

# Comments on the Prospectus for the City of Newport News Water Revenue Bonds, Series 2007

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## Overall Summary

After reviewing the Prospectus, I find that:

- Actual water demand for region is dropping and has been since the early 90's, while the prospectus water sales income is based on a compounded water demand increase at a rate of about 0.39% on an average annual basis.
- The rate of new connections should be closely related to population growth, which for the Newport News Waterworks Service Area, has been about 0.36% on a compounded basis since 1995. However, income from the new connection service fee is projected to grow by 1% annually.
- Together, the preceding cause the prospectus to significantly overestimate income from the rate and fee base.
- The Water System Capital Improvement Plan (CIP) ratio to projected income has increased significantly since the Prospectus was issued, and will increase more steeply if reservoir capital project receives final permits.

## Executive Summary

The Prospectus for the Series 2007 Water Revenue bonds relies on inaccurate and misleading assumptions of growth rates of 1% per year for the number of customer connections and 0.39% per year growth in water consumption. The prospectus is upbeat about the capital project to establish a new reservoir and downplays or ignores risks to the project.

A review of recent trends: population (1990 -2006); and water consumption by customers of Newport News Water Works (and in earlier years, Big Bethel Reservoir) for the period 1990 to 2006 raises some important questions about the Prospectus. The following errors and omissions, each of which impacts the financial feasibility of the Series 2007 Bond Issue, were noted:

1. Growth in water consumption was assumed in the Prospectus, even though the recent trend is for reduced water consumption. Future consumption is expected to decrease further due to new federal standards. Correcting this error leads to significantly lower projected revenue from water sales, impacting bond feasibility.
2. Projected growth in the number of connections (primarily residential connections) assumed in the Prospectus is not consistent with recent population growth trends and population projections. Correcting this error leads to significantly lower projected system development income, impacting bond feasibility.
3. The value of water volume sold at the start of the Prospectus water sales projection is higher

than that justified by the Prospectus assumptions by over 0.6 mgd, further artificially inflating the Prospectus' projected water sales revenue and further impacting bond feasibility. The prospectus assumption of 2007 water sales exceeded actual sales in that year by 1.7 mgd.

The Prospectus fails to disclose, or adequately discuss in one case, risks to its proposed capital improvement plans for a new reservoir in King William County, VA.

These risks have already (November, 2007) led to a \$20 million addition to the near term capital requirements the City faces with regard to the project. In November, 2007 the principal host for the project, King William County, refused to borrow the \$20 million required to purchase land for the reservoir, citing risks to final success of the project. On March 25, 2008 Newport News City Council approved an agreement under which Newport News would provide the money for the land acquisition. The City Council was scheduled to approve the issuance of \$20 million of water revenue bonds on June 24, 2008, but the item was withdrawn from the agenda, reportedly because of a communications issue with the bond purchaser involving the purpose of the bond issue.<sup>1</sup>

In order to quantify the revenue shortfalls that would accrue due to correction of the error in assuming growth of water consumption, etc., new projections were made for: 1) the population growth (rate adopted from a surrogate for the Newport News Waterworks Service area) between 1995 and 2006; and 2) of the water consumption at rates which assume existing federal standards for residential appliances. The historical data indicate that although population has been growing slowly, water consumption is dropping. Historical values and projections of population and water consumption, using correct trend data for these two critical factors, are shown in the exhibit below.

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1 Daily Press article entitled "City backs off from \$20M reservoir deal", by Sabine Hirschauer, June 25, 2008

