experience study, we first determine the number of deaths, retirements, etc. that occurred during the period. Then we determine the number expected to occur, based on the current actuarial assumptions. The number of "expected" decrements is determined by multiplying the probability of the occurrence at the given age by the "exposures" at that same age. The number of exposures can only be those members eligible for the given decrement at that time. Thus they are considered "exposed" to that assumption. Finally, we calculate the A/E ratio, where "A" is the actual number (of retirements, for example) and "E" is the expected number. If the current assumptions were "perfect", the A/E ratio would be 100%. When the A/E ratio varies much from 100%, it is a sign that new assumptions may be needed. However, it is important to consider the number of "lives" exposed before drawing conclusions. The smaller the exposure, the less likely the A/E ratio will be close to 100% (except by coincidence) even for an assumption that does not need to be changed. In addition, in some cases it may be preferred to produce an A/E ratio a little above or below 100% to introduce some conservatism. Of course, we not only look at the assumptions as a whole, but we also review how well they fit the actual results by gender, by age, and by service. Section V details how we determined the status for each individual member for each year.

Determining Exposures

First, for each fiscal year included in the study, we tested each record on the experience study data file that had a status code (i.e., each record for which the applicable status code was non-blank) as of the beginning of the fiscal year to determine whether the record (member) met the exposure criteria to be counted as an exposure for that year for that decrement. That is, to study the experience of fiscal year X, we tested the status field corresponding to fiscal year X-1, which is the status as of June 30, X-1. If the exposure criteria were met, the exposure count was increased by 1 for the age/service/gender node for that decrement. If the exposure criteria were not met, that member was not counted as an exposure.

The OA currently utilizes the nearest age and service at the beginning of the year to index the assumption tables and determine eligibilities for specific decrements. For example, for the June 30, 2010 valuation (Fiscal Year 2011 experience), all members with birthdates from January 1, 1960 through December 31, 1960 will be grouped together and treated as if they are age 50 for that year. This is a common approach to determining the age and/or service for a given exposure period and we have performed all reconciliations consistent with this approach. However, we believe this approach has drawbacks and can be improved. For example, members in several of the groups have retirement eligibilities (either reduced or unreduced) once the member attains age 55. Based on the current methodologies of determining the age for eligibilities, many members are not exposed to retirement in the year they actually turn 55. Take a member in the June 30, 2009 valuation data born on March 31, 1955. This member has an exact age of 54.25 as of the valuation date and the current procedures would group this member into the age 54 bucket for eligibilities for fiscal year 2010. Based on this approach, the model would not expose this member to retirement. However, the member will turn 55 in March of the fiscal year and thus in

reality will be eligible to retire. Using the current procedures, there are large groups of members who are not exposed to retirement in the valuation (and experience study reconciliation) but who do show up as retired by the end of the year. In fact, roughly half of the members who actually retire at age 55 fall into this scenario.

We made adjustments in the reconciliation to ensure that all actuals are utilized whether the model exposed them at the beginning of the year or not.   However, we believe a better approach would be for the model to determine eligibilities (ages and services) as of the decrement time, or middle of year. This is similar to using what age and service the member will attain during the next fiscal year.   This would reconcile active members decrementing out even though they were not exposed to the given decrement. We will discuss this adjustment with the OA between the first and the second engagement because a change of this type must be replicated in the reconciliation process. Meaning, a reconciliation done based on the beginning of year method could not be used to determine probabilities utilizing the middle of year method. The experience reconciliation in the second engagement would need to mimic any new methodology.

Counting Actual Occurrences

Next, for each member we tested the status code as of the end of the fiscal year to determine whether the member should be treated as an actual for that decrement. If the actual occurrence criteria were met, the actual occurrence count was increased by 1. Since the demographic actuarial assumptions being studied (all of which come from the tables of actuarial assumptions currently being utilized by the OA for their annual actuarial valuations) are based upon either the member's age (which is the case for all the demographic assumptions other than the active member withdrawal assumptions) or the member's years of service (which is the case for only the active member withdrawal assumptions), the counts of exposures/occurrences were subdivided into counts based upon the member's age or years of service in the fiscal year of the exposure/occurrence. Depending upon the System and the specific assumption being studied, further sub counts were determined by gender, tier, or other member criteria.

We treated the member as an actual whether the model had exposed the member to the probability or not. We believe this is important as otherwise the number of expected will be understated in the valuation. Using the age 55 example above, let's assume that a group has 400 members who fell into the scenario above and retired while rounding to age 54 at the beginning of the year and another 400 who were age 55 at the beginning of the year and retired. As of the beginning of the year, assume there were 2,000 members who rounded to age 55 and thus were exposed to retirement. If only the 400 who were originally exposed were included as actuals, then the probability of retirement would be 400/2,000 = 20%.   However, at the end of the year, there will actually be 800 members who show up retired with age 55 and the probability used in the model should be 800/2,000 = 40%. We recommend a method change because it is important for the model to treat actuals and expected consistently.
To accomplish this, when determining actuals for retirement, we categorized members based on the age and service the member had on their retirement date and rounded to the nearest integer. Utilizing this approach, we were able to eliminate most of the members who showed to be an actual for a decrement but were not yet exposed.

Developing Expected Occurrences

For the demographic assumption studies, counts of expected numbers of occurrences were developed by multiplying the appropriate age-based (or service-based) probabilities times the corresponding age-based (or service-based) counts of exposures, as determined following the rules/procedures described above. Again, depending upon the System and the specific assumption being studied, additional counts of "expected" were determined based upon member gender, tier, and/or other member criteria.

Probabilities versus Rates

All assumptions were analyzed as if the assumption was a "probability" rather than a "rate." This is consistent with how the assumptions are utilized in the valuation.

Validation of Historical Database

To verify the reliability of the prior actuary's database, which included data through 6/30/2009, GRS developed and matured a separate database using the Office of the Actuary's valuation data from 6/30/2001 to 6/30/2011. For consistency, the Historical database was also rolled forward to 6/30/2011 using OA valuation data from 6/30/2010 and 6/30/2011. Both databases were setup using the same status-assignment methodology as the prior actuary.

As an additional source of comparison, GRS looked at the 6/30/2011 valuation data from the OA. The results comparing Retirement and Accidental Disability actual counts between the 6/30/2011 Office of the Actuary Data, the Historical Database, and the GRS Data are shown on the following pages for FIRE.

GRS found that, for all decrements, actual counts between the actual June 30, 2011 OA Valuation data file and the Historical Database were consistent. Based on this analysis, GRS concluded it is acceptable to rely on the Historical Database. However, the termination assumption could not be confirmed by this process and it appears members marked as Active-Inactive were treated as active members in the prior study. Based on how these members are used in the actuarial valuation, these members should be treated as a terminated (non-active) member. We have made the adjustments for past periods accordingly.

FIRE Actual Service Retirements

Fiscal Year Ended June 30,	6/30/2011 OA Valuation Data	Historical Database	GRS Database
2002	239	255	253
2003	492	484	485
2004	141	147	150
2005	91	106	87
2006	112	148	150
2007	92	116	116
2008	46	53	53
2009	41	41	48
2010	43	44	44
2011	125	126	126
Total	**1,422**	**1,520**	**1,512**
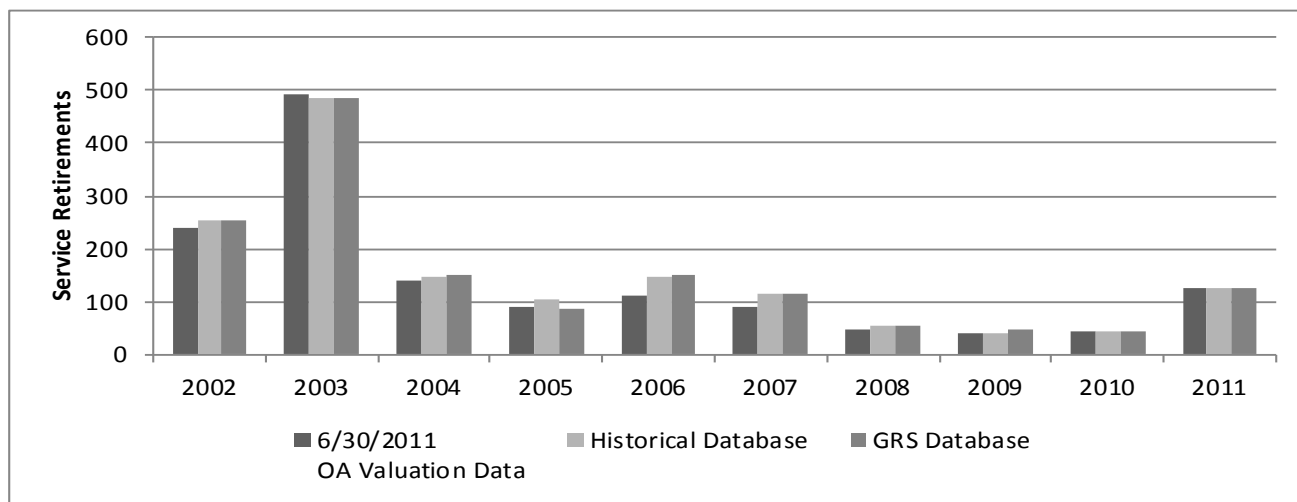
6/30/2011 OA Valuation Data
The 6/30/2011 Valuation Data from the Office of the Actuary served as a baseline to compare against the other databases. Statuses were assigned using the same method as both databases.
Historical Database
The Historical Database was developed using the prior actuary's database combined with the 6/30/2010 and 6/30/2011 data from the Office of the Actuary.
GRS Database
This database was developed using eleven years of data, ending 6/30/2011, to validate the Historical Database.

The 6/30/2011 OA Valuation Data counts do not include members that have died since retirement or members who have WTC reclassified since their retirement year. We have verified the differences between the three columns are due to these two factors.

FIRE Actual Accidental Disabilities

Fiscal Year Ended June 30,	6/30/2011 OA Valuation Data	Historical Database	GRS Database
2002	440	497	566
2003	768	749	737
2004	381	366	403
2005	387	435	363
2006	395	371	391
2007	416	394	395
2008	376	368	368
2009	328	330	323
2010	319	321	321
2011	287	287	287
Total	**4,097**	**4,118**	**4,154**
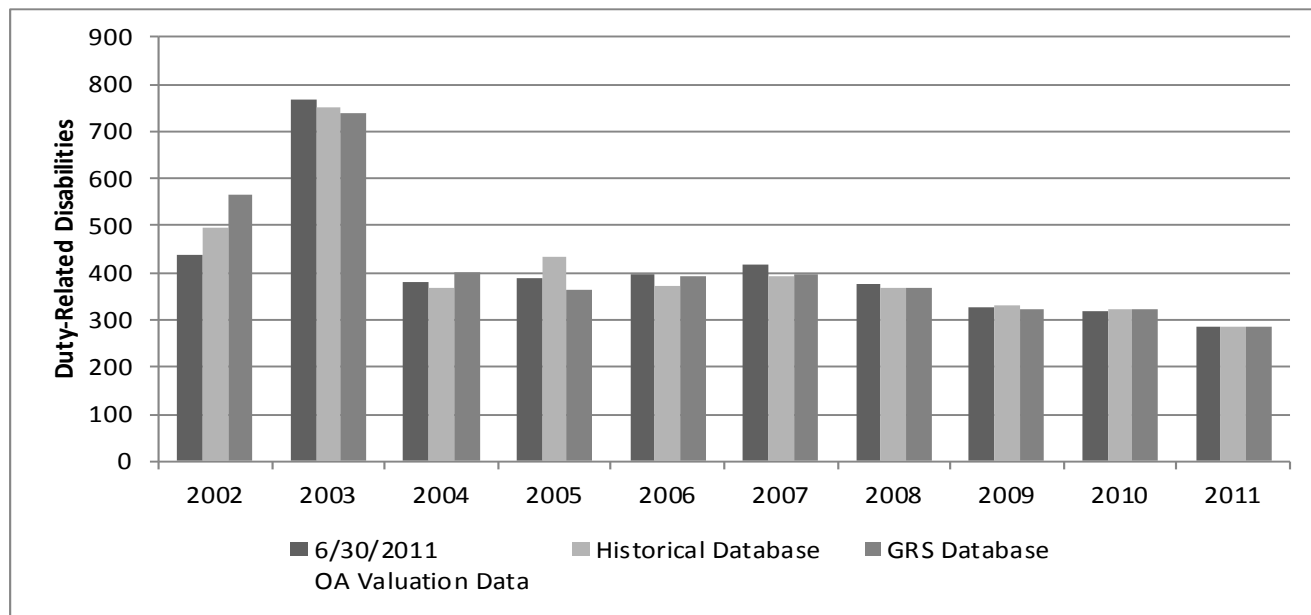
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The 6/30/2011 Valuation Data from the Office of the Actuary served as a baseline to compare against the other databases. Statuses were assigned using the same method as both databases.

Historical Database
The Historical Database was developed using the prior actuary's database combined with the 6/30/2010 and 6/30/2011 data from the Office of the Actuary.

GRS Database
This database was developed using eleven years of data, ending 6/30/2011, to validate the Historical Database.

SECTION III
ANALYSIS OF GENERAL ECONOMIC ASSUMPTIONS

INFLATION AND INVESTMENT RETURN ASSUMPTIONS

Actuarial Standards of Practice (ASOP) No. 27, Selection of Economic Assumptions for Measuring Pension Obligations, provides guidance to actuaries giving advice on selecting economic assumptions for measuring obligations for defined benefit plans.

As no one knows what the future holds, it is necessary for the actuary to estimate possible future economic outcomes. These estimates are based on a mixture of past experience, future expectations, and professional judgment. The actuary should consider a number of factors, including the purpose and nature of the measurement, and appropriate recent and long-term historical economic data. However, the standard explicitly advises the actuary not to give undue weight to recent experience.

Recognizing that there is not one right answer, the current standard calls for the actuary to develop a best-estimate range for each economic assumption, and then recommend a specific point within that range. Each economic assumption should individually satisfy this standard. Furthermore, with respect to any particular valuation, each economic assumption should be consistent with every other economic assumption over the measurement period. Generally, the economic assumptions are much more subjective in nature than the demographic assumptions.

Note, ASOP No. 27 was revised and adopted by the ASB in September 2013. While this revised standard will not be effective for any actuarial work products with a measurement date prior to October 1, 2014, our recommended economic assumptions are intended to comply with this revised practice standard.

INFLATION ASSUMPTION

By "inflation," we mean price inflation, as measured by annual increases in the Consumer Price Index (CPI). This inflation assumption underlies most of the other economic assumptions. It impacts investment return, salary increases, payroll growth, and cost-of-living increases. The current annual inflation assumption is 2.50%.

The chart on the following page shows the average annual inflation in each of the ten consecutive five-year periods over the last fifty years.

Average Annual Inflation
CPI-U, Five-Calendar-Year Averages
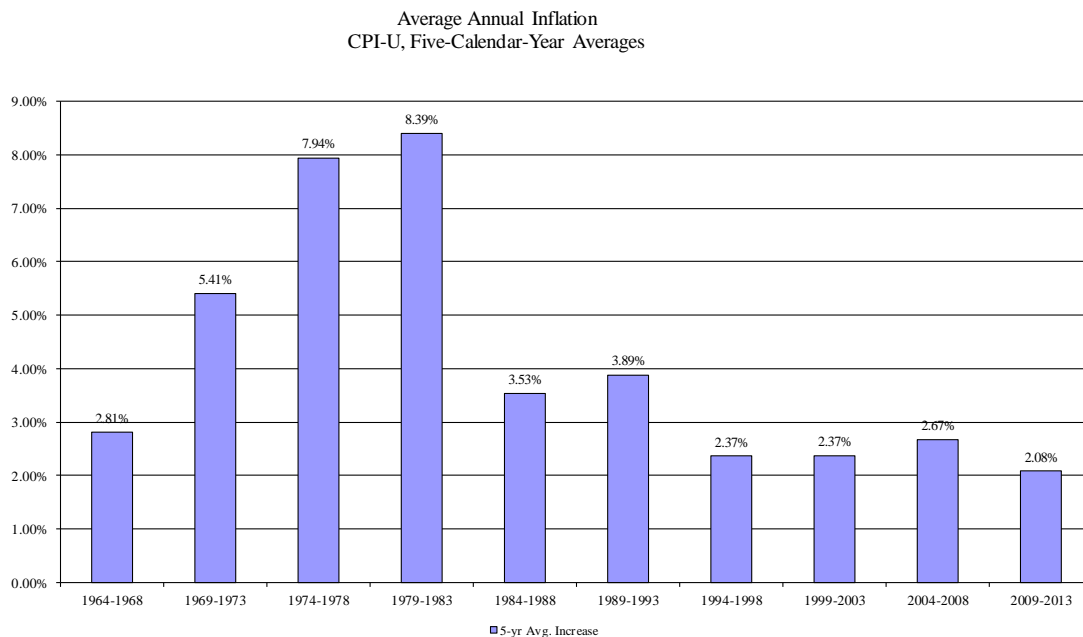
Source: Bureau of Labor Statistics, CPI-U, all items, not seasonally adjusted

The table below shows the average inflation over various periods, ending December 2013.

Periods Ending Dec. 2013	Average Annual Increase in CPI-U
Last five (5) years	2.08%
Last ten (10) years	2.37%
Last fifteen (15) years	2.37%
Last twenty (20) years	2.37%
Last twenty-five (25) years	2.67%
Last thirty (30) years	2.82%
Since 1913 (first available year)	3.20%

Source: Bureau of Labor Statistics, CPI-U, all items, not seasonally adjusted

As you can see, while inflation has been relatively low over the last 25 years, if we look back over a period of 30 or more years, inflation has averaged more than 3.00% per year. However, it is hard to ignore the steady decline in inflation statistics over the last 25 years as shown in the charts above.

Most of the investment consulting firms, in setting their capital market assumptions, currently assume that inflation will be less than 3.00%. We examined the 2014 capital market assumption sets for seven investment consulting firms: BNY Mellon, Hewitt EnnisKnupp, JP Morgan, Mercer Consulting, New England Pension Consultants (NEPC), Pension Consulting Alliance (PCA), and RV Kuhns. The average assumption for inflation was 2.49%, with a range of 2.20%

to 3.00%. However, the investment consulting firms typically set their assumptions based on a five or ten year outlook, while actuaries must make much longer projections.

In the Social Security Administration's 2013 Trustees Report, the Office of the Chief Actuary is projecting a long-term average annual inflation rate of 2.80% under the intermediate cost assumption. (The low cost assumption was 1.80% and the high cost assumption was 3.80%.) These inflation assumptions were unchanged for the last several years.

Another source of information about future inflation is the market for U.S. Treasury bonds. The December 31, 2013 yield for a 20-year inflation indexed Treasury bond (20-year TIPS) was 1.23% plus actual inflation. The yield for a 20-year non-indexed U.S. Treasury bond was 3.54%. This means the bond market was predicting that inflation over the next twenty years would average 2.28% [(1 + 3.54%) / (1 + 1.23%) - 1] per year. One year earlier, as of December 31, 2012, the spread between the 20-year inflation protected and constant maturity bonds was only marginally higher, with a difference of 2.38%, so there has been little change in this expectation. The imputed 30-year inflation level is close to the 20-year level, being 2.26% and 2.46% at December 31, 2013 and December 31, 2012, respectively.

Also, the Philadelphia Federal Reserve conducts a quarterly survey of the Society of Professional Forecasters. Their most recent forecast (first quarter of 2014) predicts inflation over the next ten years will average 2.30% (2014 to 2023). The survey forecasts have also remained relatively stable over the last few years.

As a result, we recommend continued use of the 2.50% inflation assumption. While the current assumption is lower than that used by many other retirement systems, it is more consistent with the expected rates of future inflation from the various sources, including the bond market and the surveys of the Society of Professional Forecasters.

