



# CITY OF ATLANTA

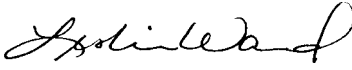
**LESLIE WARD**  
City Auditor  
[lward1@atlantaga.gov](mailto:lward1@atlantaga.gov)

**AMANDA NOBLE**  
Deputy City Auditor  
[anoble@atlantaga.gov](mailto:anoble@atlantaga.gov)

**CITY AUDITOR'S OFFICE**  
68 MITCHELL STREET SW, SUITE 12100  
ATLANTA, GEORGIA 30303-0312  
(404) 330-6452  
FAX: (404) 658-6077

**AUDIT COMMITTEE**  
Fred Williams, CPA, Chair  
Donald T. Penovi, CPA, Vice Chair  
Marion Cameron, CPA  
C.O. Hollis, Jr., CPA, CIA  
**Ex-Officio:** Mayor Kasim Reed

**TO:** Honorable Mayor and Members of the City Council

**FROM:** Leslie Ward, City Auditor 

**DATE:** September 4, 2012

**SUBJECT:** Review of Department of Watershed Management's Strategic Financial Planning Model

We conducted this audit of the department's strategic financial planning model because Atlanta had the highest water-sewer rates in the country for a major metropolitan area as of FY 2011. The 2009 performance review of watershed management conducted by KPMG questioned some of the assumptions used in the model and suggested additional review of the model by stakeholders outside of the department. Fiscal year 2012 was the last year of the city's four-year water-sewer rate plan, approved in 2008. The MOST (Municipal Option Sales Tax), passed by voters in 2004, extended in 2008 and 2012, and representing about one-fifth of the department's revenue, also expires in September 2016. Voters can extend the tax one more time through 2020. After voters approved the MOST, the Mayor announced his intention to maintain current water-sewer rates until 2016, and the City Council enacted the Mayor's rate plan in July 2012.

We sought to address the following questions:

- Are the data and formulas used in the model accurate?
- Are the assumptions in the model reasonable?

We analyzed the most recent model provided to us by the department, which was developed during the FY 2011 budget process. The current scenario, reflecting the FY 2012 budget and terms of the proposed agreement to modify the consent decree now before the U.S. District Court, could differ from the one we tested. Based on discussions with watershed management, we believe such differences could affect the magnitude of our results but

would not change the direction. Our observations are consistent with those of a consulting firm's review of the model in 2010.

We conclude the department will likely generate sufficient revenue to maintain current water-sewer rates for the next four years as planned, and possibly longer. Model inputs are accurate and formulas calculate correctly. Some assumptions are inconsistent with historical data. Our sensitivity analysis shows that changing certain assumptions for consistency with historical data results in higher than needed debt service coverage and a larger fund balance. While the current model projects annual rate increases of between 2% and 4% after 2016, smaller rate increases may be justified.

## Background

Operation of the city's water and wastewater system is subject to federal and state environmental laws and regulations. The city is currently operating under a court-ordered consent decree to eliminate water quality violations from SSOs (sanitary sewer overflows), resulting from a 1998 lawsuit brought against the city by the (EPA) United States Environmental Protection Agency, the (EPD) Georgia Environmental Protection Division, the Upper Chattahoochee Riverkeeper and a citizen for violations of the Clean Water Act and the Georgia Water Quality Control Act. The SSO program includes developing and implementing maintenance, operations, and management programs, completing specific capital improvement projects for the sewer system, instituting an aggressive grease management program, and evaluating and rehabilitating existing sewers. All operational and capital improvements, upgrades, and repairs required by this consent decree must be completed by July 2014.

City, state and federal parties recently agreed to a 13-year extension on the consent decree sewer system upgrades, subject to U.S. District Court approval. The City Council approved Ordinance 12-O-0697, which allows the mayor to enter into agreements with the EPA and EPD to modify the First Amended Consent Decree, including extending the deadline to July 2027. After a public comment period, the U.S. District Court will determine whether to grant the extension. In 2010, the city formally requested a 15-year extension to 2029 to complete the remaining consent decree work in two phases. In the major project phase, the city proposed to complete the four major projects identified in the consent decree. In the second phase, the city proposed to transition the remaining rehabilitation and relief projects into a comprehensive utility asset management program. The total budgeted amount of the remaining work is approximately \$445 million.