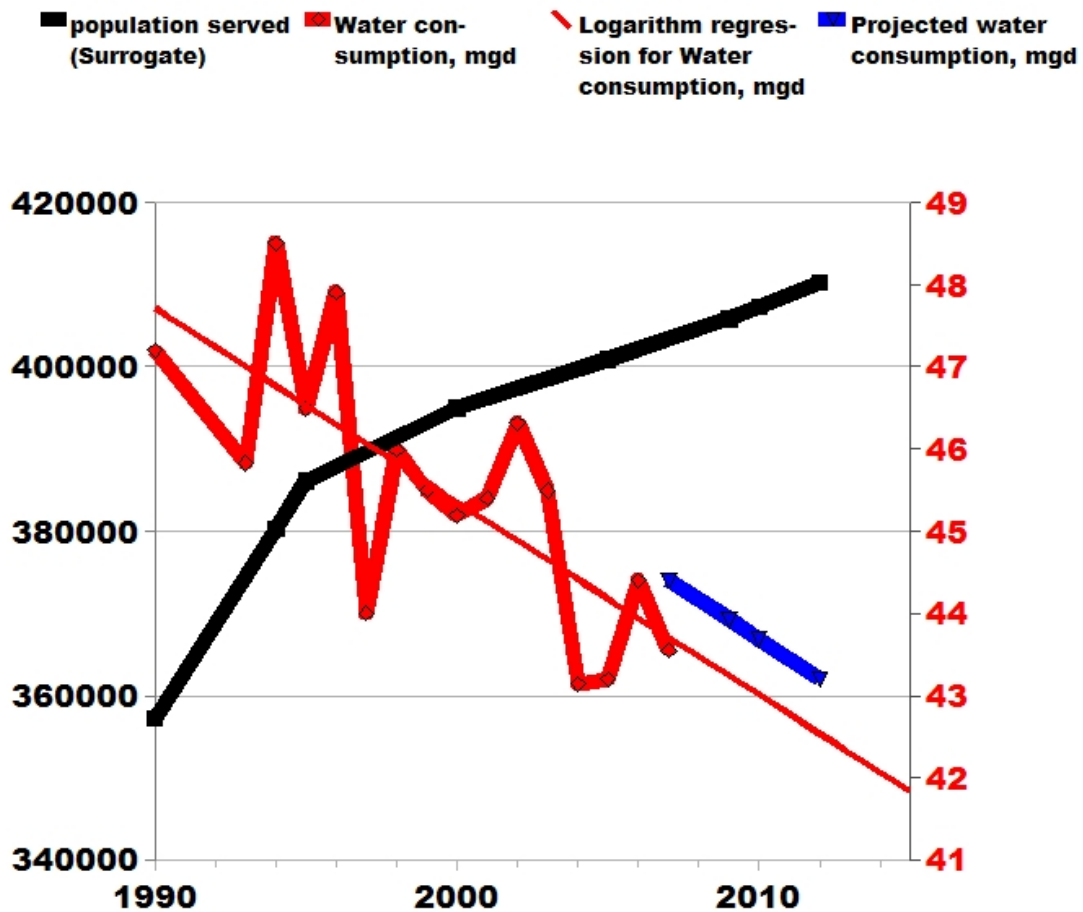


Exhibit 1. Population (black, left ordinate) and Water Consumption in millions of gallons per day (mgd) (red, right ordinate) in the Newport News Waterworks (NNWW) service area. The thin red line exhibits a regression of the water consumption data. The blue line represents the current projected water usage (right ordinate, mgd). 1990 and 2000 populations are from census data, populations for other years are taken from Weldon Cooper Center estimates. Water consumption prior to 2003 includes water from Big Bethel for customers currently served by NNWW. Water consumption data was taken from the Final Environmental Impact Statement for the proposed reservoir project, the Prospectus for the bond issue, NNWW rate studies, and Virginia Department of Health water distribution data. All data after 2007 is from the projections discussed in the text.

The rate of population growth in the NNWW service area slowed dramatically in the mid 90s and has remained about the same since that time. Reductions in water consumption were most dramatic in the mid 90s.<sup>2</sup> Although the projected water demand parallels the trend line for historical water consumption, it would be expected to decline more rapidly than the trend due to a new federal standard for efficient clothes washers, which became effective in 2007 and first impacts water consumption estimates in (FY) 2009. This failure to reflect an increased rate of decline in demand results from conservatism in the projection. The projected continuing decrease in water consumption is very different from the Prospectus projection of growth of water consumption. This continuing trend will

<sup>2</sup> The detailed shape of the water consumption curve is influenced by year-to-year variations in consumption. 1997 consumption was below average, while droughts occurred in the periods around FY 2004 and 2002, probably increasing consumption to above average values.

reduce projected operational revenue, relative to that projected in the Prospectus.

The growth rate of the number of connections (primarily residential connections) projected in the Prospectus is not consistent with data reported to the Virginia Department of Health from 1997 until 2007 (see discussion on page 7 below). In order to bring the income (system development fee income) from new connections into agreement with past ratios of the number of new connections to new residents, it is necessary to multiply the Prospectus values by 0.47. The impact of correcting income from water sales and system development fees is shown in exhibit 2.

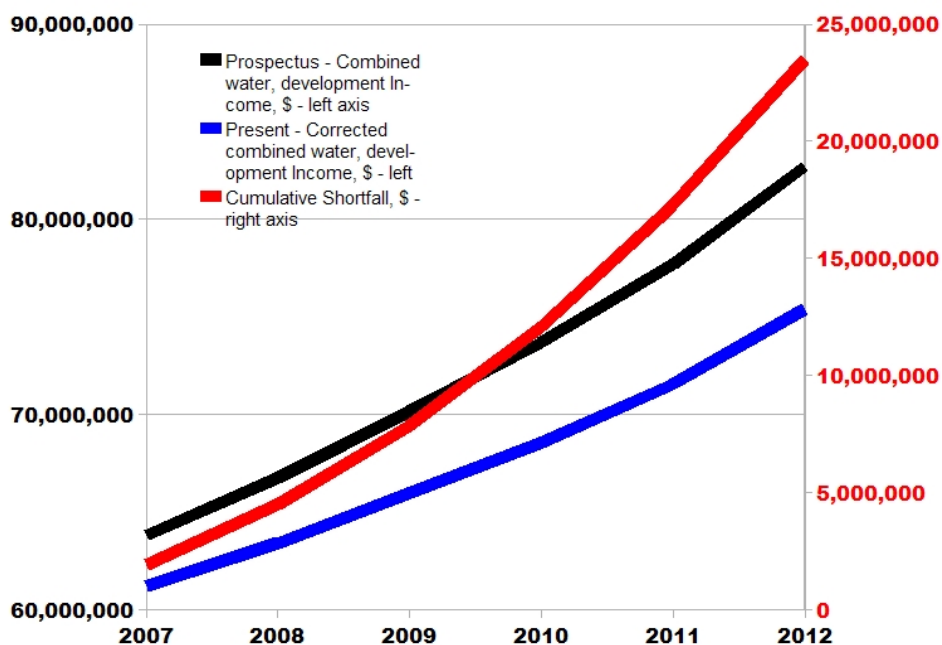


Exhibit 2. Combined income from water sales and system development fees from the Prospectus (black, left ordinate) and from the present corrected estimates (blue, left ordinate). The cumulative shortfall between Prospectus and corrected income projections is in red (right ordinate).