Also, while the Systems provide a cost-of-living adjustment that is tied to the annual increase in the CPI, the design of the COLA also limits the annual increase, thereby limiting the risk of adverse experience due to short-term occurrences of high inflation.

INVESTMENT RETURN ASSUMPTION

The investment return assumption is one of the principal assumptions used in any actuarial valuation of a retirement plan. It is used to discount future expected benefit payments to the valuation date in order to determine the liabilities of the plans. Even a small change to this assumption can produce significant changes to the liabilities and contribution rates. Currently, it is assumed that future investment returns will average 7.00% per year, net of investment expenses. The current assumption assumes inflation of 2.50% per annum and an annual real rate of return of 4.50%, net of investment expenses.

Similar to the inflation assumption, past performance is not a reliable indicator of future performance, even when averaged over a long time period. Also, the actual asset allocation of the

trust fund will significantly impact the overall performance, so returns achieved under a different allocation are not meaningful.

The Public Fund Survey shows that the median investment return assumption for large public plans is 7.90%. The survey median has slightly decreased from 8.00% in the same survey conducted last year. Subtracting the rate of inflation assumed for each plan gives a median real rate of return of 4.50%, which is consistent with the current real rate of return assumption for the New York City Retirement Systems. While we do not recommend the selection of an assumption based on prevalence information, it is still informative to identify where the New York City Retirement Systems are compared to their peers. Here is a chart showing the distribution of the investment return assumptions in the Public Fund Survey:
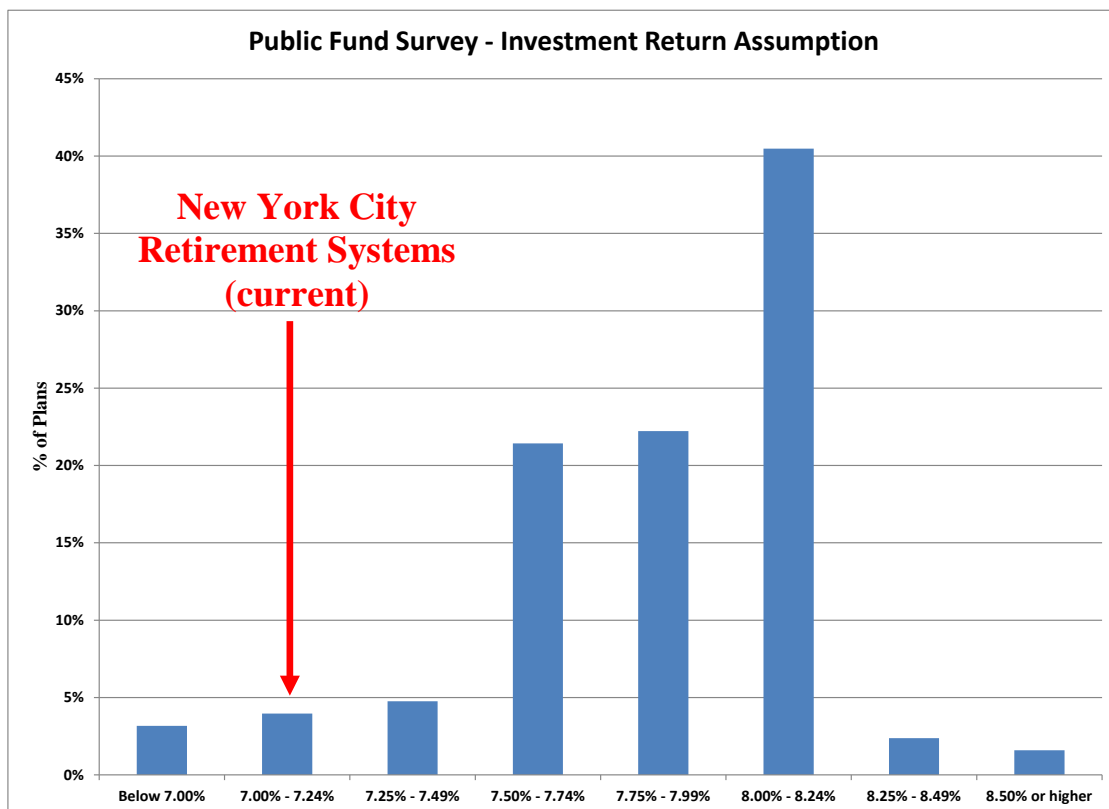
Source: Public Fund Survey (n=126). Median investment return assumption: 7.90% nominal return.

We believe a more appropriate approach to selecting an investment return assumption is to identify expected returns given the funds' asset allocation mapped to forward-looking capital market assumptions. Since each Retirement System has a slightly different investment policy, we performed this analysis on each System based on the target asset allocation provided to GRS by the Comptroller's Office.

Below is a summary of the asset allocations for each System that was used in the analysis.

ASSET CLASS	NYCERS	TRS	BERS	POLICE	FIRE
Domestic Equities	33%	31%	35%	34%	29%
International Equities	17%	17%	22%	16%	17%
Private Equity	7%	6%	6%	7%	7%
Real Assets and Real Estate	6%	9%	7%	6%	8%
Hedge Funds	4%	0%	0%	5%	5%
Fixed Income	33%	37%	30%	32%	34%
Total	100%	100%	100%	100%	100%

Where available, investments in these asset classes were split into subgroups to refine the analysis. For example, when identifiable, the domestic equities were classified as large cap, or small/mid cap securities.

Because GRS is a benefits consulting firm and does not develop or maintain our own capital market assumptions, we utilized the forward-looking return expectations developed by the following investment consulting firms:

- BNY Mellon
- JP Morgan
- Mercer Consulting
- RV Kuhns

- Hewitt EnnisKnupp
- New England Pension Consultants (NEPC)
- Pension Consulting Alliance (PCA)

These investment consulting firms periodically issue reports that describe their capital market assumptions. That is, their estimates of expected returns, volatility, and correlations. While these assumptions are developed based upon historical analysis, many of these firms also incorporate forward-looking adjustments to better reflect near-term expectations. The estimates for core investments (i.e., fixed income, equities, and real estate) are generally based on anticipated returns produced by passive index funds that are net of investment related fees. The investment return expectations for the alternative asset class such as private equity and hedge funds are also net of investment expenses. Therefore, we did not make any adjustments to account for investment related expenses.

Some of the Retirement Systems may also employ active management investment strategies that result in higher investment expenses compared to strategies that invest in passive index funds. We have assumed that active management strategies would result in the same returns, net of investment expenses, as passive management strategies.

Also, since the Retirement Systems explicitly charge employers for administrative related costs, it is not necessary to adjust the investment return assumption to account for future administrative expenses.

Given the plan's current asset allocation and the investment consultant's capital market assumptions, the development of the average nominal return, net of investment expenses, is provided in the following tables. The table shows the expected nominal return (arithmetic average) for NYCERS using each of the investment consulting firm's capital market assumptions.

The forward-looking return expectations were mapped to each System's target asset class allocation. During our analysis, we recognized that the actual asset allocation as of December 31, 2013 was somewhat different than the policy target. Based on information provided by the investment team in the Comptroller's Office, we understand the differences in the asset allocations are primarily due to short-term tactical strategies and assets not yet allocated to new target asset classes, such as emerging market debt. Since we are establishing a long-term assumption, we are disregarding these short-term deviations from the policy target in our analysis.

Expected Nominal Return for NYCERS Based on Short-Term Capital Market Assumptions
(Return Expectations for the Next 7 to 10 Years)

Investment Consultant	Investment Consultant Expected Nominal Return	Investment Consultant Inflation Assumption	Expected Real Return (2)–(3)	Actuary Inflation Assumption	Expected Nominal Return (4)+(5)
(1)	(2)	(3)	(4)	(5)	(6)
1	6.90%	3.00%	3.90%	2.50%	6.40%
2	6.83%	2.50%	4.33%	2.50%	6.83%
3	7.35%	2.75%	4.60%	2.50%	7.10%
4	7.18%	2.25%	4.93%	2.50%	7.43%
5	7.34%	2.20%	5.14%	2.50%	7.64%
6	7.43%	2.26%	5.17%	2.50%	7.67%
7	7.95%	2.50%	5.45%	2.50%	7.95%
Average	**7.28%**	**2.49%**	**4.79%**	**2.50%**	**7.29%**

Note: The expected nominal return assumption is based on the arithmetic average.

For instance, based on the 2014 capital market assumptions for investment consultant #1, the annual expected rate of return is 6.90%. Their inflation assumption of 3.00% implies an expected net real return of 3.90%. Adding the plan's 2.50% inflation assumption to the expected real return gives a nominal expected return for NYCERS of 6.40%.

The following table provides the average rates of arithmetic return for each of the Retirement Systems.

Expected Nominal Return Based on Short-Term Capital Market Assumptions
(Return Expectations for the Next 7 to 10 Years)

RETIREMENT SYSTEM	NYCERS	TRS	BERS	POLICE	FIRE
Average Expected Return	7.29%	7.26%	7.50%	7.30%	7.23%

The average expected return for BERS is slightly higher than the other Systems because the investment policy for that that System is slightly different. Specifically, according to the adjusted investment policy, they have a higher percentage of assets allocated to equities and a slightly lower percentage of assets invested in fixed income securities.

In addition to examining the expected one-year return, it is important to review anticipated volatility of the investment portfolio and to understand the range of net returns that could be produced by the investment portfolio. Therefore, the table below provides the 25th, 50th, and 75th percentiles of the 10-year geometric average of the expected nominal return, net of investment expenses, as well as the probability of exceeding the current 7.00% assumption.

Expected Annual Geometric Returns and Return Probabilities
(Based on Short-Term Capital Market Assumptions)

RETIREMENT SYSTEM	NYCERS	TRS	BERS	POLICE	FIRE
75th Percentile	9.18%	9.15%	9.49%	9.20%	9.07%
50th Percentile	6.60%	6.58%	6.69%	6.61%	6.59%
25th Percentile	4.09%	4.08%	3.97%	4.08%	4.15%
Probability of Exceeding 7.00%	46%	46%	47%	46%	46%

The capital market assumptions provided by the investment consultants and used in the analysis above are based on a 7 to 10 year investment horizon. Investment consultants develop their forecast assumptions with this time horizon in part because most pension investment management teams use this time period for developing and monitoring their investment strategies.

On the other hand, the investment return assumption used in the actuarial valuation has a significantly longer investment horizon. Therefore, it is necessary to identify and reflect differences in the economy and financial markets over the short-term and long-term time horizon.

Expected investment returns can be thought of as the sum of a risk-free rate of return and a risk premium. This is the fundamental premise in the Capital Asset Pricing Model (CAPM) that is used in Modern Portfolio Theory. Riskier investments have a higher risk premium to compensate the investor for the increased uncertainty. Generally, the risk premium for each asset class is constant over long periods of time. But there can be differences in the risk free return, depending on the investor's time horizon. We define a risk-free investment as one where the expected return is known with absolute certainty. This also means that the risk-free investment has no default and reinvestment risk. Based on this definition, we believe it is reasonable to benchmark a risk-free rate using zero coupon U.S. Treasury securities. Thus a 10-year risk-free rate is equal to the current yield of a 10-year zero coupon US Treasury bond, and a 20-year zero coupon U.S. Treasury bond is the risk-free rate for a 20-year time horizon. For the longer-term point, we have chosen the 20-year yield because it is close to an approximation of the duration of the liabilities of the Systems, meaning the average, interest-discounted benefit payment is expected to be paid 20 years form the valuation date (assuming an open group). As of July 23, 2014, the yields of the 10-year and 20-year zero coupon Treasury bonds were 2.48% and 3.00%, respectively. Therefore, it is reasonable to assume that as the investment time horizon expands from 10 years to 20 years, the risk free rate of return and corresponding expected nominal return on the portfolios would be 0.52% higher over the longer, 20-year time horizon.

The table on the following page provides the 25th, 50th, and 75th percentiles of the 20-year geometric average of the expected nominal return, net of expenses, as well as the probability of exceeding the current 7.00% assumption, based on the same short-term capital market assumptions adjusted to reflect the different risk-free returns due to the different investment time horizons.

Expected Annual Geometric Returns and Return Probabilities
(Based on Short-Term Capital Market Assumptions Adjusted
By GRS to Reflect a 20-Year Investment Horizon)

RETIREMENT SYSTEM	NYCERS	TRS	BERS	POLICE	FIRE
75th Percentile	8.61%	8.58%	8.82%	8.62%	8.54%
50th Percentile	7.13%	7.11%	7.22%	7.13%	7.11%
25th Percentile	5.67%	5.66%	5.64%	5.66%	5.70%
Probability of exceeding 7.00%	52%	51%	53%	52%	52%

Based on this analysis, we find the current assumptions are reasonable for each of the New York City Retirement Systems and recommend the continued use of a 7.00% investment return assumption, which is comprised of a 4.50% net real return and a 2.50% inflation assumption.

While there is slightly less than a 50% likelihood of attaining a 7.00% investment return over the next 10 years, the probability is projected to increase to be greater than 50% over the following 10 years (20-year period in total).

We believe this recommendation satisfies the best-estimate requirement under ASOP No. 27 as revised and adopted in September 2013. Also, this recommendation is consistent with the recommendations regarding the use of an investment return assumption that is estimated to be realizable at least 50% of the time from a report released by the Society of Actuaries Blue Ribbon Panel on public pension plan funding in February 2014.

General Wage Inflation

The OA currently assumes that General Wage Inflation will be 0.50% above price inflation. The 0.50% represents the real wage growth over time.

Historically, General Wage Inflation almost always exceeds price inflation. This is because wage inflation is in theory the result of (a) price inflation, and (b) productivity gains being passed through to wages. For the last ten years, for the economy as a whole, wage inflation has outpaced price inflation by about 0.45%, and for the last twenty years, wage inflation has exceeded price inflation by about 0.85%. Since 1951, wage inflation has been about 1.00% larger than price inflation each year.

The current assumption is consistent with national trends. It is reasonable to expect more pressure on depressing the rate of future salary increases due to projected increases in the cost of providing employee retirement and healthcare benefits.

Individual Salary increase rates

In order to project future benefits, the actuary must project future salary increases. Employees earn salary increases for a variety of reasons:

- Across-the-board increases for all employees;
- Across-the-board increases for a given group of employees;
- Increases to a minimum salary schedule;
- Additional pay for additional duties;
- Step or service-related increases;
- Increases for acquisition of advanced degrees or specialized training;
- Promotions; or
- Merit increases, if available.

The salary increase assumption used in an actuarial valuation is meant to reflect all of these types of increases.

An actuary should not look at the overall increases in payroll in setting this assumption because payroll can grow at a rate different from the average pay increase for individual members. To

analyze salary increases, we examine the actual increase in salary for each member who is active in two consecutive fiscal years.

Salary increases for governmental employees can vary significantly from year to year. When the employer's tax revenues stall or increase slowly, salary increases often are small or nonexistent. During good times, salary increases can be larger. Our experience across many governmental plans shows several occasions in which salary increases will be low for a period of several years followed by a significant increase in one year. Therefore, we prefer to use data over a longer period in establishing these assumptions.

Most actuaries recommend salary increase assumptions that depend on the member's age or service, especially for large, public retirement systems. It is typical to assume larger pay increases for younger or shorter-service employees. This reflects pay increases that accompany step increases, changes in job responsibility, promotions, demonstrated merit, etc. The experience shows salaries have been more closely correlated to service (rather than age), as promotions and productivity increases tend to be greater in the first few years of a career, even if the new employee is older than the average new hire.

We analyzed the salary increases based on the change in the member's reported pay from one year to the next. That is, we looked at each member who appeared as an active member in two consecutive valuations individually, and measured his/her salary increase. Then we grouped the increases for all members with the same service, and determined their average increase.

If we graph the increases by service, we usually get a graph where the increases are larger for shorter service employees and then level out at a lower level after a period that may be ten to twenty-five years. It might look like this, although in practice not this smooth:

Salary Increases by Service
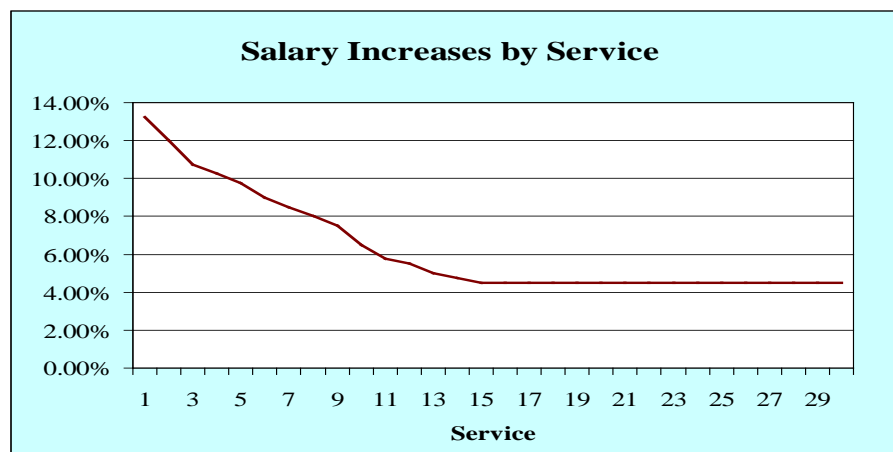
Therefore, we divide the salary increase assumption into two pieces:

1. Determining the assumption for long-service employees; and
2. Determining the additional increases to be applied to shorter-service employees.

The next two subsections will discuss these components of the salary assumption.

Salary increase assumptions for long-service employees

Many of the factors that result in pay increases are largely inapplicable or have diminished importance for longer-service employees. Step or service-related increases have stopped or are minimal. Promotions occur with less frequency. Additional training or acquisition of advanced degrees usually occurs early in the career. In theory, then, salary increases for longer-service employees are almost entirely driven by wage inflation and only a minimal amount of merit should be assumed. The OA currently utilizes this two-component salary assumption, assuming long-service employees will have salary increases equal to General Wage Inflation (3.00% above) plus a small factor for merit.

We agree that this approach is reasonable.

In this type of analysis, when there is a merit assumption for the long-term members, it is difficult to separate where the General Wage Inflation ends and the where the merit begins for those members. For example, if the actual inflation was exactly 2.50% and the actual increase for the long-term members was 3.50%, how would one differentiate how much of the additional 1.00% was a general increase and how much was merit? Thus, for the merit analysis, we have identified all increases above inflation for long-service employees in the General Increase over Inflation bucket (assuming the general wage increase will be 1.00% above inflation in the example above). The analysis for each System is provided in Section V.

SECTION IV
ANALYSIS OF POST-RETIREMENT MORTALITY

ANALYSIS OF POST-RETIREMENT MORTALITY

The issue of future mortality improvement is one that the governing bodies of our profession have recently become more concerned about. This has resulted in recent changes to the relevant Actuarial Standard of Practice, ASOP 35, Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations, and published practice notes. The standard now requires pension actuaries to make and disclose an assumption as to expected mortality improvement after the valuation date. The following are excerpts directly from the Standard:

"As mortality rates have continued to decline over time, concern has increased about the impact of potential future mortality improvements on the magnitude of pension commitments. Section 3.5.3 of current ASOP No. 35 lists "the likelihood and extent of mortality improvement in the future" as a factor for the actuary to consider in selecting a mortality assumption. In the view of many actuaries, the guidance regarding mortality assumptions should more explicitly recognize estimated future mortality improvement as a fundamental and necessary assumption, and the actuary's provision for such improvement should be disclosed explicitly and transparently."