Rates increased 81% over the past four years. In 2008, watershed management requested increases in water and sewer rates in order to compensate for reduced water use from drought restrictions and to cover operating expenses and debt service to finance the capital program. The City Council approved Ordinance 08-O-0744, which provided for a four-year schedule with annual increases as shown in Exhibit 1.

### Exhibit 1 Approved Water and Sewer Rate Increases for Fiscal Years 2008 through 2012

Fiscal Year	Rate Increase
2009	27.5%
2010	12.5%
2011	12.5%
2012	12%

**Source:** Ordinance No. 08-O-0744

The rates include a base rate for service and a tiered rate structure for varying levels of use (see Exhibit 2). The base charge of \$13.12 – \$6.56 for water and \$6.56 for sewer – applies to all bills regardless of use. The department plans to maintain 2012 rates through June 30, 2016.

### Exhibit 2 Approved Water and Sewer Usage Rates FY 2012

Rates per 100 Cubic Feet (CCF)	Water	Sewer
Tier 1 (0-3 CCF)	\$2.58	\$9.74
Tier 2 (4-6 CCF)	\$5.34	\$13.64
Tier 3 (7 CCF and higher)	\$6.16	\$15.69

**Source:** Department of Watershed Management's Website

Sales tax revenue offset water and sewer rate increases. In October 2004, voters passed the 1% MOST on goods purchased within the city limits and reauthorized it in September 2008 and March 2012. Revenue from the tax supports the city's Watershed Rate Relief Program by reducing water and sewer rates on a dollar-for-dollar basis. The tax is scheduled to expire in September 2016 with an option for a final extension through September 2020.

Watershed Management uses its strategic financial planning model to assess funding needs, not to establish water sewer rates. According to watershed management staff, the purpose of the model is to ensure that the department has enough revenue to fund its existing capital needs and maintain sufficient debt coverage. The model has supported several watershed management financial initiatives, most recently the 2010 consent decree extension request and the 2012 MOST referendum. We obtained a draft of the model as of April 2011. Exhibit 3 shows a description of each spreadsheet in the model:

### Exhibit 3 Strategic Financial Planning Model Spreadsheets

Spreadsheet Name	Description
Assumptions	Major system financing assumptions
5051 – Op	DWM Operating Budget and multi-year forecast
5052 – R&E	DWM Renewal & Extension Budget and multi-year forecast
Revenues	Input of base service revenues (without rate increases) and projections of other operating and non-operating revenues
Rate Increase	Projections of revenues resulting from rate increases (net of price elasticity adjustments)
Existing Debt	Schedules of existing debt service requirements for revenue bonds and GEFA loan payments
New Debt	Projections of debt service requirements on new senior lien or subordinate debt issues
System Fund	Projected sources and uses of funds, on a cash basis, for the integrated DWM system (including Operating, R&E Funds, and intergovernmental fund transfers)
Financial Plan	Capital financing plan and required rate increase determination based on key financial performance metrics – including calculations of debt service coverage ratios and minimum fund balance targets

**Source:** 2010 Consent Decree Extension Request

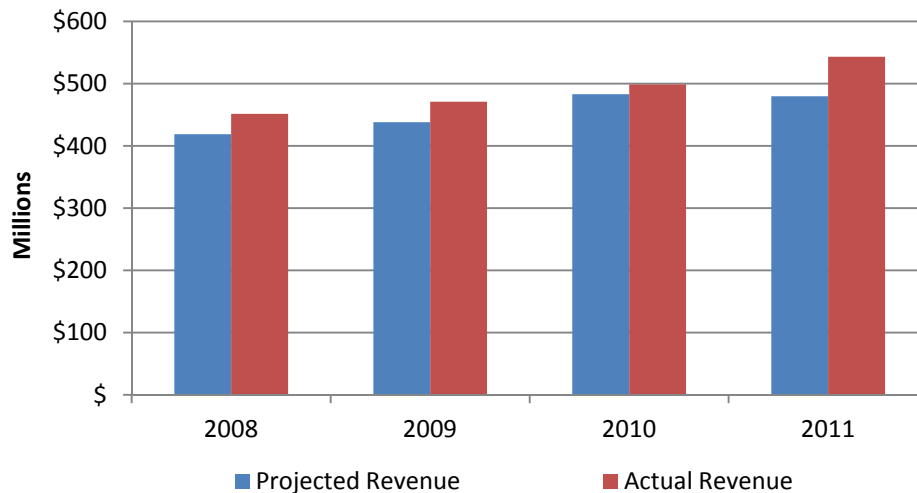
#### Data Inputs and Formulas Are Accurate