The shortfall predicted here for FY2007, the only year covered by the prospectus for which final data is available<sup>3</sup>, is \$1,903,360. The actual shortfall for FY 2007 for items included in the projection (volumetric water sales (including summer conservation rate charges) and system development fees) was \$2,150,780.

The cumulative income shortfall projected here, over the period of the Prospectus projection, is more than \$23 million. This compares to \$11.4 million of projected debt service for Series 2007 Water Revenue Bonds and \$19.7 million of projected debt service expenses for all water revenue bonds over the same period. If additional subordinate water revenue bonds are issued to provide the capital for land acquisition for the reservoir, the shortfall with respect to the debt service requirement would become greater.

## Introduction

<sup>3</sup> Actual FY 2007 water consumption and system development income obtained from Brian Ramaley, Director of NNWW, through Newport News Councilwoman McMillan.

The City of Newport News (The City) provides potable water for all of the Cities of Newport News, Hampton, and Poquoson, most of York County, as well as a smaller portion of James City County. In addition, it provides water to most major federal installations in the area as well as one major industrial customer (Busch Brewery) in James City County.

Newport News Waterworks (NNWW) has a series of reservoirs, a permit to withdraw water to supply the reservoirs from the shallow impoundment on the Chickahominy River, treatment plants at its two terminal reservoirs, and a brackish water reverse osmosis facility with a permit to withdraw mineralized water from the Potomac aquifers. The Water Works has Virginia Department of Health (VDH) permits for production of an average of 62.7 millions gallons per day (mgd) of water. In addition to these facilities and permits, Newport News has been actively pursuing the acquisition of a large reservoir in the Cohoke Mill Creek Valley in King William County Virginia with withdrawals from the Mattaponi River to fill the reservoir.

The City has received a conditional permit from the US Army Corps of Engineers (USACE) to proceed with the project after successfully fulfilling certain conditions, as well as permits from the Virginia Water Control Board (the City must apply for permit renewal in 2010 for the Water Control Board Permit before starting construction) and from the Virginia Marine Resources Board.

In order to help finance the project, Newport News has issued water revenue bonds. The remainder of these comments will examine representations made in the prospectus for the 2007 Series Water Revenue Bonds in light of recent population and water use trends in the NNWW service area.

**NNWW Large Customers**

As a part of its representations, the prospectus discusses NNWW's 10 largest customers for treated water. Large water users (in 1990) had also been discussed in the January, 1997 Final Environmental Impact Statement (FEIS) for the proposed reservoir project (FEIS Table 2 -7). Table 1 compares the information in the prospectus and the FEIS. The FEIS presented water consumption data in terms of millions of gallons per day (mgd), while the prospectus used hundreds of cubic feet per year. The prospectus data has been converted to mgd in Table 1.

Customer	1990 Consumption, mgd	2006 Consumption, mgd
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Anheuser Busch, Inc. (Brewery)	5.1	4.93
Giant, Inc. (Now Western, formerly Amoco then BP) (Refinery)	1.066	1.57
Northrop Grumman Newport News (Shipbuilding)	2.403	1.45
GRMO, Fort Eustis (US Army)	1.3 (Note 1)	1.29
Langley Air Force Base	1.234	0.63
Busch Gardens (Amusement Park)		0.59
Fort Monroe (US Army)	0.587	0.26 (Note 2)
Virginia Electric Power	0.566	0.53
Naval Weapons Station (US Navy)	0.657	0.48
Great Atlantic Management Corp. (Apartments)		0.47
Hampton University		0.37

**Table 1.** Newport News Water Works Service Area large customer water consumption in 1990 (FEIS Table 2-7) and 2006 (Prospectus). Note 1. Ft. Eustis 1990 consumption taken from Newport News federal consumption, Table 2-13 (by way of comparison, DEQ lists Ft. Eustis calendar 1989 consumption as 1.44 mgd). Note 2. Fort Monroe 2006 consumption was taken from Virginia Department of Health spreadsheet and has not been reduced to account for unaccounted for water, which is included in the VDH data.

The striking feature of Table 1 is that large users that appear in both columns, with the exception of the refinery at Yorktown, have decreased consumption since 1990. For Customers that appear in both the 1990 and 2006 columns, consumption decreased from 12.91 mgd in 1990 to 11.14 mgd in 2006.

There may, however, be a small artifact in the data with respect to the Busch Brewery which has significantly increased its production capacity since 1990. Although the FEIS Table included users with average consumption as low as 0.042 mgd, the Busch amusement park, which opened in 1976, was not in the FEIS Table. The amusement park has grown significantly and has acquired Water World, a water sports amusement park which has also grown significantly. It is possible that the two Busch accounts were lumped together in 1990, although Busch Gardens consumption would have been much smaller then. The Great Atlantic (apartments) and Hampton University entries in the prospectus list are probably due, in large part, to consolidation of a number of smaller accounts which existed in 1990.

Although the Prospectus mentions the fact that the Busch Brewery has undergone a major renovation which includes aspects of the facilities that could impact water consumption, it does not discuss the implications with respect to future water sales. A [virginiabusiness.com](http://virginiabusiness.com) (Feb 27, 2008) article mentions the fact that the renovations allowed employment to be reduced, but did not address input factors like water consumption, which are usually also reduced when efficiency is improved.