*"**The resources reviewed by the Pension Committee showed that demographers generally expect that mortality will continue to improve**. These resources noted that some scientists argue that human life has biological limits, and that the rate of mortality improvement could slow as a result of obesity or other emerging health issues, but that such limits and countervailing factors do not alter the scientific consensus of likely continuing improvements in mortality."*

"The actuary should consider the effect of mortality improvement both prior to and subsequent to the measurement date. With regard to mortality improvement, the actuary should do the following:

    i.   *__adjust mortality rates to reflect mortality improvement prior to the measurement date__. For example, if the actuary starts with a published mortality table, the mortality rates may need to be adjusted to reflect mortality improvement from the effective date of the table to the measurement date. Such an adjustment is not necessary if, in the actuary's professional judgment, the published mortality table reflects expected mortality rates as of the measurement date.*

    ii.   *__include an assumption as to expected mortality improvement after the measurement date__. This assumption should be disclosed in accordance with Section 4.1.1, even if the actuary concludes that an assumption of zero future improvement is reasonable as described in Section 3.1. **Note that the existence of uncertainty about the occurrence or magnitude of future mortality improvement does not by itself mean that an assumption of zero future improvement is a reasonable assumption.**"*

As you will note, we have highlighted the above sentences we feel need to be emphasized. To meet this standard, a recent trend in actuarial models is to use mortality tables that explicitly incorporate projected mortality improvements over time. This type of table (or series of tables) is

called "generational mortality." Historically, actuarial models have been constrained to static mortality tables due to two reasons: (1) a general belief that there was a limit on the ultimate longevity and (2) the added complexity of a generational mortality type model and limitations in computational power. A static mortality table would be used and updated with each experience study to reflect the most recent mortality. Historically, this would almost always result in adoption of lower mortality rates creating losses for plans and unfunded past service liabilities.

With advances in computing power, it has become a more mainstream practice to incorporate generational mortality models. The idea behind adopting a generational mortality model is to avoid the experience study "correction" factor. While minor adjustments may need to be made in the future, the constant bias towards needing to reduce mortality rates is avoided.

The expectation of continued increases in longevity is supported by national trends. The following graph provides the expected remaining lifetime in years for a 65 year old retiree measured beginning in 1960. Notice the recent uptrend in female longevity after almost two decades of relatively minimal improvement. This significant change in pattern (most of which has occurred since 2004) has led most of the actuarial profession to agree that future improvements will likely continue.

Life Expectancy in Years, Current Age 65
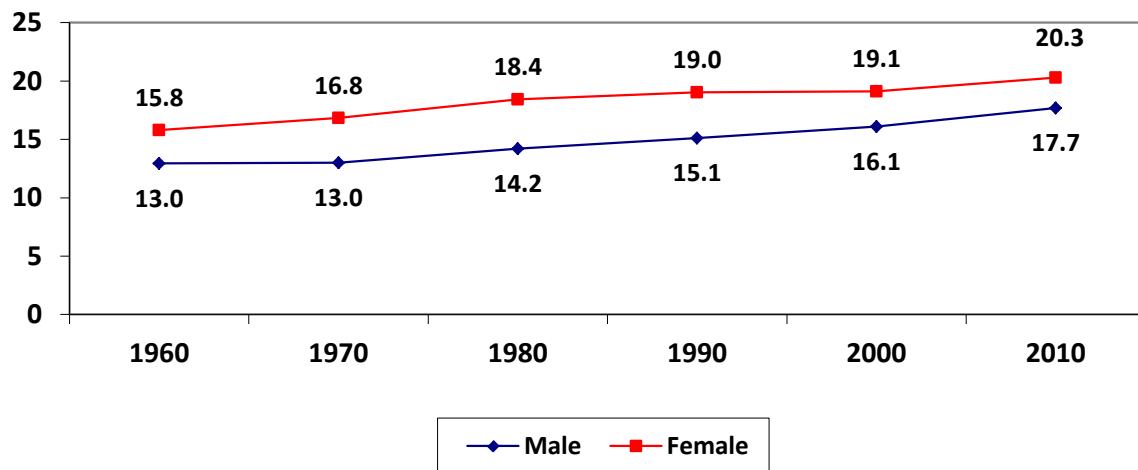
National Vital Statistics Reports, Vol 58, No 21, June 2010
National Vital Statistics Reports, Vol 60, No 4, January 2011

The most current mortality tables were provided in a recent report by the Society of Actuaries' Retirement Plans Experience Committee's (RPEC) published in September of 2012. The following are excerpts from that report:

"As part of its periodic review of retirement plan mortality experience, RPEC initiated a Pension Mortality Study in 2010. This study, which is still in progress, includes a comprehensive review

of recent mortality experience of uninsured retirement plans in the United States. The SOA anticipates publishing a new set of retirement plan mortality tables and mortality improvement rates in late 2013, or early 2014, that would be the successors to the RP-2000 tables and Scale AA.

"At an early stage of its analysis, the Mortality Improvement Sub-team of RPEC noticed that mortality improvement experience in the United States since 2000 has differed from that anticipated by Scale AA. In particular, there was a noticeable degree of mismatch between the Scale AA rates and actual mortality experience for ages under 50, and the Scale AA rates were lower than the actual mortality improvement rates for most ages over 55. Given that the Pension Mortality Study is still many months from completion, RPEC is publishing an interim improvement Scale BB, which can be used by pension actuaries as an alternative to Scale AA for the projection of base mortality rates beyond calendar year 2000. Scale BB was developed using certain techniques that have not been used previously in the construction of mortality improvement scales published by the SOA. These techniques, including the analysis of US mortality trends on a two-dimensional (age and calendar year) basis, are described in Sections 4 and 5. These important new techniques notwithstanding, the final gender-specific Scale BB rates published in this report vary solely by age, and hence can be used with existing pension valuation software."

"RPEC recognizes that there is a wide range of opinion with respect to future levels of mortality in the United States and that the assumptions underlying any set of mortality improvement rates must necessarily reflect some degree of subjectivity. RPEC characterizes the assumptions that underpin Scale BB (including a 1.0% long-term rate of mortality improvement and limited cohort effects) as middle-of–the road, being neither overly optimistic nor too pessimistic with respect to future longevity improvements in the United States."

*"In light of the nearly continuous pattern of increasing longevity in the United States over the past century, the Committee recommends that actuaries incorporate adequate provisions for future mortality improvement into their calculations. Taking into consideration the methodology used to develop Scale BB (Section 5.3) and RPEC's preference for generational projection of mortality over static approximations (Section 7.1), **the committee encourages users of Scale BB to do so on a fully generational basis.**"*

Based on the recent strengthening of the Standards of Practice, we have been recommending our clients use a fully generational approach. By doing this, future mortality rates will be projected to continually decrease each year. Therefore, the life expectancy at age 60 for someone reaching 60 now will not be as long as the life expectancy for someone reaching 60 in 2020, and their life expectancy will not be as long as someone reaching 60 in 2040, etc. The table on the following page provides the life expectancy for individuals retiring in future years, based on RP-2000 with full generational projection using Scale BB.

Proposed Life Expectancy for an Age 60 Retiree in Years					
Gender	Year of Retirement				
	2010	2015	2020	2025	2030
Male	23.1	23.7	24.3	24.8	25.4
Female	26.4	26.9	27.4	27.9	28.4

Because of this assumption of continuous improvement, life expectancies for today's younger active members are expected to be materially longer than those of today's retirees, and the improvement over time is built into the contributions of the individual members.

The RPEC has recently issued an Exposure Draft publishing a new set of tables labeled RP-2014. In the next engagement, we will compare NYCRS data to the new table to determine if it is more appropriate than the current assumptions. It should be noted that the data utilized to build the new tables did not include any data from public employee retirement systems but instead only used data from large, nationwide private employers. As such, one cannot assume the new tables will automatically be more appropriate for NYCRS.

NYCRS SPECIFIC ANALYSIS

NYCRS' actuarial liabilities and retirement contribution rates depend in part on how long retirees live. If members live longer, benefits will be paid for a longer period of time and the liability and ultimate retirement contribution rates will be larger.

Currently, the OA has "Base" tables and "Valuation" tables. The Base tables represent the fit to the data as of the end of the prior experience study (2009). The Valuation tables are then the Base tables projected forward to account for future improvements in mortality.

When choosing an appropriate mortality assumption, actuaries typically use standard mortality tables, unlike when choosing other demographic assumptions. They may choose to adjust these standard mortality tables, however, to reflect various characteristics of the covered group, and to provide for expectations of future mortality improvement (both up to and after the measurement date). If the plan population has sufficient credibility to justify its own mortality table, then the use of such a table also could be appropriate. Factors that may be considered in selecting and/or adjusting a mortality table include the demographics of the covered group, the size of the group and the statistical credibility of its experience, and future mortality improvement.

The mortality tables currently being used in the annual valuation for non-disabled retirees and for beneficiaries receiving benefits are variants of the RP-2000 Mortality Table, projected using scale AA and based on the individual experience of the group. This table has separate rates for males and females. The current application is what we refer to as a "static" table. The mortality rate for a 65-year male is projected to be the same in 30 years as it is today, with no accommodations for *continued* mortality improvements expected over time.

The OA currently has separate mortality tables for all five individual Systems. This is a common practice as individual employee groups typically will have different rates of mortality.

We first measured the credibility of the dataset to determine whether the standard, unadjusted tables should be used or if statistical analysis of NYCRS specific data was warranted. Based on a practice note issued by the American Academy of Actuaries in the fall of 2011, a dataset needs 96 expected deaths for each gender to be within +/- 20% of the actual pattern with 95% confidence. We believe +/- 20% is a rather large range to be considered fully credible. Other sources state higher requirements, such as 1,000 deaths per gender. The following table gives the number of deaths needed by gender to have a given level of confidence that the data is +/- X% of the actual pattern.

	Confidence	99% – 101%	97% – 103%	95% – 105%	90% – 110%	80% – 120%
0.674	75%	4,543	505	182	45	11
1.282	80%	16,435	1,826	657	164	41
1.645	90%	27,060	3,007	1,082	271	68
1.96	95%	38,416	4,268	1,537	384	96
2.576	99%	66,358	7,373	2,654	664	166

Using this information, 1,082 deaths are needed by gender to have 90% confidence that the data is within +/- 5% of the actual pattern. NYCERS General had 12,721 male deaths during the 10-year period, clearly indicating they are a fully credible group. Other groups are smaller, but even the 10-year data for FIRE had 1,970 male deaths, also indicating very high credibility.

We begin by determining the expected number of deaths in each year at each age for males and females. Then we compare the actual number to the expected number. The ratio of the actual deaths to the expected deaths (the A/E ratio) tells us whether the assumptions are reasonable. For this assumption, using a static mortality table, an A/E ratio between 110% and 120% has traditionally been desired for conservatism and to build in a margin for continued future improvements in mortality rates. Thus, the desired A/E level is 110% - 120% when compared to the *valuation* tables.

The results by individual System are provided in Section V. As shown, the current assumption for some groups falls into the desired range. For others, the experience has overtaken a large portion, if not all, of the margin for future mortality improvements. Looking at the 2-year results shows material improvements when compared to the 10-year results for all groups. Part of our second engagement will include a comparison of the FY2001-FY2005 results to the FY2009-FY2013 results to attempt to capture the rate of improvement.

The following graphic provides the life expectancy in years from a given age for each classification of retiree. These values are based on the actual data, not on the current assumption.
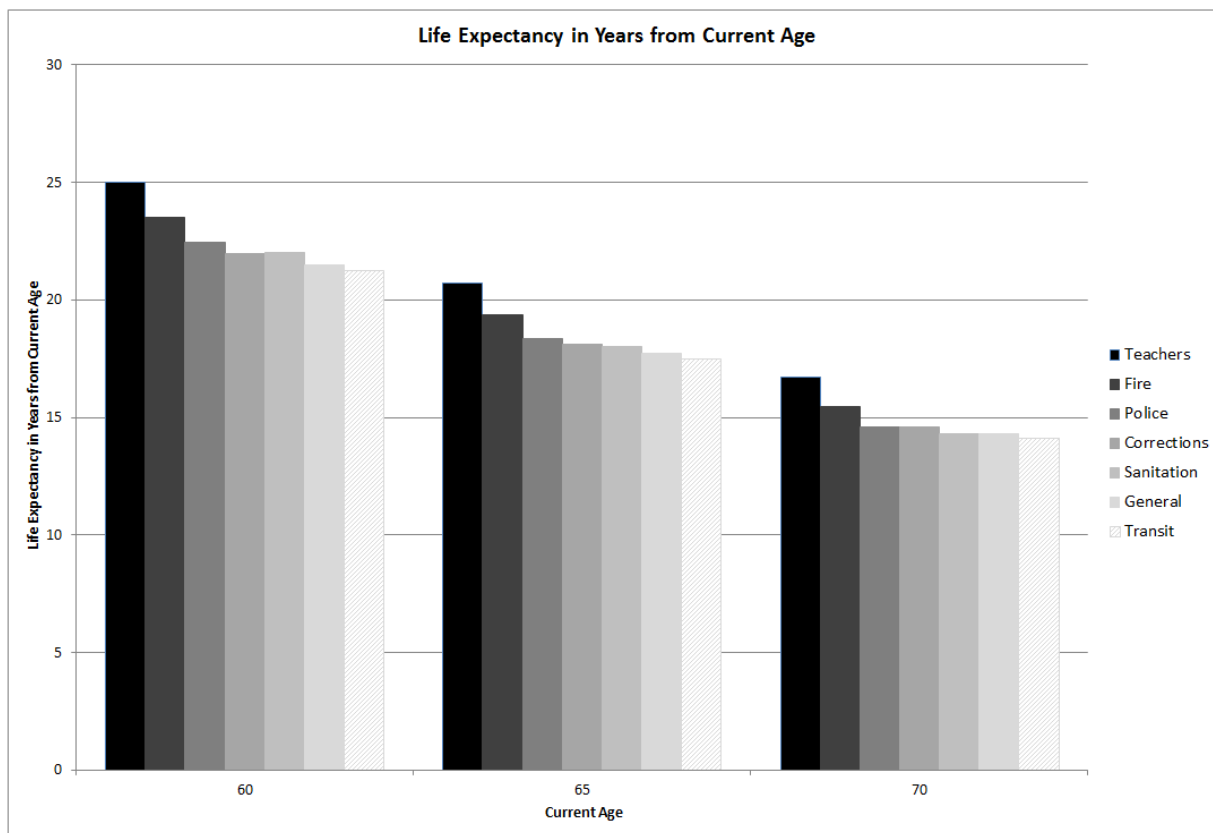
As shown, the life expectancy for retirees in TRS is substantially larger than the life expectancy of the retirees in the other Systems. Retirees in FIRE have the second highest life expectancy, followed by retirees in POLICE. The other classifications are under the NYCERS System and currently share the same mortality table. This experience appears to support the use of one table across these groups.

While the trend has been to move to fully generational tables, public sector plans often have their option calculations tied to the valuation mortality and investment rate return assumptions. This creates another level of complication that might argue against using a fully generational table. During the second engagement, we will investigate this dynamic further and may (as a result of that investigation) recommend the continued use of static tables that contain a static margin for mortality improvement (the margin is the same for all members of a particular age, regardless of what calendar year they obtain that age).

SECTION V
SUMMARY RESULTS BY SYSTEM: NYCERS

NYCERS

Findings

The results of the 10-year and 2-year experience studies are shown in Appendix I - VI. We have quantified the differences between actual experience and current actuarial assumptions. The table on the following page provides a summary of the reconciliation in comparison to the current assumptions.

The following business rules were applied to the NYCERS data. More detail is provided on the following pages.

Business Rules

Rule #	Rule Name
1	Death Reclassification
2	Accidental Disability Reclassification
3	Ordinary Disability Reclassification
4	Status Continuity
5	Termination Reclassification

Our understanding of the project is that recommendations for changes to assumptions are traditionally included only in the second engagement. GRS agrees that this is appropriate. Thus, we will wait until that time before making any formal recommendation for changes to assumptions and the estimated impact of using the recommended assumptions to calculate the liabilities and contribution requirements.

However, we do have a few observations:

For NYCERS General:

1. The experience has overtaken most of the margin in the post-retirement mortality assumption. The next change in this assumption will likely be a material strengthening. Decreasing post-retirement mortality will increase liabilities and contribution requirements.
2. The observed number of withdrawals has outpaced the number expected by the current assumptions.

For Transit:

1. The observed number of withdrawals has outpaced the number expected by the current assumptions.

1. The observed number of retirements has been less than the number expected by the current assumptions.
2. The current salary scale assumptions appear to have underestimated the actual salary increases members have received. However, it is not always necessary to assume future experience will match past experience, especially for economic assumptions.

For Sanitation:

1. The observed number of withdrawals has outpaced the number expected by the current assumptions.
2. The observed number of retirements has been less than the number expected by the current assumptions.
3. The current salary scale assumptions appear to have underestimated the actual salary increases members have received. However, it is not always necessary to assume future experience will match past experience, especially for economic assumptions.

For Corrections:

1. The experience has overtaken most of the margin in the post-retirement mortality assumption. The next change in this assumption will likely be a material strengthening. Decreasing post-retirement mortality will increase liabilities and contribution requirements.
2. The observed number of withdrawals has outpaced the number expected by the current assumptions.
3. The observed number of retirements has been less than the number expected by the current assumptions.
4. The current salary scale assumptions appear to have underestimated the actual salary increases members have received. However, it is not always necessary to assume future experience will match past experience, especially for economic assumptions.

For TBTA:

1. The experience has overtaken most of the margin in the post-retirement mortality assumption. The next change in this assumption will likely be a material strengthening. Decreasing post-retirement mortality will increase liabilities and contribution requirements.