We tested the model inputs - revenue, operating expenses, and existing debt service requirements - against available financial data and concluded they were accurate; we excluded the department's capital funding needs from testing because the model uses an aggregate figure provided by watershed management staff. The inputs are:

- **Revenue** - We verified the budgeted revenue in the model to the amount recorded in Oracle. In fiscal year 2011, the model anticipated approximately \$498 million, which was within 1% of the anticipations in Oracle. The model included budgeted revenue rather than actual receipts because watershed management staff had yet to receive the trial balance. This timing issue affects model projections each fiscal year for both revenue and expenses.

Watershed Management anticipated 8% less water and sewer revenue than it received in fiscal year 2011. The MOST, the third largest revenue source, was accurately projected. The department has received more revenue than budgeted in each of the last four fiscal years (see Exhibit 4). Projected revenue has increased 15% since fiscal year 2008, while actual revenue has increased 20% over the same time period, largely due to annual rate increases.

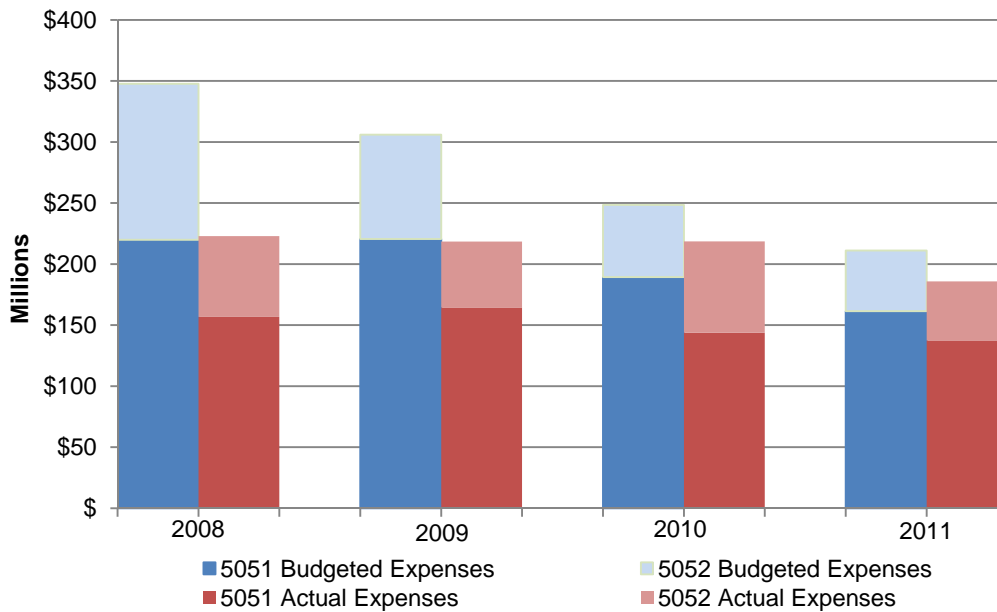
#### Exhibit 4 Projected and Actual Revenue, Fiscal Years 2008-2011