The absence of the Army's Ft. Eustis water use from the FEIS Table 2-7 is inexplicable since the installation existed with a large staff well before 1990. However, the federal water use shown for

Newport News in Table 2-13 of the FEIS is due to Ft. Eustis since there is no other large federal user located in Newport News. The water use at the Army's Fort Monroe was in the 1990 Table, but had dropped below the large user threshold in the prospectus. Fort Monroe is slated to be closed by 2011 as a result of the 2005 Base Realignment and Closure (BRAC) cycle. Part of Fort Monroe's current functions will be transferred to Ft. Eustis with the remainder going to Ft. Knox in Kentucky.

It should be noted that the FEIS list was of all Peninsula large customers, not just those served by Newport News Waterworks. Some military facilities, currently served by Newport News, were formerly supplied by water from the Army's Big Bethel reservoir and treatment plant, which was closed several years before the Prospectus was prepared.

Overall, Table 1 indicates that Newport News has a fairly stable list of large customers, but that many of those customers have been able to reduce their water consumption over time. This trend of decreasing water use by large customers is expected to continue.

### **Service Connections and Population**

The Prospectus projects future system development income on the basis of new connections. It lists the "active account" connections as *about* 126,000 (page 16) and uses the same value for 2007 in Exhibit 6 of Appendix A (Financial Feasibility Evaluation). The number of connections for NNWW is also reported to the Virginia Department of Health (VDH). The number of connections reported to the VDH was apparently not updated between January, 1990 when the VDH data indicates 101,290 connections and April, 1997 when the number jumped to 118,309. Thereafter, the number of connections was updated regularly. In June 2006, the number of connections was reported as 126,868, a value which increased to 127,883 in 2007.

The Prospectus Feasibility Evaluation indicates a customer growth rate of approximately 1% per year over the past 10 years but does not provide the data from which that growth rate was derived. The Feasibility Evaluation (Appendix A) uses the 1% growth rate to project future connection growth in Exhibit 6 and system development fee income in exhibit 10.

There are a number of curious elements in the Prospectus with regard to connections that are not addressed therein. The Prospectus' Financial Feasibility Evaluation is based on a starting population served of 405,000 and 126,000 connections. This leads to an overall ratio of 3.2 persons per connection. However, the Prospectus for the 2008 General Obligation water bonds (Series B) indicated on page A-5 that the population served was *nearly 400,000 and that the water system supplies over 125,500 accounts*. Published values for the population served and number of connections seem to be a bit fuzzy. Between 1997 and 2006 the Cooper Center population estimates for the NNWW surrogate population increased by 25,174 persons and VDH reported number of NNWW connections grew by 8,559. These values indicate that connections grew at the rate of one new connection for every 2.94 persons added to the population served. In the Prospectus, the number of connections is projected to grow by 6,427 between 2007 and 2012, but the population served growth rate discussed below would lead to a population growth from 406,458 to 413,827, a change of 8,827 persons. Thus, under the Prospectus, connections are projected to grow at a rate of 1 new connection for every 1.37 persons added to the population. No explanation of the anomalous projected growth rate of connections is apparent. The Prospectus indicates that new connections will be primarily residential connections and

that connections will grow at a rate of 1% per year. However, water consumption is projected to grow at a rate of only 0.39% per year. Although new homes use less water than homes constructed before 1997, water use in the newer homes is not lower than that of older homes by a factor of 2.5 (see water use discussion below).

The inaccurate projection of the number of new connections impacts the system development charge portions of the revenue required to pay for bond interest and redemptions. In order to bring the ratio of projected new connections to projected new population growth to the recent value of 2.94 persons per connection, it is necessary to multiply the Prospectus values for new connections by a factor of 0.47.

### **NNWW Service Area Population Growth Projection**

The Prospectus states that NNWW serves a population of 405,000 (page 16 and page A-4 of the Feasibility Evaluation) but does not project future growth of the population served. It does provide information on past population changes on the Peninsula as a whole (Table 3, page 19), but the Peninsula numbers are influenced by the rapid growth in the James City Service Authority service area. Since water use is often discussed in terms of population served, it is useful to examine this factor.

The NNWW service area includes the population of all of the cities of Newport News, Hampton, and Poquoson and most of the population of York County as well as a small portion of the population of James City County. Table 1 of the Prospectus (page 18) indicates that James City County accounts for 14% of its consumption, but most of that (11.1% of NNWW sales) is accounted for by a single customer, the Busch Brewery – not the population served. A reasonable surrogate for the population in the NNWW service area can be taken as the total populations of the cities above and all of the population of York County. The sum of those populations in July of 2006, taken from population estimates from the Weldon Cooper Center for Public Service at the University of Virginia<sup>4</sup>, was 401,474, or about 1% less than the population served value given in the 2007 Prospectus. However, the Prospectus for the 2008 Series A and Series B GO bonds (page A - 5) indicated that the population served is *nearly 400,000*, so the surrogate population may represent a slight overestimate of the current population served.

The surrogate for the population served probably overestimates the population served in early years because the percentage of York Counties total population which is served by NNWW has undoubtedly increased because most residential growth in the County has been in the NNWW service area. The FEIS (page 2-15) indicates that the percentage of York County population which is served by public water supply grew from 75% in 1983 to 80% in 1990.