2. The observed number of withdrawals has outpaced the number expected by the current assumptions.

For HP-TP:

1. This is a very small data set, but the current assumption does appear to provide some margin for future improvement in longevity.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM – GENERAL
PRELIMINARY EXPERIENCE STUDY RESULTS
OVERVIEW

Table Number	Table Type	2-YEAR PERIOD ENDING 6/30/2011		10-YEAR PERIOD ENDING 6/30/2011		GRS' Ideal A/E Range	Comments
		Ratio of Actual to Expected	Average Number of Decrements per Year	Ratio of Actual to Expected	Average Number of Decrements per Year		
	Service Retiree Mortality					110-120%	Consistent with national trends, the rates of mortality continue to decline. If trends continue, we will recommend a material adjustment in the second engagement.
1A	Men	109%	1253	116%	1280		
1B	Women	99%	1299	108%	1331		
1C	Men & Women	104%	2552	112%	2611		
1D	By Year						
	Disabled Retiree Mortality					100-120%	Consistent with national trends, the rates of mortality continue to decline. If trends continue, we will recommend a material adjustment in the second engagement.
2A	Men	105%	117	120%	119		
2B	Women	114%	82	131%	80		
2C	Men & Women	104%	199	112%	199		
2D	By Year						
	Active Member Withdrawals					100-105%	Actual withdrawals are considerably outpacing the expectations.
3A	Men	127%	1310	127%	1392		
3B	Women	138%	1987	131%	1912		
3C	Men & Women	133%	3296	129%	3304		
3D	By Year						
	Active Member Service Retirements					90-100%	Overall results look reasonable. Some groups, such as Improved in first year of eligibility, may need adjustments.
	In 1st Year of Eligibility						
4A	Total	76%	869	83%	720		
4B	Improved	79%	187	52%	72		
4C	Un-Improved	75%	682	89%	648		
	In 2nd Year of Eligibility						
5A	Total	85%	406	83%	308		
5B	Improved	96%	66	67%	30		
5C	Un-Improved	83%	341	85%	278		
	After 2nd Year of Eligibility						
6A	Total	61%	1881	58%	1284		
6B	Improved	99%	186	81%	70		
6C	Un-Improved	58%	1695	57%	1214		
6D	By Year						
	Reduced Service Retirements						
7A	Total	181%	785	193%	751		
7B	By Year						

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM – GENERAL
PRELIMINARY EXPERIENCE STUDY RESULTS
OVERVIEW

Table Number	Table Type	2-YEAR PERIOD ENDING 6/30/2011		10-YEAR PERIOD ENDING 6/30/2011		GRS' Ideal A/E Range	Comments
		Ratio of Actual to Expected	Average Number of Decrements per Year*	Ratio of Actual to Expected	Average Number of Decrements per Year*		
	Active Member Ordinary Mortality					80-100%	Minor Assumption. Experience appears to be outpacing the assumptions.
8A	Men	109%	140	123%	145		
8B	Women	117%	120	124%	114		
8C	Men & Women	113%	259	123%	259		
8D	By Year						
	Active Member Ordinary Disability					80-100%	In total, the number of disabilities appears reasonable when compared to current assumptions. The allocation between ordinary and accidental disabilities does not appear to be consistent with expectations from the current assumptions and we believe it has to do with the introduction of the Tier IV status code. We will work with the OA to determine the appropriate classification for this new code.
9A	Men	5%	9	74%	132		
9B	Women	8%	15	76%	129		
9C	Men & Women	6%	24	75%	261		
9D	By Year						
	Active Member Accidental Disability					80-100%	
10A	Men	805%	182	253%	56		
10B	Women	1179%	169	334%	46		
10C	Men & Women	950%	351	283%	102		
10D	By Year						
	Salary Increases*	Expected	Actual	Expected	Actual		Merit looks reasonable. Experience has been close to, but slightly lower than, the current assumption.
11A	Total	4.93%	2.71%	5.01%	4.55%		
11B	Merit Only	0.93%	0.58%	1.01%	0.65%		
	General Increase over Inflation	1.50%	-0.30%	1.50%	1.49%		
11C	By Year						
	Overtime Pay*	Expected	Actual	Expected	Actual		Actual overtime appears to be slightly higher than current assumption.
12A	For All Years	4.00%	5.32%	4.00%	5.11%		
12B	In Year Before Service Retirement	4.00%	4.47%	4.00%	4.30%		
12C	In Year Before Disability Retirement	4.00%	3.99%	4.00%	4.03%		
12D	By Year						

For Salary Increases, average annual percentage increase in salary is shown. For Overtime Pay, average annual overtime pay is expressed as a percentage of salary.

Note: There are no proposed changes provided in this first engagement report. Recommended assumptions changes (if any) will be included with the second engagement.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM – TRANSIT
PRELIMINARY EXPERIENCE STUDY RESULTS
OVERVIEW

Table Number	Table Type	2-YEAR PERIOD ENDING 6/30/2011		10-YEAR PERIOD ENDING 6/30/2011		GRS' Ideal A/E Range	Comments
		Ratio of Actual to Expected	Average Number of Decrements per Year	Ratio of Actual to Expected	Average Number of Decrements per Year		
	Service Retiree Mortality					110-120%	Current assumption does provide margin for future improvement in longevity.
1A	Men	113%	834	119%	839		
1B	Women	98%	61	114%	64		
1C	Men & Women	111%	895	119%	904		
1D	By Year						
	Disabled Retiree Mortality					100-120%	Current assumption does provide margin for future improvement in longevity.
2A	Men	119%	70	128%	70		
2B	Women	97%	11	93%	9		
2C	Men & Women	111%	81	119%	79		
2D	By Year						
	Active Member Withdrawals					100-105%	Actual withdrawals are considerably outpacing the expectations.
3A	Men	110%	279	112%	349		
3B	Women	169%	82	156%	93		
3C	Men & Women	119%	361	119%	442		
3D	By Year						
	Active Member Service Retirements					90-100%	The current assumption is likely too conservative.
	In 1st Year of Eligibility						
4A	Total	62%	345	58%	222		
4B	Improved	80%	209	58%	86		
4C	Un-Improved	46%	136	57%	136		
	In 2nd Year of Eligibility						
5A	Total	64%	137	64%	97		
5B	Improved	92%	69	80%	34		
5C	Un-Improved	49%	69	58%	62		
	After 2nd Year of Eligibility						
6A	Total	62%	515	68%	413		
6B	Improved	122%	189	99%	69		
6C	Un-Improved	48%	326	64%	344		
6D	By Year						
	Reduced Service Retirements						
7A	Total	429%	2	2080%	77		
7B	By Year						

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM – TRANSIT
PRELIMINARY EXPERIENCE STUDY RESULTS
OVERVIEW

Table Number	Table Type	2-YEAR PERIOD ENDING 6/30/2011		10-YEAR PERIOD ENDING 6/30/2011		GRS' Ideal A/E Range	Comments
		Ratio of Actual to Expected	Average Number of Decrements per Year*	Ratio of Actual to Expected	Average Number of Decrements per Year*		
	Active Member Ordinary Mortality					80-100%	Minor Assumption. Experience appears to be outpacing the assumptions.
8A	Men	114%	79	106%	68		
8B	Women	129%	9	135%	9		
8C	Men & Women	115%	88	109%	76		
8D	By Year						
9A	Active Member Accidental Mortality	0%	0	5%	0		
9B	By Year						
	Active Member Ordinary Disability					80-100%	In total, the number of disabilities appears reasonable when compared to current assumptions. The allocation between ordinary and accidental disabilities does not appear to be consistent with expectations from the current assumptions and we believe it has to do with the introduction of the Tier IV status code. We will work with the OA to determine the appropriate classification for this new code.
10A	Men	7%	7	75%	70		
10B	Women	6%	1	159%	23		
10C	Men & Women	7%	8	86%	92		
10D	By Year						
	Active Member Accidental Disability					80-100%	
11A	Men	1704%	105	385%	24		
11B	Women	4167%	46	934%	10		
11C	Men & Women	2076%	150	466%	34		
11D	By Year						
	Salary Increases*	Expected	Actual	Expected	Actual		
12A	Total	4.29%	4.91%	4.48%	4.97%		Overall, experience has slightly outpaced assumption, especially when adjusted for actual versus expected inflation.
12B	Merit Only	0.79%	0.98%	0.98%	1.09%		
	General Increase over Inflation	1.00%	1.58%	1.00%	1.57%		
12C	By Year						
	Overtime Pay*	Expected	Actual	Expected	Actual		
13A	For All Years	8.00%	8.02%	8.00%	7.33%		Experience has been close to, but slightly lower than, the current assumption.
13B	In Year Before Service Retirement	8.00%	7.06%	8.00%	6.87%		
13C	In Year Before Disability Retirement	8.00%	5.02%	8.00%	4.86%		
13D	By Year						

* *For Salary Increases, average annual percentage increase in salary is shown. For Overtime Pay, average annual overtime pay is expressed as a percentage of salary.*

Note: There are no proposed changes provided in this first engagement report. Recommended assumptions changes (if any) will be included with the second engagement.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM – SANITATION
PRELIMINARY EXPERIENCE STUDY RESULTS
OVERVIEW

Table Number	Table Type	2-YEAR PERIOD ENDING 6/30/2011		10-YEAR PERIOD ENDING 6/30/2011		GRS' Ideal A/E Range	Comments
		Ratio of Actual to Expected	Average Number of Decrements per Year	Ratio of Actual to Expected	Average Number of Decrements per Year		
	Service Retiree Mortality					110-120%	Current assumption does provide some margin for future improvement in longevity, but the amount of margin is decreasing rapidly.
1A	Men	109%	279	119%	287		
1B	Women	119%	2	109%	2		
1C	Men & Women	109%	280	119%	289		
1D	By Year						
	Disabled Retiree Mortality					100-120%	Current assumption does provide margin for future improvement in longevity.
2A	Men	116%	73	121%	69		
2B	Women	388%	1	278%	0		
2C	Men & Women	109%	74	119%	70		
2D	By Year						
	Active Member Withdrawals					100-105%	Actual withdrawals are considerably outpacing the expectations.
3A	Men	105%	45	126%	67		
3B	Women	143%	2	144%	2		
3C	Men & Women	106%	46	127%	69		
3D	By Year						
	Active Member Service Retirements					90-100%	The current assumption is likely too conservative.
	In 1st Year of Eligibility						
4A	Total	51%	116	54%	87		
4B	Improved	52%	98	42%	58		
4C	Un-Improved	46%	18	120%	29		
	In 2nd Year of Eligibility						
5A	Total	86%	43	79%	33		
5B	Improved	91%	42	65%	25		
5C	Un-Improved	28%	1	211%	9		
	After 2nd Year of Eligibility						
6A	Total	78%	117	91%	105		
6B	Improved	85%	113	77%	67		
6C	Un-Improved	22%	4	136%	38		
6D	By Year						
	Reduced Service Retirements						
7A	Total	120%	1	6014%	69		
7B	By Year						

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM – SANITATION
PRELIMINARY EXPERIENCE STUDY RESULTS
OVERVIEW

Table Number	Table Type	2-YEAR PERIOD ENDING 6/30/2011		10-YEAR PERIOD ENDING 6/30/2011		GRS' Ideal A/E Range	Comments
		Ratio of Actual to Expected	Average Number of Decrements per Year*	Ratio of Actual to Expected	Average Number of Decrements per Year*		
	Active Member Ordinary Mortality					80-100%	Minor Assumption.
8A	Men	90%	9	123%	12		
8B	Women	0%	0	143%	0		
8C	Men & Women	89%	9	123%	12		
8D	By Year						
9A	Active Member Accidental Mortality	0%	0	66%	1		
9B	By Year						
	Active Member Ordinary Disability					80-100%	In total, the number of disabilities appears reasonable when compared to current assumptions. The allocation between ordinary and accidental disabilities does not appear to be consistent with expectations from the current assumptions and we believe it has to do with the introduction of the Tier IV status code. We will work with the OA to determine the appropriate classification for this new code.
10A	Men	7%	2	62%	14		
10B	Women	0%	0	105%	1		
10C	Men & Women	7%	2	63%	15		
10D	By Year						
	Active Member Accidental Disability					80-100%	
11A	Men	200%	54	132%	36		
11B	Women	211%	2	129%	1		
11C	Men & Women	200%	55	132%	37		
11D	By Year						
	Salary Increases*	Expected	Actual	Expected	Actual		
12A	Total	8.96%	6.94%	7.82%	8.02%		Overall, experience has slightly outpaced assumption, especially when adjusted for actual versus expected inflation.
12B	Merit Only	5.46%	4.23%	4.32%	3.58%		
	General Increase over Inflation	1.00%	-1.00%	1.00%	2.43%		
12C	By Year						
	Overtime Pay*	Expected	Actual	Expected	Actual		
13A	For All Years	12.00%	9.19%	12.00%	11.15%		Experience has been close to the current assumption.
13B	In Year Before Service Retirement	12.00%	19.65%	12.00%	15.29%		
13C	In Year Before Disability Retirement	12.00%	10.23%	12.00%	4.46%		
13D	By Year						

* For Salary Increases, average annual percentage increase in salary is shown. For Overtime Pay, average annual overtime pay is expressed as a percentage of salary.

Note: There are no proposed changes provided in this first engagement report. Recommended assumptions changes (if any) will be included with the second engagement.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM – CORRECTIONS
PRELIMINARY EXPERIENCE STUDY RESULTS
OVERVIEW

Table Number	Table Type	2-YEAR PERIOD ENDING 6/30/2011		10-YEAR PERIOD ENDING 6/30/2011		GRS' Ideal A/E Range	Comments
		Ratio of Actual to Expected	Average Number of Decrements per Year	Ratio of Actual to Expected	Average Number of Decrements per Year		
	Service Retiree Mortality					110-120%	Consistent with national trends, the rates of mortality continue to decline. If trends continue, we will recommend a material adjustment in the second engagement.
1A	Men	94%	60	112%	57		
1B	Women	119%	12	117%	8		
1C	Men & Women	98%	71	113%	65		
1D	By Year						
	Disabled Retiree Mortality					100-120%	Consistent with national trends, the rates of mortality continue to decline. If trends continue, we will recommend a material adjustment in the second engagement.
2A	Men	79%	16	93%	16		
2B	Women	72%	3	123%	5		
2C	Men & Women	98%	19	113%	20		
2D	By Year						
	Active Member Withdrawals					100-105%	Actual withdrawals are considerably outpacing the expectations.
3A	Men	187%	83	150%	77		
3B	Women	159%	57	140%	61		
3C	Men & Women	175%	140	145%	138		
3D	By Year						
	Active Member Service Retirements					90-100%	Overall, current assumption maybe too high, especially at first eligibility.
	In 1st Year of Eligibility						
4A	Total	43%	204	57%	138		
4B	Improved	39%	160	48%	94		
4C	Un-Improved	62%	45	96%	44		
	In 2nd Year of Eligibility						
5A	Total	106%	74	102%	35		
5B	Improved	112%	66	90%	25		
5C	Un-Improved	75%	8	153%	10		
	After 2nd Year of Eligibility						
6A	Total	79%	126	83%	57		
6B	Improved	85%	112	76%	39		
6C	Un-Improved	48%	14	101%	19		
6D	By Year						
	Reduced Service Retirements						
7A	Total	0%	1	5940%	252		
7B	By Year						

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM – CORRECTIONS
PRELIMINARY EXPERIENCE STUDY RESULTS
OVERVIEW

Table Number	Table Type	2-YEAR PERIOD ENDING 6/30/2011		10-YEAR PERIOD ENDING 6/30/2011		GRS' Ideal A/E Range	Comments
		Ratio of Actual to Expected	Average Number of Decrements per Year*	Ratio of Actual to Expected	Average Number of Decrements per Year*		
	Active Member Ordinary Mortality					80-100%	Minor Assumption. Experience appears to be less than the assumptions.
8A	Men	111%	7	80%	5		
8B	Women	104%	3	111%	3		
8C	Men & Women	109%	10	89%	8		
8D	By Year						
9A	Active Member Accidental Mortality	0%	0	0%	0		
9B	By Year						
	Active Member Ordinary Disability					80-100%	In total, the number of disabilities appears reasonable when compared to current assumptions. The allocation between ordinary and accidental disabilities does not appear to be consistent with expectations from the current assumptions and we believe it has to do with the introduction of the Tier IV status code. We will work with the OA to determine the appropriate classification for this new code.
10A	Men	0%	0	63%	9		
10B	Women	6%	1	116%	10		
10C	Men & Women	2%	1	83%	19		
10D	By Year						
	Active Member Accidental Disability					80-100%	
11A	Men	132%	27	127%	29		
11B	Women	77%	13	48%	8		
11C	Men & Women	108%	40	94%	37		
11D	By Year						
		Expected	Actual	Expected	Actual		
	Salary Increases*						
12A	Total	7.59%	9.49%	6.78%	8.27%		Salary increases are substantially outpacing the assumption. The experience from the last 10 years is likey not a sustainable level of annual increase, but the assumption likely needs to be increased.
12B	Merit Only	4.09%	3.33%	3.28%	2.75%		
	General Increase over Inflation	1.00%	3.71%	1.00%	3.39%		
12C	By Year						
		Expected	Actual	Expected	Actual		
	Overtime Pay*						
13A	For All Years	11.79%	12.25%	11.30%	10.07%		Over the longer term, current overtime assumption is likely conservative.
13B	In Year Before Service Retirement	14.81%	11.69%	14.01%	7.54%		
13C	In Year Before Disability Retirement	12.61%	6.42%	11.56%	4.82%		
13D	By Year						

For Salary Increases, average annual percentage increase in salary is shown. For Overtime Pay, average annual overtime pay is expressed as a percentage of salary.

Note: There are no proposed changes provided in this first engagement report. Recommended assumptions changes (if any) will be included with the second engagement.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM – TBTA
PRELIMINARY EXPERIENCE STUDY RESULTS
OVERVIEW

Table Number	Table Type	2-YEAR PERIOD ENDING 6/30/2011		10-YEAR PERIOD ENDING 6/30/2011		GRS' Ideal A/E Range	Comments
		Ratio of Actual to Expected	Average Number of Decrements per Year	Ratio of Actual to Expected	Average Number of Decrements per Year		
	Service Retiree Mortality					110-120%	Very small data set, no credibility.
1A	Men	87%	18	114%	21		
1B	Women	203%	4	118%	2		
1C	Men & Women	96%	22	114%	22		
1D	By Year						
	Disabled Retiree Mortality					100-120%	Very small data set, no credibility.
2A	Men	115%	4	102%	3		
2B	Women	0%	0	31%	0		
2C	Men & Women	96%	4	114%	3		
2D	By Year						
	Active Member Withdrawals					100-105%	Actual withdrawals are considerably outpacing the expectations.
3A	Men	136%	17	149%	20		
3B	Women	486%	16	276%	10		
3C	Men & Women	211%	33	177%	30		
3D	By Year						
	Active Member Service Retirements					90-100%	Very small data set, no credibility.
	In 1st Year of Eligibility						
4A	Total	118%	17	109%	13		
4B	Improved	157%	11	83%	5		
4C	Un-Improved	82%	6	143%	7		
	In 2nd Year of Eligibility						
5A	Total	49%	2	120%	5		
5B	Improved	0%	0	95%	2		
5C	Un-Improved	70%	2	144%	3		
	After 2nd Year of Eligibility						
6A	Total	95%	15	102%	12		
6B	Improved	124%	5	139%	5		
6C	Un-Improved	84%	10	88%	8		
6D	By Year						
	Reduced Service Retirements						
7A	Total	317%	12	494%	13		
7B	By Year						

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM – TBTA
PRELIMINARY EXPERIENCE STUDY RESULTS
OVERVIEW

Table Number	Table Type	2-YEAR PERIOD ENDING 6/30/2011		10-YEAR PERIOD ENDING 6/30/2011		GRS' Ideal A/E Range	Comments
		Ratio of Actual to Expected	Average Number of Decrements per Year*	Ratio of Actual to Expected	Average Number of Decrements per Year*		
	Active Member Ordinary Mortality					80-100%	Very small data set, no credibility.
8A	Men	24%	1	69%	1		
8B	Women	139%	1	98%	0		
8C	Men & Women	41%	1	73%	2		
8D	By Year						
9A	Active Member Accidental Mortality	0%	0	0%	0		
9B	By Year						
	Active Member Ordinary Disability					80-100%	Very small data set, no credibility.
10A	Men	0%	0	87%	2		
10B	Women	0%	0	130%	1		
10C	Men & Women	0%	0	94%	3		
10D	By Year						
	Active Member Accidental Disability					80-100%	
11A	Men	305%	3	120%	1		
11B	Women	677%	1	281%	0		
11C	Men & Women	331%	4	132%	1		
11D	By Year						
		Expected	Actual	Expected	Actual		
	Salary Increases*						
12A	Total	4.92%	4.05%	5.42%	6.03%		Overall, experience has slightly outpaced assumption, especially when
12B	Merit Only	1.42%	2.46%	1.92%	2.96%		adjusted for actual versus expected inflation.
	General Increase over Inflation	1.00%	-3.52%	1.00%	0.84%		
12C	By Year						
		Expected	Actual	Expected	Actual		
	Overtime Pay*						
13A	For All Years	20.00%	18.50%	20.00%	18.62%		Experience has been close to, but slightly lower than, the current
13B	In Year Before Service Retirement	20.00%	20.56%	20.00%	28.74%		assumption.
13C	In Year Before Disability Retirement	20.00%	11.83%	20.00%	12.97%		
13D	By Year						

*   *For Salary Increases, average annual percentage increase in salary is shown. For Overtime Pay, average annual overtime pay is expressed as a percentage of salary.*

Note: There are no proposed changes provided in this first engagement report. Recommended assumptions changes (if any) will be included with the second engagement.