**Source:** Oracle financial data fiscal years 2008-2011

- **Expenses** - Watershed Management records expenses in two funds: 5051 (revenue fund) and 5052 (renewal and extension fund). Within fund 5051, we verified the amount of budgeted operating expenses in the model to the amount recorded in Oracle. In fiscal year 2011, the model included budgeted operating expenses of about \$161 million, which was the amount recorded in Oracle. Within fund 5052, we verified the amount of budgeted operating expenses in the model to the amount recorded in the city's budget tool. In fiscal year 2011, the model included budgeted operating expenses of about \$50 million, which was the amount recorded in the budget tool. Watershed Management spent less than its budget in each of the last four fiscal years (see Exhibit 5). According to staff:
  - Historically, watershed management staff budgeted the total amount for multi-year contracts in each year of the contract, even if the contract crossed fiscal years, in accordance with city budget processes. As of fiscal year 2011, Watershed budgets the amount to be spent on a contract in that year.
  - Watershed Management staff also budgeted the full cost of each position, even if staff only planned to fill that position for half of a year, in accordance with city budget processes.
  - Finally, finance staff did not always book audit entries in Oracle prior to fiscal year 2011, resulting in incorrect starting balances in prior years. The department runs its financial statements off a separate system, Caseware, because it tracks audit entries. Going forward, the city will make adjustments in the first closing period (ADJ1) and the auditors will make adjustments in the second closing period (ADJ2).

### Exhibit 5 Budgeted and Actual Expenses, Fiscal Years 2008-2011



**Source:** Oracle financial data and budget tool data fiscal years 2008-2011

- **Existing Debt Service** - we compared the amount of debt service recorded in the model to the 2010 debt workbook, the most recent available and confirmed that the figures were consistent. According to watershed staff, the city does not intend to issue any new debt to complete the remaining consent decree projects, although they acknowledged an interest in restructuring existing debt to lower interest expense. They plan to rely on pay-as-you-go financing, loans from GEFA (the Georgia Environmental Financing Authority), and remaining bond funds.

We also tested the accuracy of formulas in the model and concluded they were accurate.

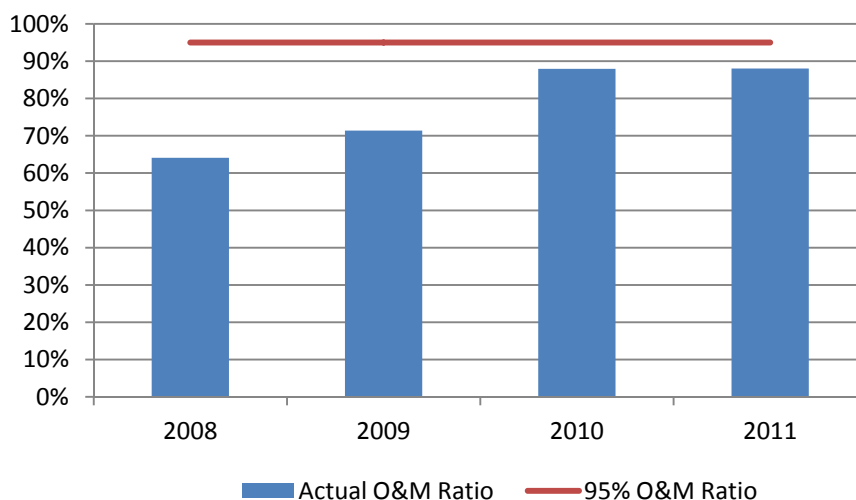
#### Model Sensitive to Changes in Assumptions

We reviewed the model assumptions that significantly affect the department's fund balance against historical data and industry standards. We conclude the department will likely generate sufficient revenue to maintain current water and sewer rates for the next four years as planned, and possibly longer. The model shows that changing certain assumptions for consistency with historical data results in higher than needed debt service coverage and a larger fund balance. While the current model projects annual rate increases of between 2% and 4% after 2016, smaller rate increases, or maintaining current rates longer, could be justified.

The assumptions are:

- **Water and Sewer Rate Percentage Increase** - the percentage annual increase in water and sewer rates over the previous year. The model assumes rate increases of 0% - through 2016, 2% per year through 2020, 3% per year through 2024, 4% per year through 2027, and 3% per year through 2031.
- **General cost escalation rate** - general inflation applied to operating budgets for 5051 and 5052. The model assumes a 3% rate. We verified the inflation rate against Federal Reserve data. We concluded this rate is consistent with industry standards. Keeping other assumptions constant, if costs increase more than inflation, watershed management will need larger rate increases to maintain its debt service coverage and fund its capital program.
- **Annual capital cost escalation rate** - the inflation rate applied to the annual capital budget. The model assumes a 3% rate. We compared the rate with the ten-year average of the annual percent change in construction costs in the Turner Construction Cost Index. We concluded the rate is consistent with the industry benchmark over the last ten years of 3%. Keeping other assumptions constant, if construction costs increase more than 3% per year, watershed management will need larger rate increases to maintain its debt service coverage and fund its capital program.
- **Operating & Maintenance (O&M) budget to actual ratio** - the sum of the operating budgets divided by the sum of the actuals. The model assumes an O&M ratio of 95%, which is a department target, according to watershed management staff. We recalculated the O&M ratio since 2008, using data from Oracle and the department's budget tool. While watershed management has come closer to achieving the assumed rate in recent years, the department has yet to reach it (see Exhibit 6). By spending less than 95% of the combined budget, watershed management increases its fund balance, accruing more funding for capital spending and debt service.