The surrogate population from the same (Weldon Cooper Center) source for 1995 was 386,100. This corresponds to a population growth rate for the 11 year period between 1995 and 2006 of slightly less than 0.36% per year. This growth rate is very similar to that used in the Prospectus Feasibility Evaluation to project growth in water demand (0.39% for 2007 to 2011 and 0.38% for growth from 2011 to 2012).

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4 The Weldon Cooper Center produces the official Commonwealth of Virginia estimates of the populations of counties and independent cities on April 1 based on a regression analysis of data for the jurisdiction for the year in question. The methodology used is discussed on its web site. [HTTP://www.coopercenter.org/demographics/DEFINITIONS%20%26%20EXPLANATIONS/methodology.php](http://www.coopercenter.org/demographics/DEFINITIONS%20%26%20EXPLANATIONS/methodology.php)



Using the Prospectus value of 405,000 for the population served in 2006 and the recent growth rate of the population in the surrogate service area, results in a projected 2012 population served of 413,827.

For the longer term, it should be noted that both Hampton and Newport News' Comprehensive Plans indicate that they have essentially hit build-out and expect most future change to result from redevelopment. At the same time, growth in York County has slowed and is likely to be facing build out before the maturity dates of the latter bonds issued as a part of the 2007 series. These factors suggest that long term population growth rate in the NNWW service area will be smaller than the short term growth rate used in the present projection.

### **NNWW Future Water Consumption**

Before proceeding to discuss future changes in water consumption, it should be noted that a surprising discrepancy exists in the Prospectus' Financial Feasibility Evaluation. The Prospectus (page 16) states that FY 2006 average water consumption was 44.4 mgd and the Feasibility Evaluation (page A-14) is based on a 0.39% growth in billable consumption. However, Exhibit 8 of the Feasibility Evaluation starts off the projection with 22,057,958 hcf of water consumption billable at regular rates. When converted, this volume of water produces a starting consumption rate of 45.2 mgd. Without some explanation, the 2007 starting consumption would have been expected to have grown from the 2006 consumption to  $1.0039 \times 44.4 = 44.57$  mgd. This unexplained inflation of the starting consumption is important because it has an impact on the projected operating revenues and the financial feasibility of the bond issue. Future projected rate increases and compounding this anomalous amount by the assumed growth rate would further inflate subsequent years' projected incomes. The actual volume of water sold in FY 2007 was only 43.5 mgd.

The Prospectus provides values of 43.2 mgd and 44.4 mgd for the amount of finished water consumed in fiscal years 2005 and 2006. Year to year variations in demand are not very useful for understanding demand trends because they are dependent on short term variations in factors like the weather (because of a drought in early FY2006, lawn irrigation consumption would be expected to be larger than average for that year). Longer term trends in water use can be carried out utilizing water consumption data from the Prospectus, Table 2-14 of the Final Environmental Impact Statement (FEIS) for the reservoir project, data from the Virginia Department of Health, and data from NNWW rate studies.

One correction is required for NNWW customer water consumption. The Air Force's (formerly the Army's) Big Bethel Reservoir and treatment plant supplied some large federal installations which have been served by NNWW since this federal facility was shut down in 2003. The FEIS provided data on water consumed by Big Bethel customers in 1990 and on un-accounted for water (UAW) from Big Bethel for that year. VDH spreadsheets provide information on the total (consumed +UAW) water production by Big Bethel in other years. Table 2-14 of the FEIS indicates that 94% of the water produced by Big Bethel was consumed with the balance being UAW. A factor of 0.94 will be used to correct VDH data for Big Bethel. Table 2 exhibits water consumption from NNWW and Big Bethel.

	1990	1994	1996	1997	1999	2000	2001	2002	2005	2006	2007
NNWW, mgd	45.66	46.5	46.1	43.0	44.2	44.0	44.3	45.8	43.2	44.4	43.5
Big Bethel, mgd	1.54	1.97	0.38	1.03	1.33	1.19	1.14	0.51	0	0	0
Total, mgd	47.2	48.5	46.5	44.0	45.5	45.2	45.4	46.3	43.2	44.4	43.5

Table 2. Water consumption from Newport News Waterworks and Big Bethel. Consumption data for NNWW from Reservoir FEIS, NNWW Rate Studies, and the Prospectus. Big Bethel Consumption data is from the FEIS and VDH data with the latter corrected for estimated un-accounted for water. The Big Bethel supply was off line during parts of some of the years shown. Water was purchased from NNWW during the periods when Big Bethel was off-line.

The Table exhibits the surprising fact that although the surrogate population of the Newport News service area has grown by about 44,000 persons, or 12%, over the 16 year period from 1990 to 2006, water consumption has decreased in absolute terms. In addition to the population growth, there has been increases in tourism in the area, as typified by the water now used by Busch Gardens and its Water World USA subsidiary (listed in the large users table of the Prospectus). Most of the reduction in water consumption occurred in the mid 1990's. Year to year variations in water consumed because of weather, etc. influence the values given. NNWW water consumption in 1997 was lower than average and consumption in FY 2004, FY 1999 - 2002 and, to a lesser extent, 2006 was probably high because those were drought periods.

The decrease in water demand is in large part due to increased efficiency in the use of water by industry, commercial, and institutional concerns. Motels use more efficient laundry facilities and offer customers the possibility of skipping the change of bed linens every day, etc. The improvements made by existing concerns more than offset the (lower) consumption by new concerns.