GRS Gabriel Roeder Smith & Company
Consultants & Actuaries

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM – HP TP
PRELIMINARY EXPERIENCE STUDY RESULTS
OVERVIEW

Table Number	Table Type	2-YEAR PERIOD ENDING 6/30/2011		10-YEAR PERIOD ENDING 6/30/2011		GRS' Ideal A/E Range	Comments
		Ratio of Actual to Expected	Average Number of Decrements per Year	Ratio of Actual to Expected	Average Number of Decrements per Year		
	Service Retiree Mortality					110-120%	Small dataset, but the current assumption does provide margin for future improvement in longevity.
1A	Men	117%	60	121%	50		
1B	Women	263%	1	150%	0		
1C	Men & Women	118%	61	121%	51		
1D	By Year						
	Disabled Retiree Mortality					100-120%	Small dataset, but the current assumption does provide margin for future improvement in longevity.
2A	Men	132%	33	124%	26		
2B	Women	0%	0	80%	0		
2C	Men & Women	131%	33	123%	26		
2D	By Year						

Note: There are no proposed changes provided in this Preliminary Report. Recommended assumptions changes (if any) will be included with the second engagement.

GRS APPROACH TO ASSIGNING STATUSES FOR NYCERS ACTIVE TABLES
FROM 6/30/2010 THROUGH 6/30/2013

GRS Status Code	Meaning	Associated Decrement	MSTATP*	MSTATC*
A	Active		10, 20, or 60	10
B1	Beneficiary of Retiree	Beneficiary		
B2	Beneficiary of Ordinary Death	Beneficiary		
B3	Beneficiary of Accidental Death	Beneficiary		
B4	Beneficiary of Ordinary Disability	Beneficiary		
B5	Beneficiary of Accidental Disability	Beneficiary		
D	Deceased	Ordinary Mortality	10, 20, or 60	60
D1	Ordinary Death w/o Ben	Ordinary Mortality	not 81 or 82	60
D2	Accidental Death w/o Ben	Accidental Mortality		61
F	Active-Inactive	Withdrawal		20
I	Ordinary Disability	Ordinary Disability		70
J	Accidental Disability	Accidental Disability		71
L	Lump Sum	Withdrawal		
P	Duplicate			
R	Service Retirement Year 1	Retirement		90
R	Service Retirement Year 2	Retirement		91
R	Service Retirement Year Ultimate	Retirement		92
R	Reduced Service Retirement	Retirement		93
S	Retiree from Vested	Retirement		
T	Terminated Non-Vested	Withdrawal		80
U	5-Year Out	Withdrawal		
V	Deferred Vested	Withdrawal		81 or 82
WI	Missing Ordinary Disability	Ordinary Disability		
WJ	Missing Accidental Disability	Accidental Disability		
WR	Missing Services Retirement	Retirement		
WS	Missing Retirement from Vested	Retirement		
Z	Refunded	Withdrawal		

GRS APPROACH TO ASSIGNING STATUSES FOR NYCERS PENSIONER TABLES
FROM 6/30/2010 THROUGH 6/30/2013

GRS Status Code	Meaning	Associated Decrement	MSTATP*	MSTATC*	RetCause	PayeePen
A	Active					
B1	Beneficiary of Retiree	Beneficiary			0 or 3	not 0,1 or 1
B2	Beneficiary of Ordinary Death	Beneficiary			7	not 0,1 or 1
B3	Beneficiary of Accidental Death	Beneficiary			4	not 0,1 or 1
B4	Beneficiary of Ordinary Disability	Beneficiary			2	not 0,1 or 1
B5	Beneficiary of Accidental Disability	Beneficiary			1	not 0,1 or 1
D	Deceased	Mortality*		60		
D1	Ordinary Death w/o Ben	Mortality*				
D2	Accidental Death w/o Ben	Mortality*				
F	Active-Inactive	Withdrawal				
I	Ordinary Disability	Ordinary Disability			2	0, 1, or 6
J	Accidental Disability	Accidental Disability			1 or 6	0, 1, or 6
L	Lump Sum	Withdrawal				
P	Duplicate					
R	Service Retiree	Retirement			3	0, 1, or 6
S	Retiree from Vested	Retirement			0	0, 1, or 6
T	Terminated Non-Vested	Withdrawal		80		
U	5-Year Out	Withdrawal				
V	Deferred Vested	Withdrawal	70	10	0	
WI	Missing Ordinary Disability	Ordinary Disability	70	10	2	0, 1, or 6
WJ	Missing Accidental Disability	Accidental Disability	70	10	1 or 6	0, 1, or 6
WR	Missing Services Retirement	Retirement	70	10	3	0, 1, or 6
WS	Missing Retirement from Vested	Retirement	70	10		

* The mortality decrements are determined by the member's status in the previous year. For example, a disability retiree's mortality decrement would be Disabled Mortality.

Business Rule 1: Death Reclassification

Description:	Example:		2006	2007	2008	2009
For a member who shows as a death in a given data file and shows a date of death in an earlier period, the death status was filled backwards until the fiscal year associted with the death date.	A member is identified as a death status in the 6/30/2009 data file with a Date of Death of 7/2/2006. The member's 6/30/2007 status and all future statuses are updated to reflect the new Date of Death.	**Initial**	R	R	R	R
				⬇	⬇	⬇
		Matured	R	D	D	D

Business Rule 2: Accidental Disability Reclassification

Description:	Example:		2002	2003	2004	2005
For members reclassifying to Accidental Disability (status code 'J') within one year after retirement, GRS changed the record as though the member immediately retired under Accidental Disability.	An active member retires 8/22/2002 and is reclassified to Accidental Disability as of 6/30/2005. The statuses for FYE 2003 and 2004 are changed to Accidental Disability.	**Initial**	A	R	R	J
				⬇	⬇	
		Matured	A	J	J	J

Business Rule 3: Ordinary Disability Reclassification

Description:	Example:		2001	2002	2003	2004
For members retiring under Ordinary Disability (status code 'I'), either after service retirement or after termination, GRS changed the record as though the member immediately retired under Ordinary Disability.	An active member retires 4/23/2002 and is reclassified to ordinary disability in FYE 2004. The statuses for FYE 2002 and 2003 are changed to Ordinary Disability.	**Initial**	A	R	R	I
				⬇	⬇	
		Matured	A	I	I	I

Business Rule 4: Status Continuity

Description:	Example:		2004	2005	2006	2007
In any three year period, if the first and last year's status matched, the middle year was also changed to be consistent. This rule was applied to statuses A, I, J, and R.	A record shows ordinary disability in 6/30/2004 and 6/30/2006 but beneficiary in 6/30/2005. The 6/30/2005 status is changed to oridinary disability.	**Initial**	I	B3	I	I
				⬇		
		Matured	I	I	I	I

Business Rule 5: Termination Reclassification

Description:	Example:		2004	2005	2006	2007
If an active record shifted to inactive, then returned to active any number of years later, the record is changed as though the member were active over all years. Applied to status codes F, T, V, and Y.	A record shows the termination of an active member as of 6/30/2005. By 6/30/2007, the member is active again. The FYE 2005 and 2006 statuses are changed to active.	**Initial**	A	F	F	A
				⬇	⬇	
		Matured	A	A	A	A

Status Changes due to Maturation

Status	Fiscal Year Ended June 30,											Total
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	
No Status	-7,359	-7,672	-7,985	-8,319	-8,634	-8,987	-9,397	-9,795	-10,201	-99,942	-104,820	**-283,111**
A	989	953	1,010	962	902	1,122	998	1,029	2,370	1,975	-6	**12,304**
B1	-13,197	-13,114	-13,119	-13,033	-12,883	-12,648	-12,381	-12,283	-12,228	-11,478	-11,336	**-137,700**
B2	0	0	0	0	0	0	0	0	0	0	0	**0**
B3	-102	-102	-104	-104	-104	-104	-104	-100	-102	-1,578	-1,658	**-4,162**
B4	-1,280	-1,345	-1,406	-1,502	-1,553	-1,600	-1,638	-1,667	-1,689	-998	-986	**-15,664**
B5	-121	-120	-124	-128	-127	-134	-133	-138	-138	-175	-180	**-1,518**
D	22,191	22,462	22,818	23,162	23,334	23,649	24,056	24,563	25,092	114,233	119,257	**444,817**
D1	0	0	0	0	-1	-17	-24	-20	-29	-3	-61	**-155**
D2	0	0	0	0	0	0	0	0	0	0	0	**0**
F	-275	-293	-374	-376	-390	-838	-622	-842	-2,523	-2,146	-4	**-8,683**
I	-2	158	168	192	204	186	211	273	494	305	-3	**2,186**
J	-1	18	16	10	14	20	26	32	58	28	0	**221**
L	0	0	0	0	0	-112	-289	-413	-498	0	0	**-1,312**
P	0	-8	-8	-8	-8	-8	-8	-8	-8	0	0	**-64**
R	-68	-187	-188	-201	-158	-191	-221	-254	-307	-55	-31	**-1,861**
S	-3	-4	-3	-4	-3	-3	-4	-4	-4	-2	0	**-34**
T	-495	-406	-361	-313	-231	-67	-59	-111	-143	-55	-161	**-2,402**
U	-5	-5	-7	0	0	0	0	0	0	0	0	**-17**
V	-234	-267	-291	-293	-294	-228	-283	-200	-122	-67	-9	**-2,288**
WI	0	-21	0	0	0	0	0	0	0	-38	-1	**-60**
WJ	0	0	0	0	-1	-1	-1	-1	-1	-4	0	**-9**
WR	0	-10	0	0	0	-1	-1	-1	-1	0	-1	**-15**
WS	0	0	0	0	0	0	0	0	0	0	0	**0**
Y	-38	-37	-42	-45	-67	-38	-126	-60	-20	0	0	**-473**
Z	0	0	0	0	0	0	0	0	0	0	0	**0**
Total												**0**

Status Counts after Maturation

Status	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
No Status	145,046	137,618	130,121	124,135	119,876	106,962	94,216	81,161	69,828	131,498	137,205	**1,277,666**
A	177,413	181,010	178,035	177,673	179,989	182,428	183,749	186,528	188,581	178,379	165,667	**1,979,452**
B1	211	33	32	52	66	324	441	410	268	4	3	**1,844**
B2	426	0	0	0	0	10	10	12	12	0	0	**470**
B3	7	6	5	6	4	4	3	3	2	0	0	**40**
B4	36	14	12	11	2	13	16	12	3	0	0	**119**
B5	4	1	1	1	0	0	1	0	0	0	0	**8**
D	98,762	103,107	107,987	113,158	117,960	122,487	127,801	132,741	137,682	118,850	123,905	**1,304,440**
D1	278	732	697	636	472	773	905	1,054	1,568	429	62	**7,606**
D2	0	0	0	0	0	1	1	1	1	0	0	**4**
F	1,938	2,084	2,340	2,476	2,600	22,669	23,915	20,363	18,956	17,173	18,267	**132,781**
I	7,792	8,168	8,323	8,602	8,647	8,772	8,910	9,075	9,220	9,253	9,202	**95,964**
J	4,074	4,108	4,145	4,191	4,197	4,267	4,295	4,333	4,337	4,252	4,228	**46,427**
L	0	0	0	0	0	195	560	729	906	0	0	**2,390**
P	18	12	16	13	11	11	11	11	11	0	0	**114**
R	96,455	95,785	99,737	100,248	98,933	99,515	99,819	100,747	100,413	100,520	103,006	**1,095,178**
S	1,398	1,386	1,370	1,375	1,319	1,359	1,408	1,356	1,305	2,893	3,255	**18,424**
T	22,390	24,864	27,425	28,416	27,112	10,882	13,250	21,168	26,835	6,082	4,439	**212,863**
U	13,353	10,141	8,521	7,311	6,948	6,944	6,942	6,938	6,932	0	0	**74,030**
V	6,987	7,472	7,930	8,224	8,673	9,064	9,330	8,945	8,732	8,970	9,047	**93,374**
WI	3	7	2	0	1	1	1	1	0	4	39	**59**
WJ	1	2	2	0	4	4	4	4	4	0	0	**25**
WR	17	123	37	18	85	82	79	82	80	80	62	**745**
WS	1	11	1	1	0	0	0	0	0	0	0	**14**
Y	1,621	1,636	1,598	1,808	1,459	1,620	2,720	2,713	2,711	0	0	**17,886**
Z	118	0	0	0	0	0	0	0	0	0	0	**118**
Total												**6,362,041**

SECTION V
SUMMARY RESULTS BY SYSTEM: TRS

TRS

Findings

The results of the 10-year and 2-year experience studies are shown in Appendix VII. We have quantified the differences between actual experience and current actuarial assumptions. The table on the following page provides a summary of the reconciliation in comparison to the current assumptions.

The following business rules were applied to the TRS data. More detail is provided on the following pages.

Business Rules

Rule #	Rule Name
1	Death Reclassification
2	Accidental Disability Reclassification
3	Ordinary Disability Reclassification
4	Status Continuity
5	Termination Reclassification

Our understanding of the project is that recommendations for changes to assumptions are traditionally included only in the second engagement. GRS agrees that this is appropriate. Thus, we will wait until that time before making any formal recommendation for changes.

However, we do have a few observations:

1. The experience has overtaken most, if not all, of the margin in the post-retirement mortality assumption. The next change in this assumption will likely be a material strengthening. Decreasing post-retirement mortality will increase liabilities and contribution requirements.

2. The actual number of members qualifying for Accidental disability is outpacing the current assumption. An adjustment to better match experience would produce a small increase in the liabilities and contributions.

3. The observed number of withdrawals has outpaced the number expected by the current assumptions.

4. The observed number of retirements has been less than the number expected by the current assumptions.

TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK
PRELIMINARY EXPERIENCE STUDY RESULTS
OVERVIEW

Table Number	Table Type	2-YEAR PERIOD ENDING 6/30/2011		10-YEAR PERIOD ENDING 6/30/2011		GRS' Ideal A/E Range	Comments
		Ratio of Actual to Expected	Average Number of Decrements per Year	Ratio of Actual to Expected	Average Number of Decrements per Year		
	Service Retiree Mortality					110-120%	Consistent with national trends, the rates of mortality continue to decline. If trends continue, will recommend a material adjustment in the second engagement.
1A	Men	95%	529	102%	487		
1B	Women	107%	1086	114%	1039		
1C	By Year						
	Disabled Retiree Mortality					100-120%	Consistent with national trends, the rates of mortality continue to decline. If trends continue, will recommend a material adjustment in the second engagement.
2A	Men	100%	23	118%	26		
2B	Women	112%	67	118%	70		
2C	By Year						
3A	Active Member Withdrawals	99%	3419	124%	4122	100-115%	Actual withdrawals are considerably outpacing the expectations.
3B	By Year						
	Active Member Service Retirements In 1st Year of Eligibility Total					90-100%	Consistent with national trends, members continue to delay retirement past historical patterns. If trend continues, there could be room to weaken the assumption.
4A	Men	74%	141	128%	235		
4B	Women	61%	376	99%	509		
	Improved						
4C	Men	84%	53	53%	11		
4D	Women	80%	179	47%	37		
	Un-Improved						
4E	Men	69%	89	138%	224		
4F	Women	50%	198	108%	473		
4G	By Year						
	In 2nd Year of Eligibility Total					90-100%	
5A	Men	107%	105	175%	160		
5B	Women	109%	339	141%	350		
	Improved						
5C	Men	111%	31	72%	7		
5D	Women	95%	106	61%	22		
	Un-Improved						
5E	Men	105%	74	186%	154		
5F	Women	118%	234	155%	328		
5G	By Year						

TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK
PRELIMINARY EXPERIENCE STUDY RESULTS
OVERVIEW

Table Number	Table Type	2-YEAR PERIOD ENDING 6/30/2011		10-YEAR PERIOD ENDING 6/30/2011		GRS' Ideal A/E Range	Comments
		Ratio of Actual to Expected	Average Number of Decrements per Year*	Ratio of Actual to Expected	Average Number of Decrements per Year*		
	After 2nd Year of Eligibility					90-100%	
	Total						
6A	Men	66%	333	102%	478		
6B	Women	80%	1177	91%	1174		
	Improve						
6C	Men	103%	44	83%	9		
6D	Women	92%	144	71%	30		
	Unimproved						
6E	Men	63%	290	102%	469		
6F	Women	78%	1033	92%	1144		
6G	By Year						
	Reduced Service Retirements					90-100%	Extremely small experience along with an assumption that no member retires prior to age 55 for Tiers 1 & 2 produce an abnormal result. This assumption is very minor and the current assumption is likely appropriate for Tiers 3 & 4.
	Total						
7A	Men	219%	163	234%	139		
7B	Women	178%	515	176%	410		
7C	By Year						
	Active Member Ordinary Mortality					80-100%	Minor assumption.
8A	Men	137%	45	114%	36		
8B	Women	132%	74	150%	79		
8C	By Year						
	Active Member Ordinary Disability					80-100%	In total, the number of disabilities appears reasonable when compared to current assumptions. The allocation between ordinary and accidental disabilities does not appear to be consistent with expectations from the current assumptions and we believe it has to do with the introduction of the Tier IV status code. We will work with the OA to determine the appropriate classification for this new code.
9A	Men	20%	3	101%	24		
9B	Women	19%	13	91%	84		
9C	By Year						
	Active Member Accidental Disability					80-100%	
10A	Men	701%	39	249%	14		
10B	Women	729%	123	276%	44		
10C	By Year						
	Salary Increases*	**Expected**	**Actual**	**Expected**	**Actual**		While overall salary increases have been lower than historical data, the Merit portion of the assumption shows A/E ratios of 87% in the short-term and 112% in the long-term, which are both within range of the expectation.
11A	Total	6.61%	2.66%	6.67%	6.18%		
11B	Merit Only	2.61%	2.27%	2.67%	2.66%		
	General Increase over Inflation	1.50%	-1.90%	1.50%	1.53%		
11C	By Year						

* *For Salary Increases, average annual percentage increase in salary is shown. For Overtime Pay, average annual overtime pay is expressed as a percentage of salary.*

Note: There are no proposed changes provided in this first engagement report. Recommended assumptions changes (if any) will be included with the second engagement.

GRS APPROACH TO ASSIGNING STATUSES FOR TRS ACTIVE TABLES
FROM 6/30/2010 THROUGH 6/30/2013

GRS Status Code	Meaning	Associated Decrement	MSTATP*	MSTATC*
A	Active			10
B1	Beneficiary of Retiree	Beneficiary		
B2	Beneficiary of Ordinary Death	Beneficiary		
B3	Beneficiary of Accidental Death	Beneficiary		
B4	Beneficiary of Ordinary Disability	Beneficiary		
B5	Beneficiary of Accidental Disability	Beneficiary		
D	Deceased	Ordinary Mortality		
D1	Ordinary Death w/o Ben	Ordinary Mortality		60
D2	Accidental Death w/o Ben	Accidental Mortality		61
F	Active-Inactive	Withdrawal		20
I	Ordinary Disability	Ordinary Disability		70
J	Accidental Disability	Accidental Disability		71
L	Lump Sum	Withdrawal		
P	Duplicate			
R	Service Retirement Year 1	Retirement		90
R	Service Retirement Year 2	Retirement		91
R	Service Retirement Year Ultimate	Retirement		92
R	Reduced Service Retirement	Retirement		93
S	Retiree from Vested	Retirement		
T	Terminated Non-Vested	Withdrawal		80
U	5-Year Out	Withdrawal		
V	Deferred Vested	Withdrawal		81
WI	Missing Ordinary Disability	Ordinary Disability		
WJ	Missing Accidental Disability	Accidental Disability		
WR	Missing Services Retirement	Retirement		
WS	Missing Retirement from Vested	Retirement		
Z	Refunded	Withdrawal		

GRS APPROACH TO ASSIGNING STATUSES FOR TRS PENSIONER TABLES
FROM 6/30/2010 THROUGH 6/30/2013

GRS Status Code	Meaning	Associated Decrement	MSTATP*	MSTATC*	RetCause	PayeePen
A	Active					
B1	Beneficiary of Retiree	Beneficiary			0 or 3	not 0 or 1
B2	Beneficiary of Ordinary Death	Beneficiary			7	not 0 or 1
B3	Beneficiary of Accidental Death	Beneficiary			4	not 0 or 1
B4	Beneficiary of Ordinary Disability	Beneficiary			2	not 0 or 1
B5	Beneficiary of Accidental Disability	Beneficiary			1	not 0 or 1
D	Deceased	Mortality*		60		
D1	Ordinary Death w/o Ben	Mortality*				
D2	Accidental Death w/o Ben	Mortality*				
F	Active-Inactive	Withdrawal				
I	Ordinary Disability	Ordinary Disability			2	0 or 1
J	Accidental Disability	Accidental Disability			1	0 or 1
L	Lump Sum	Withdrawal				
P	Duplicate					
R	Service Retiree	Retirement			3	0 or 1
S	Retiree from Vested	Retirement			0	0 or 1
T	Terminated Non-Vested	Withdrawal		80		
U	5-Year Out	Withdrawal				
V	Deferred Vested	Withdrawal	70	10	0	
WI	Missing Ordinary Disability	Ordinary Disability	70	10	2	0 or 1
WJ	Missing Accidental Disability	Accidental Disability	70	10	1	0 or 1

The mortality decrements are determined by the member's status in the previous year. For example, a disability retiree's mortality decrement would be Disabled Mortality.