**Exhibit 6 Operating & Maintenance Budget to Actual Ratio Fiscal Years 2008-2011**



**Source:** Oracle financial data fiscal years 2008-2011 and budget tool data fiscal years 2009-2011

Keeping other assumptions constant, if watershed management continues to spend less than 95% of its combined budget, the department will have a higher fund balance and debt service coverage ratio. For example, lowering the assumed O&M ratio to 88% (the actual 2011 O&M ratio) in the model increases 2031 ending cash balance by \$363 million and minimum debt service coverage by about eight percentage points (see Exhibit 7). In order to meet city requirements, watershed management's net revenues should equal at least 120% (ratio of 1.20) of the average annual debt service on bonds issued to finance the consent decree work.

**Exhibit 7 Sensitivity Testing on Operating & Maintenance Budget to Actual Ratio**

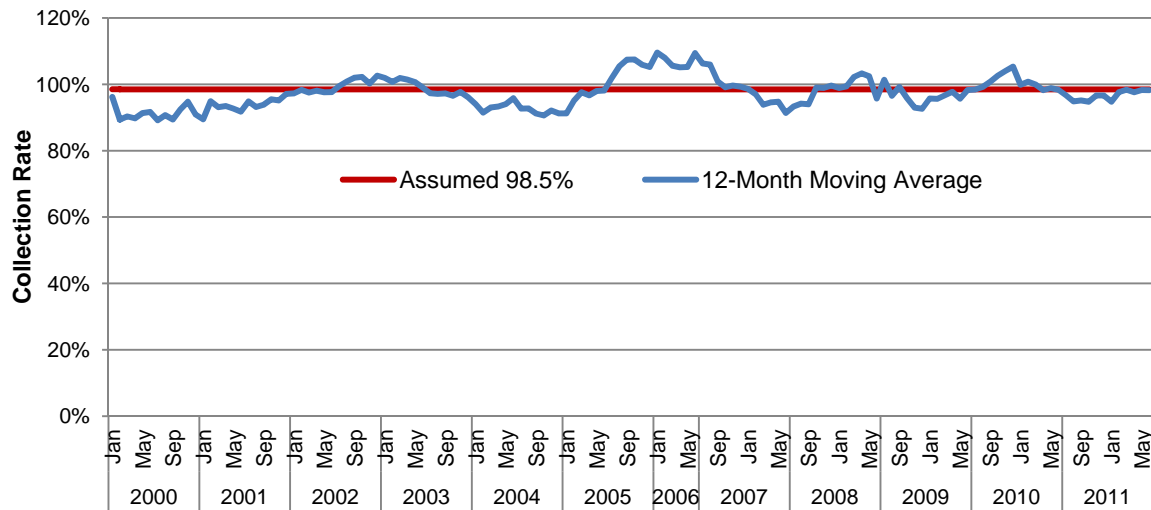
<b>O&amp;M Budget to Actual Ratio</b>	<b>95% (Model)</b>	<b>67%</b>	<b>88%</b>	<b>100%</b>
<b>Debt Service Coverage</b>				
Minimum	1.307	1.595	1.384	1.252
Maximum	2.004	2.436	2.112	1.926
Average	1.589	1.908	1.668	1.532
Ending Cash Balance 2031	164,312,109	1,614,523,397	528,864,931	(94,654,192)
Minimum Ending Cash Balance	51,944,317	295,467,199	251,130,664	(161,540,760)
Minimum > 60 days O&M?	TRUE	TRUE	TRUE	FALSE