Similarly, the new federal standards for ultra low flush toilets and low flow shower heads, which went into effect at the end of 1997 are already having an impact on residential, as well as commercial water consumption. A 1999 American Water Works Association Research Foundation (AWWARF) report on residential water use found that actual savings due this standard were 10.5 gallons per capita day (gpcd) for the ultra low flush toilets and 4.5 gpcd for low flow shower heads. Toilets are assumed to have an average replacement life of 50 years. Using a more conservative 1.75% per year for the initial replacement rate leads to an estimate that between the ends of 1997 and 2006, 15.75% of the pre 1997 toilets would have been replaced. If the (very conservative) assumption that shower heads were replaced at the same rate, water appliance replacement in homes serving people living in pre-1997 homes would have generated an estimated 0.93 mgd water saving by the end of 2006. The (future) replacement of the remaining pre-1997 toilets and shower heads will result in an estimate of 3.49 mgd of additional water savings to be realized in the future.

The USACE's Institute for Water Resources (IWR) Final (revised) report "An Evaluation of the Risk of Water Shortages in the Lower Peninsula, Virginia" August 15, 2001 used 65.3 gpcd for the total residential water use per day in 1999 - 2000. Reducing the indoor use by 15 gallons per day would

result in a 50.3 gpcd total water demand for new residences. Thus, the 1997 standards have led to water savings that offset the increased residential demand due to almost 19,000, or 42% of the 44,000 population gain realized since 1990.

There have been other factors contributing to the reduced demand. No account has been taken of the fact that the 1997 federal standard also covered sink faucets, but they are undoubtedly also contributing to reduced demand. The IWR value for total residential water demand per day was based on the mixture of low density single family residences and higher density housing types typical of the Peninsula in 1999. As the cities in the NNWW service area have approached build-out, they have begun switching to more mixed use and higher density housing for new growth, leading to lower per capita residential water demand, primarily because of decreased outdoor water use. In addition, the fraction of single family housing which is less than 5 years of age has decreased in the NNWW service area. New houses have new lawns which require significant irrigation until the lawns become well established. As the residential developments age, the outdoor residential demand decreases. These demand reducing factors would require analysis beyond the scope of these comments in order to quantify their impact, but there is little doubt that they are contributing.

The water savings in the industrial, commercial, and institutional sectors have more than offset the growth in demand in those sectors and the remainder of the residential demand growth. This trend of decreasing demand is not new. In 1999 Mike Siegel of Public and Environmental Financial Associates reported that comparison of information in the NNWW Water Rate Study for FY 2000 and that in the FEIS indicated that combined NNWW industrial, commercial, and institutional demand had decreased by about 1.3 mgd over the 9 year period, federal demand had fallen by about 0.7 mgd, and residential demand had increased by only 0.3 mgd. Overall demand decreased by 3.6% in spite of significant increases in population and commercial and institutional employment during the period.<sup>5</sup>

It is not possible to estimate the amount of water demand reduction which may occur in the future due to increased efficiency in the industrial, commercial, and institutional sectors, but only to note that the trend of reduced water consumption for existing customers is likely to continue. The fact that the cost of water from NNWW has increased, and is projected to continue to increase, faster than the rate of inflation provides a strong incentive for that sector to continue to invest in water use efficiencies. Also, residential consumption is not immune from “price elasticity” of demand.

As noted above, considerable additional demand reductions are expected to accrue due to the 1997 toilet and shower head standards and the replacement of those appliances in pre-1997 housing. Continuing to use the 1.75% per year replacement rate for pre-existing residences, the water savings in the near term due to the standards would increase by 94,500 gallons per day (gpd) each year. Based on the extension of the recent past population growth into the future,  $.0036 * 405,000 = 1458$  persons would be expected to be added to the population served by NNWW between 2007 and 2008. At 50.3 gpcd, this population gain would increase residential water demand by 73,337 gpd, or approximately 20,000 gpd less than the offset provided by ongoing replacement of pre-1997 toilets and shower heads.

A new factor which will further reduce residential demand in the future is the 2007 standard (10CFR 430 rule) requiring more water efficient clothes washers. The Department of Energy Federal Register (Volume 65, number 194, page 59552) discussion of the proposed rule included an estimate that, on

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5 Mike Siegel comments to the Norfolk District of the US Army Corps of Engineers, August 13, 1999.

average, the new washers would reduce water consumption for washing clothes by 18 gallons per load. The 1999 AWWARF report mentioned above provides data on clothes washing water use that allows the savings per capita per day to be estimated to be about 8 gallons, or slightly more than half of the combined toilet and shower head savings. Since washing machines are estimated to have a replacement life of 14 years, about 7% of pre-2007 washers would be expected to be replaced each year. Based on a 2007 population served of about 405,000, the replacement of old washers would lead to an additional estimated decrease of residential water use of about 231,400 gpd each year. It would also lead to a reduction of the total residential demand to 42.3 gpcd for population added after 2007.

With the information provided above in hand, it is possible to make a conservative estimate of water consumption in the NNWW service area through the Prospectus projection period. Industrial and federal water consumption will be assumed to remain constant. In order to get an approximate per capita water use value without heavy industry and federal consumption but including commercial, institutional and light industry (CIL) demand, the 11.73 mgd used by large users (excluding Hampton University and Apartment users) in 2006 (Table 1) was subtracted from the 2006 average demand and the result was divided by the 2006 population served. The value obtained, 79.68 gpcd is significantly higher than a value of 71 gpcd for Newport News published by the Hampton Roads Sanitation District (HRSD) in 2003. HRSD stated that “Recent data indicates a decreasing potable water consumption in most local jurisdictions ranging from approximately 53 gpcd in Virginia Beach to 71 gpcd in Newport News.”<sup>6</sup> In order to remain consistent, the larger value obtained by the present estimate of residential and CIL per capita daily use for the NNWW service area will be used in the water consumption projections below.