Business Rule 1: Death Reclassification

Description:	Example:		2006	2007	2008	2009
For a member who shows as a death in a given data file and shows a date of death in an earlier period, the death status was filled backwards until the fiscal year associated with the death date.	A member is identified as a death status in the 6/30/2009 data file with a Date of Death of 7/2/2006. The member's FYE 2007 status and all future statuses are updated to reflect the new Date of Death.	**Initial**	R	R	R	R
				↓	↓	↓
		Matured	R	D	D	D

Business Rule 2: Accidental Disability Reclassification

Description:	Example:		2002	2003	2004	2005
For members reclassifying to Accidental Disability (status code 'J') within one year after retirement, GRS changed the record as though the member immediately retired under Accidental Disability.	An active member retires 8/22/2002 and is reclassified to Accidental Disability as of 6/30/2005. The statuses for FYE 2003 and 2004 are changed to Accidental Disability.	**Initial**	A	R	R	J
				↓	↓	
		Matured	A	J	J	J

Business Rule 3: Ordinary Disability Reclassification

Description:	Example:		2001	2002	2003	2004
For members retiring under Ordinary Disability (status code 'I'), either after service retirement or after termination, GRS changed the record as though the member immediately retired under Ordinary Disability.	An active member retires 4/23/2002 and is reclassified to ordinary disability in FYE 2004. The statuses for FYE 2002 and 2003 are changed to Ordinary Disability.	**Initial**	A	R	R	I
				⬇	⬇	
		Matured	A	I	I	I

Business Rule 4: Status Continuity

Description:	Example:		2004	2005	2006	2007
In any three year period, if the first and last year's status matched, the middle year was also changed to be consistent. This rule was applied to statuses A, I, J, and R.	A record shows ordinary disability FYE 2004 and FYE 2006 but beneficiary in FYE 2005. The FYE 2005 status is changed to ordinary disability.	**Initial**	I	B3	I	I
				⬇		
		Matured	I	I	I	I

Business Rule 5: Termination Reclassification

Description:	Example:		2004	2005	2006	2007
If an active record shifted to inactive, then returned to active any number of years later, the record is changed as though the member were active over all years. Applied to status codes F, T, V, and Y.	A record shows the termination of an active member as of 6/30/2005. By 6/30/2007, the member is active again. The FYE 2005 and 2006 statuses are changed to active.	**Initial**	A	F	F	A
				⬇	⬇	
		Matured	A	A	A	A

Status Changes due to Maturation

Status	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
No Status	-1,635	-2,166	-2,437	-2,661	-2,943	-3,048	-3,133	-3,247	-3,360	-23,587	-25,031	**-73,248**
A	-2,028	-1,257	-1,539	-2,785	-2,276	-2,949	-1,344	238	-585	-3,183	-5,314	**-23,022**
B1	-2,487	-2,619	-2,690	-2,788	-2,886	-2,851	-2,914	-2,965	-3,188	-2,917	-2,930	**-31,235**
B2	0											**0**
B3										-53	-451	**-504**
B4	-253	-273	-279	-283	-297	-306	-307	-311	-317	-240	-234	**-3,100**
B5	-10	-9	-9	-10	-10	-10	-10	-9	-12	-9	-33	**-131**
D	5,144	5,440	5,815	6,104	6,335	6,467	6,651	7,209	7,842	27,599	28,838	**113,444**
D1	-1	-1	-1	-1	0	0	2	5	5	-79	0	**-71**
D2												**0**
F	-692	-862	-629	-718	-952	-4,687	-4,162	-4,555	-3,200	-3,901	0	**-24,358**
I	-22	23	17	24	66	37	78	98	143	89	-2	**551**
J	-2	6	5	7	14	6	4	7	38	41	0	**126**
L								-293	-497			**-790**
P	-22	-16	-25	-28	-48	-7	-7	-7	-7			**-167**
R	-186	-21	-147	-148	-32	-54	-54	-117	88	97	-41	**-615**
S	-1	0	-2	-1	-1	5	6	8	17	8	-1	**38**
T	2,458	1,819	1,938	3,318	3,105	7,429	5,113	3,830	2,746	5,951	5,199	**42,906**
U	-245	-57	-16	-9	-10	-2	-2	-2	-2			**-345**
V	-7	13	2	-5	-36	-13	96	128	306	196	0	**680**
WI	0	0	-2	-7	-19	-13	-13	-13	-13	-8	0	**-88**
WJ										-4	0	**-4**
WR	1	-19	-2	-9	-9	-3	-3	-3	-3	0	0	**-50**
WS												**0**
Y	0	-1	1	0	-1	-1	-1	-1	-1			**-5**
Z	-12										0	**-12**
Total												**0**

Status Counts after Maturation

Status	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
					Fiscal Year Ended June 30,							
No Status	104,455	104,471	95,063	81,893	73,434	62,137	52,934	41,981	34,575	61,948	57,286	770,177
A	93,854	94,679	97,746	104,008	104,970	108,416	109,290	112,629	112,471	108,347	104,316	1,150,726
B1	131	129	124	121	124	144	191	241	88	62	60	1,415
B2	28	0	0	0	0	0	0	0	0	0	0	28
B3	0	0	0	0	0	0	0	0	0	0	5	5
B4	22	18	16	16	17	18	20	24	14	17	14	196
B5	2	2	2	2	2	2	3	2	1	1	1	20
D	19,922	21,424	23,178	25,012	26,671	28,556	31,010	32,686	34,672	28,710	30,370	302,211
D1	3	8	13	21	62	179	311	441	576	29	107	1,750
D2	0	0	0	0	0	0	0	0	0	0	0	0
F	3	3	3	0	3	389	1,199	2,152	5,379	6,902	10,938	26,971
I	1,790	1,840	1,841	1,899	2,019	2,038	2,083	2,123	2,122	2,152	2,131	22,038
J	438	453	465	487	526	543	585	601	630	656	663	6,047
L	0	0	0	0	0	0	0	382	830	0	0	1,212
P	266	303	558	369	366	3	3	3	3	0	0	1,874
R	44,913	47,021	50,225	54,451	56,692	58,570	59,310	60,484	61,571	62,648	63,810	619,695
S	1,729	1,964	2,133	2,355	2,500	2,526	2,565	2,524	2,503	3,095	3,282	27,176
T	11,428	10,479	11,498	12,332	15,251	18,742	22,637	25,234	25,973	6,946	7,917	168,437
U	5,093	838	347	277	220	148	148	146	146	0	0	7,363
V	5,042	5,424	5,655	6,035	6,438	6,914	7,045	7,687	7,787	8,433	9,001	75,461
WI	1	7	3	3	3	2	2	1	1	0	20	43
WJ	0	0	0	0	0	0	0	0	0	0	7	7
WR	18	313	366	143	176	175	173	170	169	24	41	1,768
WS	0	0	0	0	0	0	0	0	0	0	0	0
Y	562	594	734	546	496	468	461	459	459	0	0	4,779
Z	270	0	0	0	0	0	0	0	0	0	1	271
Total												3,189,670

SECTION V
SUMMARY RESULTS BY SYSTEM: BERS

BERS

Findings

The results of the 10-year and 2-year experience studies are shown in Appendix VIII. We have quantified the differences between actual experience and current actuarial assumptions. The table on the following page provides a summary of the reconciliation in comparison to the current assumptions.

The following business rules were applied to the BERS data. More detail is provided on the following pages.

Business Rules

Rule #	Rule Name
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2	Accidental Disability Reclassification
3	Ordinary Disability Reclassification
4	Status Continuity
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1. The experience has overtaken most, if not all, of the margin in the post-retirement mortality assumption. The next change in this assumption will likely be a material strengthening. Decreasing post-retirement mortality will increase liabilities and contribution requirements.

2. The actual number of members qualifying for accidental disability is outpacing the current assumption. An adjustment to better match experience would produce a small increase in the liabilities and contributions.

5. The observed number of withdrawals has outpaced the number expected by the current assumptions.

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM
PRELIMINARY EXPERIENCE STUDY RESULTS
OVERVIEW

Table Number	Table Type	2-YEAR PERIOD ENDING 6/30/2011		10-YEAR PERIOD ENDING 6/30/2011		GRS' Ideal A/E Range	Comments
		Ratio of Actual to Expected	Average Number of Decrements per Year	Ratio of Actual to Expected	Average Number of Decrements per Year		
	Service Retiree Mortality					110-120%	Consistent with national trends, the rates of mortality continue to decline. If trends continue, we will recommend a material adjustment in the second engagement.
1A	Men	73%	62	104%	78		
1B	Women	90%	254	104%	235		
1C	By Year						
	Disabled Retiree Mortality					100-120%	Very small dataset.
2A	Men	128%	9	131%	7		
2B	Women	131%	17	115%	11		
2C	By Year						
	Active Member Withdrawals					100-105%	Actual withdrawals are considerably outpacing the expectations.
3A	Men	134%	175	153%	218		
3B	Women	149%	468	158%	570		
3C	By Year						
	Active Member Service Retirements					90-100%	Consistent with national trends, members continue to delay retirement past historical patterns. If trend continues, there could be room to weaken the assumption.
	In 1st Year of Eligibility						
4A	Total	32%	86	72%	194		
4B	Improved	48%	3	109%	8		
4C	Un-Improved	74%	83	76%	186		
	In 2nd Year of Eligibility						
5A	Total	74%	0	76%	77		
5B	Improved	112%	7	83%	3		
5C	Un-Improved	73%	108	76%	74		
	After 2nd Year of Eligibility						
6A	Total	42%	392	44%	331		
6B	Improved	109%	14	103%	8		
6C	Un-Improved	41%	378	43%	323		
6D	By Year						
	Reduced Service Retirements						
7A	Total	294%	191	232%	214		
7B	By Year						

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM
PRELIMINARY EXPERIENCE STUDY RESULTS
OVERVIEW

Table Number	Table Type	2-YEAR PERIOD ENDING 6/30/2011		10-YEAR PERIOD ENDING 6/30/2011		GRS' Ideal A/E Range	Comments
		Ratio of Actual to Expected	Average Number of Decrements per Year*	Ratio of Actual to Expected	Average Number of Decrements per Year*		
	Active Member Ordinary Mortality					80-100%	
8A	Men	57%	7	116%	13		
8B	Women	39%	12	106%	30		
8C	By Year						
	Active Member Ordinary Disability					80-100%	Recent trends show fewer disabilities than historical experience.
9A	Men	51%	11	83%	16		
9B	Women	64%	46	72%	46		
9C	By Year						
	Active Member Accidental Disability					80-100%	Recent and long-term trends show more accidental disabilities than expected based on the current assumptions.
10A	Men	0%	0	70%	1		
10B	Women	218%	8	182%	6		
10C	By Year						
	Salary Increases*	**Expected**	**Actual**	**Expected**	**Actual**		Overall salary increases have been lower than historical data.
11A	Total	5.06%	0.27%	5.24%	4.08%		
11B	Merit Only	1.06%	0.03%	1.24%	0.91%		
	General Increase over Inflation	1.50%	-2.05%	1.50%	0.76%		
11C	By Year						

* For Salary Increases, average annual percentage increase in salary is shown. For Overtime Pay, average annual overtime pay is expressed as a percentage of salary.

Note: There are no proposed changes provided in this first engagement report. Recommended assumptions changes (if any) will be included with the second engagement.

GRS Gabriel Roeder Smith & Company
Consultants & Actuaries

GRS APPROACH TO ASSIGNING STATUSES FOR BERS ACTIVE TABLES FROM 6/30/2010 THROUGH 6/30/2013

GRS Status Code	Meaning	Associated Decrement	MSTATP*	MSTATC*
A	Active			10
B1	Beneficiary of Retiree	Beneficiary		
B2	Beneficiary of Ordinary Death	Beneficiary		
B3	Beneficiary of Accidental Death	Beneficiary		
B4	Beneficiary of Ordinary Disability	Beneficiary		
B5	Beneficiary of Accidental Disability	Beneficiary		
D	Deceased	Ordinary Mortality		
D1	Ordinary Death w/o Ben	Ordinary Mortality		60
D2	Accidental Death w/o Ben	Accidental Mortality		
F	Active-Inactive	Withdrawal		20
I	Ordinary Disability	Ordinary Disability		70
J	Accidental Disability	Accidental Disability		71
L	Lump Sum	Withdrawal		
P	Duplicate			
R	Service Retirement Year 1	Retirement		90
R	Service Retirement Year 2	Retirement		91
R	Service Retirement Year Ultimate	Retirement		92
R	Reduced Service Retirement	Retirement		93
S	Retiree from Vested	Retirement		
T	Terminated Non-Vested	Withdrawal		80
U	5-Year Out	Withdrawal		
V	Deferred Vested	Withdrawal		81
WI	Missing Ordinary Disability	Ordinary Disability		
WJ	Missing Accidental Disability	Accidental Disability		
WR	Missing Services Retirement	Retirement		
WS	Missing Retirement from Vested	Retirement		
Z	Refunded	Withdrawal		

GRS APPROACH TO ASSIGNING STATUSES FOR BERS PENSIONER TABLES FROM 6/30/2010 THROUGH 6/30/2013

GRS Status Code	Meaning	Associated Decrement	MSTATP*	MSTATC*	RetCause	PayeePen
A	Active					
B1	Beneficiary of Retiree	Beneficiary			0 or 3	not 0 or 1
B2	Beneficiary of Ordinary Death	Beneficiary				
B3	Beneficiary of Accidental Death	Beneficiary			4	not 0 or 1
B4	Beneficiary of Ordinary Disability	Beneficiary			2	not 0 or 1
B5	Beneficiary of Accidental Disability	Beneficiary			1	not 0 or 1
D	Deceased	Mortality*		60		
D1	Ordinary Death w/o Ben	Mortality*				
D2	Accidental Death w/o Ben	Mortality*				
F	Active-Inactive	Withdrawal				
I	Ordinary Disability	Ordinary Disability			2 or 6	0 or 1
J	Accidental Disability	Accidental Disability			1	0 or 1
L	Lump Sum	Withdrawal				
P	Duplicate					
R	Service Retiree	Retirement			3	0 or 1
S	Retiree from Vested	Retirement			0	0 or 1
T	Terminated Non-Vested	Withdrawal		80		
U	5-Year Out	Withdrawal				
V	Deferred Vested	Withdrawal	70	10	0	
WI	Missing Ordinary Disability	Ordinary Disability	70	10	2	0 or 1
WJ	Missing Accidental Disability	Accidental Disability	70	10	1	0 or 1

The mortality decrements are determined by the member's status in the previous year. For example, a disability retiree's mortality decrement would be Disabled Mortality.

Business Rule 1: Death Reclassification

Description:	Example:		2006	2007	2008	2009
For a member who shows as a death in a given data file and shows a date of death in an earlier period, the death status was filled backwards until the fiscal year associated with the death date.	A member is identified as a death status in the 6/30/2009 data file with a Date of Death of 7/2/2006. The member's 6/30/2007 status and all future statuses are updated to reflect the new Date of Death.	**Initial**	R	R	R	R
				⬇	⬇	⬇
		Matured	R	D	D	D

Business Rule 2: Accidental Disability Reclassification

Description:	Example:		2002	2003	2004	2005
For members reclassifying to Accidental Disability (status code 'J') within one year after retirement, GRS changed the record as though the member immediately retired under Accidental Disability.	An active member retires 8/22/2002 and is reclassified to Accidental Disability as of 6/30/2005. The statuses for FYE 2003 and 2004 are changed to Accidental Disability.	**Initial**	A	R	R	J
				⬇	⬇	
		Matured	A	J	J	J

Business Rule 3: Ordinary Disability Reclassification

Description:	Example:		2001	2002	2003	2004
For members retiring under Ordinary Disability (status code 'I'), either after service retirement or after termination, GRS changed the record as though the member immediately retired under Ordinary Disability.	An active member retires 4/23/2002 and is reclassified to Ordinary Disability in FYE 2004. The statuses for FYE 2002 and 2003 are changed to Ordinary Disability.	**Initial**	A	R	R	I
				⬇	⬇	
		Matured	A	I	I	I

Business Rule 4: Status Continuity

Description:	Example:		2004	2005	2006	2007
In any three-year period, if the first and last year's status matched, the middle year was also changed to be consistent. This rule was applied to statuses A, I, J, and R.	A record shows Ordinary Disability FYE 2004 and FYE 2006 but beneficiary in FYE 2005. The FYE 2005 status is changed to Ordinary Disability.	**Initial**	I	B3	I	I
				⬇		
		Matured	I	I	I	I

Business Rule 5: Termination Reclassification

Description:	Example:		2004	2005	2006	2007
If an active record shifted to inactive, then returned to active any number of years later, the record is changed as though the member were active over all years. Applied to status codes F, T, V, and Y.	A record shows the termination of an active member as of 6/30/2005. By 6/30/2007, the member is active again. The FYE 2005 and 2006 statuses are changed to active.	**Initial**	A	F	F	A
				⬇	⬇	
		Matured	A	A	A	A

Status Changes due to Maturation

Status	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
No Status	0	-2	-2	-2	-2	-2	-2	-2	-1	-1	0	**-16**
A	-1,261	-1,310	-953	-772	-840	-1,205	-1,089	-953	-742	-5	-5	**-9,135**
B1	0	0	0	0	0	0	0	0	0	0	0	**0**
B2	0	0	0	0	0	0	0	0	0	0	0	**0**
B3	0	0	0	0	0	0	0	0	0	0	0	**0**
B4	0	0	0	0	0	0	0	0	-2	0	0	**-2**
B5	0	0	0	0	0	0	0	0	0	0	0	**0**
D	0	0	0	0	0	0	0	0	0	0	0	**0**
D1	0	0	0	-1	0	0	0	0	0	0	0	**-1**
D2	0	0	0	0	0	0	0	0	0	0	0	**0**
F	0	0	0	0	0	-1	-10	-16	-38	-14	0	**-79**
I	0	-4	-6	-7	2	-10	-56	-72	-86	0	0	**-239**
J	0	8	14	18	20	21	81	110	158	16	0	**446**
L	0	0	0	0	0	0	-2	-2	-1	0	0	**-5**
P	0	0	-1	0	0	0	0	0	0	0	0	**-1**
R	0	-1	-2	-2	-2	-2	-8	-17	-28	0	0	**-62**
S	0	0	0	0	0	0	0	0	0	0	0	**0**
T	1,261	1,309	951	768	837	1,204	1,088	953	741	5	5	**9,122**
U	0	0	0	0	0	0	0	0	0	0	0	**0**
V	0	0	0	-1	-3	-4	-1	0	0	0	0	**-9**
WI	0	0	0	-1	-7	-1	-1	-1	-1	0	0	**-12**
WJ	0	0	0	0	0	0	0	0	0	-1	0	**-1**
WR	0	0	0	0	-5	0	0	0	0	0	0	**-5**
WS	0	0	0	0	0	0	0	0	0	0	0	**0**
Y	0	0	-1	0	0	0	0	0	0	0	0	**-1**
Z	0	0	0	0	0	0	0	0	0	0	0	**0**
Total												**0**