**Source:** City Auditor Analysis of Changing Model Assumptions

- Bad Debt Expense as a Percent of Rate Revenue** - the allowance for uncollectable accounts. The model assumes that 1.5% of accounts will be uncollectable, which assumes a 98.5% collection rate. We verified the collection rate by recalculating a 12-month moving average of the collection rate over 11 years, measured as cash receipts divided by total adjusted billings (see Exhibit 8). Overall collection rate was 97.5% from the beginning of fiscal year 2007 through the end of fiscal year 2011. The one percentage point difference amounted to \$17.5 million over the five years, or \$3.4 million per year, which is equivalent to about 1% of average annual cash receipts. The collection rate calculation is sensitive to adjustments, which have become much more variable since 2005.



**Exhibit 8 Comparison of 12-Month Moving Average to 98.5% Target Collection Rate**



**Source:** Department of Watershed Management 6248 reports from enQuesta

Keeping other assumptions constant, more bad debt requires higher water and sewer rates to collect the same amount of revenue (see Exhibit 9). For example, increasing the assumed bad debt expense to 2% in the model reduces 2031 ending cash balance by \$55 million and decreases minimum debt service coverage by 1.2 percentage points.

**Exhibit 9 Sensitivity Testing on Bad Debt Expense**

<b>Bad Debt</b>	<b>1.5% (Model)</b>	<b>1%</b>	<b>2%</b>	<b>3%</b>
<b>Debt Service Coverage</b>				
Minimum	1.307	1.319	1.295	1.272
Maximum	2.004	2.022	1.986	1.950
Average	1.589	1.601	1.576	1.552
Ending Cash Balance 2031	164,312,109	219,358,243	109,265,976	(826,291)
Minimum Ending Cash Balance	51,944,317	96,488,574	7,400,060	(81,688,454)
Minimum > 60 days O&M?	TRUE	TRUE	TRUE	FALSE

**Source:** City Auditor Analysis of Changing Model Assumptions

- **Elasticity of Demand** - the change in demand associated with change in price within the model. The model assumes the elasticity of demand of -0.15, meaning for every 1% increase in rates, watershed management expects a corresponding 0.15% decrease in demand. We reviewed industry literature to assess the reasonableness of this assumption. According to literature by the American Water Works Association, “a review of elasticity studies indicates that the most likely price elasticity range for long-term overall residential demand is -0.10 to -0.30, with price elasticity for long-

term commercial and industrial demand ranging up to -0.80.” With larger increases in water and sewer rates, watershed management collects proportionately less revenue. Keeping other assumptions constant, increasing the magnitude of this elasticity results in a lower fund balance and lower debt service coverage (see Exhibit 10). For example, changing the assumed price elasticity from -0.15 to -0.2 in the model reduces 2031 ending cash balance by about \$94 million and minimum debt service coverage by 1.6 percentage points.

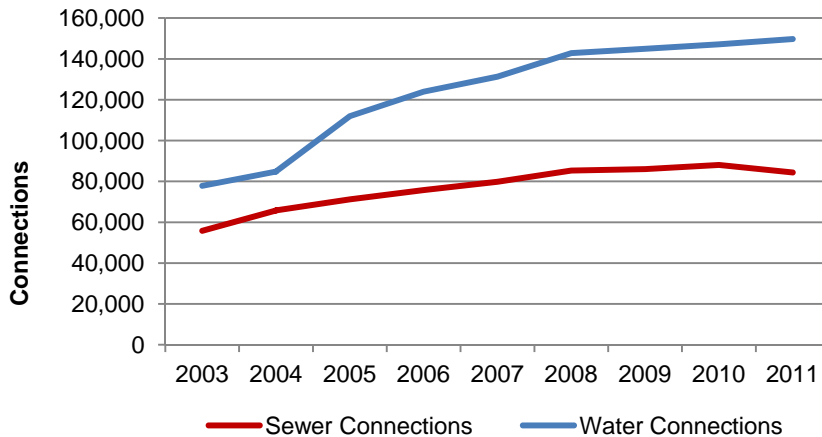
**Exhibit 10 Sensitivity Testing on Elasticity of Demand**