Only the residential water reduction factors which have been quantified will be taken into account. Other factors which should reduce residential demand, but which have not been quantified will also be ignored. The projected changes in residential water consumption are contained in Table 3.

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6 HRSD Development Plan 2000, Locality Version, May 2003, page 7.

Year	2006	2007	2008	2009	2010	2011	2012
Total Population Served	405,000	406,458	407,921	409,390	410,864	412,343	413,828
Population Growth, persons		1,458	1,463	1,469	1,474	1,479	1,485
New Resident and CIL Consumption Rate, gpcd		64.68	64.68	56.68	56.68	56.68	56.68
Residential and CIL Consumption Increase Due to Population Increase, gpd		94,303	94,627	83,263	83,546	83,830	84,170
New Residential Consumption Offset Due to pre-1997 Toilet and Shower Head Replacement, gpd		-94,500	-94,500	-94,500	-94,500	-94,500	-94,500
New Residential Consumption Offset Due to pre-2007 Washing Machine Replacement, gpd			-231,400	-231,400	-231,400	-231,400	-231,400
Total Change in Residential Water Consumption, gpd		-197	-231,273	-242,637	-242,354	-242,070	-241,730
Total Consumption, mgd	44.40	44.40	44.17	43.93	43.68	43.44	43.20

Table 3. Projected changes in NNWW total water consumption based on extending the recent population growth rate and the effects of federal water saving standards. The projection is based on NNWW consumption in 2006. The new resident and CIL consumption rate starts with the gallons per capita per day (gpcd) value of 79.68 gpcd obtained as described in the text and deducts 15 gpcd for 1997 federal standards and deducts an additional 8 gpcd after 2008 for demand reductions due to the 2007 federal washing machine standard. Note that actual water volume sold by NNWW in FY2007 was 43.55 mgd, about 0.9 mgd less than the value used in this projection.

The results, in Table 3, indicate that, in spite of continuing population growth, NNWW billable water consumption may decrease by about 1 mgd by 2012 based on residential water savings due to federal standards. Other, unquantified trends in residential water use and recent trends in industrial, commercial, and institutional consumption may lead to additional reductions in future water consumption. The impact of reduced, rather than increased, water consumption on the financial feasibility of the bonds will be examined in the next section.

### **Financial Feasibility of the 2007 Series Water Revenue Bonds**

With the estimates above and rate information derived from the prospectus, the performance of the volumetric charges portion of the NNWW revenue budget can be assessed.

In the following, the Prospectus ratios for partitioning total demand into lifeline, regular, and summer conservation rates will be utilized along with the rate structure from the Prospectus, Appendix A,

Exhibit 15. Total consumption was from Table 3 above, with conversion of values from mgd to hcf.

Year	2007	2008	2009	2010	2011	2012
Total Estimated Consumption, hcf	21,665,679	21,552,826	21,434,426	21,316,166	21,198,043	21,080,087
Lifeline Consumption, hcf		3,801,918	3,781,033	3,760,172	3,739,335	3,718,527
Regular Consumption, hcf	21,665,679	17,750,907	17,653,394	17,555,994	17,458,708	17,361,559
Excess Summer Consumption, hcf	1,737,587	1,728,537	1,719,041	1,709,556	1,700,083	1,690,623
Lifeline rate, \$/hcf		2.78	2.78	2.90	3.04	3.22
Lifeline income, \$		10,569,333	10,511,271	10,904,498	11,367,578	11,973,658
Regular rate, \$/hcf	2.78	2.92	3.08	3.22	3.38	3.58
Regular Income, \$	60,230,589	51,832,649	54,372,452	56,530,301	59,010,434	62,154,382
Summer Rate, \$/hcf	0.56	0.59	0.63	0.66	0.70	0.75
Summer Income, \$	973,049	1,019,837	1,082,996	1,128,307	1,190,058	1,267,967
Projected Total Volumetric Sales Income, \$	61,203,638	63,421,819	65,966,720	68,563,106	71,568,070	75,396,007
Prospectus Projected Total Volumetric Sales Income, \$	62,311,998	65,161,622	68,416,540	71,782,726	75,640,181	80,436,320
Cumulative Shortfall, \$	-1,108,360	-2,848,163	-5,297,984	-8,517,604	-12,589,715	-17,630,027

Table 4. Effects of decreasing projected residential water consumption and corrected projection starting point on Newport News Waterworks', projected operating income. Water consumption is taken from Table 3 and converted from mgd to hcf (per year).

The results displayed in Table 4 indicate that the quantified reductions expected for residential per capita water consumption lead to a shortfall of almost \$18 million over the period for which the Prospectus projected income. Other, unquantified trends leading to reduced water consumption may be expected to cause additional income shortfalls.

The other major revenue issue is the question of the system development fees in the non-operating portion of the projected revenue contained in Prospectus Exhibit 10 of Appendix A. The projected system development fees are derived from projected new connections and an anticipated growth in the fee per connection at a rate of 8% per year. The discussion of projected new connections above indicates that the Prospectus values would have to be multiplied by a factor of 0.47 to bring the ratio of new connections to added population down to about the value experienced over the past 10 years. Table 5 presents a comparison of the system development income in Exhibit 10 of the Prospectus

Appendix A and that which would be obtained using the 0.47 correction factor.