Status Counts after Maturation

Status	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
No Status	21,793	19,124	17,199	22,918	22,359	20,108	18,465	16,387	14,766	32,630	33,766	239,515
A	23,463	23,951	21,541	20,647	22,258	22,174	21,345	22,253	22,557	21,869	20,327	242,385
B1	485	505	517	533	550	584	606	599	623	545	556	6,103
B2	112	3	0	1	0	0	0	0	0	0	0	116
B3	4	4	4	3	3	3	3	3	3	52	33	115
B4	36	40	45	55	65	70	71	73	77	75	76	683
B5	6	6	6	6	7	7	9	11	9	13	6	86
D	2,271	2,448	2,815	3,165	3,530	3,761	4,061	4,346	4,627	256	401	31,681
D1	58	134	138	120	61	123	179	210	218	10	52	1,303
D2	0	0	0	0	0	0	0	0	0	0	0	0
F	63	67	83	86	62	2,643	3,122	3,235	3,627	3,636	3,371	19,995
I	282	331	430	476	518	536	527	517	503	480	461	5,061
J	99	109	134	147	150	150	226	250	292	337	381	2,275
L	0	0	0	0	0	157	406	522	704	0	0	1,789
P	6	5	4	2	0	0	0	0	0	0	0	17
R	8,846	9,137	10,010	10,259	10,526	10,959	11,333	11,593	11,786	11,959	12,334	118,742
S	196	226	271	273	276	273	279	276	271	384	410	3,135
T	5,096	5,867	7,821	7,429	6,565	5,565	6,523	6,926	7,197	942	1,010	60,941
U	389	389	365	264	300	299	298	297	297	0	0	2,898
V	277	271	293	313	322	369	326	285	229	199	201	3,085
WI	0	0	0	0	1	0	0	0	0	0	0	1
WJ	0	0	0	0	0	0	1	0	0	0	1	2
WR	11	23	22	152	235	11	16	16	15	4	5	510
WS	0	0	0	0	0	0	0	0	0	0	0	0
Y	9,898	10,751	11,693	6,542	5,603	5,599	5,595	5,592	5,590	0	0	66,863
Z	0	0	0	0	0	0	0	0	0	0	0	0
Total												807,301

SECTION V
SUMMARY RESULTS BY SYSTEM: POLICE

POLICE

Findings

The results of the 10-year and 2-year experience studies are shown in Appendix IX. We have quantified the differences between actual experience and current actuarial assumptions. The table on the following page provides a summary of the reconciliation in comparison to the current assumptions.

The following business rules were applied to the POLICE data. More detail is provided on the following pages.

Business Rules

Rule #	Rule Name
1	Death Reclassification
2	Accidental Disability Reclassification
3	Ordinary Disability Reclassification
4	Status Continuity

Our understanding of the project is that recommendations for changes to assumptions are traditionally included only in the second engagement. GRS agrees that this is appropriate. Thus, we will wait until that time before making any formal recommendation for changes.

However, we do have a few observations:

1. The experience surrounding September 11, 2001 decreases the usability of many of the earlier years in the period. The mortality rates and disability rates surrounding that occurrence, as well as the impact on overtime and overall salary increases are likely not reflective of longer term norms. As such, in the second phase of this analysis, we will likely not focus on data from the first part of the observation period for developing recommended assumptions. For example, it may be more reasonable to use the 8-year period of Fiscal Year 2006 through Fiscal Year 2013 instead of the 12-year period Fiscal Year 2002 through Fiscal Year 2013.

2. Overall, the actual experience for salary increases for individual members has been higher than expected based on the current assumptions. This is true for the general wage increase portion, the merit increase portion, and the dual service overtime assumption.

   The current salary scale assumption utilizes a building block approach of general price inflation (2.50%) plus an increase for general wage increases (0.50%) plus an increase for merit, promotion, etc. that is based on the service of the member. The long-term members are assumed to receive 0.50% merit increases, making the long-service, across the board expectation 3.50%. In this type of analysis, when there is a merit assumption for the long-term members, it is difficult to separate where the general wage increase ends and the where the merit begins for those members. For example, if the actual inflation was exactly 2.50% and the actual increase for the long-term members was

3.50%, how would one differentiate how much of the additional 1.00% was a general increase and how much was merit? Thus, for the merit analysis, we have included all of 3.50% long-term assumption in the general wage increase bucket (assuming the general wage increase will be 1.00% above inflation) and assumed that increases above this level are merit.

Using this approach, the following table gives the average actual increase and the average expected increase by category:

	10-Year Period Ending FY2011		2-Year Period Ending FY2011	
	Expected	**Actual**	**Expected**	**Actual**
Inflation	2.50%	2.40%	2.50%	2.30%
General Increase above Inflation	1.00%	1.91%	1.00%	2.65%
Average Additional Merit	3.86%	4.22%	4.70%	8.98%
Baseline Overtime	14.89%	15.89%	14.81%	14.91%
Dual Service Overtime	17.56%	22.61%	17.38%	19.65%
Expected "Spike"	2.67%	6.72%	2.57%	4.74%

As shown, for the 10-year period, the observed general wage increase was 1.91% above inflation compared to the expected 1.00%. For the 2-year period, the difference was even more pronounced. In addition, the merit portion outpaced the current assumption.
For the overtime assumptions, the most important influence of this assumption is the difference between the amount of overtime during the entire career of the member and the amount during the final averaging period. This difference is commonly referred to as "spiking". As shown, during the 2-year period, the expected increase was 2.57% while the actual was closer to 4.74%.

However, future economic expectations should not solely be based on historical information as economic activity, compensation policies, maturing of demographic patterns, increasing costs of benefits, and numerous other factors can change the pattern throughout time.   With that in mind, we will likely not recommend the future assumptions be increased all the way up to perfectly "fit" the observed data. That said, it is likely that we will be recommending increases in several of the salary related assumptions, and if adopted by the OA, those recommendations would increase the liabilities and contribution requirements.

3. For the other demographic assumptions, the POLICE experience is not a large group and thus the credibility of the experience can have large year-to-year volatility over short periods of time. For example, active withdrawal shows very low experience over the past 2 years, but very high experience when all 10 years are used.

4. Most of the current assumptions appear to be in the reasonable range, with some refinements improving the model.

5. Most notably, it appears the current expected rates of accidental disability are too strong with fewer actuals than expected over post periods.

NEW YORK POLICE PENSION FUND
PRELIMINARY EXPERIENCE STUDY RESULTS
OVERVIEW

Table Number	Table Type	2-YEAR PERIOD ENDING 6/30/2011		10-YEAR PERIOD ENDING 6/30/2011		GRS' Ideal A/E Range	Comments
		Ratio of Actual to Expected	Average Number of Decrements per Year	Ratio of Actual to Expected	Average Number of Decrements per Year		
	Service Retiree Mortality					110-120%	Current assumption does provide margin for future improvement in longevity.
1A	Men	112%	522	119%	489		
1B	By Year						
	Disabled Retiree Mortality					100-120%	Consistent with national trends, the rates of mortality continue to decline. If trends continue, we will recommend a material adjustment in the second engagement.
2A	Men	99%	295	108%	273		
2B	By Year						
3A	Active Member Withdrawals	66%	242	165%	650	100-105%	
3B	By Year						
	Active Member Service Retirements					90-100%	
4A	In 1st Year of Eligibility	107%	849	205%	1169		
4B	In 2nd Year of Eligibility	25%	70	101%	68		
4C	After 2nd Year of Eligibility	78%	272	85%	184		
4D	By Year						
	Active Member Ordinary Mortality					80-100%	
5A	Men	52%	10	109%	19		
5B	By Year						

NEW YORK POLICE PENSION FUND
PRELIMINARY EXPERIENCE STUDY RESULTS
OVERVIEW

Table Number	Table Type	2-YEAR PERIOD ENDING 6/30/2011		10-YEAR PERIOD ENDING 6/30/2011		Ideal A/E Range	Comments
		Ratio of Actual to Expected	Average Number of Decrements per Year*	Ratio of Actual to Expected	Average Number of Decrements per Year*		
6A	Active Member Accidental Mortality	26%	3	38%	4	80-100%	
6B	By Year						
7A	Active Member Ordinary Disability	106%	58	121%	66	80-100%	
7B	By Year						
	Active Member Accidental Disability					80-100%	The current assumptions may be too conservative for members not WTC eligible.
8A	WTC Eligible	49%	219	44%	209		
8B	WTC Ineligible	52%	77	126%	159		
8C	By Year						
	Salary Increases*	Expected	Actual	Expected	Actual		
9A	Total	8.20%	13.93%	7.36%	9.00%		
9B	Merit Only	4.70%	8.98%	3.86%	4.22%		
	General Increase over Inflation	1.00%	2.65%	1.00%	1.91%		
9C	By Year						
	Overtime Pay*	Expected	Actual	Expected	Actual		
10A	For All Years	14.81%	14.91%	14.89%	15.80%		
10B	In Year Before Service Retirement	17.38%	19.65%	17.56%	22.61%		
10C	In Year Before Disability Retirement	9.57%	10.23%	9.39%	11.51%		
10D	By Year						

* *For Salary Increases, average annual percentage increase in salary is shown. For Overtime Pay, average annual overtime pay is expressed as a percentage of salary.*

Note: There are no proposed changes provided in this Preliminary Report. Recommended assumption changes (if any) will be included with the second engagement.

GRS APPROACH TO ASSIGNING STATUSES FOR POLICE ACTIVE TABLES
FROM 6/30/2010 THROUGH 6/30/2013

GRS Status Code	Meaning	Associated Decrement	MSTATP*	MSTATC*
A	Active			10
B1	Beneficiary of Retiree	Beneficiary		
B2	Beneficiary of Ordinary Death	Beneficiary		
B3	Beneficiary of Accidental Death	Beneficiary		
B4	Beneficiary of Ordinary Disability	Beneficiary		
B5	Beneficiary of Accidental Disability	Beneficiary		
D	Deceased	Ordinary Mortality		
D1	Ordinary Death w/o Ben	Ordinary Mortality		60
D2	Accidental Death w/o Ben	Accidental Mortality		61
F	Active-Inactive	Withdrawal		20
I	Ordinary Disability	Ordinary Disability		70
J	Accidental Disability	Accidental Disability		71
L	Lump Sum	Withdrawal		
P	Duplicate			
R	Service Retiree	Retirement		≥90
S	Retiree from Vested	Retirement		
T	Terminated Non-Vested	Withdrawal		80
U	5-Year Out	Withdrawal		
V	Deferred Vested	Withdrawal		81
WI	Missing Ordinary Disability	Ordinary Disability		
WJ	Missing Accidental Disability	Accidental Disability		
WR	Missing Services Retirement	Retirement		
WS	Missing Retirement from Vested	Retirement		
Z	Refunded	Withdrawal		

GRS APPROACH TO ASSIGNING STATUSES FOR POLICE PENSIONER TABLES
FROM 6/30/2010 THROUGH 6/30/2013

GRS Status Code	Meaning	Associated Decrement	MSTATP*	MSTATC*	RetCause	PayeePen
A	Active					
B1	Beneficiary of Retiree	Beneficiary			0 or 3	not 0 or 1
B2	Beneficiary of Ordinary Death	Beneficiary			7	not 0 or 1
B3	Beneficiary of Accidental Death	Beneficiary			4	not 0 or 1
B4	Beneficiary of Ordinary Disability	Beneficiary			2	not 0 or 1
B5	Beneficiary of Accidental Disability	Beneficiary			1	not 0 or 1
D	Deceased	Mortality*		60		
D1	Ordinary Death w/o Ben	Mortality*				
D2	Accidental Death w/o Ben	Mortality*				
F	Active-Inactive	Withdrawal				
I	Ordinary Disability	Ordinary Disability			2	0 or 1
J	Accidental Disability	Accidental Disability			1	0 or 1
L	Lump Sum	Withdrawal				
P	Duplicate					
R	Service Retiree	Retirement			3	0 or 1
S	Retiree from Vested	Retirement			0	0 or 1
T	Terminated Non-Vested	Withdrawal		80		
U	5-Year Out	Withdrawal				
V	Deferred Vested	Withdrawal	70	10	0	
WI	Missing Ordinary Disability	Ordinary Disability				
WJ	Missing Accidental Disability	Accidental Disability				
WR	Missing Services Retirement	Retirement				
WS	Missing Retirement from Vested	Retirement				
Z	Refunded	Withdrawal				

The mortality decrements are determined by the member's status in the previous year. For example, a disability retiree's mortality decrement would be Disabled Mortality.

Business Rule 1: Death Reclassification

Description:	Example:		2006	2007	2008	2009
For a member who shows as a death in a given data file and shows a date of death in an earlier period, the death status was filled backwards until the fiscal year associated with the death date.	A member is identified as a death status in the 6/30/2009 data file with a Date of Death of 7/2/2006. The member's 6/30/2007 status and all future statuses are updated to reflect the new Date of Death.	**Initial**	R	R	R	R
				⬇	⬇	⬇
		Matured	R	D	D	D

					Fiscal Year Ended June 30,							
Status	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**Total**
No Status												
A	-1					-1			-1			**-3**
B1	-198	-43	-35	-33	-26	-17	-33	-27	-33			**-445**
B3	-94	-17	-2		-1	-5						**-119**
B4	-107	-9	-6	-5	-3	-8	-8	-8	-3			**-157**
B5	-71	-10	-7	-8	-11	-10	-13	-7	-9	-61	-57	**-264**
D	481	93	69	76	43	57	64	55	60	82	57	**1,137**
D1		-7	-10	-17						-7		**-41**
D2		-1	-5	-4					-1			**-11**
I	-1					-6	-3	-2	-3	-6		**-21**
J	-2					-2	-2	-2		-1		**-9**
R	-4	-5	-4	-5	-1	-4	-3	-3	-10	-5		**-44**
S												
T	-3	-1		-4	-1	-4	-1	-5	-1	-2		**-22**
U									-1			**-1**
V												
WJ												
WR												
Z												
Total												

Business Rule 2: Accidental Disability Reclassification

Description:	Example:		2002	2003	2004	2005
For members reclassifying to Accidental Disability (status code 'J') within one year after retirement, GRS changed the record as though the member immediately retired under Accidental Disability.	An active member retires 8/22/2002 and is reclassified to Accidental Disability as of 6/30/2005. The statuses for FYE 2003 and 2004 are changed to Accidental Disability.	**Initial**	A	R	R	J
				↓	↓	
		Matured	A	J	J	J

	Fiscal Year Ended June 30,											
Status	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**Total**
No Status												
A												
B1												
B3												
B4												
B5												
D												
D1												
D2												
I		-1	-1	-1	-4	-7	-8	-9	-12	-2		**-45**
J	1	10	22	28	55	57	65	73	86	41		**438**
R		-8	-21	-26	-46	-43	-54	-63	-74	-39		**-374**
S												
T												
U												
V	-1	-1		-1	-3	-7	-3	-1				**-17**
WJ					-2							**-2**
WR												
Z												
Total												

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Business Rule 3: Ordinary Disability Reclassification

Description:	Example:		2001	2002	2003	2004
For members retiring under Ordinary Disability (status code 'I'), either after service retirement or after termination, GRS changed the record as though the member immediately retired under Ordinary Disability.	An active member retires 4/23/2002 and is reclassified to ordinary disability in FYE 2004. The statuses for FYE 2002 and 2003 are changed to Ordinary Disability.	**Initial**	A	R	R	I
				⬇	⬇	
		Matured	A	I	I	I

Status	Fiscal Year Ended June 30,											Total
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	
No Status												
A												
B1												
B3												
B4												
B5												
D												
D1												
D2												
I					2			1	1	3		**7**
J												
R									-1	-2		**-3**
S												
T												
U												
V					-2				-1	-1		**-4**
WJ												
WR												
Z												
Total												

Business Rule 4: Status Continuity

Description:	Example:		2004	2005	2006	2007
In any three year period, if the first and last year's status matched, the middle year was also changed to be consistent. This rule was applied to statuses A, I, J, and R.	A record shows ordinary disability in 6/30/2004 and 6/30/2006 but beneficiary in 6/30/2005. The 6/30/2005 status is changed to ordinary disability.	**Initial**	I	B3	I	I
				⬇		
		Matured	I	I	I	I

Status	Fiscal Year Ended June 30,											Total
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	
No Status												
A						1	1					**2**
B1												
B3												
B4												
B5												
D												
D1												
D2												
I												
J												
R												
S												
T												
U												
V						-1	-1					**-2**
WJ												
WR												
Z												
Total												

Status Changes due to Maturation

Status	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
No Status												
A	-1						1		-1			**-1**
B1	-198	-43	-35	-33	-26	-17	-33	-27	-33			**-445**
B2												
B3	-94	-17	-2		-1	-5						**-119**
B4	-107	-9	-6	-5	-3	-8	-8	-8	-3			**-157**
B5	-71	-10	-7	-8	-11	-10	-13	-7	-9	-61	-57	**-264**
D	481	93	69	76	43	57	64	55	60	82	57	**1,137**
D1		-7	-10	-17						-7		**-41**
D2		-1	-5	-4				-1				**-11**
F												
I	-1	-1	-1	-1	-2	-13	-11	-10	-14	-5		**-59**
J	-1	10	22	28	55	55	63	71	86	40		**429**
L												
R	-4	-13	-25	-31	-47	-47	-57	-66	-85	-46		**-421**
S												
T	-3	-1		-4	-1	-4	-1	-5	-1	-2		**-22**
U							-1					**-1**
V	-1	-1		-1	-5	-8	-4	-2		-1		**-23**
WI												
WJ					-2							**-2**
WR												
WS												
Y												
Z												
Total												

Status Counts after Maturation

Status	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
					Fiscal Year Ended June 30,							
No Status	6,026	5,234	4,585	3,830	3,273	2,665	2,215	1,628	1,314	1,577	1,588	33,935
A	9,295	9,673	9,750	10,396	10,776	11,099	11,194	11,444	11,482	11,090	10,650	116,849
B1	1,572	1,461	1,348	1,263	1,140	1,017	907	793	700	580	502	11,283
B2	5		1									6
B3	232	374	385	373	362	356	348	347	342	396	389	3,904
B4	18	19	19	20	22	22	23	25	27	31	31	257
B5	37	40	43	44	52	51	59	67	67	83	84	627
D	5,587	5,761	5,963	6,173	6,338	6,732	7,124	7,499	7,882	8,222	80,789	148,070
D1		1	2	5	9	16	17	22	29	33	41	175
D2	2	20	21	24	28	31	31	31	31	31	31	281
F	13	11	5	5				1	8	13	16	72
I	978	959	922	886	854	823	791	753	709	680	641	8,996
J	3,642	3,846	4,194	4,288	4,513	4,697	4,847	4,957	5,045	5,284	5,453	50,766
L									3			3
R	76,263	76,104	76,097	76,204	76,244	76,151	76,066	75,977	75,866	75,780	3,580	764,332
S	17	17	17	17	17	16	15	13	13	17	20	179
T	68	62	78	95	117	63	95	173	210	13	16	990
U	86	84	90	90	95	95	95	95	95			825
V	14	13	15	13	19	20	31	33	35	33	30	256
WI								1	1	1		3
WJ		23	29	44	2	2	3	3	3			109
WR		156	289	91		7	1	1	1			546
WS												
Y	1	5	10	2	2							20
Z	7										2	9
Total												1,142,493

Development of WTC Reclassification Assumption

Members can retire or become disabled immediately from active service with WTC benefits. In addition, it is possible for members to reclassify from Active Mortality, Service Retirement, Ordinary Disability, and accidental disability to WTC benefits if certain requirements are satisfied. This can be done on a prospective or retrospective basis. Based on the historical data provided, there was not enough information in the data to know whether a member was an original WTC classification, a retroactive reclassification, or a prospective reclassification. By creating the tables shown on the following page, GRS developed a simplifying assumption for the reclassification by assuming members immediately were classified under WTC benefits if they were reclassified within the first year of retirement.