<b>Price Elasticity</b>	<b>-0.15 (Model)</b>	<b>-0.2</b>	<b>-0.3</b>
<b>Debt Service Coverage</b>			
Minimum	1.307	1.291	1.259
Maximum	2.004	1.927	1.779
Average	1.589	1.567	1.523
Ending Cash Balance 2031	164,312,109	70,482,868	(113,205,297)
Minimum Ending Cash Balance	51,944,317	(1,947,679)	(129,970,972)
Minimum > 60 days O&M?	TRUE	FALSE	FALSE

**Source:** City Auditor Analysis of Changing Model Assumptions

- System-wide Growth Rate** - the expectation of growth in the number of accounts from year-to-year. The model assumes an annual system-wide growth rate of 1.0%. We reviewed the growth in the number of connections – active water or wastewater accounts with service – for the last eight fiscal years identified in watershed management’s Comprehensive Annual Financial Report (see Exhibit 11). Water connections increased by 14% between 2007 and 2011 and sewer connections increased by 5.7% over the same period . Given the growth pattern since fiscal year 2007, watershed management’s conservative estimate of system-wide growth underestimates the amount of anticipated revenue.

**Exhibit 11 Water and Sewer Connections Fiscal Years 2003-2011**



**Source:** Department of Watershed Management 2011 Comprehensive Annual Financial Report

Keeping other assumptions constant, a higher system-wide growth rate results in a larger fund balance and greater debt service coverage (see Exhibit 12). For example, increasing the assumed system-wide growth rate to 1.5% in the model increases 2031 ending cash balance by about \$560 million and minimum debt service coverage by 3.0 percentage points.

**Exhibit 12 Sensitivity Testing on System-Wide Growth**

<b>System-Wide Growth</b>	<b>1.0% (Model)</b>	<b>1.5%</b>	<b>2.0%</b>
<b>Debt Service Coverage</b>			
Minimum	1.307	1.337	1.337
Maximum	2.004	2.363	2.756
Average	1.589	1.720	1.859
Ending Cash Balance 2031	164,312,109	724,461,311	1,321,151,832
Minimum Ending Cash Balance	51,944,317	236,351,819	236,351,819
Minimum > 60 days O&M?	TRUE	TRUE	TRUE

**Source:** City Auditor Analysis of Changing Model Assumptions

Applying assumptions that are more consistent with recent historical data results in the model projecting more revenue than needed to meet assumed debt service and operating costs; projected rate increases could be lower. The above sensitivity tests showed the effects of changing one assumption while holding all others constant. Some assumptions partially offset others. Exhibit 13 shows these assumption changes together in the model consistent with historical and industry data. Applying these changes to better reflect historical data simultaneously under the existing rate structure shows that watershed management likely could meet assumed revenue requirements with lower rate increases.

**Exhibit 13 Model Outcomes of Cumulative Changes in Assumption**

Model Assumption Changes	O&M = 95%	O&M = 88%
	Bad Debt = 1.5%	Bad Debt = 2.5%
	Elasticity = -0.15	Elasticity = -0.3
	System Growth = 1.0%	System Growth = 1.5%
Debt Service Coverage		
Minimum	1.307	1.385
Maximum	2.004	2.188
Average	1.589	1.705
Ending Cash Balance 2031	164,312,109	676,641,202
Minimum Ending Cash Balance	51,944,317	247,373,065
Minimum > 60 days O&M?	TRUE	TRUE

**Source:** City Auditor Analysis of Changing Model Assumptions

Uncertainties might affect long-term funding needs. Although we conclude that watershed management may be able to maintain current rates beyond 2016, factors outside the model create uncertainty. Bond refinancing would reduce the funds needed for debt service and therefore would reduce expenses. Drought conditions or water conservation efforts that typically lower water use would reduce collections and therefore require additional revenue. Most significantly, if residents vote against reauthorizing the MOST in 2016, watershed management revenue would drop by more than \$100 million per year, requiring alternative funding sources to complete consent decree projects and meet debt service requirements.

Generally accepted government auditing standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. The Audit Committee has reviewed this report and is releasing it in accordance with Article 2, Chapter 6 of the City Charter. We appreciate the courtesy and cooperation of city staff throughout the audit. The team for this project was Stephanie Jackson, Christopher Armstead, and Dawn Williams.