Year	2007	2008	2009	2010	2011	2012
Prospectus System Development Income, \$	1,500,000	1,600,000	1,744,000	1,900,960	2,072,046	2,258,531
0.47 times the above, \$	705,000	752,000	819,680	893,451	973,862	1,061,510
Cumulative Shortfall, \$	-795,000	-1,643,000	-2,567,320	-3,574,829	-4,673,013	-5,870,034

Table 5. Comparison of Prospectus and adjusted income from system development fees.

The combination of the income shortfall exhibited in Table 5 and that from Table 4 is over \$23 million. This compares to projected debt service of \$11,377,668 on the series 2007 bonds and a total debt service of \$19,696,301 on all revenue bonds (Prospectus Appendix A, Exhibit 13) over the period covered by the Prospectus. Note that the combined shortfalls from Tables 4 and 5 for FY 2007 is \$1,903,360. In FY2007, the only year covered by the prospectus for which final data is available, Newport News' actually experienced an income shortfall for regular water sales and system development fees of \$2,150,780 relative to the prospectus projection for the items covered in Tables 4 and 5. A larger percentage (9.7%) of the 43.5 mgd 2007 total water sales were subject to the summer conservation surcharge than the value used in the prospectus projection (8%), so the total shortfall for projected water sales and connection fees is reduced to \$1,973,374. That the total 2007 water sales would have been even lower if summer outdoor use hadn't been higher than normal reinforces the fact that indoor use is continuing to fall.

It should be noted that the present analysis is conservative because it does not take into account other trends and factors which may result in further reductions in water consumption in the NNWW service area. Any such further reductions in water consumption due to those trends would increase the revenue shortfalls relative to the Prospectus projections.

### Additional Risks

The Prospectus fails to disclose, or adequately disclose in one case, risks to its proposed capital improvement plans for a new reservoir in King William County, VA.

This risk has already (November, 2007) led to a \$20 million addition to the near term capital requirements the City faces with regard to the project. In 2007 the principal host for the project, King William County, refused to borrow that amount to purchase land for the reservoir, citing risks to final success of the project. On March 25, 2008 Newport News City Council approved an agreement under which Newport News would provide the money for the land acquisition.<sup>7</sup>

The Prospectus CIP budget for the water system was 257% of the projected water revenue for FY 2007. Since actual water system revenue from water sales and system development fees experienced a shortfall of over \$2 million in FY2007, the debt burden is higher than apparent from the Prospectus. The Public Utilities (Water Works) FY 2009 CIP plan (from City web page) calls for expending \$269,280,000 through 2013. This is 324% of the water revenue *projected* for FY 2009 in the

<sup>7</sup> Daily Press (dailypress.com) article by Sabine Herschauer, February 26, 2008.

Prospectus.

Further steep increases in Capital Improvements costs can be expected if the reservoir project does receive final permits. The most recent estimate of the cost of the reservoir, which is currently scheduled to be constructed between 2012 and the end of 2018, is \$289 million.

This water system debt burden occurs against a background of a City struggling with what Moody's characterizes as an "above average" debt burden. The City is also struggling with an accrued shortfall in its contributions to pension and post retirement health and welfare funds for employees. In FY 2008, the City's budgeted contributions to the pension funds were \$22.8 million short of the actuarially required contribution, adding to a \$211 unfunded liability at the beginning of that fiscal year. In addition, the FY 2009 budget position paper indicates that the post retirement health benefits fund for city and school employees was \$349 million short when the fund's status was last reevaluated. The total unfunded "moral obligation" is over \$580 million.

## **Conclusion**

The financial feasibility statement contained in the Prospectus for the Series 2007 Water Revenue Bonds was based on assumptions of sales of increasing volumes of water and unrealistic income from new customer connections. Correcting the projected income from sales of water and system development fees for new connections leads to a projected shortfall in income of almost \$24 million, relative to that projected in the Prospectus.

The ratio of the water system capital improvement budget to projected water system income is growing rapidly beyond that discussed in the Prospectus and is expected to continue rapid growth if the proposed reservoir project receives final permits.

The financial feasibility of the 2007 Series Water Revenue Bonds is thus overestimated in the Prospectus for the bonds. The largest areas of flexibility in the Prospectus Budget are the Return on Equity payments to Newport News and the Cash Funded Capital expenditures. Taking shortfalls out of the former would encumber the City's ability to meet other obligations, while reducing Cash Funded Capital would increase the long term debt burden on the Water System and/or the City.

Other measures, such as limiting maintenance and operations expenditures could result in greater long term costs. For example, determining the need for maintenance on Walkers Dam by inspection and testing probably would have resulted in considerable savings to NNWW over the \$14 to \$16M estimated cost of repairs following the catastrophic failure of the dam in 2007. Fortunately, Walkers Dam isn't very high – such a failure of one of NNWW's larger dams would have been much more expensive.

## **About the Author**

Dr. Donald H. Phillips is a physicist who has applied his talents to a wide range of issues. He has taken an active interest in water supply and demand issues on the Virginia Lower Peninsula for some time. He has participated in discussions of these matters in meetings with the US Army's Corps of Engineers (USACE), Norfolk District and the USACE's Institute for Water Resources in Alexandria, VA. He is on record as opposing the NNWW's King William Reservoir project.