The reclassification process was not fully implemented prior to 6/30/2007, so the most appropriate period to study is beginning with FY 2007. GRS used the **WTC Eligibility** field (looked at members who filed for WTC, "WT," and approved WTC Disabilities, "TC") to identify reclassification and eligibility for WTC Accidental Disability. To determine the actual counts, GRS studied the number of retirement years before reclassification, given a reclassification occurred. Exposures are measured as any member in retirement, ordinary disability, or duty disability for a particular year. To illustrate, a member retires FY 2007 and reclassifies to WTC Accidental Disability in FY 2009. This member generates an exposure in the 2007 row in the first three columns. He then is an actual reclassification in the third column for members retired as of 6/30/2007. The final table is developed as the ratio of actuals to exposed.

Actual number of WTC Reclassifications after n Years of Retirement by Retirement Year						
Retired FYE June 30,	0*	1	2	3	4	Totals
2007	47	6	10	17	12	92
2008	22	3		2		27
2009	41					41
2010	14	1				15
2011	23					23
Totals	147	10	10	19	12	198

Exposures to WTC Reclassification after n Years of Retirement by Retirement Year						
Retired FYE June 30,	0*	1	2	3	4	Totals
2007	3,824	3,189	3,142	3,131	3,040	16,326
2008	918	855	780	779		3,332
2009	624	595	551			1,770
2010	906	850				1,756
2011	1,474					1,474
Totals	7,746	5,489	4,473	3,910	3,040	24,658

Probability of WTC Reclassification after n Years of Retirement by Retirement Year					
Retired FYE June 30,	0*	1	2	3	4
2007	1%	0%	0%	1%	0%
2008	2%	0%		0%	
2009	7%				
2010	2%	0%			
2011	2%				

*   *0 years of retirement should be interpreted as immediate classification as WTC Accidental Disability upon retirement.*

SECTION V
SUMMARY RESULTS BY SYSTEM: FIRE

FIRE

Findings

The results of the 10-year and 2-year experience studies are shown in Appendix X. We have quantified the differences between actual experience and current actuarial assumptions. The table on the following page provides a summary of the reconciliation in comparison to the current assumptions.

The following business rules were applied to the FIRE data. More detail is provided on the following pages.

Business Rules

Rule #	Rule Name
1	Death Reclassification
2	Accidental Disability Reclassification
3	Ordinary Disability Reclassification
4	Status Continuity

Our understanding of the project is that recommendations for changes to assumptions are traditionally included only in the second engagement. GRS agrees that this is appropriate. Thus, we will wait until that time before making any formal recommendation for changes.

However, we do have a few observations:

1. The experience surrounding September 11, 2001 decreases the usability of many of the earlier years in the period. The mortality rates and disability rates surrounding that occurrence, as well as the impact on overtime and overall salary increases are likely not reflective of longer term norms. As such, in the second phase of this analysis, we will likely not focus on data from the first part of the observation period for developing recommended assumptions. For example, it may be more reasonable to use the 8-year period of Fiscal Year 2006 through Fiscal Year 2013 instead of the 12-year period Fiscal Year 2002 through Fiscal Year 2013.

2. Overall, the actual experience for salary increases for individual members has been higher than expected based on the current assumptions. This is true for the general wage increase portion, the merit increase portion, and the dual service overtime assumption.

3. For the other demographic assumptions, the FIRE experience is not a large group and thus the credibility of the experience can have large year-to-year volatility over short periods of time. For example, active withdrawal shows very low experience over the past 2 years, but very high experience when all 10 years are used.

NEW YORK FIRE PENSION FUND
PRELIMINARY EXPERIENCE STUDY RESULTS
OVERVIEW

Table Number	Table Type	2-YEAR PERIOD ENDING 6/30/2011		10-YEAR PERIOD ENDING 6/30/2011		GRS' Ideal A/E Range	Comments
		Ratio of Actual to Expected	Average Number of Decrements per Year	Ratio of Actual to Expected	Average Number of Decrements per Year		
	Service Retiree Mortality					110-120%	Current assumption does provide margin for future improvement in longevity.
1A	Men	116%	196	119%	197		
1B	By Year						
	Disabled Retiree Mortality					100-120%	Current assumption does provide margin for future improvement in longevity.
2A	Men	112%	224	117%	204		
2B	By Year						
3A	Active Member Withdrawals	93%	23	58%	18	100-105%	
3B	By Year						
	Active Member Service Retirements					90-100%	
4A	In 1st Year of Eligibility	55%	25	104%	52		
4B	In 2nd Year of Eligibility	92%	5	236%	14		
4C	After 2nd Year of Eligibility	64%	56	114%	86		
4D	By Year						
	Active Member Ordinary Mortality					80-100%	
5A	Men	133%	12	57%	5		
5B	By Year						
6A	Active Member Accidental Mortality	118%	7	732%	38	80-100%	
6B	By Year						

NEW YORK FIRE PENSION FUND
PRELIMINARY EXPERIENCE STUDY RESULTS
OVERVIEW

Table Number	Table Type	2-YEAR PERIOD ENDING 6/30/2011		10-YEAR PERIOD ENDING 6/30/2011		GRS' Ideal A/E Range	Comments
		Ratio of Actual to Expected	Average Number of Decrements per Year	Ratio of Actual to Expected	Average Number of Decrements per Year		
7A	Active Member Ordinary Disability	0%	0	27%	7	80-100%	
7B	By Year						
	Active Member Accidental Disability					80-100%	
8A	WTC Eligible	118%	296	158%	394		
8B	WTC Ineligible	56%	9	213%	18		
8C	By Year						
	Salary Increases*	Expected	Actual	Expected	Actual		
9A	Total	7.06%	6.38%	7.41%	7.25%		
9B	Merit Only	3.56%	5.43%	3.91%	3.67%		
	General Increase over Inflation	1.00%	-1.36%	1.00%	1.17%		
9C	By Year						
	Overtime Pay*	Expected	Actual	Expected	Actual		Actual overtime appears to be higher than current assumption.
10A	For All Years	14.78%	13.74%	14.97%	16.51%		
10B	In Year Before Service Retirement	16.61%	17.94%	18.40%	26.81%		
10C	In Year Before Disability Retirement	14.90%	16.51%	15.51%	21.87%		
10D	By Year						

* For Salary Increases, average annual percentage increase in salary is shown. For Overtime Pay, average annual overtime pay is expressed as a percentage of salary.

Note: There are no proposed changes provided in this Preliminary Report. Recommended assumptions changes (if any) will be included with the second engagement.

GRS APPROACH TO ASSIGNING STATUSES FOR FIRE ACTIVE TABLES
FROM 6/30/2010 THROUGH 6/30/2013

GRS Status Code	Meaning	Associated Decrement	MSTATP*	MSTATC*
A	Active			10
B1	Beneficiary of Retiree	Beneficiary		
B2	Beneficiary of Ordinary Death	Beneficiary		
B3	Beneficiary of Accidental Death	Beneficiary		
B4	Beneficiary of Ordinary Disability	Beneficiary		
B5	Beneficiary of Accidental Disability	Beneficiary		
D	Deceased	Ordinary Mortality		
D1	Ordinary Death w/o Ben	Ordinary Mortality		60
D2	Accidental Death w/o Ben	Accidental Mortality		61
F	Active-Inactive	Withdrawal		20
I	Ordinary Disability	Ordinary Disability		70
J	Accidental Disability	Accidental Disability		71
L	Lump Sum	Withdrawal		
P	Duplicate			
R	Service Retiree	Retirement		≥90
S	Retiree from Vested	Retirement		
T	Terminated Non-Vested	Withdrawal		80
U	5-Year Out	Withdrawal		
V	Deferred Vested	Withdrawal		81
WI	Missing Ordinary Disability	Ordinary Disability		
WJ	Missing Accidental Disability	Accidental Disability		
WR	Missing Services Retirement	Retirement		
WS	Missing Retirement from Vested	Retirement		
Z	Refunded	Withdrawal		

GRS APPROACH TO ASSIGNING STATUSES FOR FIRE PENSIONER TABLES
FROM 6/30/2010 THROUGH 6/30/2013

GRS Status Code	Meaning	Associated Decrement	MSTATP*	MSTATC*	RetCause	PayeePen
A	Active					
B1	Beneficiary of Retiree	Beneficiary			0 or 3	not 0 or 1
B2	Beneficiary of Ordinary Death	Beneficiary				
B3	Beneficiary of Accidental Death	Beneficiary			4 or 6	not 0 or 1
B4	Beneficiary of Ordinary Disability	Beneficiary			2	not 0 or 1
B5	Beneficiary of Accidental Disability	Beneficiary			1 or 5	not 0 or 1
D	Deceased	Mortality*		60		
D1	Ordinary Death w/o Ben	Mortality*				
D2	Accidental Death w/o Ben	Mortality*				
F	Active-Inactive	Withdrawal				
I	Ordinary Disability	Ordinary Disability			2	0 or 1
J	Accidental Disability	Accidental Disability			1	0 or 1
L	Lump Sum	Withdrawal				
P	Duplicate					
R	Service Retiree	Retirement			3	0 or 1
S	Retiree from Vested	Retirement			0	0 or 1
T	Terminated Non-Vested	Withdrawal				
U	5-Year Out	Withdrawal				
V	Deferred Vested	Withdrawal	70	10	0	
WI	Missing Ordinary Disability	Ordinary Disability				
WJ	Missing Accidental Disability	Accidental Disability	70	10	1	0 or 1
WR	Missing Services Retirement	Retirement				
WS	Missing Retirement from Vested	Retirement				
Z	Refunded	Withdrawal		80		

* *The mortality decrements are determined by the member's status in the previous year. For example, a disability retiree's mortality decrement would be Disabled Mortality.*

Business Rule 1: Death Reclassification

Description:	Example:		2006	2007	2008	2009
For a member who shows as a death in a given data file and shows a date of death in an earlier period, the death status was filled backwards until the fiscal year associated with the death date.	A member is identified as a death status in the 6/30/2009 data file with a Date of Death of 7/2/2006. The member's 6/30/2007 status and all future statuses are updated to reflect the new Date of Death.	**Initial**	R	R	R	R
				⬇	⬇	⬇
		Matured	R	D	D	D

				Fiscal Year Ended June 30,								
Status	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
No Status	-4			-108								**-112**
A	-1	-2	-1		-2		-1	-4	-9	-4		**-24**
B1				-1								**-1**
B3			-1	-1				-6	-1			**-9**
B4												
B5	-1											**-1**
D	77	22	76	124	78	2	4	18	10	4		**415**
D1			-1	-2	-2							**-5**
D2												
I	-2		-1	-1	-1		-1	-1				**-7**
J	-3	-2	-4	-2	-7	-1		-4				**-23**
R	-8	-5	-3	-3	-11	-1	-2	-3				**-36**
S												
T			-54	-2	-2							**-58**
U	-14	-1	-1	-1								**-17**
V												
WJ		-8										**-8**
WR												
Z	-44	-4	-10	-3	-53							**-114**
Total												

Business Rule 2: Accidental Disability Reclassification

Description:	Example:		2002	2003	2004	2005
For members reclassifying to Accidental Disability (status code 'J'), either after service retirement or after termination, GRS changed the record as though the member immediately retired under Accidental Disability.	An active member retires 8/22/2002 and is reclassified to Accidental Disability as of 6/30/2005. The statuses for FYE 2003 and 2004 are changed to Accidental Disability.	**Initial**	A	R	R	J
				↓	↓	
		Matured	A	J	J	J

					Fiscal Year Ended June 30,							
Status	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**Total**
No Status		-73	-49	-28	-12	-142						**-304**
A												
B1												
B3		-5	-6	-5	-1,022							**-1,038**
B4												
B5												
D												
D1												
D2												
I				-17	-15	-1	-1					**-34**
J		290	554	542	1,449	218	64	31	59	11		**3,218**
R		-186	-472	-486	-394	-75	-62	-30	-58	-11		**-1,774**
S												
T			-6	-4								**-10**
U												
V					-2		-1		-1			**-4**
WJ		-24	-12		-2			-1				**-39**
WR		-1	-7									**-8**
Z		-1	-2	-2	-2							**-7**
Total												

Business Rule 3: Ordinary Disability Reclassification

Description:	Example:		2001	2002	2003	2004
For members retiring under Ordinary Disability (status code 'I'), either after service retirement or after termination, GRS changed the record as though the member immediately retired under Ordinary Disability.	An active member retires 4/23/2002 and is reclassified to ordinary disability in FYE 2004. The statuses for FYE 2002 and 2003 are changed to Ordinary Disability.	**Initial**	A	R	R	I
				⬇	⬇	
		Matured	A	I	I	I

Status	Fiscal Year Ended June 30,											Total
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	
No Status		-3	-1			-20						**-24**
A												
B1												
B3					-19							**-19**
B4												
B5												
D												
D1												
D2												
I		20	29		19	20						**88**
J		-2	-2									**-4**
R		-15	-26									**-41**
S												
T												
U												
V												
WJ												
WR												
Z												
Total												

Business Rule 4: Status Continuity

Description:	Example:		2004	2005	2006	2007
In any three year period, if the first and last year's status matched, the middle year was also changed to be consistent. This rule was applied to statuses A, I, J, and R.	A record shows ordinary disability in 6/30/2004 and 6/30/2006 but beneficiary in 6/30/2005. The 6/30/2005 status is changed to ordinary disability.	**Initial**	I	B3	I	I
				⬇		
		Matured	I	I	I	I

	Fiscal Year Ended June 30,											Total
Status	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**Total**
No Status					-292							**-292**
A												
B1												
B3					-14							**-14**
B4												
B5												
D												
D1												
D2												
I					14	16						**30**
J												
R					276							**276**
S												
T												
U												
V												
WJ												
WR												
Z												
Total												

Status Changes due to Maturation

Status	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
					Fiscal Year Ended June 30,							
No Status	-4	-76	-50	-136	-12	-454						**-732**
A	-1	-2	-1		-2		-1	-4	-9	-4		**-24**
B1				-1								**-1**
B2												
B3		-5	-7	-6	-1,055			-6	-1			**-1,080**
B4												
B5	-1											**-1**
D	77	22	76	124	78	2	4	18	10	4		**415**
D1			-1	-2	-2							**-5**
D2												
F												
I	-2	20	28	-18	17	35	-2	-1				**77**
J	-3	286	548	540	1,442	217	64	27	59	11		**3,191**
L												
R	-8	-206	-501	-489	-405	200	-64	-33	-58	-11		**-1,575**
S												
T			-60	-6	-2							**-68**
U	-14	-1	-1	-1								**-17**
V					-2		-1		-1			**-4**
WI												
WJ		-32	-12		-2			-1				**-47**
WR		-1	-7									**-8**
WS												
Y												
Z	-44	-5	-12	-5	-55							**-121**
Total												

Status Counts after Maturation

Status	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
No Status	6,050	5,245	4,591	3,834	3,278	2,668	2,218	1,631	1,317	1,582	1,593	34,007
A	11,355	11,312	10,906	11,334	11,505	11,640	11,530	11,597	11,482	11,090	10,650	124,401
B1	1,595	1,485	1,373	1,288	1,168	1,047	937	824	731	611	531	11,590
B2	5		1									6
B3	327	607	633	621	607	599	592	591	584	640	630	6,431
B4	34	34	34	35	37	37	38	42	45	48	49	433
B5	68	70	78	85	91	93	103	112	111	125	127	1,063
D	6,478	6,769	7,095	7,421	7,699	8,226	8,748	9,257	9,771	10,263	10,803	92,530
D1		1	2	5	9	16	17	22	29	33	41	175
D2	2	20	21	24	28	31	31	31	33	31	31	283
F	13	11	5	5				3	8	13	16	74
I	1,628	1,590	1,547	1,487	1,441	1,387	1,338	1,286	1,217	1,165	1,110	15,196
J	6,047	6,387	6,948	7,126	7,515	7,806	8,068	8,294	8,469	8,644	8,739	84,043
L									3			3
R	6,386	6,179	6,211	6,457	6,551	6,428	6,321	6,174	6,025	5,876	5,797	68,405
S	33	33	33	34	34	33	31	28	28	31	33	351
T	68	62	78	95	117	63	95	173	210	13	16	990
U	86	84	90	90	95	95	95	95	95			825
V	15	15	16	13	19	20	31	33	35	33	30	260
WI								1	1	1		3
WJ		39	44	93	2	2	3	3	3			189
WR		250	481	149			7	1	1	1		890
WS			1									1
Y	1	5	10	2	2							20
Z	7										2	9
Total												442,178

Development of WTC Reclassification Assumption

The FIRE System reclassifies members from service retirement, ordinary disability, and accidental disability to WTC Accidental Disability if certain requirements are satisfied. Based on the historical data, GRS determined it was not feasible to develop a credible reclassification assumption. Therefore, GRS developed a simplifying assumption for the reclassification by assuming members immediately retired under WTC Accidental Disability if they were reclassified within the first year of retirement.

The most appropriate period to study the data is years 6/30/2007 through 6/30/2011 because the reclassification process was not fully implemented prior to 6/30/2007. GRS used the **Retirement Cause** (a change in Retirement Cause from any value to 5 indicates a reclassification) and **WTC Eligibility** (only looked at members who were WTC Eligible) fields to identify reclassification and eligibility for WTC Accidental Disability. To determine the actual counts, GRS studied the number of retirement years before reclassification, given a reclassification occurred. Exposures are measured as any member in retirement, ordinary disability, or duty disability for a particular year. To illustrate, a member retires Fiscal Year Ending ("FYE") 2007 and reclassifies to WTC Accidental Disability in FYE 2009. This member generates an exposure in the 2007 row in the first three columns. He then is an actual reclassification in the third column for members retired as of 6/30/2007. The final table is developed as the ratio of actuals to exposed.

Actual number of WTC Reclassifications after n Years of Retirement by Retirement Year						
Retired FYE June 30,	0*	1	2	3	4	Totals
2007	31	24	6	19	30	110
2008	115	17	8	12		152
2009	118	25	11			154
2010	128	17				145
2011	133					133
Totals	525	83	25	31	30	694

Exposures to WTC Reclassification after n Years of Retirement by Retirement Year						
Retired FYE June 30,	0*	1	2	3	4	Totals
2007	753	722	698	689	670	3,532
2008	423	308	292	286	275	1,584
2009	369	251	226	215		1,061
2010	354	226	208			788
2011	404	271				675
Totals	2,303	1,778	1,424	1,190	945	7,640

Probability of WTC Reclassification after n Years of Retirement by Retirement Year					
Retired FYE June 30,	0*	1	2	3	4
2007	4%	3%	1%	3%	4%
2008	27%	6%	3%	4%	
2009	32%	10%	5%		
2010	36%	8%			
2011	33%				

*   *0 years of retirement should be interpreted as immediate classification as WTC Accidental Disability upon retirement.*